

Stroke - References

Web Links

The Brain Attack Coalition Guidelines and Pathways

<http://www.stroke-site.org/guidelines/guidelines.html>

<http://www.stroke-site.org/pathways/pathways.html>

Internet Stroke Center "The Internet Stroke Center is a non-profit, educational service of the Stroke Center at Barnes-Jewish Hospital, Washington University Medical Center and the Cerebrovascular Diseases Section of the Department of Neurology at Washington University School of Medicine in St. Louis.

The Internet Stroke Center exists to advance understanding of stroke research and clinical care. Our goal is to provide current, professional, un-biased information about stroke. The information on this site is obtained from published accounts, meeting presentations, internet searches, and direct correspondence."

<http://www.strokecenter.org/prof/>

Life after Stroke: New Zealand Guideline for Management of Stroke December 2003

http://www.nzgg.org.nz/guidelines/dsp_guideline_popup.cfm?&guidelineID=37

Management of Patients with Stroke: Rehabilitation and Management of Complications, and Discharge Planning SIGN Guideline #64 Scottish Intercollegiate Guideline Network

<http://www.sign.ac.uk/guidelines/fulltext/64/>

National Clinical Guidelines for Stroke (UK) Royal College of Physicians 2004

<http://www.rcplondon.ac.uk/pubs/books/stroke/>

NHS Modernisation Agency Good Care Planning for People with Long-Term Conditions: Updated Version

September 2005 "This report, commissioned by the NHS Modernisation Agency to support implementation of the National Service Framework (NSF) for People with Long-Term Conditions, is the outcome of a project which aimed to provide guidance and tools "to assist local health and social care service providers to implement evidence-based, person-centred care planning". Although the NSF focuses on neurological conditions, the guidance is intended to be more widely applicable. The report considers the benefits of, and barriers to, evidence-based, person-centred care planning". Although the NSF focuses on neurological conditions, the guidance is intended to be more widely applicable. The report considers the benefits of, and barriers to, implementation of good care planning, and identifies critical success factors. It includes case studies and a self-assessment toolkit."

http://www.networks.nhs.uk/uploads/2005_Oct/CarePlanningReportSep05.pdf



NHS Modernisation Agency Neurology Website "This site replaces the Action On Neurology website and provides information about the outcomes from the Action On Neurology programme, summarised in the report Improving Neurology Services - a practical guide.

Delivering well co-ordinated patient centred neurology services is challenging as people with neurological conditions often have complex needs requiring a range of services and support from different professionals and agencies.

The National Service Framework for Long Term Conditions (NSF) published in March 2005 describes a set of core principles in the form of Evidence Based Quality Requirements, which are designed to address the needs of people living with long term neurological conditions.

The Action On Neurology report links the outcomes and lessons learnt by the pilot sites to the relevant NSF Quality Requirements to support the implementation of the NSF and gives ideas about how to go about redesigning services. Many examples of good practice can also be found in the NSF Good Practice Guide.

See the Neurology Collaboration area to find out more about the Action On Neurology pilot sites and some of the tools they have developed to improve their services."

<http://www.wise.nhs.uk/cmsWISE/Clinical+Themes/neurology/services.htm>

Reducing Brain Damage: Faster Access to Better Stroke Care UK National Audit Office November 2005
"Sir John Bourn, head of the National Audit Office, reported today that the priority afforded to stroke care by the Department of Health and the wider health service can be increased, given its impact and cost. Sir John's report shows that notable progress has been made from a low starting point. It recommends further improvements in preventing, treating and managing stroke patients, in line with recent evidence. These improvements would reduce the number of deaths, improve recovery rates, increase NHS efficiency and lead to significant financial savings.

Stroke costs about £7 billion a year. The direct cost to the NHS is about £2.8 billion a year - more than the cost of treating coronary heart disease - and annual costs to the wider economy associated with lost productivity, disability and informal care are around £4.2 billion. Stroke is one of the top three causes of death in England and a leading cause of adult disability. Approximately 110,000 strokes and a further 20,000 Transient Ischaemic Attacks ('mini strokes') occur in England every year. There are at least 300,000 people in England living with moderate to severe disabilities as a result of stroke.

The report's conclusions and recommendations target areas needing attention and action."

<http://www.nao.org.uk/pn/05-06/0506452.htm>

Veterans Affairs (US) Stroke Queri Center "The Department of Veterans Affairs Quality Enhancement Research Initiative (QUERI), is designed to translate research discoveries and innovations into better patient care and systems improvements. QUERI focuses on eight high-risk and/or highly prevalent diseases or conditions among veterans: Chronic Heart Failure, Colorectal Cancer, Diabetes, HIV/AIDS, Ischemic Heart Disease, Mental Health, Spinal Cord Injury, Stroke, and Substance Abuse.

In 1998, VA's Health Services Research and Development Service (HSR&D) launched the VA Quality Enhancement Research Initiative (QUERI). The QUERI mission is to enhance the quality and outcomes of VA health care by systematically implementing clinical research findings and evidence-based recommendations into routine clinical practice. In evaluating quality of care, the QUERI process focuses on three elements:

- structure (provider and organizational characteristics),
- process (providers' clinical actions toward patients), and
- outcome (health status, economic impact, satisfaction."

<http://www1.va.gov/stroke-queri/>

Victoria. Department of Human Services Home-Based Rehabilitation Evaluation

<http://www.health.vic.gov.au/subacute/h-b-r-e.htm>

Victoria. Department of Human Services Sub-acute Ambulatory Care Services Framework

<http://www.health.vic.gov.au/subacute/sacs/index.htm>

Guidelines Published in Stroke

Guidelines for the Early Management of Patients With Ischemic Stroke: 2005 Guidelines Update A Scientific Statement From the Stroke Council of the American Heart Association/American Stroke Association

Stroke, Apr 2005; 36: 916 - 923.

http://stroke.ahajournals.org/cgi/content/full/36/4/916?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=guidelines&searchid=1135245340234_228&FIRSTINDEX=10&search_url=http%3A%2F%2Fstroke.ahajournals.org%2Fcgi%2Fsearch&journalcode=strokeaha

Management of Adult Stroke Rehabilitation Care: A Clinical Practice Guideline

Stroke, Sep 2005; 36: e100 - e143.

http://stroke.ahajournals.org/cgi/reprint/36/9/e100?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=guidelines&searchid=1135244973592_209&FIRSTINDEX=0&search_url=http%3A%2F%2Fstroke.ahajournals.org%2Fcgi%2Fsearch&journalcode=strokeaha

Recommendations for Comprehensive Stroke Centers: A Consensus Statement From the Brain Attack Coalition

Stroke, Jul 2005; 36: 1597 - 1616.

http://stroke.ahajournals.org/cgi/reprint/36/7/1597?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=guidelines&searchid=1135245340234_228&FIRSTINDEX=10&search_url=http%3A%2F%2Fstroke.ahajournals.org%2Fcgi%2Fsearch&journalcode=strokeaha

Recommendations for the Establishment of Stroke Systems of Care: Recommendations From the American Stroke Association's Task Force on the Development of Stroke Systems

Stroke, Mar 2005; 36: 690 - 703.

http://stroke.ahajournals.org/cgi/reprint/36/3/690?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=guidelines&searchid=1135244973592_209&FIRSTINDEX=0&search_url=http%3A%2F%2Fstroke.ahajournals.org%2Fcgi%2Fsearch&journalcode=strokeaha

Veterans Affairs/Department of Defense Clinical Practice Guideline for the Management of Adult Stroke Rehabilitation Care: Executive Summary

Stroke, Sep 2005; 36: 2049 - 2056.

http://stroke.ahajournals.org/cgi/reprint/36/9/2049?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=guidelines&searchid=1135244973592_209&FIRSTINDEX=0&search_url=http%3A%2F%2Fstroke.ahajournals.org%2Fcgi%2Fsearch&journalcode=strokeaha

Journal References

The journal references listed were searched in the PubMed database on 21st December 2005 using the search strategy shown below. This was supplemented by a textword search for articles not yet indexed.

("hospital restructuring"[MeSH Terms] OR "efficiency, organizational"[MeSH Terms] OR "process assessment (health care)"[MeSH Terms] OR "delivery of health care, integrated"[MeSH Terms] OR "patient-centered care"[MeSH Terms] OR "efficiency"[MeSH Terms] OR "disease management"[MeSH Terms] OR "health care reform"[MeSH Terms] OR "models, organizational"[MeSH Terms] OR "ambulatory care"[MeSH Terms] OR "office nursing"[MeSH Terms] OR "ambulatory care facilities"[MeSH Terms] OR "ambulatory surgical procedures"[MeSH Terms] OR "ambulatory surgical procedures"[MeSH Terms] OR "benchmarking"[MeSH Terms] OR "surgicenters"[MeSH Terms] OR "manpower"[Subheading] OR "organization and administration"[sh] OR "utilization review"[MeSH Terms] OR "planning techniques"[MeSH Terms] OR "workload"[MeSH Terms] OR "home care services, hospital-based"[MeSH Terms]) AND "cerebrovascular accident"[MeSH Major Topic] AND English[Lang] AND "humans"[MeSH Terms] AND ("2005"[PDAT] : "3000"[PDAT])

The search may be repeated by clicking on the link below. This will run the search strategy shown above and limit it to all references in English from 2005 onwards.

[Search now.](#)

Check journal availability (online and print) at your Library's intranet site. Some of the articles may also be available via the CIAO interface. [Clinical Information Access Online] <http://www.ciao.health.wa.gov.au> Articles not available locally may be obtained through the inter-library document supply system.

Acad Emerg Med. 2004; 11(1): 116-8; author reply 118.

Society for Academic Emergency Medicine (SAEM) Neurologic Emergencies Interest Group response to the SAEM Board position on optimizing care of the stroke patient.

Jauch E.

Publication Types: Comment Letter

PMID:14709442

Acta Neurol Belg. 2005; 105(2): 57-61.

Antihypertensive and lipid lowering treatment in stroke prevention: current state and future.

Piechowski-Jozwiak B, Bogousslavsky J.

Department of Neurology, CHUV, Lausanne, Switzerland. bpiechow@amwaw.edu.pl

Diabetes mellitus, arterial hypertension, smoking are major stroke risk factors. The role of hypercholesterolemia in stroke has not been established yet. In patients with type 2 diabetes mellitus there is evidence that intensive glucose lowering therapy diminishes the risk of microvascular complications. In all patients with stroke or transient ischemic attack (TIA), blood pressure should be lowered irrespectively of the baseline level with either diuretics, angiotensin converting enzyme (ACE) inhibitors, beta-blockers, or calcium antagonists. The role of angiotensin II (AT2) receptor blockers has not been established so far. In general terms a global approach to management of patients with vascular risk factors should be developed. An extended follow-up of randomised trials on preventive therapy should be completed. Controlled trials comparing angiotensin receptor blockers with ACE inhibitors should be started. Further research may focus on the new lipid lowering agents, and on the comparison of single lipid lowering agent vs. combinations in stroke prevention. These efforts should help in finding the best vasoprotective strategy in stroke prevention.

Publication Types: Journal Article Review

PMID:16076057

Age Ageing. 2004; 33(6): 618-24.

Older stroke patients in Europe: stroke care and determinants of outcome.

Bhalla A, Grieve R, et al.

Department of Public Health Sciences, GKT School of Medicine, London, UK. abhalla@sthelier.sghms.ac.uk

BACKGROUND: in order to implement cost-effective stroke services for older patients, it is necessary to identify how stroke care is currently provided for these patients and how provision relates to outcome. **OBJECTIVES:** to estimate the structure and process of care, and identify independent factors associated with 3 month mortality and functional outcome in patients aged over 75 years compared with younger stroke patients across Europe. **SETTING:** 13 hospitals in 10 European countries. **SUBJECTS AND METHODS:** 1,847 subjects with first in a lifetime stroke admitted to hospital. Sociodemographic details, acute case severity, resource use and 3-month survival and dependency were collected. **RESULTS:** from a total of 1,847 patients, 1,112 patients (60%) were under 75 years. Older stroke patients were more likely to be incontinent, dysphasic, dysphagic and comatose ($P < 0.001$). Computed tomography scan rates were higher in younger (87%) than in older patients (79%) ($P < 0.001$). Access to organised stroke care was higher in older (58%) than in younger patients (51%) ($P = 0.002$). Median acute length of stay was longer in younger (14 days, range 7-21 days) than in older patients (11 days, range 8-22 days) ($P = 0.04$). Nursing time in hospital was higher in older patients ($P = 0.01$), whilst therapy time was higher in younger patients ($P = 0.03$). By 3 months, younger patients were more likely to receive outpatient care ($P < 0.001$), physiotherapy ($P < 0.001$) and occupational therapy ($P < 0.001$). For older stroke patients, not having a computed tomography scan (OR = 0.2, 95% confidence intervals (CI) = 0.01-0.6, $P = 0.003$) was significantly related to mortality at 3 months after adjusting for case mix. Access to organised stroke care

was significantly associated with reduced 3-month mortality in younger patients only (OR = 0.29, 95% CI = 0.14-0.6, P < 0.001). **CONCLUSION:** stroke care varies considerably across European centres, with older people more likely to gain access to organised stroke care in many centres but less likely to receive diagnostic investigations, therapy input and outpatient review. Where there is evidence of age discrimination for access to stroke services, guidelines need to be adopted to ensure patients of all ages receive optimal evidence-based stroke care at all stages of their illness.

Publication Types: Journal Article Multicenter Study
PMID:15501838

Age Ageing. 2004; 33(4): 362-7.

Effects of introducing an integrated care pathway in an acute stroke unit.

Kwan J, Hand P, et al.

Western General Hospital, University of Edinburgh, Crewe Road, Edinburgh EH4 2XU, UK. jk@1to1.org

BACKGROUND AND PURPOSE: integrated care pathways are often implemented to guide acute stroke therapy and improve organisation of care, but there is not sufficient evidence to support their routine use. We sought to evaluate the effects of introducing an integrated care pathway for acute stroke. **METHODS:** we performed a before-and-after study. The 'before' (control) group comprised 154 consecutive stroke patients admitted to the acute stroke unit over a 9-month period. The 'after' (intervention) group comprised 197 consecutive patients admitted to the same unit over a 9-month period in the year after the introduction of the integrated care pathway. Effectiveness was assessed with a variety of measures: quality of documentation; process of care; occurrence of complications; death and discharge destination. Results were adjusted for case mix using a validated model. **RESULTS:** the baseline characteristics of the two groups were similar, although there were more total anterior circulation strokes (29% versus 18%, P = 0.005) and fewer partial anterior circulation strokes (30% versus 42% P = 0.04) in the intervention group. In the intervention group, we found that urinary tract infections were significantly less frequent (OR 0.37, CI 0.15-10.91) and the quality of several aspects of care (e.g. CT scanning < 48 hours) and documentation were significantly better. However, there were no significant differences in deaths, discharge destination, or length of stay between the two groups. **CONCLUSION:** this before-and-after study has provided further evidence that introducing an integrated care pathway for acute stroke may improve the quality of documentation and process of care, and reduce the risk of certain post-stroke complications.

Publication Types: Journal Article
PMID:15047573

Age Ageing. 2004; 33(2): 116-21.

A systematic review of barriers to delivery of thrombolysis for acute stroke.

Kwan J, Hand P, et al.

University Department of Geriatric Medicine, Level E (MP807), Southampton General Hospital, Tremona Road, Southampton SO16 6YD, UK.

BACKGROUND AND PURPOSE: Barriers within the patient pathway can prevent early administration of thrombolytic therapy in patients admitted with acute stroke. This systematic review aimed to identify such barriers that have been reported in the medical literature. **METHODS:** We searched MEDLINE and EMBASE for prospective and retrospective observational studies that assessed the nature of barriers to delivery of thrombolysis for acute stroke. **RESULTS:** We identified 54 eligible studies (including a total of 39030 patients). The reported barriers included: (i). the patient or family did not recognise symptoms of stroke or seek urgent help, (ii). the general practitioner (rather than an ambulance) was called first, (iii). the paramedics and emergency department staff triaged stroke as non-urgent, (iv). delays in neuroimaging, (v). inefficient process of in-hospital emergency stroke care, (vi). difficulties in obtaining consent for thrombolysis, and (vii). physicians' uncertainty about administering thrombolysis. **CONCLUSIONS:** We identified important pre-hospital and in-hospital barriers that should be overcome if thrombolysis is to be administered to stroke patients efficiently and equitably.

Publication Types: Journal Article Review
PMID:14960425

Age Ageing. 2005; 34(4): 331-8.

Early assessment by a mobile stroke team: a randomised controlled trial.

Dey P, Woodman M, et al.

University of Manchester, UK. PaolaDey62@hotmail.com

BACKGROUND: There is overwhelming evidence of the effectiveness of specialist stroke rehabilitation, but more limited evidence of the effectiveness of organised stroke care during the acute phase of stroke. **OBJECTIVE:** To determine the impact on outcome of access to a mobile team during the acute phase of

stroke among patients admitted to general wards. **STUDY POPULATION:** 308 patients admitted to one of two hospitals within 5 days of the onset of a clinically diagnosed stroke. **STUDY DESIGN:** Randomised controlled trial. **STUDY GROUPS:** Following admission, patients in the intervention arm were visited by members of a mobile stroke team who advised clinical staff on appropriate and timely investigation and management. They co-ordinated early input from therapy groups and identified those ready for transfer to the stroke rehabilitation unit. Patients in the control arm were not visited by the mobile stroke team. **MAIN OUTCOME MEASURE:** All-cause mortality measured at 6 weeks and 12 months. **RESULTS:** There was no statistically significant difference observed between study groups in mortality at 6 weeks (95% CI(adj) - 7.4 to 7.4%) nor at 12 months (95% CI(adj) -4.1 to 15.9%). There were also no differences observed between study groups in morbidity outcomes or health-related quality of life measured at 12 months. **CONCLUSION:** The trial was terminated before the necessary sample size was collected but findings suggest that the mobile stroke team failed to confer significant long-term mortality benefit compared with general ward-based care alone.

Publication Types: Clinical Trial Journal Article Multicenter Study Randomized Controlled Trial
PMID:15955756

AJNR Am J Neuroradiol. 2005; 26(3): 618-24.

Diagnostic and prognostic value of early MR imaging vessel signs in hyperacute stroke patients imaged <3 hours and treated with recombinant tissue plasminogen activator.

Schellinger PD, Chalela JA, et al.

National Institute of Neurological Disorders and Stroke, National Institutes of Health, Bethesda, MD, USA.

BACKGROUND AND PURPOSE: Analogous to the CT hyperattenuated vessel sign (HMCAS), MR imaging may show hypo- or hyperintense vessels in acute ischemic stroke (AIS) patients. We assessed the diagnostic and prognostic strength of early MR imaging vessel signs in AIS patients treated with intravenous thrombolysis (IVT) within 3 hours of the onset of symptoms. **METHODS:** We studied AIS patients both treated with IVT and stroke MR imaged within 3 hours of the onset of symptoms and at 2 hours and 24 hours after treatment. We assessed the presence or absence of early vessel signs (hyperintense fluid-attenuated inversion recovery sign [FLAIR HVS]; gradient-echo susceptibility vessel sign [GRE SVS]) compared with a combined MR angiography/perfusion-weighted imaging reference and their strength for predicting clinical outcome (favorable vs. poor, independent vs. dependent, or dead, death), recanalization (by clot composition and flow), and hemorrhage in uni- and multivariate analysis. **RESULTS:** Fifty-six patients (age range, 76 years +/- 13 years; median National Institutes of Health stroke scale score [NIHSS], 11) met the inclusion criteria. Forty-four patients (78.6%) had a vessel occlusion at baseline; 22 of them (50%) recanalized. Nineteen patients (33.9%) suffered some form of intracranial hemorrhage (ICH), 24 patients (42.9%) had an independent outcome, 18 patients (32.1%) a favorable outcome, and 14 patients died. Compared with our combined reference for vessel status PWI/MRA, the sensitivities of CT HMCAS, FLAIR HVS, and GRE SVS were 40%, 66%, and 34%, respectively, and improved during the hours that followed. Localization was accurately reflected by FLAIR HVS but not by GRE SVS. Only NIHSS and age were independent predictors for recanalization and all clinical outcomes in multiple logistic regression analysis. **CONCLUSION:** Although early vessel signs can be helpful in the diagnosis of intravascular disease, they do not independently predict recanalization, ICH, or any of the three clinical outcomes in a multivariate logistic regression model. Thrombus composition as reflected by signal intensity characteristics on GRE and FLAIR does not predict the therapeutic effect of IVT.

Publication Types: Evaluation Studies Journal Article
PMID:15764589

Am J Med. 2005; 118(2): 198-9; author reply 199.

How can modeling best contribute to the assessment of secondary stroke prevention strategies?

Matchar DB, Samsa GP.

Publication Types: Comment Letter

PMID:15694909

Am J Phys Med Rehabil. 2004; 83(6): 434-8.

Association of physical functioning with same-hospital readmission after stroke.

Bohannon RW, Lee N.

Research Department, Hartford Hospital, Hartford, Connecticut, USA.

OBJECTIVE: Readmission after hospitalization for stroke is an important outcome. We sought to document the frequency of same-hospital readmission and to determine the relative value of physical functioning as a predictor of the outcome. **DESIGN:** Consenting patients (n = 228) who were admitted for ischemic stroke were characterized according to demographics, stroke severity, and self-reported prestroke and

postadmission physical functioning. The hospital's administrative database was used to track readmissions during the year after index hospitalization. RESULTS: Same-hospital readmissions were experienced by 37.3% of the patients. The readmissions usually occurred within 100 days of discharge. The most common readmission diagnosis was stroke (14.1%). Lower prestroke and postadmission physical functioning (as reflected by dichotomous Barthel index scores) were weak but significant predictors of readmission ($r = -0.165$ and -0.268 , respectively). Regression analysis showed that once postadmission physical functioning was accounted for, neither prestroke functioning nor any other measured variable added to the explanation of same-hospital readmission. CONCLUSION: The importance of physical functioning goes beyond rehabilitation. It is a potentially modifiable variable with implications for readmission.
Publication Types: Journal Article
PMID:15166687

Am J Phys Med Rehabil. 2004; 83(2): 88-93.

Full-time integrated treatment program, a new system for stroke rehabilitation in Japan: comparison with conventional rehabilitation.

Sonoda S, Saitoh E, et al.

Nanakuri Sanatorium, the Department of Rehabilitation Medicine, Fujita Health University, Japan.

OBJECTIVE: To validate the effectiveness of the Full-time Integrated Treatment (FIT) program that is characterized by rehabilitation 7 days/wk, encouragement of daytime activity, and enhanced communication between staff in stroke rehabilitation. DESIGN: Since our facility changed from the conventional rehabilitation system of 5 days of treatment to the FIT program in December 2000, we compared the conventional rehabilitation program with the FIT program at our hospital. The conventional treatment group and the FIT group consisted of 48 and 58 first-stroke hemiplegics, respectively. RESULTS: The motor subscore of the FIM instrument at admission and at discharge was 64.3 and 77.0 in the conventional group and 60.6 and 80.9 in the FIT group, respectively. The length of stay and efficiency of the FIM instrument were 80.0 days and 0.16 in the conventional group and 69.8 days and 0.30 in the FIT group, respectively. These differences between groups were statistically significant, with the exception of admission FIM data. CONCLUSIONS: Because the FIT program attained a higher discharge FIM level with a shorter length of stay, the FIT program was concluded to be an efficient and effective method of stroke rehabilitation.

Publication Types: Journal Article Validation Studies

PMID:14758294

Am J Phys Med Rehabil. 2005; 84(8): 613-9.

Changes in stroke rehabilitation outcomes after the implementation of Japan's long-term care insurance system: a hospital-based study.

Miyoshi Y, Teraoka JK, et al.

Division of Physical Medicine and Rehabilitation, Stanford University School of Medicine, Stanford, California, USA.

OBJECTIVE: To explore the changes in stroke rehabilitation outcomes after the introduction of Japan's long-term care insurance (LTCI) system. DESIGN: Stroke patients discharged during a 3-yr period before and after the implementation of LTCI were compared (before-LTCI vs. after-LTCI). Outcome measures included onset to admission interval, length of stay, and correlation between discharge site and functional level at discharge. RESULTS: A total of 201 patients in the before-LTCI group and 252 patients in the after-LTCI group were eligible for the study. Shorter mean length of stay ($P < 0.01$) and higher rates of discharge to a rehabilitation facility ($P < 0.01$) were found in the after-LTCI group. Logistic regression analysis revealed that the patients with higher activities of daily living scores or ambulatory status at discharge were more likely to be discharged to home after inpatient rehabilitation in both groups ($P < 0.01$). The rate of discharge to home was similar in both groups. CONCLUSIONS: Within this rehabilitation hospital's experience, the mean length of stay was reduced after the implementation of the LTCI. Although it was one of the primary goals of the LTCI, the rate of discharge to home did not significantly increase. Further evaluation and modification of the LTCI and more efforts to improve a patient's activities of daily living and ambulatory status at discharge will be necessary to promote in-home care in Japan.

Publication Types: Journal Article

PMID:16034231

Am J Surg. 2004; 188(6): 638-43.

Development and implementation of a rapid, accurate, and cost-effective protocol for national stroke prevention screening.

Lavenson GS, Jr., Pantera RL, et al.

Department of Vascular Surgery, Kaweah Delta District Hospital, 609 Acequia, Suite C, Visalia, CA 93291, USA. glavenson@aol.com

BACKGROUND: Three medical conditions--cervical carotid artery disease, atrial fibrillation, and hypertension--cause the majority of strokes. Discovering these silent, immediate causes of stroke through screening, so they can be treated before stroke occurs, can potentially prevent strokes on an epidemiologic scale. **METHODS:** A rapid, accurate, and cost-effective stroke prevention screening (SPS) protocol was developed. **RESULTS:** The SPS protocol was used to screen 6,073 seniors residing in the central valley of California, at Madigan Army Medical Center, at New York University, and by the American Vascular Association at 68 leading institutions. The screening was estimated to have prevented 30 strokes and to have saved the health care system >\$2 million. **CONCLUSIONS:** Implementation of a national SPS for seniors can discover the silent, immediate causes of strokes so they can be managed before stroke occurs and can potentially prevent the majority of strokes that we are currently not preventing.

Publication Types: Journal Article

PMID:15619477

Arch Phys Med Rehabil. 2004; 85(9): 1417-23.

Can forced-use therapy be clinically applied after stroke? An exploratory randomized controlled trial.

Ploughman M, Corbett D.

Div. of Basic Medical Sciences, Faculty of Medicine, Memorial University, St. John's, NL, Canada. mploughm@mun.ca

OBJECTIVE: To determine the efficacy, safety, and compliance with forced-use therapy (FUT) applied without additional "shaping" therapy during the rehabilitation phase of stroke. **DESIGN:** Prospective, randomized controlled trial. **SETTING:** Tertiary mixed rehabilitation center. **PARTICIPANTS:** Consecutive sample of 30 inpatients or outpatients with first stroke showing minimal movement of the arm and hand. Subjects who scored below 26 on the Mini-Mental State Examination were excluded. Seven subjects either did not provide consent or withdrew from the study. The remaining subjects were randomized into the control group (n=13) and the FUT group (n=10). **INTERVENTION:** FUT involved wearing a thick constraint mitten on the sound arm for as many as 6 hours a day. **MAIN OUTCOME MEASURES:** The Chedoke McMaster Impairment Inventory for arm, hand, postural control, and shoulder pain; Action Research Arm Test; grip strength; and FIM instrument. **RESULTS:** FUT subjects experienced 20% more recovery of the arm than did control subjects and more recovery of postural control (P=.04). Men benefited most from the program, and there was a tendency for FUT subjects to have more shoulder pain. Compliance was related to cognitive status. **CONCLUSIONS:** FUT, without shaping therapy, appears to augment arm recovery, but a larger sample is required to confirm these findings. The FUT mitten was safe and well tolerated; however, more research is needed to determine the relation between FUT and hemiplegic shoulder pain.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial

PMID:15375810

Arch Phys Med Rehabil. 2004; 85(2): 324-8.

Concurrent validity of the stroke drivers screening assessment.

Radford KA, Lincoln NB.

School of Psychology, University of Nottingham, Nottingham, UK.

OBJECTIVE: To determine the concurrent validity of the Stroke Drivers Screening Assessment (SDSA). **DESIGN:** Comparison of the SDSA with criterion standards. **SETTING:** Subjects' homes in the community in the United Kingdom. **PARTICIPANTS:** Ninety-three stroke patients (age range, 22-83y) who were referred for assessment of fitness to drive or who had been driving before their stroke. Participants were assessed a median of 5 months post stroke. **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURES:** Patients were assessed on the SDSA and tests of visuospatial ability (Visual Object and Space Perception [VOSP] Battery), executive abilities (Stroop Neuropsychological Screening Test, Trail-Making Test [TMT], Cognitive Estimates Test [CET]), and visual memory (Recognition Memory Tests [RMT], Verbal Descriptions of Road Signs [VDRS]). **RESULTS:** The SDSA subtests all correlated significantly with the Stroop test (P<.001) and TMT (P<.001), which suggests that they measure executive abilities and attention. The SDSA Dot Cancellation (DC) also correlated significantly with the VDRS (P<.01). The SDSA Square Matrices (SM) test correlated significantly with the VOSP cube analysis (P< or =.01) and the RMT faces subtest (P<.001), which suggests that the SM test also measures visuospatial abilities and visual memory. The SDSA Road Sign Recognition (RSR) test also correlated significantly with the VOSP cube analysis (P<.05), which

suggests that the RSR test also measures visuospatial abilities. Factor analysis produced a 2-factor solution with DC time, SM compass, and RSR all loading on factor 1, together with the Stroop and TMT. This factor was interpreted as "executive abilities and attention." The RMT faces subtest and CET loaded onto a second factor. CONCLUSIONS: The SDSA seems to measure predominantly attention and executive abilities, which have previously been shown to be important determinants of safety to drive. This may account for the high predictive validity of the SDSA.

Publication Types: Journal Article Validation Studies PMID:14966721

Arch Phys Med Rehabil. 2005; 86(3): 403-9.

Team functioning and patient outcomes in stroke rehabilitation.

Strasser DC, Falconer JA, et al.

Department of Rehabilitation Medicine, Emory University School of Medicine, Atlanta, GA, USA.
dale_strasser@emory.org

OBJECTIVE: To evaluate the relationship between rehabilitation team functioning and stroke patient outcomes. DESIGN: Prospective observational study. SETTING: Veterans Administration (VA) inpatient and subacute rehabilitation units. PARTICIPANTS: Forty-six VA rehabilitation teams, including 530 rehabilitation team members from 6 disciplines (medicine, nursing, social work, physical therapy, occupational therapy, speech language pathology) and 1688 stroke patients treated by the teams. INTERVENTIONS: Not applicable. MAIN OUTCOME MEASURES: Ten scales assessing team member perceptions of team functioning (communication, perceived effectiveness, physician involvement, physician support, teamness, utility of quality information, innovation, interprofessional relationships, order and organization, task orientation) and 3 primary patient outcome variables-functional improvement, discharge home, and length of rehabilitation stay (LOS). RESULTS: Three of the 10 measures of team functioning were significantly associated with patient functional improvement ($P < .05$): task orientation, order and organization, and utility of quality information. One measure of team functioning-effectiveness-was significantly associated with LOS ($P < .05$). None of the team variables predicted discharge destination. Aspects of team functioning that were important to outcomes differed depending on the outcome of interests. Efforts directed toward improving team activities and relationships, including collaborative planning and problem solving and the use of feedback information, may enhance rehabilitation treatment effectiveness. CONCLUSIONS: Characteristics of team functioning predict selected rehabilitation outcomes.

Publication Types: Journal Article Multicenter Study PMID:15759219

Aust J Physiother. 2004; 50(3): 163-7.

A six-week, resource-efficient mobility program after discharge from rehabilitation improves standing in people affected by stroke: placebo-controlled, randomised trial.

McClellan R, Ada L.

School of Physiotherapy, The University of Sydney, Lidcombe, NSW 1825, Australia.

Although intervention is effective in reducing the disability associated with stroke, limited resources mean that physiotherapy services often cease by six months after stroke. The purpose of this clinical trial was to investigate the efficacy of resource-efficient physiotherapy services in improving mobility and quality of life after stroke. Twenty-six people with residual walking difficulties after stroke were randomised into an experimental or control group after discharge from physiotherapy services. The experimental group participated in a six-week, home-based mobility program. The control group participated in a six-week, home-based program of upper-limb exercises (i.e. 'sham' mobility exercises). Subjects met with the therapist for prescription of exercises only three times during the six weeks. Strategies used to offset potential problems associated with minimal subject-therapist interaction included videotaped instructions to encourage correct performance of exercises, modification of the environment and involvement of carers to enhance safety, and telephone contact and self-monitoring to promote compliance. Standing (Functional Reach), walking (MAS Item 5) and quality of life (SA-SIP30) were measured prior to, immediately after, and two months after intervention ceased by an assessor who was blinded to group allocation. Subjects in the experimental group demonstrated significant improvement in standing compared to the control group ($p = 0.01$) which was maintained two months after the cessation of intervention ($p = 0.04$). There was no difference between the groups in walking ($p = 0.50$) or quality of life ($p = 0.70$). The six-week, resource-efficient mobility program was effective in improving some of the mobility in people after discharge from stroke rehabilitation. The provision of resource-efficient programs is recommended wherever possible so that people affected by stroke may continue rehabilitation for longer.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial
PMID:15482247

Aust J Physiother. 2005; 51(4): 221-31.

Constraint-induced movement therapy following stroke: a systematic review of randomised controlled trials.

Hakkennes S, Keating JL.

School of Physiotherapy, La Trobe University, VIC 3086, Australia. sharonh@barwonhealth.org.au

This systematic review investigated the effects on function, quality of life, health care costs, and patient/carer satisfaction of constraint-induced movement therapy (CIMT) for upper limb hemiparesis following stroke. A comprehensive search of the complete holdings of MEDLINE, CINAHL, EMBASE, Cochrane Library, PEDro and OTseeker to March 2005 was conducted. Fourteen eligible randomised controlled trials were identified and relevant data extracted by two independent reviewers. Effect sizes were calculated and results were pooled where possible. Method quality of the trials, assessed using the PEDro scale, had a mean score of five (range three to seven). Thirteen trials compared CIMT to an alternative treatment and/or a control group. One trial compared two CIMT protocols. Acute, subacute, and chronic conditions were studied. Effect sizes could be estimated for nine trials. Results were significant and in favour of CIMT in eight of these for at least one measure of upper limb function. The pooled standardised mean difference could be calculated for five outcome measures producing moderate to large effect sizes, only one of which attained statistical significance. Results indicate that CIMT may improve upper limb function following stroke for some patients when compared to alternative or no treatment. Rigorous evaluation of constraint-induced movement therapy using well-designed and adequately powered trials is required to evaluate the efficacy of different protocols on different stroke populations and to assess impact on quality of life, cost and patient/carer satisfaction.

Publication Types: Journal Article PMID:16321129

Axone. 2004; 25(4): 12-7.

Bringing innovation to stroke care: development of a comprehensive stroke unit.

Bisaillon S, Douloff C, et al.

Neuroscience/MSK Health Systems, Trillium Health Centre, Mississauga, Ontario. sbisaillon@thc.on.ca

Much work has been done in the past 10 years to research and document best practices in stroke care along the continuum of care. The challenge now for stroke care practitioners is to turn those best practices into reality in a clinical setting. In spite of a general understanding and acceptance of the benefits to the patient, an organization's culture and limited access to resources can frustrate our best efforts to introduce best practices at the bedside. Trillium Health Centre, a community hospital serving a diverse community of more than one million people, has turned best practice stroke care guidelines into reality by developing a 14-bed comprehensive stroke unit. This innovative approach to care uses specialized stroke teams, an interdisciplinary approach to care, and a single unit where the patient remains in the same bed throughout the acute and rehabilitation stages of care. Commitment to the new delivery model by formal leaders, informal leaders, and front-line staff and a supportive organizational structure contributed to an expedited and successful implementation. All changes were implemented without an increase in the overall resources assigned to the unit. Early results show that the average length of stay is shorter than the national standard and that provider and patient satisfaction have improved.

Publication Types: Journal Article PMID:15368879

Axone. 2005; 26(4): 22-7.

Research to practice: nursing stroke assessment guidelines link to clinical performance indicators.

Lindsay MP, Kelloway L, et al.

Department of Health Policy, Management and Evaluation, University of Toronto.

Stroke is the fourth leading cause of death in Canada and, each year, approximately 50,000 Canadians will suffer a stroke with a range of severities from mild, short duration symptoms to significant long-term disability or death. Of these 50,000 patients, at least 20,000 are hospitalized. Earlier this year, a core set of evidence-based performance indicators were identified by a national consensus panel that may be used to determine the quality of care provided to stroke patients in hospital during the acute phase of illness. Nurses play a critical role in stroke care across the continuum and recently published stroke assessment guidelines for nurses clearly describe key approaches to assessment and/or screening of stroke survivors. Many of the nursing assessments and/or screening actions recommended in the guidelines have direct or indirect associations with the recent performance indicators. This article describes where those relationships exist and the role nurses may play in determining overall performance for acute stroke patient care delivery during the hospitalization phase of the stroke continuum of care.

Publication Types: Comment Evaluation Studies Journal Article
PMID:16028727

Axone. 2005; 26(4): 8-13.

Ontario regional stroke centres: survey of neurological nursing assessment practices with acute stroke patients.

Gocan S, Fisher A.

The Ottawa Hospital, Champlain Region.

A survey to explore which neurological stroke assessment scales were being used by nurses at all nine regional stroke centres (RSCs) in Ontario, and education strategies for implementation of the new scales was conducted in 2004. Findings revealed that nurses are moving away from reliance on the Glasgow Coma Scale (GCS) towards use of more standardized stroke severity scales to facilitate assessment, documentation, and care planning with acute stroke survivors. Scales used include the Canadian Neurological Scale and the National Institutes of Health Stroke Scale. Consistency in use between nurses was identified as an implementation challenge that was best addressed through integration of the scale into the process of care and documentation and bedside education.

Publication Types: Journal Article

PMID:16028725

BMC Health Serv Res. 2005; 5(1): 10.

The role of 'confounding by indication' in assessing the effect of quality of care on disease outcomes in general practice: results of a case-control study.

de Koning JS, Klazinga NS, et al.

Department of Public Health, Erasmus MC, University Medical Centre Rotterdam, the Netherlands.
j.s.dekoning@amc.uva.nl

BACKGROUND: In quality of care research, limited information is found on the relationship between quality of care and disease outcomes. This case-control study was conducted with the aim to assess the effect of guideline adherence for stroke prevention on the occurrence of stroke in general practice. We report on the problems related to a variant of confounding by indication, that may be common in quality of care studies. **METHODS:** Stroke patients (cases) and controls were recruited from the general practitioner's (GP) patient register, and an expert panel assessed the quality of care of cases and controls using guideline-based review criteria. **RESULTS:** A total of 86 patients was assessed. Compared to patients without shortcomings in preventive care, patients who received sub-optimal care appeared to have a lower risk of experiencing a stroke (OR 0.60; 95% CI 0.24 to 1.53). This result was partly explained by the presence of risk factors (6.1 per cases, 4.4 per control), as reflected by the finding that the OR came much closer to 1.00 after adjustment for the number of risk factors (OR 0.82; 95% CI 0.29 to 2.30). Patients with more risk factors for stroke had a lower risk of sub-optimal care (OR for the number of risk factors present 0.76; 95% CI 0.61 to 0.94). This finding represents a variant of 'confounding by indication', which could not be fully adjusted for due to incomplete information on risk factors for stroke. **CONCLUSIONS:** At present, inaccurate recording of patient and risk factor information by GPs seriously limits the potential use of a case-control method to assess the effect of guideline adherence on disease outcome in general practice. We conclude that studies on the effect of quality of care on disease outcomes, like other observational studies of intended treatment effect, should be designed and performed such that confounding by indication is minimized.

Publication Types: Journal Article

PMID:15676067

BMC Public Health. 2004; 4: 26.

Risk factors and in-hospital outcomes in stroke and myocardial infarction patients.

Ivanusa M, Ivanusa Z.

Department of Internal Medicine, Bjelovar General Hospital, HR-43000 Bjelovar, Croatia. mivanusa@vip.hr

BACKGROUND: Acute stroke (AS) and acute myocardial infarction (AMI) share major risk factors such as age, gender, and high blood pressure. The main objective of this study was to compare vascular risk factor profiles with in-hospital outcomes in AS and AMI patients. **METHODS:** We evaluated 486 consecutive patients who were admitted to Bjelovar General Hospital with diagnoses of AS (ischaemic stroke or intracerebral haemorrhage; N = 380) or AMI (N = 106) during a one year period. The frequency of risk factors and in-patient mortality rates were assessed in both groups. For statistical analysis we used t-tests and chi2 tests. **RESULTS:** AS patients were significantly older than AMI patients: the mean age for AS patients was 68.9 +/- 9.1 years, and for AMI patients was 62.8 +/- 11.7 years (p < 0.001). AMI was significantly more common than AS in patients younger than 65 years; 51% of this group had AMI and 26% had AS (p < 0.001). Hypertension was a more common risk factor in AS patients (69% AS patients vs. 58% AMI patients; p = 0.042). Patients who died did not differ significantly in age between the groups. In-patient mortality rates were significantly higher in AS than AMI cases (31% vs. 12%, p < 0.001 for all

patients; 37% vs.5%, $p < 0.001$ for men). Women hospitalized for AMI were more likely to die in hospital than men (28% vs. 5%; $p = 0.002$). **CONCLUSIONS:** We found that age at the time of presentation was a significant differentiating factor between patients with AS and AMI. The only exceptions were women, whose ages at the onset of AS and AMI were similar. In contrast, patients who died did not differ significantly in age. We observed significantly higher inpatient mortality for men (when adjusted for age) than for women with AS. The five-fold higher in-patient mortality rate in women than in men with AMI is most likely to have resulted from other factors related to treatment.

Publication Types: Journal Article

PMID:15236659

Bmj. 2004; 329(7472): 968-70.

The PROGRESS trial three years later: time for a balanced report of effectiveness.

Wennberg R, Zimmermann C.

Department of Medicine, University of Toronto, University Health Network, Toronto, ON, Canada M5T 2S8.

Richard.Wennberg@uhn.on.ca

Publication Types: Journal Article

PMID:15499116

<http://bmj.bmjournals.com/contents-by-date.0.shtml>

Bmj. 2004; 329(7464): 476.

Stroke services have improved but remain overstretched.

Shannon C.

Publication Types: News

PMID:15331467

<http://bmj.bmjournals.com/contents-by-date.0.shtml>

Bmj. 2004; 328(7448): 1102.

Training care givers of stroke patients: economic evaluation.

Patel A, Knapp M, et al.

Centre for the Economics of Mental Health, Institute of Psychiatry, London SE5 8AF.

BACKGROUND: Training care givers reduces their burden and improves psychosocial outcomes in care givers and patients at one year. However, the cost effectiveness of this approach has not been investigated. **OBJECTIVE:** To evaluate the cost effectiveness of caregiver training by examining health and social care costs, informal care costs, and quality adjusted life years in care givers. **DESIGN:** A single, blind, randomised controlled trial. **SETTING:** Stroke rehabilitation unit. **SUBJECTS:** 300 stroke patients and their care givers. **INTERVENTIONS:** Caregiver training in basic nursing and facilitation of personal care techniques compared with no care giver training. **MAIN OUTCOME MEASURES:** Health and social care costs, informal care costs, and quality adjusted life years in care givers over one year after stroke. **RESULTS:** Total health and social care costs over one year for patients whose care givers received training were significantly lower (mean difference -4043 pounds sterling (7249 dollars; 6072 euros), 95% confidence interval -6544 pounds sterling to -595 pounds sterling). Inclusion of informal care costs, which were similar between the two groups, did not alter this conclusion. The cost difference was largely due to differences in length of hospital stay. The EQ-5D did not detect changes in quality adjusted life years in care givers. **CONCLUSION:** Compared with no training, caregiver training during rehabilitation of patients reduced costs of care while improving overall quality of life in care givers at one year.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial

PMID:15130978

<http://bmj.bmjournals.com/contents-by-date.0.shtml>

Bmj. 2004; 328(7448): 1099.

Training carers of stroke patients: randomised controlled trial.

Kalra L, Evans A, et al.

Department of Medicine, Guy's, King's and St Thomas's School of Medicine, London SE5 9PJ.

lalit.kalra@kcl.ac.uk

BACKGROUND: Informal care givers support disabled stroke patients at home but receive little training for the caregiving role. **OBJECTIVE:** To evaluate the effectiveness of training care givers in reducing burden of stroke in patients and their care givers. **DESIGN:** A single, blind, randomised controlled trial. **SETTING:** Stroke rehabilitation unit. **SUBJECTS:** 300 stroke patients and their care givers. **INTERVENTIONS:** Training care givers in basic nursing and facilitation of personal care techniques. **MAIN OUTCOME MEASURES:** Cost

to health and social services, caregiving burden, patients' and care givers' functional status (Barthel index, Frenchay activities index), psychological state (hospital anxiety and depression score), quality of life (EuroQol visual analogue scale) and patients' institutionalisation or mortality at one year. RESULTS: Patients were comparable for age (median 76 years; interquartile range 70-82 years), sex (53% men), and severity of stroke (median Barthel index 8; interquartile range 4-12). The costs of care over one year for patients whose care givers had received training were significantly lower (10,133 pounds sterling v 13,794 pounds sterling (18,087 dollars v 24,619 dollars; 15,204 euros v 20,697 euros); P = 0.001). Trained care givers experienced less caregiving burden (care giver burden score 32 v 41; P = 0.0001), anxiety (anxiety score 3 v 4; P = 0.0001) or depression (depression score 2 v 3; P = 0.0001) and had a higher quality of life (EuroQol score 80 v 70; P = 0.001). Patients' mortality, institutionalisation, and disability were not influenced by caregiver training. However, patients reported less anxiety (3 v 4.5; P < 0.0001) and depression (3 v 4; P < 0.0001) and better quality of life (65 v 60; P = 0.009) in the caregiver training group. CONCLUSION: Training care givers during patients' rehabilitation reduced costs and caregiver burden while improving psychosocial outcomes in care givers and patients at one year.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial

PMID:15130977

<http://bmj.bmjournals.com/contents-by-date.0.shtml>

Bmj. 2004; 328(7441): 655-6.

Diagnosis of stroke on neuroimaging.

Wardlaw JM, Farrall AJ.

Publication Types: Editorial

PMID:15031215

<http://bmj.bmjournals.com/contents-by-date.0.shtml>

Bmj. 2005; 331(7526): 1161.

Watchdog finds that NHS is failing stroke patients.

Coombes R.

Publication Types: News

PMID:16293821

<http://bmj.bmjournals.com/contents-by-date.0.shtml>

Br J Gen Pract. 2004; 54(508): 856-7.

Effectiveness of computerised rehabilitation for long-term aphasia: a case series study.

Mortley J, Wade J, et al.

Speech and Language Therapy Research Unit, North Bristol NHS Trust, Frenchay Hospital, Bristol, UK.

Seven participants with long-standing aphasia following cerebrovascular accident were serially recruited to a case series study where language therapy was delivered at home and monitored via the Internet. All participants improved in word finding, and four improved in general communication.

Publication Types: Journal Article

PMID:15527613

Brain Inj. 2004; 18(8): 811-23.

Post-acute brain injury rehabilitation for patients with stroke.

Adams RA, Sherer M, et al.

Methodist Rehabilitation Center, Jackson, MS 39216, USA.

PRIMARY OBJECTIVE: Conduct an investigation of post-acute brain injury rehabilitation (PABIR) for persons with stroke. RESEARCH DESIGN: Pre-post-treatment observation study. METHODS AND PROCEDURES: Demographic and medical data for 127 persons with stroke admitted for PABIR at a median interval of 87 days post-stroke were abstracted from medical records. Participants' levels of independence and productivity were assessed at admission and discharge. Follow-up data were available for 90 participants at a median interval of 346 days post-discharge. EXPERIMENTAL INTERVENTIONS: Not applicable. MAIN OUTCOMES AND RESULTS: Participants showed improvements in productivity and independence level from admission to discharge and these gains were maintained at follow-up. Predictors of productivity at discharge were gender and level of independence at admission (Model R(2) = 0.28). Predictors of independence at discharge were similar (Model R(2) = 0.37). CONCLUSION: While this investigation has limitations, findings suggest that PABIR is beneficial for some persons with strokes.

Publication Types: Journal Article

PMID:15204321

Can J Neurol Sci. 2004; 31(3): 387-93.

Trends in hospital admission for stroke in Calgary.

Field TS, Green TL, et al.

Faculty of Medicine, Dalhousie University, Halifax, NS, Canada.

BACKGROUND: Stroke incidence has fallen since 1950. Recent trends suggest that stroke incidence may be stabilizing or increasing. We investigated time trends in stroke occurrence and in-hospital morbidity and mortality in the Calgary Health Region. **MEthods:** All patients admitted to hospitals in the Calgary Health Region between 1994 and 2002 with a primary discharge diagnosis code (ICD-9 or ICD-10) of stroke were included. In-hospital strokes were also included. Stroke type, date of admission, age, gender, discharge disposition (died, discharged) and in-hospital complications (pneumonia, pulmonary embolism, deep venous thrombosis) were recorded. Poisson and simple linear regression was used to model time trends of occurrence by stroke type and age-group and to extrapolate future time trends. **RESULTS:** From 1994 to 2002, 11642 stroke events were observed. Of these, 9879 patients (84.8%) were discharged from hospital, 1763 (15.1%) died in hospital, and 591 (5.1%) developed in-hospital complications from pneumonia, pulmonary embolism or deep venous thrombosis. Both in-hospital mortality and complication rates were highest for hemorrhages. Over the period of study, the rate of stroke admission has remained stable. However, total numbers of stroke admission to hospital have faced a significant increase ($p=0.012$) due to the combination of increases in intracerebral hemorrhage ($p=0.021$) and ischemic stroke admissions ($p=0.011$). Sub-arachnoid hemorrhage rates have declined. In-hospital stroke mortality has experienced an overall decline due to a decrease in deaths from ischemic stroke, intracerebral hemorrhage and sub-arachnoid hemorrhage. **CONCLUSIONS:** Although age-adjusted stroke occurrence rates were stable from 1994 to 2002, this is associated with both a sharp increase in the absolute number of stroke admissions and decline in proportional in-hospital mortality. Further research is needed into changes in stroke severity over time to understand the causes of declining in-hospital stroke mortality rates.

Publication Types: Journal Article

PMID:15376486

Cerebrovasc Dis. 2004; 17(2-3): 143-52.

Development and validation of NEWSQOL, the Newcastle Stroke-Specific Quality of Life Measure.

Buck D, Jacoby A, et al.

Department of Primary Care, University of Liverpool, UK. dbuck@liverpool.ac.uk

BACKGROUND: A review of stroke-specific quality of life (QOL) measures indicated little evidence of their validity/reliability. **PURPOSE:** To describe the development/validation of a new measure - the Newcastle Stroke-Specific Quality of Life Measure (NEWSQOL). **METHODS:** Phase I: qualitative interviews (28 stroke patients) determined QOL issues for inclusion in the measure. Initial items/response categories were pre-tested (30 patients). Administration of the NEWSQOL in the item reduction stage (100 patients) identified poorly performing items and factor analysis showed likely domains. Internal consistency was examined. Phase II: NEWSQOL and comparator measures were administered (106 patients) to examine validity/test-retest reliability. **RESULTS:** Phase I: 140 items were identified for initial inclusion. Qualitative pre-testing led to an extensive revision. Item reduction resulted in a final measure of 56 items in 11 domains (feelings, activities of daily living/self-care, cognition, mobility, emotion, sleep, interpersonal relationships, communication, pain/sensation, vision, fatigue; Cronbach's alpha = 0.71-0.90). Phase II: NEWSQOL domain scores, except cognition, were moderately/highly correlated (0.45-0.76) with relevant comparator measures. NEWSQOL domains feelings, communication and cognition low/moderately correlated with Barthel Index scores (-0.49 to -0.28), as predicted. Test-retest reliability was high (intraclass correlation coefficient range 0.78-0.92). **CONCLUSIONS:** NEWSQOL is an acceptable, patient-derived, interviewer-administered, stroke-specific QOL measure with evidence of reliability and validity, making it a promising instrument for assessing QOL after stroke. Involvement of relevant patients in determining the content and format considerably enhances confidence in its validity.

Publication Types: Journal Article Validation Studies

PMID:14707414

Cerebrovasc Dis. 2004; 17(2-3): 134-42.

Costs of stroke care according to handicap levels and stroke subtypes.

Spieler JF, Lanoe JL, et al.

Institut National de la Sante et de la Recherche Medicale (U-537: 'Economy of health'), Paris, France.

BACKGROUND: If new advances in stroke management are to be put into practice, crucial information about their costs needs to be considered in relation to clinically pertinent variables (e.g. handicap level and stroke subtypes). Details of costs throughout the entire period of stroke care are essential in the political decision-making process, in order to avoid other budget-balancing approaches, which are not

always satisfactory. Our aim was to perform an in-depth evaluation of the direct medical cost of stroke care in a large cohort. **METHODS:** We included 435 consecutive patients with brain infarction in 12 primary-care and referral neurology departments. Information on acute care was prospectively collected. Information on postacute care was collected by research nurses' visits to the patient's or a relative's home 18-40 months after the stroke onset. We thus collected detailed information on handicap levels, stroke subtypes, acute hospitalization costs, rehabilitation, nursing care and ambulatory costs. This enabled us to calculate costs over an 18-month period after the initial acute hospital discharge. **RESULTS:** By the 12th month after discharge, the costs amounted to 17,799 euros (16,440-19,158) per patient; the initial hospitalization accounted for 42% of this cost, rehabilitation for 29% and ambulatory care for 8%. These costs were mostly concentrated within the first 3- to 6-month period. After 46 months without recurrence, the cost of ambulatory care outweighed the cost of the first 6 months. Handicap levels explained 43% of the variance of costs ($p < 0.0001$) and, according to the Rankin scale divided into 3 classes (0-2, 3 and 4-5), cumulative costs over time differed considerably. Stroke subtypes were not discriminating variables except for lacunar strokes, which were significantly less costly than the other groups. **CONCLUSIONS:** By providing a fairly comprehensive figure for the details of direct costs of stroke care over time, our study gives some clues about the economic burden of stroke care which is mostly driven by a high handicap level. This suggests that any early intervention aimed at reducing the handicap level will probably dramatically reduce this burden.

Publication Types: Journal Article

PMID:14707413

Cerebrovasc Dis. 2004; 17 Suppl 2: 1-14.

Organization of stroke care: education, referral, emergency management and imaging, stroke units and rehabilitation. European Stroke Initiative.

Brainin M, Olsen TS, et al.

Publication Types: Guideline Journal Article Practice Guideline

PMID:14707403

Cerebrovasc Dis. 2004; 17 Suppl 1: 124-9.

The cost of stroke.

Martinez-Vila E, Irimia P.

Department of Neurology, University of Navarra School of Medicine, Pamplona, Spain. emartinez@unav.es

The control of health expenditure has become one of the main axes of health policy. Cost studies are an indispensable tool for determining the economic impact of disease and for assigning the material and human resources required for the prevention, diagnosis, treatment, and follow-up of patients with different diseases. Cost studies in stroke are necessary due to the increasing incidence of this disease which represents a significant cause of death and invalidity in adults and produces important hospital and social spending, and for which patients must be treated in specialized units (stroke units). The principal cost-determining factors in most studies are those generated by hospital admission (principally hospital stay). Other cost-determining factors include severity, stroke subtype or the fate of patients on discharge. Future health policies aimed at optimizing economic resources must be directed towards reducing hospital stay and minimizing patient disability.

Publication Types: Journal Article Review

PMID:14694289

Cerebrovasc Dis. 2004; 17 Suppl 1: 113-23.

Organization of medical care in acute stroke: importance of a good network.

Gil Nunez AC, Vivancos Mora J.

Stroke Units, Hospital General Universitario Gregorio Maranon, Madrid, Spain. agiln@meditex.es

Stroke is a medical emergency which requires hospital care. Therapeutic and effective organizative measures, such as thrombolysis and stroke units, are available, but early attention is required, as the benefits are time dependent (therapeutic window). To achieve this objective, a high level of organization and coordination is required between the various steps of care. The chain of attention in acute stroke (from symptom onset till stroke unit admission) is a complex process. The main points are reviewed: delay in attention, knowledge and attitude towards stroke, emergency transportation, neurological attention, educational campaigns, clinical protocols and pathways, stroke codes, and existing resources for care. The organization must be modified to have the resources for care necessary for attending acute stroke available, if we want to achieve the real objective of maximum benefit for our patients as set out in the Declaration of Helsingborg.

Publication Types: Journal Article Review PMID:14694288

Cerebrovasc Dis. 2005; 20 Suppl 2: 129-34.

Homeostasis as basis of acute stroke treatment: stroke units are the key.

Diez-Tejedor E, Fuentes B.

Stroke Unit, Department of Neurology, Hospital Universitario La Paz, Universidad Autonoma de Madrid, Madrid, Spain.

Introduction: Several studies suggest that the control of blood pressure (BP), blood glucose level, body temperature, and oxygen saturation, when analyzed separately, is related with successful acute stroke outcome. However, in a biological system these parameters are interrelated and could influence the process. Recent studies highlight the importance of the appropriate maintenance of these variables that are involved in homeostasis in patients with stroke and the influence they have on outcome. Methods: A review was conducted of published studies which analyzed the influence of control of these physiological variables in acute stroke, whether in isolation or combinations, and we have contributed our own data derived from observational studies. Results: The maintenance of homeostasis forms the basis of acute stroke treatment, in what is termed nonpharmacological neuroprotection. Stroke units (SU) are the ideal environment for this therapeutic approach since their favorable influence on the correct management of BP, body temperature, oxygen saturation, and blood glucose in the progress of stroke patients have been proved. Conclusions: The proper management of physiological variables (homeostasis) such as BP, body temperature, blood glucose, and oxygen saturation is the basis of acute stroke treatment, and SU are the key to this approach. Copyright (c) 2005 S. Karger AG, Basel.

Publication Types: Journal Article

PMID:16327263

Cerebrovasc Dis. 2005; 21(1-2): 6-17.

Pathophysiology of Stroke Rehabilitation: Temporal Aspects of Neurofunctional Recovery.

Kreisel SH, Bazner H, et al.

Department of Neurology, Universitätsklinikum Mannheim, University of Heidelberg, Mannheim, Germany.

Stroke almost always causes an impairment of motor activity and function. Clinical recovery, though usually incomplete, is often highly dynamic and reflects the ability of the neuronal network to adapt. Mechanisms that underlie neurofunctional plasticity are now beginning to be understood. Albeit the enormous efforts undertaken to support the natural course of convalescence through rehabilitation, little has been done to relate possible effects of these therapeutic approaches to mechanisms of adaptive pathophysiology. The review presented here focuses on these mechanisms during the course of recovery poststroke. Next to an unmasking of latent network representations, other adaptive processes, such as excitatory metabolic stress, an imbalance in activating and inhibiting transmission, leading to salient hyperexcitability or mechanisms that consolidate novel connections prime the system's plastic capabilities. These pathophysiological processes potentially interact with rehabilitative interventions. They therefore form the foundation of positive, but possibly also negative recuperation under therapy. Copyright (c) 2006 S. Karger AG, Basel.

Publication Types: Journal article

PMID:16282685

Cerebrovasc Dis. 2005; 20(5): 325-31.

The effect of weekends and holidays on stroke outcome in acute stroke units.

Hasegawa Y, Yoneda Y, et al.

Cerebrovascular Division, Department of Medicine, National Cardiovascular Center, Osaka, Japan. yazhase@hsp.ncvc.go.jp

BACKGROUND AND PURPOSE: In almost all acute stroke units in Japan, staffing level is lower on weekends and holidays and rehabilitative services are provided only on weekdays. We sought to investigate the effects of low-volume care early after stroke resulting from weekends and holidays on the outcome of stroke. METHODS: Patients with completed stroke within 72 h of onset were prospectively registered by 10 acute stroke units in Japan. Main outcome measures were favorable outcomes as indicated by a score of 0-1 on the modified Rankin scale (mRS01) on their 21st hospital day and at discharge and case fatality during the hospital stay. Cox proportional hazards models were used to identify the effects of weekday admission and a weekday ratio (a number of weekdays / total length of hospital stay, or 21 days if hospitalization was longer than 21 days) on the main outcome measures. RESULTS: In a total of 1,134 patients, Cox proportional hazards regression analyses demonstrated that the weekday admission was significantly associated with mRS01 at discharge (hazard ratio, HR: 1.385, 95% CI: 1.087-1.764) and case fatality (HR: 0.477, 95% CI: 0.285-0.798). In 858 patients with rehabilitative therapy, the weekday ratio was significantly associated with mRS01 at discharge ($p = 0.014$). Compared with the lowest tertile of weekday ratio (<66.6%), the highest tertile (>71.4%) was significantly positively associated with mRS01 at discharge

(HR: 1.524, 95% CI: 1.053-2.206; $p < 0.026$). CONCLUSIONS: Weekday admission was an independent negative predictor of case fatality and a positive predictor of favorable outcome (mRS01) at discharge from acute stroke units. In patients with rehabilitative therapy, a reduction in the weekday ratio was also associated with unfavorable outcome, probably due to a reduction in multidisciplinary care.

Publication Types: Journal Article

PMID:16131801

Cerebrovasc Dis. 2005; 20(3): 193-200.

Cost-effectiveness analysis of thrombolytic treatment for stroke.

Mar J, Begiristain JM, et al.

Clinical Management Unit, Hospital Alto Deba, Mondragon, Spain. jmar@hmon.osakidetza.net

PURPOSE: Thrombolysis is used to treat stroke patients based on the National Institute of Neurological Disorders and Stroke study and meta-analysis results. We present a cost-effectiveness analysis based on a probabilistic model of the use of thrombolytic therapy in stroke treatment. METHODS: We surveyed patients who had had a stroke during their hospital stay and examined them again 1 year after release from the hospital to obtain data on costs and natural history. We then calculated utility weights using the European Quality of Life Questionnaire. When the model runs, 4,000 Monte Carlo simulations are undertaken in which each parameter value changes depending on its probability distribution. The results are expressed in terms of the cost-effectiveness plane and the cost-effectiveness acceptability curve. RESULTS: We studied 435 patients, of whom 304 had had an ischemic stroke. One year later, 216 were still alive. The mean utility values were 0.22 for disabled patients and 0.77 for autonomous patients. The incremental cost-effectiveness ratio (ICER) obtained by means of the parameters was -19,000 EUR/quality-adjusted life year, reflecting a saving of 6,000 EUR and a health benefit for patients. The cost-effectiveness plane showed that thrombolysis was a dominant variable in 96.1% of simulations. In the acceptability curves, only 0.4 of simulations obtained an ICER higher than the societal threshold. CONCLUSIONS: Thrombolytic therapy seems to be a useful intervention because it is inexpensive and cost-effective. The key factor is the decreased rate of disability, which results in a better quality of life of the patient and lower costs.

Publication Types: Journal Article

PMID:16088115

Cerebrovasc Dis. 2005; 20(2): 85-91.

A family support organiser for stroke patients and their carers: a randomised controlled trial.

Tilling K, Coshall C, et al.

Department of Public Health Sciences, King's College London, London, UK. kate.tilling@bristol.ac.uk

BACKGROUND: Previous trials of interventions to support stroke survivors and their families in the community have had contradictory and inconclusive results. Using the MRC Framework for Complex Interventions we developed a family support organiser (FSO) service and refined outcome measures for evaluation. We tested the effects of the intervention in a randomised controlled trial. METHODS: From 1 March 1999 to 1 April 2001 all first-in-a-lifetime strokes ($n = 513$) were identified and 340 (96%) of eligible strokes randomised to receive FSO or usual care. Patients and their carers were followed up at 3 months and 1 year post-stroke. Outcomes included satisfaction (main outcome) with hospital staff and outpatient services, use of social services, reintegration to normal living (RNLI) and feelings about life after the stroke. RESULTS: The mean number of contacts with the FSO was 15 (SD = 9.8) per patient. More intervention than control patients received some social services and had increased patient and carer satisfaction in most aspects, particularly with information about recovery and feeling that someone had listened. There was little evidence at 3 or 12 months of differences in RNLI. CONCLUSIONS: A meta-analysis of trials in this area is now needed along with further trials of interventions in subgroups of the stroke population to fully identify any benefits of the FSO role.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial

PMID:15976500

Cerebrovasc Dis. 2005; 19(6): 376-83.

Early supported discharge for stroke patients improves clinical outcome. Does it also reduce use of health services and costs? One-year follow-up of a randomized controlled trial.

Fjaertoft H, Indredavik B, et al.

Department of Public Health, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway. hild.fjaertoft@medisin.ntnu.no

BACKGROUND: An early supported discharge service (ESD) appears to be a promising alternative to conventional care. The aim of this trial was to compare the use of health services and costs with

traditional stroke care during a one-year follow-up. **METHODS:** Three hundred and twenty patients were randomly allocated either to ordinary stroke unit care or stroke unit care combined with ESD which was coordinated by a mobile team. The use of all health services was recorded prospectively; its costs were measured as service costs and represent a combination of calculated average costs and tariffs. Hospital expenses were measured as costs per inpatient day and adjusted for the DRG. **RESULTS:** There was a reduction in average number of inpatient days at 52 weeks in favour of the ESD group ($p = 0.012$), and a non-significant reduction in total mean service costs in the ESD group (EUR 18,937/EUR 21,824). ESD service seems to be most cost-effective for patients with a moderate stroke. **CONCLUSION:** Acute stroke unit care combined with an ESD programme may reduce the length of institutional stay without increasing the costs of outpatient rehabilitation compared with traditional stroke care.
Publication Types: Journal Article Randomized Controlled Trial PMID:15860914

Cerebrovasc Dis. 2005; 19(2): 102-9.

Cognitive impairment after stroke - impact on activities of daily living and costs of care for elderly people. The Goteborg 70+ Stroke Study.

Claesson L, Linden T, et al.

Sahlgrenska Academy at Goteborg University, Institute of Clinical Neuroscience, Stroke Research Group, Goteborg University, Goteborg, Sweden. licl@neuro.gu.se

BACKGROUND AND PURPOSE: The economic burden of stroke is substantial and is likely to increase with an increasing number of elderly individuals in the population. There is thus a need for information on the use of health care resources and costs among these elderly stroke patients. We examined the impact of the cognitive impairments on the ability to perform activities of daily living (ADL) and utilization and costs of health care in a cohort of elderly stroke patients. **METHODS:** One hundred and forty-nine patients aged ≥ 70 years with acute stroke were included. The patients were assessed regarding their ability to carry out ADL and health resource utilization and cost during the first year after stroke. Cognitive impairments were assessed 18 months after the index stroke. **RESULTS:** Stroke severity in acute stroke and cognitive impairment at 18 months after stroke onset was associated with impairment in ADL and increased costs for utilisation of care during the first year. Patients with cognitive impairment were more dependent on personal assistance in ADL. Costs per patient during the study were three times higher for patients with cognitive impairment. Hospital care, institutional living and different kinds of support from society accounted for the highest costs. **CONCLUSIONS:** Costs of care utilisation during the first year after stroke were associated with cognitive impairments, stroke severity and dependence in ADL. The results should be interpreted cautiously as the assessment of cognitive function was made 18 months after stroke onset and costs were estimated for the first year after stroke.

Publication Types: Journal Article PMID:15608434

Circulation. 2005. Dec 19; [Epub ahead of print]

Standards for Statistical Models Used for Public Reporting of Health Outcomes. An American Heart Association Scientific Statement From the Quality of Care and Outcomes Research Interdisciplinary Writing Group. Cosponsored by the Council on Epidemiology and Prevention and the Stroke Council Endorsed by the American College of Cardiology Foundation.

Krumholz HM, Brindis RG, et al.

Abstract--With the proliferation of efforts to report publicly the outcomes of healthcare providers and institutions, there is a growing need to define standards for the methods that are being employed. An interdisciplinary writing group identified 7 preferred attributes of statistical models used for publicly reported outcomes. These attributes include (1) clear and explicit definition of an appropriate patient sample, (2) clinical coherence of model variables, (3) sufficiently high-quality and timely data, (4) designation of an appropriate reference time before which covariates are derived and after which outcomes are measured, (5) use of an appropriate outcome and a standardized period of outcome assessment, (6) application of an analytical approach that takes into account the multilevel organization of data, and (7) disclosure of the methods used to compare outcomes, including disclosure of performance of risk-adjustment methodology in derivation and validation samples.

Publication Types: Journal article PMID:16365198

Clin Evid. 2005; (13): 152-66.

Stroke management.

Warburton E.

Neuroscience's Addenbrookes Hospital, Cambridge, UK.

Publication Types: Journal Article Review

PMID:16135260

Clin Med. 2004; 4(2): 132-5.

Integrated care pathways: disease-specific or process-specific?

Edwards SG, Thompson AJ, et al.

Neurorehabilitation Unit, The National Hospital for Neurology and Neurosurgery, Queen Square, London.

BACKGROUND/AIM: conventional teaching on integrated care pathways (ICP) suggests that they have to be specific both to a particular setting and to a specific diagnosis. We wished to explore the potential for a generic process-based care pathway. **STUDY DESIGN:** we evaluated three different, disease-specific ICPs in use on a neurological rehabilitation unit to identify prompts common to and differing between them. Variance types and goal outcomes in all three diagnostic groups were compared. **RESULTS:** 93% of prompts on the care pathway were common to all three diagnostic groups. The prompts that differed were unique to each diagnostic group and provided important guidelines about management. **CONCLUSION:** in neurorehabilitation, where the process of multidisciplinary care is well defined, it is possible to develop a process-based ICP. Process-based ICPs may not be unique to rehabilitation but may also be relevant to other settings in which patients with differing diagnoses share similar needs.

Publication Types: Evaluation Studies Journal Article

PMID:15139730

Clin Med. 2005; 5(4): 368-73.

Plasticity and functional recovery in neurology.

Ramachandran VS.

Center for Brain and Cognition, University of California at San Diego, La Jolla 92093-0109, USA. vramacha@ucsd.edu

Experiments on patients with phantom limbs suggest that neural connections in the adult human brain are much more malleable than previously assumed. Three weeks after amputation of an arm, sensations from the ipsilateral face are referred to the phantom; this effect is caused by the sensory input from the face skin 'invading' and activating deafferented hand zones in the cortex and thalamus. Many phantom arms are 'paralysed' in a painful position. If a mirror is propped vertically in the sagittal plane and the patient looks at the reflection of his/her normal hand, this reflection appears superimposed on the 'felt' position of the phantom. Remarkably, if the real arm is moved, the phantom is felt to move as well and this sometimes relieves the painful cramps in the phantom. Mirror visual feedback (MVF) has shown promising results with chronic regional pain syndrome and hemiparesis following stroke. These results suggest two reasons for a paradigm shift in neurorehabilitation. First, there appears to be tremendous latent plasticity even in the adult brain. Second, the brain should be thought of, not as a hierarchy of organised autonomous modules, each of which delivers its output to the next level, but as a set of complex interacting networks that are in a state of dynamic equilibrium with the brain's environment. Both principles can be potentially exploited in a clinical context to facilitate recovery of function.

Publication Types: Journal Article Review

PMID:16138492

Clin Med. 2005; 5(1): 42-6.

Research networks for stroke rehabilitation: opportunities and barriers.

Forster A, Young J.

Department of Health Care for the Elderly, St Luke's Hospital, Bradford. a.forster@leeds.ac.uk

The previous negative attitude to stroke care is gradually giving way to a more positive approach, stimulated by a growing evidence base and policy initiatives such as the requirement that stroke units be established in all district general hospitals. There is now a new opportunity to link groups of stroke units into research networks to support the implementation of multi-centre trials. Such trials have the potential to increase patient recruitment rates, and will enhance the generalisability of the findings. Recent experience in establishing a stroke rehabilitation research network is reported in this paper.

Publication Types: Journal Article

PMID:15745197

Clin Radiol. 2005; 60(10): 1076-82.

Imaging findings and referral outcomes of rapid assessment stroke clinics.

Widjaja E, Manuel D, et al.

Radiology Department, Royal Hallamshire Hospital, Sheffield, UK. elysa.widjaja@sth.nhs.uk

AIM: A rapid assessment stroke clinic (RASC) was established to provide a rapid diagnostic service to individuals with suspected transient cerebral or ocular ischaemia or recovered non-hospitalized strokes. In this report we review imaging findings and clinical outcomes of patients proceeding to the carotid surgery programme. **METHODS:** Between October 2000 and December 2002, 1339 people attended the RASC. The

findings of head CT and carotid Doppler ultrasound of the 1320 patients who underwent brain and carotid imaging were reviewed, and the number subsequently proceeding to carotid angiography and intervention was reported. RESULTS: CT head scans were normal in 57% of cases; 38% demonstrated ischaemia or infarction; and 3% yielded incidental or other significant findings not related to ischaemia. On screening with carotid Doppler ultrasound, 7.5% showed greater than 50% stenosis on the symptomatic side. A total of 83 patients (6.2%) proceeded to cerebral angiography and 65 (4.8%) underwent carotid endarterectomy or endovascular repair. CONCLUSION: Rapid-access neurovascular clinics are efficient in selecting patients for carotid intervention, but this is at a cost and the number of potential strokes prevented is small. Alternative management pathways based on immediate medical treatment need to be evaluated.
Publication Types: Journal Article
PMID:16179167

Clin Rehabil. 2004; 18(7): 776-84.

An exploration looking at the impact of domiciliary and day hospital delivery of stroke rehabilitation on informal carers.

Low JT, Roderick P, et al.

Royal Free & University College Medical School, London, UK. joseph.low@rfc.ucl.ac.uk

OBJECTIVES: To explore the impact of two methods of post-hospital stroke rehabilitation on both carers' perceptions of the health services offered and their quality of life. SETTING: East Dorset Health Authority. SUBJECTS: Forty-six informal carers were recruited from a sample of 106, initially identified from stroke patients participating in a larger randomized controlled trial. DESIGN: Qualitative methods. METHODS: Semi-structured interviews were used at baseline and six months to explore carers' perception of a good therapy, the advantages and disadvantages of the different services and their fulfilment with the services. In-depth thematic analysis was carried out to explore the impact of the two different methods of service delivery on carers' quality of life. RESULTS: Day hospitals provided carers with respite opportunities, whilst domiciliary stroke teams provided carers with better educational opportunities to be involved in therapy. No qualitative difference was found in the impact that the different services had on carers' quality of life, which were influenced by factors such as the degree of disruption that caring had on their lives, the loss of a shared life and the availability of social support. Ultimately, carers saw the services as providing benefit for survivors and not themselves. CONCLUSIONS: Domiciliary stroke teams provided informal stroke carers with skills that could help improve postdischarge stroke rehabilitation amongst stroke survivors. Informal carers also benefited from the respite elements of day hospital. A mixed model using both domiciliary care and day hospital care, could provide carers with the benefits of education, convenience and respite.

Publication Types: Journal Article

PMID:15573834

Clin Rehabil. 2004; 18(5): 580-6.

Acute stroke unit care combined with early supported discharge. Long-term effects on quality of life. A randomized controlled trial.

Fjaertoft H, Indredavik B, et al.

Department of Neuroscience and Motion, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway. hild.fjartoft@medisin.ntnu.no

OBJECTIVES: The aim of the present trial was to compare the effects of an extended stroke unit service (ESUS) with the effects of an ordinary stroke unit service (OSUS) on long-term quality of life (QoL). DESIGN: One year follow-up of a randomized controlled trial with 320 acute stroke patients allocated either to OSUS (160 patients) or ESUS (160 patients) with early supported discharge and follow-up by a mobile team. The intervention was a mobile team and close co-operation with the primary health care service. All assessments were blinded. MAIN OUTCOME MEASURE: Primary outcome of QoL in this paper was measured by the Nottingham Health Profile (NHP) at 52 weeks. Secondary outcomes measured at 52 weeks were differences between the groups measured by the Frenchay Activity Index, Montgomery-Asberg Depression Scale, Mini-Mental State Score and the Caregivers Strain Index. RESULTS: The ESUS group had a significantly better QoL (mean score 78.9) assessed by global NHP after one year than the OSUS group (mean score 75.2) ($p=0.048$). There were no significant differences between the groups in the secondary outcomes, but a trend in favour of ESUS. Caregivers Strain Index showed a mean score of 23.3 in the ESUS group and 22.6 in the OSUS group ($p=0.089$). CONCLUSION: It seems that stroke unit treatment combined with early supported discharge in addition to reducing the length of hospital stay can improve long-term QoL. However, similar trials are necessary to confirm the benefit of this type of service.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial

PMID:15293492

Clin Rehabil. 2004; 18(3): 238-48.

Evaluation of an extended stroke unit service with early supported discharge for patients living in a rural community. A randomized controlled trial.

Askim T, Rohweder G, et al.

Department of Public Health and General Practice and Department of Neuroscience, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway. torunn.askim@medisin.ntnu.no

OBJECTIVE: To evaluate the effect of an extended stroke unit service (extended service), with early supported discharge and co-ordination of further rehabilitation in co-operation with the primary health care system in three rural municipalities. **DESIGN:** A randomized controlled trial comparing extended service with ordinary stroke unit service (ordinary service). **SUBJECTS:** Sixty-two eligible patients with acute stroke living in the rural municipalities of Malvik, Melhus and Klaebu. **MAIN MEASURES:** The primary outcome was the proportion of patients who were independent according to Modified Rankin Scale (mRS) (independence = mRS < or = 2) 52 weeks after onset of stroke. Secondary outcomes were mRS at 6 and 26 weeks and Barthel Index (BI), Nottingham Health Profile (NHP) and Caregiver Strain Index (CSI) at 6, 26 and 52 weeks. Mortality and length of stay were registered during the 52 weeks. **RESULTS:** Twelve patients (39%) in the extended service group versus 16 patients (52%) in the ordinary service group were independent according to mRS at 52 weeks ($p = 0.444$). The odds ratio for independence (extended service versus ordinary service) was 0.33 (95% confidence interval (CI) 0.088-1.234). According to outcome by secondary measures there were no significant differences except less social isolation on NHP in the extended service group at 26 weeks ($p = 0.046$). There were no significant differences in length of stay. **CONCLUSION:** An extended stroke unit service with early supported discharge seems to have no positive effect on functional outcome for patients living in rural communities, but might give a trend toward better quality of life. There were no significant differences in length of stay.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial

PMID:15137554

Clin Rehabil. 2004; 18(2): 156-63.

Outreach nurse support after stroke: a descriptive study on patients' and carers' needs, and applied nursing interventions.

Boter H, Rinkel GJ, et al.

Rudolf Magnus Institute of Neuroscience, Department of Neurology, University Medical Centre, Utrecht, The Netherlands. H.Boter@azu.nl

OBJECTIVE: To describe the number and types of problems mentioned by successfully contacted home-dwelling stroke patients and their carers, and nursing interventions applied. **DESIGN:** In this multicentre quantitative study in the Netherlands, stroke patients and carers received outreach nurse support consisting of three telephone contacts and one home visit within six months after discharge. Standardized checklists describing a wide range of potential problems were used to record problems and interventions. **SUBJECTS:** A sample of 173 patients admitted for a stroke and discharged home, and 148 carers. **RESULTS:** Of 173 patients, 166 (96%) were contacted and 162 mentioned in total 1419 problems. Physical problems were mentioned most frequently (92%; 153/166), followed by emotional problems (60%; 99/166). The proportion of patients with problems decreased from 94% (142/151) at the first contact to 74% (108/145) at the last contact. Of 148 carers, 118 (80%) were contacted and 84 mentioned 266 problems. 'Psychosocial burden' was mentioned most frequently (45%; 53/118). Proportions of carers with problems were 56% (54/96) at the first contact and 37% (26/70) at the last contact. Of 864 interventions to patients, stroke nurses most frequently applied 'supportive listening' (55%; 471/864) and 'reassuring or encouraging' (12%; 107/864), and of 258 interventions to carers 45% (115/258) were 'supportive listening' and 17% (43/258) 'informing'. **CONCLUSIONS:** Almost all patients and most carers were contacted. Though the number of needs decreased during the consecutive contacts, many patients and carers still raised problems during the last contact. Nurses most frequently applied the intervention 'supportive listening'.

Publication Types: Clinical Trial Journal Article Multicenter Study Randomized Controlled Trial

PMID:15053124

Clin Rehabil. 2005; 19(8): 819-33.

Hyperbaric oxygen therapy for stroke: a systematic review of the evidence.

Carson S, McDonagh M, et al.

Oregon Evidence-based Practice Center, Oregon Health & Science University, Department of Medical Informatics & Clinical Epidemiology, Portland, OR 97239, USA. carsons@ohsu.edu

OBJECTIVE: To identify the benefits and harms of using hyperbaric oxygen therapy to treat acute or subacute stroke or the chronic effects of a stroke. We aimed to identify any gaps in the evidence to provide guidance for future research. **DESIGN:** A systematic review of the evidence. **SEARCH STRATEGY:**

We searched MEDLINE, EMBASE, the Cochrane Library, HealthSTAR, CINAHL, MANTIS, bibliographic databases from professional societies and hyperbaric oxygen therapy practitioners, and reference lists. Databases were searched from inception to December 2003. INCLUSION CRITERIA: Studies: Controlled clinical trials and observational studies published in English. PARTICIPANTS: Patients with ischaemic stroke in any inpatient or outpatient setting. OUTCOMES: Mortality, functional health outcomes and adverse events. Data collection and analysis: Using predetermined criteria, two reviewers assessed each study for inclusion, and abstracted data about study design, population, interventions, and outcomes. We assigned an overall quality rating (good, fair, or poor) based on internal validity. RESULTS: We identified only four randomized controlled trials and one controlled clinical trial. The best evidence shows no benefit to hyperbaric oxygen therapy in patients with stroke, but because the stage of patients enrolled (acute, subacute, or chronic), the documentation of type and severity of stroke, and the dosage of hyperbaric oxygen therapy given varied considerably, the generalizability of these results is limited. We identified 17 observational studies; all were poor quality. CONCLUSIONS: The overall evidence is insufficient to determine the effectiveness of hyperbaric oxygen therapy in any subgroup of stroke patients. To determine if hyperbaric oxygen therapy for stroke provides any benefit and that these outweigh potential harms, good quality studies are needed.

Publication Types: Journal Article

PMID:16323381

Clin Rehabil. 2005; 19(4): 387-97.

Promoting research use in speech and language therapy: a cluster randomized controlled trial to compare the clinical effectiveness and costs of two training strategies.

Pennington L, Roddam H, et al.

Speech and Language Sciences, Newcastle University, UK. lindsay.pennington@ncl.ac.uk

OBJECTIVE: To evaluate the clinical and cost effectiveness of two training strategies to promote the use of research evidence in speech and language therapy (SLT) management of poststroke dysphagia. DESIGN: Pragmatic, cluster randomized trial. SETTING: Seventeen SLT departments in north-west England. PARTICIPANTS: Two SLTs from each department received training and cascaded information across their department. Process of care was measured from the notes of 708 patients with acute poststroke dysphagia across eight departments allocated to training strategy A, and 762 patients across nine departments in strategy B. INTERVENTIONS: Strategy A: training on the critical appraisal of published research papers and practice guidelines. Strategy B: strategy A plus training on management of change in clinical practice. MAIN OUTCOME MEASURES: Pre- and post-training adherence to practice guidelines in poststroke dysphagia management, based on a review of case notes. Incremental cost of increased adherence to clinical guidelines. RESULTS: Departments' practice differed in adherence to guidelines. Departments changed following training ($F=2.22$, df 16, 1436, $p=0.004$). The effect of training strategy on clinical practice was not significant. Strategy B departments engaged in more activities relating to research use following training than strategy A. Total costs of training averaged 12001, 2892 Euros, \$3886 (SD 1502, 726 Euros, \$975) for strategy A and 13366, 4866 Euros, \$6537 (SD 12121, 3066 Euros, \$4119) for strategy B. CONCLUSIONS: Training in research implementation in addition to critical appraisal and guideline introduction is associated with increased dissemination activities and awareness of research information, but not with changes in clinical practice within six months of training. The department in which SLTs work influences their use of research. The process of poststroke dysphagia management can be measured using a tool developed from practice guidelines.

Publication Types: Clinical Trial Journal Article Multicenter Study Randomized Controlled Trial

PMID:15929507

Clin Rehabil. 2005; 19(4): 365-71.

Changing occupational therapy and physiotherapy practice through guidelines and audit in the United Kingdom.

Hammond R, Lennon S, et al.

Chartered Society of Physiotherapy, London.

BACKGROUND: The National Clinical Guidelines for Stroke (NCGS) were produced and three rounds of the National Sentinel Audit of Stroke conducted to improve the quality of stroke care in the UK. OBJECTIVE: To compare the results of the occupational therapy and physiotherapy elements of the most recent national sentinel audit with the occupational therapy- and physiotherapy-specific recommendations of the NCGS. METHODS: Retrospective case-note audit. RESULTS: Over 95% of hospitals/sites who manage stroke in England, Wales and Northern Ireland took part in the most recent round of the sentinel audit. The clinical audit took place from 1 April to 30 June 2001 and incorporated 235 hospitals/sites. The organizational audit took place in January 2002 and incorporated 240 hospitals/sites. Data are presented

from the 235 with both clinical and organizational data, under the headings of: approaches to rehabilitation; carers/families; rehabilitation interventions; and transfer to the community. Low rates of compliance with national standards were observed for all domains. **CONCLUSION:** Our findings suggest that occupational therapists and physiotherapists are not fully complying with the national standards for stroke care.

Publication Types: Journal Article

PMID:15929504

Clin Rehabil. 2005; 19(3): 323-30.

Psychological services for people with stroke: compliance with the U.K. National Clinical Guidelines.

Bowen A, Knapp P, et al.

Humanities, University of Manchester, Oxford Road, Manchester M13 9PL, UK.
audrey.bowen@manchester.ac.uk

BACKGROUND: The UK National Clinical Guidelines for Stroke (2000) include recommendations on psychological services. The third National Sentinel Audit of Stroke was completed in 2001-2002.

OBJECTIVES: To examine the extent to which UK stroke services complied with the national guidelines.

DESIGN: Use of three retrospective case note audits of hospital admissions, covering the period from admission to six months after discharge, and audits of how stroke services were organized. **SETTING:**

Hospitals within England, Wales, Northern Ireland, the Channel Islands and the Isle of Man. **SUBJECTS:**

Stroke patients admitted consecutively within a three-month time frame. **MAIN MEASURES:** Compliance with the guidelines on mood disorders and cognitive impairments, and changes between audits. **RESULTS:**

The 2001-2002 audit provided data on 60% of possible participants, from 145 hospitals and 5152 patients.

Compliance with the guideline to screen for mood disturbance was poor; the median patient compliance rate of hospitals was 50%. More hospitals (88%) had a locally agreed cognitive assessment protocol in 2001-

2002 than in 1998 (68%) and in 1999 (82%). However, actual rates of screening for cognitive difficulties were lower than implied by the existence of a local protocol. There were no strong case-mix associates of mood and cognitive screening. Access to clinical psychologists was poor. Mood and cognitive assessment rates were not much better for stroke units with access to clinical psychologists than for units without access (mood: $p = 0.6$, cognition: $p = 0.09$).

CONCLUSIONS: Although compliance with some of the guidelines has improved, many areas in current psychological services for stroke urgently need attention.

Publication Types: Journal Article Multicenter Study

PMID:15859533

Clin Rehabil. 2005; 19(2): 194-9.

Improving patient and carer communication, multidisciplinary team working and goal-setting in stroke rehabilitation.

Monaghan J, Channell K, et al.

Stroke Team for Audit and Research, University Hospital Aintree, Longmoor Lane, Liverpool L9 7AL, UK.
josephine.monaghan@aht.nwest.nhs.uk

OBJECTIVE: To determine the extent to which three forms of multidisciplinary team (MDT) care in stroke rehabilitation meet the standards set by the United Kingdom National Service Framework (NSF). **DESIGN:**

Consecutive assessment of the three forms of care was completed. **SUBJECTS:** The study included three groups of 25 stroke inpatients on the stroke rehabilitation ward. **INTERVENTION:** (1) A standard weekly MDT meeting using a standard form for documentation; (2) a standard MDT meeting using a newly devised form; and (3) a novel MDT ward round using the new form, and attended by doctors. **RESULTS:** MDT ward rounds result in significantly better consideration of patients' needs (median 7 per patient compared with 0 and 5 in phases one and two), enhanced SMART (specific, measurable, achievable, realistic and time framed) goal-setting (median 3 per patient compared to 1 in phases one and two); greater patient involvement (12 patients compared to 0 and 4 in phases one and two); and improved team working (measured using the team climate inventory) than do MDT meetings. **CONCLUSIONS:** In the present study, standard weekly MDT meetings did not meet the standards set for MDT care by the NSF. The use of a MDT ward round allows these standards to be achieved.

Publication Types: Journal Article

PMID:15759535

Cmaj. 2004; 170(7): 1134-7.

The patient with transient cerebral ischemia: a golden opportunity for stroke prevention.

Johnston DC, Hill MD.

Department of Medicine (Neurology), University of British Columbia, and Centre for Health Evaluation and Outcome Sciences, St. Paul's Hospital, Vancouver. dccj@interchange.ubc.ca

Transient ischemic attack (TIA) provides a golden opportunity for stroke prevention. TIA should be treated as a medical emergency with prompt investigations to determine the mechanism of ischemia and subsequent preventive therapy. The risk of stroke after TIA is estimated to be 10%-20% in the first 90 days. The risk is time-dependent with 50% of the risk accruing in the first 48 hours. In this review, we describe the diagnosis and management of TIA, introduce new concepts in TIA and suggest that all patients with significant TIA should undergo rapid investigation and management to prevent stroke.

Publication Types: Case Reports Journal Article Review PMID:15051699

<http://www.cmaj.ca/contents-by-date.0.shtml>

Cmaj. 2004; 170(7): 1123-33.

Current and future concepts in stroke prevention.

O'Rourke F, Dean N, et al.

Stroke Prevention Clinic, University of Alberta Hospital, Mackenzie Health Sciences Centre.

Stroke is a major cause of morbidity and mortality in an aging population. The current understanding of the pathophysiology of atherosclerotic diseases, the most common cause of stroke, and the evidence for existing therapeutic interventions for the prevention of stroke are presented. Specifically, we review the evidence for antiplatelet agents, anticoagulants, antihypertensive medications, lipid-lowering agents and carotid endarterectomy for stroke prevention.

Publication Types: Journal Article Review PMID:15051698

<http://www.cmaj.ca/contents-by-date.0.shtml>

Cmaj. 2005; 172(10): 1307-12.

Thrombolysis for acute ischemic stroke: results of the Canadian Alteplase for Stroke Effectiveness Study.

Hill MD, Buchan AM.

Department of Clinical Neurosciences, University of Calgary, Calgary, Alta.

BACKGROUND: Thrombolysis for acute ischemic stroke has remained controversial. The Canadian Alteplase for Stroke Effectiveness Study, a national prospective cohort study, was conducted to assess the effectiveness of alteplase therapy for ischemic stroke in actual practice. **METHODS:** The study was mandated by the federal government as a condition of licensure of alteplase for the treatment of stroke in Canada. A registry was established to collect data over 2.5 years for stroke patients receiving such treatment from Feb. 17, 1999, through June 30, 2001. All centres capable of administering thrombolysis therapy according to Canadian guidelines were eligible to submit patient data to the registry. Data collection was prospective, and follow-up was completed at 90 days after stroke. Copies of head CT scans obtained at baseline and at 24-48 hours after the start of treatment were submitted to a central panel for review. **RESULTS:** A total of 1135 patients were enrolled at 60 centres in all major hospitals across Canada. The registry collected data for an estimated 84% of all treated ischemic stroke patients in the country. An excellent clinical outcome was observed in 37% of the patients. Symptomatic intracranial hemorrhage occurred in only 4.6% of the patients (95% confidence interval [CI] 3.4%-6.0%); however, 75% of these patients died in hospital. An additional 1.3% (95% CI 0.7%-2.2%) of patients had hemiorolingual angioedema. **CONCLUSIONS:** The outcomes of stroke patients undergoing thrombolysis in Canada are commensurate with the results of clinical trials. The rate of symptomatic intracranial hemorrhage was low. Stroke thrombolysis is a safe and effective therapy in actual practice.

Publication Types: Journal Article Multicenter Study PMID:15883405

<http://www.cmaj.ca/contents-by-date.0.shtml>

Cmaj. 2005; 172(3): 363-5.

The Canadian Stroke Quality of Care Study: establishing indicators for optimal acute stroke care.

Lindsay MP, Kapral MK, et al.

Institute for Clinical Evaluative Sciences and the Department of Medicine, University of Toronto, Toronto, Ont. patty.lindsay@utoronto.ca

Publication Types: Journal Article PMID:15684120

<http://www.cmaj.ca/contents-by-date.0.shtml>

Cochrane Database Syst Rev. 2005; 4: CD001925.

Antiplatelet therapy for preventing stroke in patients with non-valvular atrial fibrillation and no previous history of stroke or transient ischemic attacks.

Aguilar M, Hart R.

BACKGROUND: Non-valvular atrial fibrillation (AF) carries an increased risk of stroke. Antiplatelet therapy (APT) is proven effective for stroke prevention in most patients at high-risk for vascular events, but its

value for primary stroke prevention in patients with non-valvular AF merits separate consideration because of the suspected cardioembolic mechanism of most strokes in AF patients. OBJECTIVES: To assess the efficacy and safety of long-term APT for primary prevention of stroke in patients with chronic non-valvular AF. SEARCH STRATEGY: We searched the Cochrane Stroke Group Trials Register (searched August 2004). In addition, we searched the Cochrane Central Register of Controlled Trials (The Cochrane Library Issue 1, 2005), MEDLINE (1966 to June 2004), and the reference lists of recent review articles. We also contacted experts working in the field to identify unpublished and ongoing trials. SELECTION CRITERIA: Randomized trials comparing long-term APT with placebo or control in patients with non-valvular AF and no history of transient ischemic attack (TIA) or stroke. A sensitivity analysis included one additional randomized trial involving primary prevention with aspirin plus very low dose warfarin. DATA COLLECTION AND ANALYSIS: Two authors independently selected trials for inclusion and extracted data for each outcome. Unpublished data were obtained from trial investigators. MAIN RESULTS: Three trials tested aspirin in dosages ranging from 75 mg to 325 mg per day and 125 mg every other day to placebo (in two trials) or control (in one trial) in 1965 AF patients without prior stroke or TIA. The mean duration of follow up averaged 1.3 years per participant. Aspirin was associated with non-significant lower risks of all stroke (odds ratio (OR) 0.70, 95% confidence interval (CI) 0.47 to 1.07), ischemic stroke (OR 0.70, 95% CI 0.46 to 1.07), all disabling or fatal stroke (OR 0.86, 95% CI 0.50 to 1.49) and all-cause death (OR 0.75, 95% CI 0.54 to 1.04). The combination of stroke, myocardial infarction or vascular death was significantly reduced (OR 0.71, 95% CI 0.51 to 0.97). No increase in intracranial hemorrhage or major extracranial hemorrhage was observed. AUTHORS' CONCLUSIONS: Aspirin appears to reduce stroke and major vascular events in patients with non-valvular AF similar to its effect in other high-risk patients (ie by about 25%). For primary prevention among AF patients with an average stroke rate of 4% per year, about 10 strokes would likely be prevented yearly for every 1000 AF patients given aspirin.

Publication Types: Journal article PMID:16235290

<http://thecochranelibrary.com>

Crit Care Med. 2004; 32(11): 2365-6.

Futility in stroke care-still a concept in progress.

Mirsen TR.

Publication Types: Comment Editorial Review PMID:15640667

Crit Care Med. 2004; 32(11): 2332-42.

Absolutely no hope? Some ambiguity of futility of care in devastating acute stroke.

Wijdicks EF, Rabinstein AA.

Neurological-Neurosurgical Intensive Care Unit, Saint Marys, Mayo Clinic College of Medicine, Rochester, MN 55905, USA. wijde@mayo.edu

OBJECTIVE: Devastating stroke can produce irreversible brain damage of massive proportions. In those patients, continuation of aggressive medical or surgical care may be futile and may unnecessarily prolong the suffering of families. Therefore, it is essential for clinicians to be aware of key clinical and radiologic features predictive of poor outcome. There has not been a critical review of the data used to make decisions of withdrawal of care in patients with severe strokes. DATA SOURCE: Literature review. DATA SYNTHESIS: Although in many instances the studies that validate these prognosticators represent class III or class IV evidence, there are several clinico-radiologic profiles that have consistently been predictive of mortality or dependency after cerebrovascular catastrophes. CONCLUSIONS: Inconclusiveness remains in the determination of futility of care after major stroke. However, predictors of dismal outcome after several types of stroke have been identified and are relevant information in regard to withdrawal of care.

Publication Types: Journal Article Review PMID:15640651

Curr Atheroscler Rep. 2004; 6(4): 257-60.

Randomized clinical stroke trials in 2003.

Rabadi MH, Blass J.

Burke Rehabilitation Hospital and Medical Research Institute, Weill Medical College of Cornell University, 785 Mamaroneck Avenue, White Plains, NY 10605, USA. mrabadi@burke.org

Randomized clinical stroke trials published during 2003 dealt with what impact treatment of stroke risk factors have on reducing future strokes. Treatment of hypertension and hyperlipidemia, and atrial fibrillation with a new anticoagulant, were confirmed to be beneficial. Treatment with female hormones was not beneficial. A potentially important study indicated that donepezil is a useful treatment for dementia in people who have had strokes.

Publication Types: Journal Article Review PMID:15191698

Curr Med Res Opin. 2005; 21(10): 1617-29.

Review of the cost of diabetes complications in Australia, Canada, France, Germany, Italy and Spain.

Ray JA, Valentine WJ, et al.

CORE--Center for Outcomes Research, Binningen/Basel, Switzerland. ray@thecenter.ch

OBJECTIVES: To provide a comprehensive source document on previously published cost data for diabetic complications in Australia, Canada, France, Germany, Italy and Spain for use in a peer-reviewed, validated diabetes model. **METHODS:** A search for published cost of diabetes complications data was performed in peer-reviewed journals listed in PubMed and health economic conference proceedings from 1994 to March 2005. Where country specific data were not available, we referred to government websites and local cost experts. All costs were inflated to 2003 Euros (E). Major complication costs are presented. **RESULTS:** First year costs of non-fatal myocardial infarction varied between E19277 in Spain and E12292 in Australia. In subsequent years of treatment, this range was E1226 (France) to E203 (Australia). Angina costs were similar across all four countries: E1716 in Australia; E2218 in Canada; E2613 in France; E3342 in Germany; E2297 in Italy; and E2207 in Spain. Event costs of non-fatal stroke were higher in Canada (E23173) than in other countries (Australia E13443; France E11754; Germany E19399; Italy E6583; Spain E4638). Event costs of end-stage renal disease varied depending on the type of dialysis: in Australia (E17188-27552); Canada (E33811-58159); France (E24608-56487); Germany (E46296-68175); Italy (E43075-56717); and Spain (E28370-32706). Lower extremity amputation costs were: E18547 (Australia); E17130 (Canada); E31998 (France); E22096 (Germany); E10177 (Italy); and E14787 (Spain). **CONCLUSIONS:** Overall, our search showed costs are well documented in Australia, Canada, France and Germany, but revealed a paucity of data for Spain and Italy. Spanish costs, collected by contacting local experts and from government reports, generally appeared to be lower for treating cardiovascular complications than in other countries. Italian costs reported in the literature were primarily hospitalization costs derived from diagnosis-related groups, and therefore likely to misrepresent the cost of specific complications. Additional research is required to document complication costs in Spain and Italy. Australian and German values were collected primarily by referring to diagnostic related group (DRG) tariffs and, as a result, there may be a need for future economic evaluations measuring the accuracy of the costs and resource utilization in the reported values. These cost data are essential to create models of diabetes that are able to accurately simulate the cumulative costs associated with the progression of the disease and its complications.

Publication Types: Journal Article PMID:16238902

Curr Med Res Opin. 2005; 21(1): 19-26.

Overview of costs of stroke from published, incidence-based studies spanning 16 industrialized countries.

Palmer AJ, Valentine WJ, et al.

CORE - Center for Outcomes Research, Basel, Switzerland. ap@thecenter.ch

OBJECTIVE: The aim of this review is to summarize published data (based on a search of Medline sources, 1993-October 2003) from the last 10 years on the costs of stroke. With the recent encouraging evidence of interventions that reduce the incidence of stroke, the primary focus is on incidence-based cost of stroke studies to identify important factors for future cost-effectiveness analyses on stroke interventions. **FINDINGS:** Lifetime costs per patient were in the range USD 11 787 for 'unclassified' stroke in Australia to USD 3035671 in stroke patients with untreated non-rheumatic atrial fibrillation in a UK setting (costs inflated to 2003 values). For the lifetime costs of ischemic stroke only, the range narrowed to USD 41257 in Australia and USD 104629 in the UK. These data confirm that stroke management is associated with a vast economic burden. No correlation of lifetime cost of stroke with specific cost components or time horizon was identified. The cost of stroke is influenced by severity (more severe strokes cost more due to extended hospitalization), age (costs were greater in younger stroke patients) and gender (direct costs were greater for women, but indirect costs were greater in men). **CONCLUSION:** Conducting research according to methodological consensus would markedly improve the quality of data from future studies of stroke and support identification of the main cost drivers in different country-specific settings.

Publication Types: Journal Article Review PMID:15881472

Curr Neurol Neurosci Rep. 2004; 4(1): 31-5.

Understanding stroke recovery and rehabilitation: current and emerging approaches.

Dombovy ML.

Department of Physical Medicine and Rehabilitation, Unity Health System, University of Rochester, 89 Genesee Street, Rochester, NY 14611, USA. mdombovy@unityhealth.org

Although stroke is the third leading cause of death in the United States, it is the significant disability among survivors that has the greatest impact on healthcare and society. It is currently accepted that comprehensive rehabilitation programs improve outcome following stroke. We are now trying to discern

which specific therapeutic approaches work and which do not. Years of animal research have resulted in a better understanding of what occurs in the brain following stroke and how the brain may reorganize in response to treatment. Repetitive use of the involved extremities appears key to optimal behavioral recovery and optimal brain reorganization. The advent of technology such as functional magnetic resonance imaging and transcortical magnetic stimulation has allowed the study of brain reorganization following stroke and rehabilitation in humans. Certain drugs also appear to influence neuroplasticity after stroke. Timing of therapy and drug delivery appears crucial; the optimal "critical period" has not yet been clearly identified. New approaches are slow to reach widespread adoption. Neural transplantation combined with repetitive training approaches produces behavioral recovery in animals and offers hope for the future.

Publication Types: Journal Article Review PMID:14683625

Curr Neurol Neurosci Rep. 2004; 4(1): 13-8.

Organization of regional and local stroke resources: methods to expedite acute management of stroke.

Kennedy J, Ma C, et al.

Department of Clinical Neurosciences, University of Calgary, Foothills Hospital, Room 1162, 1403 29th Street NW, Calgary, AB T2N 2T9, Canada.

Proving the efficacy of thrombolysis in improving outcome from stroke has put time to assessment of patients at the forefront for healthcare providers when organizing stroke care. The chain of recovery begins with the patient. Efforts are being made to improve the general public's understanding of stroke. However, it appears at the moment that a greater effect in reducing the delay to initial medical assessment and treatment decision is to be gained through streamlining care as soon as 911 has been called. Emergency medical services dispatchers and technicians play a key role in recognizing that a patient is having a stroke and prioritizing the transport of the patient to an appropriate facility. Emergency departments need to have clear protocols in place to ensure that physicians can make prompt treatment decisions after having fully assessed and investigated the patient. Only with all these pieces in place is the initial phase of the chain of recovery complete, with the end result that more patients have the chance to have an improved outcome from stroke.

Publication Types: Journal Article Review PMID:14683622

Curr Opin Lipidol. 2005; 16(6): 601-5.

Statin therapy for prevention and treatment of acute and chronic cardiovascular disease: update on recent trials and metaanalyses.

Briel M, Nordmann AJ, et al.

Basel Institute for Clinical Epidemiology, University Hospital Basel, Basel, Switzerland.

PURPOSE OF REVIEW: To summarize the evidence from recent clinical trials and metaanalyses on the efficacy of statin therapy to reduce death, myocardial infarction and stroke, and to review the effects of statins in patients with low LDL cholesterol, diabetes, end-stage renal disease, and acute coronary syndrome. **RECENT FINDINGS:** In large metaanalyses of randomized controlled trials relative risk reductions from statins compared with placebo for patients with manifest or with risk factors for coronary artery disease were 13% for overall mortality, 26% for fatal and nonfatal myocardial infarction, and 18% for fatal and nonfatal stroke. Evidence from large trials suggests that patients with type II diabetes compared with patients without diabetes have similar risk reductions from statins for cardiovascular events, but this benefit is not seen in patients with diabetes and end-stage renal disease. In patients with acute coronary syndrome, early treatment with high-dose atorvastatin reduces cardiovascular morbidity after the first 4 months following the event, but the impact on mortality endpoints remains less clear. Results from recent trials in patients with stable coronary artery disease or type II diabetes suggest that statins provide benefit at considerable low LDL cholesterol levels. Therefore, target values for LDL cholesterol of less than 1.8 mmol/l (<70 mg/dl) should be considered for all patients with coronary artery disease or equivalent coronary risk. **SUMMARY:** For patients at high risk of coronary artery disease there is growing evidence for the concept of 'the lower, the better' regarding LDL cholesterol levels. Ongoing trials are further investigating the safety of lower target values in patients at various risk of coronary artery disease.

Publication Types: Journal Article PMID:16276235

Curr Opin Neurol. 2005; 18(6): 681-691.

Assessment of subjective health and health-related quality of life in persons with acquired or degenerative brain injury.

von Steinbuechel N, Richter S, et al.

aMedical Psychology bDepartment of Psychogeriatrics, University Clinic, Geneva, Switzerland cFaculty of Psychology and Gerontopsychology dMR-Research in Neurology and Psychiatry, Georg-August-University, Göttingen, Germany eCentre for Reviews and Dissemination, University of York, York, UK.

PURPOSE OF REVIEW: Health-related quality of life is a new outcome variable in neurology. Several generic measures aim at assessing this variable in adults with neurological diseases. Disease-specific measures are still rare; however, individuals with neurological diseases frequently suffer from cognitive impairment, yet are often excluded from health-related quality of life investigations. When included in such studies, cognitive functioning is not monitored via neuropsychological evaluation, possibly leading to methodological problems. Papers from May 2004 until July 2005 are reviewed with respect to psychometric quality and information about persons after traumatic brain injury, stroke, Parkinson's disease or dementia. **RECENT FINDINGS:** Several new cross-sectional and longitudinal outcome studies are reviewed. The Medical Outcome Study Short Form with 36 items, the Sickness Impact Profile and the Nottingham Health Profile were identified as the most frequently used measures in neurology. For traumatic brain injury, two new generic instrument validations (Life Satisfaction Index-A, Subjective Quality of Life Profile) and one internationally validated disease-specific development (Quality of Life after Brain Injury) were found; for stroke, one disease-specific tool (Burden of Stroke Scale) was identified. In Parkinson's disease, the disease-specific health-related quality of life measure Parkinson's Disease Questionnaire-39 is well validated. In dementia, three dementia-specific instruments (Quality of Life for Dementia, Quality of Life in Late-Stage Dementia Scale and Quality of Life in Alzheimer's Disease Scale) seem to be valid. **SUMMARY:** In neurology, only a few measures have been developed and validated for respondents with cognitive impairment, often showing poorer validity results than studies involving healthy persons. Health-related quality of life assessment should therefore be validated in the specific diseases and, if necessary, combined with a neuropsychological evaluation and a disease-specific health-related quality of life measure.

Publication Types: Journal article PMID:16280680

Dis Manag Advis. 2005; 11(3): 25-8.

A DM-style approach to stroke recovery.

Publication Types: Journal Article PMID:15846968

Disabil Rehabil. 2004; 26(20): 1198-205.

Characteristics of physiotherapy sessions from the patient's and therapist's perspective.

Wohlin Wottrich A, Stenstrom CH, et al.

Division of Physiotherapy, Neurotec Department, Karolinska Institutet, Stockholm, Sweden.
annica.wohlin.wottrich@neurotec.ki.se

PURPOSE: The purpose was to explore, describe and compare the characteristics of physiotherapy sessions with patients after stroke from two perspectives: the patients' and the physiotherapists', in relation to observed behaviour. **METHODS:** A qualitative, descriptive, comparative approach was used. Nine patients and 10 physiotherapists participated. Data from observations and semi-structured interviews were used. **RESULTS:** Six themes were identified: setting and attaining goals, focusing on motor activity, finding the optimal training strategy, facilitating active patient involvement, making use of environmental factors and adjusting to the structural reorganization of the rehabilitation services. The physiotherapists and the patients made similar descriptions in some of the themes but differed in some. The physiotherapists expressed what they perceived to be their lack of scientific knowledge, while the patients trusted their physiotherapists' competence. The physiotherapists wanted to take the patients' personal experiences into account in the sessions, which was not obvious to the patients. **CONCLUSION:** Differences in physiotherapists' and patients' descriptions of characteristics of physiotherapy sessions have to be taken into consideration in the rehabilitation of stroke patients. In order to empower the patient to take a more active part in the rehabilitation process, there is a need to explore how to incorporate the patients' personal experiences and knowledge into the rehabilitation process.

Publication Types: Journal Article PMID:15371020

Disabil Rehabil. 2004; 26(4): 191-7.

Prognostic social factors in the subacute phase after a stroke for the discharge destination from the hospital stroke-unit. A systematic review of the literature.

Meijer R, van Limbeek J, et al.

Department of Rehabilitation Medicine, Academic Medical Centre, Amsterdam, The Netherlands.
r.meijer@grootklimmendaal.nl

PURPOSE: The objective of our study was to identify prognostic social factors in the subacute phase after stroke for the discharge destination from the hospital stroke-unit. **METHODS:** A systematic literature

search was performed, designed in accordance with the Cochrane Collaboration criteria. Internal, statistical and external validity of the studies were assessed using a checklist with 11 methodological criteria. RESULTS: Characteristics of the social situation that proved to be important for prediction of the discharge destination are marital status and social support. Quantity and methodological quality of the research studies were insufficient, and the number of possible social prognostic factors investigated was limited by the absence of a conceptual framework of social subdomains in the studies, including an unambiguous definition of the prognostic social factors within these subdomains. CONCLUSIONS: A great need exists for research into the prognostic qualities of the following social factors: the ability to provide support, presence, and readiness of the homefront; the availability of professional care, personal financial means, membership of societies and clubs, frequency of contacts with close relatives and friends; the quality of the patient's residence with regard to the adaptation to the needs and abilities of the patient. A commitment about the aforementioned conceptual framework is mandatory.
Publication Types: Journal Article Review PMID:15164952

Disabil Rehabil. 2005; 27(20): 1253-9.

Deep vein thrombosis and pulmonary embolism in an ambulatory chronic stroke patient.

Lee SG, Kim JH, et al.

Department of Physical Medicine and Rehabilitation, Research Institute of Medical Sciences, Chonnam National University Medical School & Hospital, Gwangju City, Republic of Korea.

PURPOSE: Deep vein thrombosis (DVT) is a well-known complication of stroke and frequently develops in acute stroke patients. Immobility in stroke patients increases the risk of DVT and pulmonary embolism (PE). The incidence of DVT in non-ambulatory stroke patients is more frequent than the incidence in ambulatory stroke patients. We report a case of DVT and PE in an ambulatory chronic stroke patient.

METHOD: Initial physical examination showed heat and swelling of hemiplegic leg. The patient was only able to ambulate with the assist of a monocane and a plastic leaf spring orthosis due to ankle dorsiflexor weakness. The patient was treated with anticoagulation and inferior vena cava filter placement. RESULTS: After long-term anticoagulation, follow-up studies revealed satisfactory resolution of DVT and PE. CONCLUSIONS: We present a case of DVT and PE which developed during the chronic stage of stroke, 2 years from the onset of stroke, and review the cause of DVT.

Publication Types: Journal Article PMID:16298927

Eur J Epidemiol. 2004; 19(11): 999-1003.

Recurrent ischaemic stroke hospitalisations: a retrospective cohort study using Western Australia linked patient records.

Lee AH, Yau KK, et al.

Department of Epidemiology and Biostatistics, School of Public Health, Curtin University of Technology, Perth, Australia. Andy.Lee@curtin.edu.au

A retrospective cohort study was undertaken to determine factors that affect the frequency of recurrent ischaemic stroke hospitalisations. Linked hospitalisation records of all Western Australian patients admitted for ischaemic stroke for the first time during July-December 1995 were retrieved until December 2000 to derive the number of readmissions for recurrent strokes, patient medical conditions and co-morbidities at the index episode. A negative binomial regression model adjusting for inter-hospital variations was used to determine the prognostic factors influencing recurrent stroke hospitalisations. Of the 678 patients in the cohort, 124 (18.3%) experienced repeated episodes of ischaemic stroke. Rural residence and carotid endarterectomy procedure were positively associated with the recurrence frequency, the adjusted incidence rate ratio being 1.66 (95% CI: 1.17-2.36) and 3.96 (95% CI: 2.30-6.82), respectively. Rural patients contributed to 18% of the patients in the cohort yet they accounted for 27% of those sustaining repeated episodes of stroke. Readmissions were also related to the presence of diabetes at the index episode. The effect of diabetes, with adjusted incidence rate ratio 1.35 (95% CI: 1.01-1.79), was only evident after accounting for within hospital correlations. These findings have implications on hospital resource planning and secondary preventive strategies to reduce the burden of stroke.

Publication Types: Journal Article PMID:15648592

Eur J Health Econ. 2004; 5 Suppl 1: S74-83.

Economic evidence in stroke: a review.

Ekman M.

Stockholm Health Economics, Stockholm, Sweden. mattias.e@healtheconomics.se

Publication Types: Journal Article Review

PMID:15754078

Eur J Neurol. 2005; 12(9): 665-80.

EFNS guidelines on cognitive rehabilitation: report of an EFNS task force.

Cappa SF, Benke T, et al.

Department of Psychology, Vita Salute San Raffaele S. Raffaele University, Milano, Italy.
cappa.stefano@hsr.it

Disorders of language, spatial perception, attention, memory, calculation and praxis are a frequent consequence of acquired brain damage [in particular, stroke and traumatic brain injury (TBI)] and a major determinant of disability. The rehabilitation of aphasia and, more recently, of other cognitive disorders is an important area of neurological rehabilitation. We report here a review of the available evidence about effectiveness of cognitive rehabilitation. Given the limited number and generally low quality of randomized clinical trials (RCTs) in this area of therapeutic intervention, the Task Force considered, besides the available Cochrane reviews, evidence of lower classes which was critically analysed until a consensus was reached. In particular, we considered evidence from small group or single cases studies including an appropriate statistical evaluation of effect sizes. The general conclusion is that there is evidence to award a grade A, B or C recommendation to some forms of cognitive rehabilitation in patients with neuropsychological deficits in the post-acute stage after a focal brain lesion (stroke, TBI). These include aphasia therapy, rehabilitation of unilateral spatial neglect (ULN), attentional training in the post-acute stage after TBI, the use of electronic memory aids in memory disorders, and the treatment of apraxia with compensatory strategies. There is clearly a need for adequately designed studies in this area, which should take into account specific problems such as patient heterogeneity and treatment standardization.

Publication Types: Guideline Journal Article PMID:16128867

Eur J Neurol. 2005; 12 Suppl 1: 78-84.

Cost of stroke in Europe.

Truelsen T, Ekman M, et al.

Department of Neurology, Bispebjerg University Hospital, Copenhagen, Denmark.

Publication Types: Journal Article PMID:15877785

Eur J Public Health. 2004; 14(4): 338-42.

Place, time and certified cause of death in people who die after hospital admission for myocardial infarction or stroke.

Goldacre MJ, Roberts SE, et al.

Unit of Health-Care Epidemiology, Department of Public Health, University of Oxford, OX3 7LF, UK.
michael.goldacre@dphpc.ox.ac.uk

BACKGROUND: Two areas of uncertainty about routine statistics for mortality after hospital admission for myocardial infarction (MI) or stroke are i) whether most deaths occur in the admission episode itself rather than after discharge, and ii) whether most deaths are certified on death certificates as, respectively, MI or stroke. **METHODS:** Use of linked hospital and mortality statistics to analyse the time, place and certified cause of death in people aged 35-74 after admission for MI or stroke. **RESULTS:** Of 7,964 deaths within a year of admission for MI, 5,686 (71.4%) occurred within 30 days of admission. Of these, 4,856 (85.4%) occurred during the initial hospital admission. Of 7,070 deaths within a year of admission for stroke, 4,905 (69.4%) were within 30 days, and 4,509 (91.9%) of these occurred during the initial admission. As expected, deaths at longer intervals than 30 days occurred mainly after discharge. Of deaths within 30 days of MI and stroke, 85.2% and 80.0%, respectively, were certified with MI or stroke as the underlying cause of death. **CONCLUSION:** In-hospital death rates alone, calculated without record linkage to death certificates, would have identified most deaths that occurred within 30 days of admission. Nonetheless, linkage added to completeness of ascertainment even within this time period. Data without linkage are unreliable in identifying deaths at longer time intervals. Routine mortality statistics for MI and stroke, as the underlying cause, reliably included most deaths that occurred within 30 days of admission for each respective disease.

Publication Types: Journal Article PMID:15542866

Eur Neurol. 2004; 51(1): 35-7.

Factors influencing the pre- and in-hospital management of acute stroke--data from a Greek tertiary care hospital.

Koutlas E, Rudolf J, et al.

Department of Neurology, Papageorgiou Regional General Hospital, Thessaloniki, Greece.

In a prospective observational study, data on pre- and in-hospital management of acute stroke patients were collected from 100 consecutive patients admitted to the emergency room (ER) of Papageorgiou

Hospital, a tertiary health care facility in Thessaloniki, Greece. Public emergency services were used by 58% of the patients, and 42% were brought by their relatives. 27% of the patients arrived within 1.5 h, 45% within 3 h, and 71% within 6 h from symptom onset. The median interval from ER arrival to examination by a board-certified neurologist was 20 min (range 5-40 min). Time from ER arrival until brain CT scan ranged from 17 min to 28 h, with a median of 1.7 h. The majority (57%) of acute stroke patients reached hospital and received adequate diagnostic and treatment within 6 h, and approximately 30% even within 3 h from symptom onset. Thus, and in contrast to widespread perception, there is a time window for hyper-acute stroke treatment in Greek public hospitals. However, the fraction of patients eligible for acute treatment may be increased by shortening both the interval from symptom onset to hospital arrival, and also the door-to-CT interval.

Publication Types: Journal Article

PMID:14685017

Expert Rev Cardiovasc Ther. 2005; 3(4): 571-90.

Acute anticoagulation adjustment in patients with atrial fibrillation at risk for stroke: approaches, strategies, risks and benefits.

Olshansky B, Guo H.

Cardiac Electrophysiology, University of Iowa Hospitals, 4426A JCP, 200 Hawkins Drive, Iowa City, IA 52242, USA. brian-olshansky@uiowa.edu

The acute management of anticoagulation in patients with atrial fibrillation to prevent stroke and other thromboembolic complications includes the use of individualized strategies tailored to the patient and based on the situation (cardioversion, surgeries, dental procedures, cardiac interventions, other invasive procedures and initiation of, or adjustment to, warfarin dosing). The vast range of choices can cause confusion and few randomized controlled clinical trials in this area provide adequate guidance. Chronic anticoagulation management is more straightforward since clinical evidence is ample, randomized clinical trial data provides cogent information and guidelines have been established. Acute management of anticoagulation in patients with atrial fibrillation to prevent thromboembolic complications is often unrecognized but is emerging as a crucial, but challenging, and increasingly complex aspect of the care of patients with atrial fibrillation. This review addresses issues regarding such patients who may be at risk for stroke and require acute adjustments of anticoagulation (in light of, or in lieu of, chronic anticoagulation). Several promising new strategies are considered in light of established medical care. This analysis provides practical recommendations based on available data and presents results from recent investigations that may provide insight into future strategies.

Publication Types: Journal Article

PMID:16076269

Expert Rev Cardiovasc Ther. 2005; 3(3): 405-12.

Acute stroke hypertension: current and future management.

Eames PJ, Mistri AK, et al.

University of Leicester, Ageing and Stroke Medicine, Department of Cardiovascular Science, University Hospitals of Leicester, NHS Trust, Gwendolen Road, Leicester, LE5 4PW, UK.

The management of hypertension in acute stroke remains a hotly debated issue. Clinical practice varies widely between physicians, and both European and US guidelines reflect the uncertainty surrounding this question. Although there is a large amount of data that, on the whole, tends to support a connection between poststroke hypertension and hypotension and worse outcome, there have been few randomized controlled trials to clarify whether pharmacologic intervention is safe or beneficial. Data from secondary prevention trials convincingly demonstrate the benefits of controlling hypertension after a stroke but do not guide us as to how early to implement therapy. There is even less information from trials regarding the use of pressor agents in hypotensive stroke patients. This review discusses the dilemmas in the management of acute stroke hypertension and summarizes the available evidence from studies involving a variety of both depressor and pressor agents. The authors detail the ongoing studies that will help to answer some of the outstanding questions and summarizes the existing guidelines regarding indications for acute stroke blood pressure manipulation currently available to physicians.

Publication Types: Journal Article

PMID:15889968

Gait Posture. 2005; 22(3): 267-81.

A review of standing balance recovery from stroke.

Geurts AC, de Haart M, et al.

St. Maartenskliniek Research, Nijmegen, The Netherlands. ach.geurts@planet.nl

Recently, interest in the mechanisms underlying balance recovery following stroke has grown, because insight into these mechanisms is necessary to develop effective rehabilitation strategies for different types of stroke. Studies dealing with the recovery of standing balance from stroke are, however, limited to rehabilitation inpatients with a unilateral supratentorial brain infarction or haemorrhage. In most of these patients, stance stability improves in both planes as well as the ability to compensate for external and internal body perturbations and to control posture voluntarily. Although there is evidence of true physiological recovery of paretic leg muscle functions in postural control, particularly during the first three months post-stroke, substantial balance recovery also occurs in patients when there are no clear signs of improved support functions or equilibrium reactions exerted through the paretic leg. This type of recovery probably takes much longer than 3 months. Apparently, mechanisms other than the restoration of paretic leg muscle functions may determine the standing balance recovery in patients after severe stroke. No information is available about the role of stepping responses as an alternative to equilibrium reactions for restoring the ability to maintain upright stance after stroke. The finding that brain lesions involving particularly the parieto-temporal junction are associated with poor postural control, suggests that normal sensory integration is critical for balance recovery. Despite a considerable number of intervention studies, no definitive conclusions can be drawn about the best approach to facilitate the natural recovery of standing balance following stroke.

Publication Types: Journal Article

PMID:16214666

Health Policy. 2004; 69(3): 305-15.

Economic benefit from clinical practice guideline compliance in stroke patient management.

Quaglini S, Cavallini A, et al.

Department of Computer Science and Systems, University of Pavia, Via Ferrata No. 1, 27100 Pavia, Italy. silvana.quaglini@unipv.it

BACKGROUND AND PURPOSE: In a previous study we showed that compliance with evidence-based guidelines improves the health outcome of stroke patients in terms of both survival and residual disability. In this analysis, we shall investigate the impact of such guidelines on healthcare costs during the acute/sub-acute hospitalisation phase. **METHOD:** we considered the direct costs from the hospital's point of view, where funding is provided by the National Healthcare System. We did not consider production loss or intangible costs related to the decreased quality of life. Data was collected on both costs and guideline compliance prospectively, and the relationship between them was studied through a multivariate statistical model. **RESULTS:** Patients treated according to guidelines result in lower costs; on average they have a shorter length of stay in hospital (10.8 versus 12.9 days), leading to a significant difference in the consumption of hospital resources. On a level of statistical analysis, guideline compliance is a significant independent indicator of cost, together with the patient's initial disability and neurological deficit.

Publication Types: Journal Article Multicenter Study

PMID:15276310

Health Policy. 2005; 73(2): 202-11.

Hospital cost of ischemic stroke and intracerebral hemorrhage in Japanese stroke centers.

Yoneda Y, Okuda S, et al.

Division of Neurology, Hyogo Brain and Heart Center and Kobe Red Cross Hospital, 1-3-1 Wakihama Bay Street, Chuo-ku, Kobe 651-0073, Japan. y-yoneda@kobe.jrc.or.jp

BACKGROUNDS: In Japan, the healthcare expenditure has increased to 8.0% of the gross domestic products in 2001. Stroke care is costly. **OBJECTIVE:** To examine hospital costs and clinical outcomes of ischemic stroke (IS) and intracerebral hemorrhage (ICH) in Japanese stroke centers. **DESIGN:** A prospective non-interventional multi-center study. **SETTING:** Ten Japanese stroke centers. **STUDY PERIOD:** Fourteen months between October 2000 and December 2001. **PATIENTS:** Patients were those who were consecutively hospitalized with acute IS or ICH within 72 h of onset, excluding subarachnoid hemorrhage. Stroke was defined as focal neurological deficits lasting more than 24 h and the relevant lesions were to be confirmed by brain CT and/or MRI. **METHODS:** We examined demography, in-hospital cares, length of hospital stay, clinical outcomes at discharge, and direct hospital medical costs including physician's fees. The hospital medical cost data were collected from official hospital medical cost charts for reimbursement to the healthcare insurance systems. **RESULTS:** There were a total of 1113 patients with a mean age of 70 years, of whom 913 (82%) patients had an IS and 200 (18%) patients had an ICH. The 317 patients (28%) experienced a recurrent stroke. Patients with ICH had the higher baseline stroke severity, resulting in longer hospitalization (39 days for IS and 46 days for ICH; $P < 0.001$), lower independence rate at discharge (55 and 40%; $P < 0.001$), higher mortality rate (5 and 10%; $P = 0.03$), and higher medical costs (US dollar 8662 and US dollar 10,260; $P < 0.001$) than those with IS. Patients with recurrent stroke had

significantly older age, higher stroke severity, and lower independence rate at discharge than those with first-ever stroke. The length of stay, in-hospital mortality, and hospital medical costs were similar among first-ever and recurrent strokes. In subtype of IS, patients with cardioembolic stroke had the worst neurological deficits, poorest outcomes, and highest medical costs. The hospital costs had a greatest association with length of stay. CONCLUSIONS: Stroke care is costly in Japan. ICH is more likely to impose substantial physical and economic burden than IS. Because the cares of both first-ever and recurrent stroke were costly, primary and secondary prevention of stroke is important on the healthcare aspects.

Publication Types: Journal Article Multicenter Study

PMID:15978963

Health Policy. 2005; 71(3): 359-73.

A comparison of patient characteristics and rehabilitation treatment content of chronic low back pain (CLBP) and stroke patients across six European countries.

Engbers LH, Vollenbroek-Hutten MM, et al.

Roessingh Research & Development, Roessinghsbleekweg 33B, 7522 AH Enschede, The Netherlands.

BACKGROUND: So far no studies have been conducted on the issue of comparability of rehabilitation treatment profiles and patient characteristics across countries. These aspects might have implications for the feasibility of treating patients abroad but also for the comparison of treatment outcome on an international level. OBJECTIVE: This study attempts to compare the patient characteristics and treatment profiles in six European countries of two rehabilitation categories (chronic low back pain (CLBP) and stroke) and to reveal possible consequences for international treatment and multi-centre studies. DESIGN: Cross-sectional study comparing demographic variables, treatment profiles, generic health (SF-36) and disabilities (RDQ for CLBP and the Barthel index for stroke) in six European countries. SUBJECTS: 255 patients with CLBP and 246 patients with stroke, treated in 36 different institutions in Austria (AUT), Finland (FIN), Germany (GER), Ireland (IR), Italy (IT) and The Netherlands (NL). RESULTS: The treatment profiles of CLBP patients show marked differences between countries and three categories of treatment can be distinguished: (a) predominant physiotherapy (IR, IT), (b) all disciplines equally provided (NL, GER, AUS) and (c) treatment concentrated in four disciplines (FIN). Striking differences are also found for patient characteristics, characterised by in particular the younger and more disabled Dutch patients and the older and less disabled (mostly female) Italian patients. International stroke rehabilitation was more similar between countries; however, a few differences in patient characteristics were found which again could mostly be ascribed to the Dutch and Italian patients. CONCLUSION: International treatment and outcome assessment of CLBP patients is not possible unless standardisation is considered of treatment content and patient selection. For stroke treatment international traffic and multi-centre outcome assessment might be more feasible.

Publication Types: Journal Article Multicenter Study

PMID:15694502

Health Qual Life Outcomes. 2004; 2: 53.

Identification of rehabilitation needs after a stroke: an exploratory study.

Talbot LR, Viscogliosi C, et al.

Nursing Department, Faculty of Medicine, Universite de Sherbrooke, 3001, 12e Avenue Nord, J1H 5N4 Sherbrooke, Quebec, Canada. Lise.Talbot@USherbrooke.ca

BACKGROUND: Services to meet adequate rehabilitation needs of elderly stroke survivors are not always provided. Indeed, since 1995, in the wake of the Quebec shift to ambulatory care, home care services, mainly those related to rehabilitation of the elderly, are either unavailable or incomplete. The aim of this study was to examine the rehabilitation needs of this clientele from their hospitalization to their reintegration into the community. METHODS: The "Handicap Production Process" conceptual approach was chosen to help identify the rehabilitation needs of persons affected by physical or cognitive disabilities due to the interactions between personal and environmental factors, and (activities of daily living, social roles). This qualitative exploratory study was performed in 2003. Data were collected among four groups of experts: patients, caregivers, health care providers and administrators. Data triangulation was used to ensure a rigorous analysis and validity of the results. RESULTS: Unfulfilled needs could be found in the categories of pertaining to residence, community living, psychological and emotional needs. Indeed, it appears that a psychological follow-up to discuss acceptance and consequences of non-acceptance would facilitate mid-to long-term rehabilitation. CONCLUSION: Improving accessibility to healthcare services, respecting priority parking spaces for the disabled as well as promoting public awareness would enable a better social reintegration and recovery of social roles, thus limiting the onset of handicap situations.

Publication Types: Journal Article

PMID:15383147

Health Serv J. 2005; 115(5958): 26-8.
Clinical management. Stroke of genius.
Dix A.
ann.dix@emap.com
Publication Types: Journal Article PMID:15957359

Health Technol Assess. 2005; 9(18): 1-94.
A randomised controlled comparison of alternative strategies in stroke care.
Kalra L, Evans A, et al.
Department of Diabetes, Endocrinology and Internal Medicine, Guy's, King's & St Thomas' School of Medicine, London, UK.
OBJECTIVES: To compare outcomes between stroke patients managed on the stroke unit, on general wards with stroke team support or at home by specialist domiciliary team and to derive prognostic variables that will identify patients most suitable for management by each strategy. To describe organisational aspects of individual strategies of stroke care and to evaluate cost-effectiveness of each strategy and its acceptability to patients, carers and professionals. DESIGN: Prospective single-blind randomised controlled trial undertaken in patients recruited from a community-based stroke register. SETTING: Suburban district in south-east England. PARTICIPANTS: Patients with disabling stroke who could be supported at home. INTERVENTIONS: The stroke unit gave 24-hour care provided by specialist multidisciplinary team based on clear guidelines for acute care, prevention of complications, rehabilitation and secondary prevention. The stroke team provided management on general wards with specialist team support. The team undertook stroke assessments and advised ward-based nursing and therapy staff on acute care, secondary prevention and rehabilitation aspects. Domiciliary care involved management at home under the supervision of a GP and stroke specialist with support from specialist team and community services. Support was provided for a maximum of 3 months. MAIN OUTCOME MEASURES: The primary measure was death or institutionalisation at 1 year. Secondary measures were dependence, functional abilities, mood, quality of life, resource use, length of hospital stay, and patient, carer and professional satisfaction. RESULTS: Of the 457 patients randomised, 152 patients were allocated to the stroke unit; 152 patients to stroke team and 153 patients to domiciliary stroke care (average age 76 years, 48% women). The groups were well matched for baseline characteristics, stroke type and severity, level of impairment and initial disability. Fifty-one (34%) patients in the domiciliary group were admitted to hospital after randomisation. Mortality and institutionalisation at 1 year were lower on stroke unit compared with stroke team or domiciliary care. Significantly fewer patients on the stroke unit died compared with those managed by the stroke team. The proportion of patients alive without severe disability at 1 year was also significantly higher on the stroke unit compared with stroke team or domiciliary care. These differences were present at 3 and 6 months after stroke. Stroke survivors managed on the stroke unit showed greater improvement on basic activities of daily living compared with other strategies. Achievement of higher levels of function was not influenced by strategy of care. Quality of life at 3 months was significantly better in stroke unit and domiciliary care patients. There was greater dissatisfaction with care on general wards compared with stroke unit or domiciliary care. Poor outcome with domiciliary care and on general wards was associated with Barthel Index <5, incontinence and, on general wards, age over 75 years. The total costs of stroke per patient over the 12-month period were pound11,450 for stroke unit, pound9527 for stroke team and pound6840 for home care. However, the mean costs per day alive for the stroke unit were significantly less than those for the specialist stroke team patients, but no different from domiciliary care patients. Costs for the domiciliary group were significantly less than for those managed by the specialist stroke team on general wards. CONCLUSIONS: Stroke units were found to be more effective than a specialist stroke team or specialist domiciliary care in reducing mortality, institutionalisation and dependence after stroke. A role for specialist domiciliary services for acute stroke is not supported by this study. Management of patients with strokes on general medical wards, even with specialist team input, is not supported by this study. The stroke unit intervention was less costly per patient day alive and more effective than the stroke team intervention. The stroke unit was more effective and of equivalent cost when compared to home care. Hence, the stroke unit is a more cost-effective intervention than either stroke team or home care. Further research is needed to understand processes contributing to the reduction in mortality on stroke units and to determine the generalisability of these results and the factors that will influence the implementation of the findings of this study in clinical practice.
Publication Types: Journal Article PMID:15890138

Hosp Case Manag. 2004; 12(5): 78-80.
Stroke coordinators manage acute stays.
Publication Types: Journal Article PMID:15108639

Hosp Health Netw. 2004; 78(12): 38-42, 44, 2.

Clinical management. Hospitals bring new urgency and better tools to stroke care.

Haugh R.

Executives who thought their hospitals were qualified to offer high-level stroke care are taking a second look-and taking action. By developing a clearly delineated plan to treat patients, including setting up acute stroke teams and taking better advantage of technology, experts say U.S. hospitals can improve care and save millions of dollars a year.

Publication Types: Journal Article

PMID:15637868

Hosp Med. 2004; 65(6): 369-70.

Stroke medicine: a new subspecialty.

Starke I.

Department of Medicine for the Elderly, University Hospital Lewisham, London SE13 6LH.

The specialist management of patients with stroke has assumed increasing importance over the last 10 years. In recognition of this the Specialist Training Authority has accepted stroke medicine as a subspecialty. The scope of the training programme and the route into it are described.

Publication Types: Journal Article Review

PMID:15222215

Int J Qual Health Care. 2005.

Process of care and mortality of stroke patients with and without a do not resuscitate order in the West Midlands, UK.

Mohammed MA, Mant J, et al.

Public Health & Epidemiology, Birmingham University, Birmingham, UK.

OBJECTIVE: . To compare the process of care of stroke patients with and without a do not resuscitate (DNR) order. DESIGN: /B>. Retrospective case note review with prospective follow up of mortality.

SETTING: /B>. Seven acute hospitals, with stroke units, in the West Midlands, UK. PARTICIPANTS: /B>. A random sample of patients (n = 702) admitted to hospital with acute stroke over a twelve month period.

MAIN OUTCOME MEASURES: /B>. Case mix and process of care measures derived from the intercollegiate stroke audit package. Thirty day and one year mortality. RESULTS: /B>. About one-third (34%, 238/702) of stroke patients had DNR orders. The thirty-day mortality for DNR patients was 67% (160/238) versus 10%

(46/449) for patients without DNR orders. DNR patients had significantly worse case-mix profile than non-DNR patients - median age 81 y vs 75y; fully conscious 36% vs 79%, able to walk 1% vs 21% and no loss of power in either arm 5% vs 24% (all p < 0.0001). DNR patients were more likely to be assessed early by a

speech and language therapist (77% vs 59%, p < 0.001), but less likely to receive the majority of their care in a stroke/rehabilitation unit (20% vs 57%, p < 0.0001), or be cared for on a stroke unit or by a stroke

team (42% vs 70%, p < 0.0001), or had a description of the site of the cerebral lesion (31% vs 38%, p = 0.05) or be given aspirin (30% vs 42%, p = 0.007). CONCLUSIONS: /B>. Stroke patients with a DNR order are not

receiving optimum care in that they are not being cared for on stroke units or by specialist teams. This may reflect the inadequate provision of specialist stroke services in the UK.

Publication Types: Journal article

PMID:16214881

Int J Qual Health Care. 2005; 17(1): 59-65.

Quality of stroke prevention in general practice: relationship with practice organization.

de Koning JS, Klazinga N, et al.

Department of Public Health, Erasmus MC, University Medical Center Rotterdam, the Netherlands. j.s.dekoning@amc.uva.nl

OBJECTIVE: To investigate the relationship between elements of practice organization related to stroke prevention in general practice, and suboptimal preventive care preceding the occurrence of stroke.

DESIGN: This study was conducted among 69 Dutch general practitioners in the Rotterdam region. Information on the implementation of elements of practice organization related to stroke prevention was

collected by postal questionnaire. Data on the process of patient care were collected by means of chart review and interviews with general practitioners. Cases of stroke (n = 186) were retrospectively audited

by an expert panel with guideline-based review criteria. Using logistic regression analysis we investigated the relationship between the probability of suboptimal care delivery and the presence of specific

elements of practice organization related to stroke prevention (tailored information systems, formal delegation of preventive tasks, standardization of care). RESULTS: For some elements of practice

organization significant relationships with the quality of stroke prevention were found. Suboptimal care

was less common among general practitioners with a higher level of noting high risk patients in the patient records (odds ratio 0.30; 95% CI 0.13-0.69, P = 0.01), delegating follow-up visits to support staff (odds ratio 0.42; 95% CI 0.22-0.82, P = 0.01) and compliance with the hypertension guideline (odds ratio 0.57; 95% CI 0.41-0.78, P = <0.001). Except for practice type (general practitioners in health centres less often provided suboptimal care, P = 0.02), no significant relationships with general practitioner and practice characteristics were found. **CONCLUSION:** This study shows that general practitioners with a higher level of integrated organizational structures for stroke prevention (record keeping, formal delegation of preventive tasks, guideline compliance) are less likely to deliver suboptimal care.

Publication Types: Journal Article

PMID:15668312

Int J Qual Health Care. 2005; 17(1): 31-6.

Comparing processes of stroke care in high- and low-mortality hospitals in the West Midlands, UK.

Mohammed MA, Mant J, et al.

Public Health and Epidemiology, Birmingham University, Birmingham, UK. m.a.mohammed@bham.ac.uk

OBJECTIVE: There are wide variations in hospital-specific mortality for stroke. The aim of this study was to investigate whether there were differences in quality of care when a group of hospitals with high standardized mortality ratios (SMRs) in nationally published league tables were compared with a group with low SMRs. **DESIGN:** Retrospective case note review of a random sample of patients from hospitals with high and low mortality according to published league tables. **SETTING:** Eight hospitals in the West Midlands, UK. **PARTICIPANTS:** 702 patients admitted to hospital with acute stroke during the year 2000-2001. **MAIN OUTCOME MEASURES:** Process measures derived from the Intercollegiate Stroke Audit Package. **RESULTS:** Crude 30 day mortality was 25% (99/402) in 'top' ranking hospitals and 38% (113/300) in 'bottom' ranking hospitals (P < 0.001). Bottom hospitals performed significantly (P < 0.001) less well on four out of seven indicators of process of care relating to the patients' first 24 hours in hospital-assessment of eye movements and visual fields, screening for swallowing disorders and sensory testing. However, analysis at the individual hospital level showed that this was largely due to poor performance in one hospital with high mortality. If this outlier was omitted, there was little relationship between process of care and SMR. No significant differences were found in care provided after 24 hours. Nevertheless even in 'top' ranking hospitals only 47% of stroke patients had at least 50% of their hospital stay in a stroke/rehabilitation unit and only 40% were on aspirin within 48 hours. **CONCLUSIONS:** Our results show that there is scope for improving the quality of stroke care irrespective of where a hospital ranks in terms of mortality. The lack of association between SMR and quality of care as assessed by process measures casts some doubt over the value of ranking hospitals in terms of stroke SMR.

Publication Types: Journal Article

PMID:15668308

Int J Rehabil Res. 2004; 27(2): 155-8.

Allocation and preference of patients for domiciliary or institutional rehabilitation after a stroke.

Weiss Z, Snir D, et al.

The Geriatric Unit, Maemek Medical Centre, The Israel Institute of Technology, Haifa, Israel.

On discharge from an acute-care hospital after a stroke, 191 patients were told that they needed rehabilitation and were offered the option of receiving care in an institution or in their homes. One hundred and one (52.4%) patients chose an institution and 91 (47.6%) preferred rehabilitation in their own home. A higher number of women than men chose to be rehabilitated at home. Multivariate logistic regression showed that odds for being included in the home rehabilitation group were higher for women and for those who had a stroke in the past. Odds for being included in the institutional rehabilitation group were individuals with diabetes and difficulty in ambulating and those who had a longer stay in the acute-care hospital. Findings of the study suggest that in Israel there is a sub-population of acute stroke survivors who may be appropriate for rehabilitation at home and accept the option when they are offered it.

Publication Types: Journal Article

PMID:15167115

Int J Rehabil Res. 2004; 27(2): 119-25.

Effectiveness of home rehabilitation after stroke in Israel.

Weiss Z, Snir D, et al.

Ha'Emek Medical Centre, Israel Institute of Technology, Haifa, Israel.

On discharge from an acute general hospital after a stroke, 191 patients were in need of, and were appropriate for, multidisciplinary rehabilitation. One-hundred-and-one patients (52.4%) received it in a

rehabilitation institution as inpatients (the institutional rehabilitation group (IR) group) and 91 patients received it at home (the home rehabilitation (HR) group). Patients in the HR group had their mobility, activities of daily living (ADL), range of movements, tone, coordination and sensation determined on admission to home rehabilitation and on discharge from it, 6 weeks to 2 months later. This group contained more women and more patients able to walk with devices and who were partially independent in ADL. The IR group consisted of more men and more patients with diabetes and marked difficulties in ADL and ambulation. In both groups the Barthel index and the Frenchay activities index were determined 1 year after the stroke by way of a telephone interview and no meaningful differences were found between the two groups. IR was considerably more expensive than HR. In Israel there exists a subpopulation of acute stroke survivors in need of, and appropriate for, multidisciplinary rehabilitation that can be provided at home; such rehabilitation was found to be effective in the short and long term, as well as cost effective.

Publication Types: Journal Article

PMID:15167109

Int J Rehabil Res. 2005; 28(1): 1-7.

Would discussion on patients' needs add value to the rehabilitation process?

Liu KP, Chan CC, et al.

Department of Rehabilitation Sciences, Hong Kong Polytechnic University, Hung Hom, Hong Kong.
rskliu@polyu.edu.hk

The objective of this study was to examine the effect of therapists' methods of addressing patients' problems (based on assessment results and discussions of patients' needs compared with assessment results only) on the level of agreement, between patients and therapists, over patients' daily living problems. A comparative design was adopted to examine the five most important daily living problems identified by patients and their occupational therapists. Twelve occupational therapists and five stroke patients of each therapist under in-patient rehabilitation were recruited. Thus, a total of 60 patients were recruited. Content analyses of the therapists' methods of analysing their patients' problems revealed that eight therapists had discussed their patients' needs with their patients (66.7%) and four relied on the assessment results (33.3%). The kappa statistics showed that a higher agreement of daily living problems was identified for the patients of those therapists who had held discussions ($\kappa=0.76$; $P<0.001$). The results suggested that therapists should take their patients' needs into account in the planning of interventions. If therapists could help their patients to carry out their future life roles, it would lead the patients to better participate in the rehabilitation process.

Publication Types: Journal Article Multicenter Study

PMID:15729091

Int J Technol Assess Health Care. 2005; 21(4): 499-505.

Development and application of Model of Resource Utilization, Costs, and Outcomes for Stroke (MORUCOS): an Australian economic model for stroke.

Mihalopoulos C, Cadilhac DA, et al.

The University of Melbourne, 4/207 Bouverie Street, Melbourne, 3010 Victoria, Australia.
c.mihalopoulos@unimelb.edu.au

OBJECTIVES: To outline the development, structure, data assumptions, and application of an Australian economic model for stroke (Model of Resource Utilization, Costs, and Outcomes for Stroke [MORUCOS]).
METHODS: The model has a linked spreadsheet format with four modules to describe the disease burden and treatment pathways, estimate prevalence-based and incidence-based costs, and derive life expectancy and quality of life consequences. The model uses patient-level, community-based, stroke cohort data and macro-level simulations. An interventions module allows options for change to be consistently evaluated by modifying aspects of the other modules. To date, model validation has included sensitivity testing, face validity, and peer review. Further validation of technical and predictive accuracy is needed. The generic pathway model was assessed by comparison with a stroke subtypes (ischemic, hemorrhagic, or undetermined) approach and used to determine the relative cost-effectiveness of four interventions. **RESULTS:** The generic pathway model produced lower costs compared with a subtypes version (total average first-year costs/case AUD\$ 15,117 versus AUD\$ 17,786, respectively). Optimal evidence-based uptake of anticoagulation therapy for primary and secondary stroke prevention and intravenous thrombolytic therapy within 3 hours of stroke were more cost-effective than current practice (base year, 1997). **CONCLUSIONS:** MORUCOS is transparent and flexible in describing Australian stroke care and can effectively be used to systematically evaluate a range of different interventions. Adjusting results to account for stroke subtypes, as they influence cost estimates, could enhance the generic model.

Publication Types: Journal Article Validation Studies PMID:16262974

Int J Technol Assess Health Care. 2005; 21(1): 15-21.

Systematic review of economic evidence on stroke rehabilitation services.

Brady BK, McGahan L, et al.

Canadian Coordinating Office for Health Technology Assessment, Ottawa, Ontario, Canada.
bruceb@ccohta.ca

OBJECTIVES: Given the resource-intensive nature of stroke rehabilitation, it is important that services be delivered in an evidence-based and cost-efficient manner. The objective of this review was to assess the evidence on the relative cost or cost-effectiveness of three rehabilitation services after stroke: stroke unit care versus care on another hospital ward, early supported discharge (ESD) services versus "usual care," and community or home-based rehabilitation versus "usual care." **METHODS:** A systematic literature review of cost analyses or economic evaluations was performed. Study characteristics and results (including mean total cost per patient) were summarized. The level of evidence concerning relative cost or cost-effectiveness for each service type was determined qualitatively. **RESULTS:** Fifteen studies met the inclusion criteria: three on stroke unit care, eight on ESD services, and four on community-based rehabilitation. All were classified as cost-consequences analysis or cost analysis. The time horizon was generally short (1 year or less). The comparators and the scope of costs varied between studies. **CONCLUSIONS:** There was "some" evidence that the mean total cost per patient of rehabilitation in a stroke unit is comparable to care provided in another hospital ward. There is "moderate" evidence that ESD services provide care at modestly lower total costs than usual care for stroke patients with mild or moderate disability. There was "insufficient" evidence concerning the cost of community-based rehabilitation compared with usual care. Several methodological problems were encountered when analyzing the economic evidence.

Publication Types: Journal Article Review

PMID:15736510

Intern Med. 2005; 44(4): 371-4.

Therapeutic strategy for acute stroke--prologue for an epoch of brain attack--. Future aspects of gene therapy in acute ischemic stroke.

Kitagawa K, Hori M, et al.

Department of Internal Medicine and Therapeutics, Osaka University Graduate School of Medicine, Osaka .

Publication Types: Journal Article PMID:15897659

Intern Med. 2005; 44(4): 369-71.

Therapeutic strategy for acute stroke--prologue for an epoch of brain attack--. EBM and current state in Japan of thrombolytic therapy for acute ischemic stroke.

Minematsu K.

Cerebrovascular Division, Department of Medicine, National Cardiovascular Center, Osaka.

Publication Types: Journal Article PMID:15897658

Intern Med. 2005; 44(4): 365-8.

Therapeutic strategy for acute stroke--prologue for an epoch of brain attack--. The present state of acute ischemic stroke therapy in Japan.

Okada K, Kobayashi S.

Department of Neurology, Oda Municipal Hospital, Shimane.

Publication Types: Journal Article PMID:15897657

Intern Med. 2005; 44(4): 363-5.

Therapeutic strategy for acute stroke--prologue for an epoch of brain attack--. Acute stroke therapy based on Japanese guidelines for the management of stroke 2004.

Nagayama M, Shinohara Y.

Department of Neurology, Tokai University School of Medicine, Bohseidai, Isehara.

Publication Types: Journal Article PMID:15897656

Intern Med. 2005; 44(4): 360-2.

Therapeutic strategy for acute stroke--prologue for an epoch of brain attack--. Progress of diagnosis of acute stroke.

Hashimoto Y, Hirano T, et al.

Department of Neurology, Kumamoto City Hospital, Kumamoto.

Publication Types: Journal Article PMID:15897655

Ir Med J. 2004; 97(10): 294-5.
Hemiplegia of the will and trends in stroke incidence.
Coughlan T, O'Neill D.
Publication Types: Editorial
PMID:15696872

Ir Med J. 2004; 97(2): 56.
Cost of teaching stroke in an Irish teaching hospital.
Delargy M.
Publication Types: Comment Letter
PMID:15134276

Isr Med Assoc J. 2004; 6(12): 772-3.
Stroke rehabilitation research: specific answers are urgently needed.
Gottlieb D.
Publication Types: Comment Editorial
PMID:15609894

Isr Med Assoc J. 2004; 6(10): 603-6.
Post-stroke follow-up in a rehabilitation center outpatient clinic.
Greenberg E, Treger J, et al.
Department of Neurologic Rehabilitation C, Loewenstein Rehabilitation Center, Raanana, Israel.
BACKGROUND: Follow-up examinations in a rehabilitation center clinic after stroke are essential for coordinating post-acute services and monitoring patient progress. Of first-stroke patients discharged from our rehabilitation ward to the community 92% are invited for ambulatory check-up once every 6 months. OBJECTIVES: To review patient complaints at follow-up and the recommendations issued by the attending physical medicine and rehabilitation specialist at the outpatient clinic. METHODS: We extracted relevant data from the records and assessed the relationship between functional status on admission and discharge (measured by FIM), length of stay, and number of complaints. Patients were divided according to the side of neurologic damage, etiology, whether the stroke was a first or recurrent event, and main clinical syndrome (neglect or aphasia). RESULTS: Patients' complaints included: decreased hand function (in 40%), general functional deterioration (20%), difficulty walking (11%), speech dysfunction (10%), various pains (especially in plegic shoulder) (8%), urine control (2%), sexual dysfunction (3%), swallowing difficulties (2%), and cognitive disturbances (2%). Patients received the following recommendations: physiotherapy (for 52.5%), occupational therapy (37.5%), speech therapy (12.5%), different bracing techniques (22.5%), pain clinic treatment (12.5%), changing medication prescriptions (7.5%), psychological treatment (10%), sexual rehabilitation (5%), vocational counseling (2.5%), counseling by social workers (2.5%), and repeat neuropsychological diagnosis (2.5%). A reverse correlation was found between the number of complaints and FIM at admission ($P = 0.0001$) and discharge ($P = 0.0003$), and between LOS and FIM at admission ($P = 0.0001$) and discharge ($P = 0.004$). A direct correlation was found between the number of complaints and LOS ($P = 0.029$). No relation was found between age, type of stroke, first and recurrent event, and clinical syndromes and patient complaints in the outpatient rehabilitation. Community rehabilitation services met 58% of all recommendations in 62% of patients, mainly physiotherapy and occupational therapy, with 34% of patients waiting for implementation of the recommendations and 4% not available for follow-up. CONCLUSIONS: Follow-up examinations should be an integral part of post-stroke rehabilitation. Rehabilitation treatment in the community must be strengthened.
Publication Types: Journal Article
PMID:15473587

Isr Med Assoc J. 2005; 7(11): 739.
Dedicated stroke units and outcome.
Bornstein NM.
Publication Types: Comment Editorial
PMID:16309000

Isr Med Assoc J. 2005; 7(11): 688-93.
Effectiveness of establishing a dedicated acute stroke unit in routine clinical practice in Israel.
Koton S, Schwammenthal Y, et al.
Israel Center for Disease Control, Ministry of Health, Tel Hashomer, Israel.
BACKGROUND: Clinical trials have demonstrated the superiority of managing acute stroke in a dedicated

stroke unit over conventional treatment in general medical wards. Based on these findings, nationwide stroke unit care programs have been implemented in several countries. OBJECTIVE: To assess the effect of establishing a new dedicated acute stroke unit within a department of neurology on indicators of process of care and outcome of acute stroke in a routine clinical setting in Israel. METHODS: Stroke patients admitted to the Sheba Medical Center during the period March 2001 to June 2002 were included in a prospective study according to selection criteria. Data on demographics, risk factors, co-morbidities and stroke severity were collected. Indicators of process of care and outcome were assessed at hospital discharge and 30 days follow-up. Comparison between outcome variables by hospitalization ward was done using logistic regression analysis adjusting for confounders. RESULTS: Of 616 acute stroke patients (mean age 70 years, 61% men, 84% ischemic stroke), 353 (57%) were admitted to general wards and 263 (43%) to the stroke unit. Diagnostic procedures were performed more often and the infection rate was lower in the setting of the stroke unit. Poor outcome (modified Rankin scale ≥ 3 or death) was present less often in patients managed in the stroke unit both at hospital discharge (adjusted odds ratio 0.5, 95% confidence interval 0.3-0.8) and at 30 day follow-up (adjusted OR 0.6, 95%CI 0.3-0.9). A Functional Independence Measure score ≤ 90 or death at 30 day follow-up was less frequent among patients managed in the stroke unit than in general wards (adjusted OR 0.5, 95%CI 0.2-0.8). CONCLUSIONS: Improved outcomes and higher adherence to guidelines were observed in patients treated in a stroke unit within a department of neurology. The results suggest that patients with acute stroke should have access to treatment in a dedicated stroke unit.

Publication Types: Journal Article
PMID:16308989

J Adv Nurs. 2004; 46(3): 235-44.

Informal carers' experience of caring for stroke survivors.

Smith LN, Lawrence M, et al.

Nursing and Midwifery School, University of Glasgow, Glasgow, UK. l.n.smith@clinmed.gla.ac.uk

BACKGROUND: Stroke is the third most common cause of death in industrialized countries and a major cause of adult disability. However, the burden of caring for stroke survivors usually rests with family members who have neither chosen nor volunteered for the role of 'carer'. AIMS: This paper reports on a study which aimed to describe the experience of caring for a stroke survivor at one year after stroke in Scotland. STUDY DESIGN: Semi-structured, taped interviews were conducted with 90 carers of stroke survivors one year after stroke and the data analysed using NUD*IST. The interviews were part of a larger study, which included the administration of a range of valid and reliable multidimensional instruments to both carers and stroke survivors. The interview prompt schedule had been developed and tested in a previous study. FINDINGS: Although a medical emergency, stroke was not always diagnosed or treated as such by either the public or general practitioners. Initially most carers found that they lacked the knowledge and skills to care for the stroke survivor at home and so they had to learn how to obtain the information and assistance required. Carers had to adapt to the changes that stroke effected in the stroke survivor and seek alternative ways of securing the resources they needed for managing their lives. They thought that they had not been prepared adequately for the caring role or assessed satisfactorily in terms of whether they could manage given their skill level, age and/or health status. CONCLUSIONS: A public health campaign to educate and inform that stroke is a medical emergency is required if stroke disability is to be minimized. The use of new technologies should be considered in facilitating carers' learning how to care. There is a need to test alternative models of stroke follow-up in multi-centre studies that are holistic and place the carer-stroke survivor at the centre of care.

Publication Types: Journal Article
PMID:15066101

J Adv Nurs. 2005; 52(6): 640-50.

Expanding the role of the stroke nurse: a pragmatic clinical trial.

Burton C, Gibbon B.

Department of Nursing, University of Central Lancashire, Preston, UK. c.burton@whsmithnet.co.uk

AIMS: This paper reports a study evaluating whether expanding a specialist nursing role to provide outreach education and support to stroke patients and carers after discharge from hospital is effective in promoting recovery. BACKGROUND: Building therapeutic relationships with patients and carers is a key component of the nursing role in stroke rehabilitation, although this is limited by the constraints of service organization. METHODS: A pragmatic randomized controlled trial was undertaken. Patients with a diagnosis of stroke were randomized to receive continued support from a stroke nurse (n = 87) or usual care and follow-up (n = 89) after discharge from hospital. Patients were recruited from two hospitals in the north-west of England from November 1999 to April 2001. Patient dependence (Barthel Index), general

health (Nottingham Health Profile), activities of living (Frenchay Activity of Living Index), depression (Beck Depression Inventory) and carer strain (Carer Strain Index) were assessed at 3 and 12 months after stroke. RESULTS: The continued intervention of a stroke nurse after discharge was associated with improved patient perceptions of general health at 12 months (median difference 42.6, P = 0.012), and in particular reduced negative emotional reaction (P = 0.037) and perceived social isolation (P = 0.002). In addition, the intervention reduced carer strain at 3 months (P = 0.045), and reduced deterioration in physical dependence from 3 to 12 months (P = 0.049). CONCLUSION: The provision of continued intervention from a stroke nurse after discharge from hospital, focusing on education and support, has tangible benefits for patients and carers.

Publication Types: Journal Article

PMID:16313377

J Allied Health. 2005; 34(1): 3-10.

A variables associated with occupational and physical therapy stroke rehabilitation utilization and outcomes.

Cook C, Stickley L, et al.

Division of Physical Therapy, Duke University, Durham, NC 27710, USA. chad.cook@duke.edu

Many studies have reported the benefits of a comprehensive stroke team including occupational therapy/physical therapy (OT/PT) services; however, factors associated with access to these services are less known. This study used a subsample of the Health and Retirement Study database, a cross-sectional survey of more than 11,126 Americans aged 65 to 106 years within the contiguous United States. The purposes of this study were to determine the associational factors that contribute to attending OT/PT and determine if attending OT/PT leads to a reduced report of stroke-related problems. The findings indicated that fewer than 10% of stroke survivors in a noninstitutionalized, community-based setting were currently accessing OT/PT. Additionally, access to OT/PT services was highly associated with report of having an attending physician, report of stroke-related weakness, higher monthly income, and older age. The increased odds of reported continued problems associated with a past stroke were associated with failure to access OT/PT services, lower monthly income, Hispanic culture, and age. OT/PT services were typically provided to patients who reported a higher level of physical dysfunction. Despite the greater degree of severity, OT/PT intervention led to reports of lower levels of disability and problems over time.

Publication Types: Journal Article

PMID:15839599

J Altern Complement Med. 2005; 11(1): 175-7.

Does acupuncture help stroke patients become more independent?

Hopwood V, Lewith GT.

Complementary Medicine Research Unit, Aldermoor Health Centre, Southampton, UK. val.hopwoodaACP@btinternet.com

This short speculative report describes the outcome of three studies looking at the effect of acupuncture on stroke recovery and the subsequent place of residence of the subjects entered. It is not a systematic review and does not endeavor to provide comprehensive data on the effect of acupuncture on post-stroke recovery. Our observations demonstrate that patients may be more likely to remain independent and in their own homes one year post stroke if they receive acupuncture. This conclusion is supported by our study and two previous trials. It may be that acupuncture improves post-stroke perception, thereby enhancing independence.

Publication Types: Journal Article Review

PMID:15750379

J Am Geriatr Soc. 2004; 52(9): 1587-8.

Stroke units and acute care for elders model of care.

Rozzini R, Sabatini T, et al.

Publication Types: Comment Letter

PMID:15341577

J Am Geriatr Soc. 2004; 52(2): 278-83.

Home hospitalization service for acute uncomplicated first ischemic stroke in elderly patients: a randomized trial.

Ricauda NA, Bo M, et al.

Department of Medical and Surgical Science, Section of Gerontology, University of Turin, Italy.

OBJECTIVES: To evaluate whether home treatment of elderly patients with acute uncomplicated first

ischemic stroke is associated with different mortality rates and clinical outcomes from those of patients treated on a general medical ward (GMW). DESIGN: Randomized, controlled, single-blind trial. SETTING: S. Giovanni Battista Hospital of Turin. PARTICIPANTS: One hundred twenty elderly patients admitted to the emergency department of the hospital with first acute ischemic stroke were randomized to home treatment from a geriatric home hospitalization service (GHHS) or to GMW treatment. MEASUREMENT: Main outcome was cumulative survival at 6 months in the two groups. Residual functional impairment, neurological deficit, depression, morbidity, and admission to rehabilitation and long-term care facilities were considered as secondary outcomes in survivors. RESULTS: One hundred twenty patients (mean age 82; 54 men and 66 women) were enrolled (60 in each study arm). The cumulative proportion of cases surviving at 6 months was 0.65 in the GHHS group and 0.60 in GMW group (log-rank test $P=.53$). Functional and neurological parameters were significantly improved in both GHHS and GMW patients, without significant differences between the two groups. Depression score was significantly better in home-treated patients ($P<.001$), who were more likely to remain at home at 6 months than hospital-treated patients and had a lower rate of select medical complications. CONCLUSION: Home-treated elderly patients with ischemic stroke have better depressive scores and lower rates of admission to nursing homes. These results should prompt further studies to evaluate home hospitalization for elderly stroke patients. Publication Types: Clinical Trial Journal Article Randomized Controlled Trial PMID:14728641

J Am Geriatr Soc. 2005; 53(8): 1442-3.

Acute ischemic stroke in elderly patients treated in Hospital at Home: a cost minimization analysis.

Ricauda NA, Tibaldi V, et al.

Publication Types: Clinical Trial Letter Randomized Controlled Trial

PMID:16078983

J Cardiovasc Nurs. 2004; 19(5): 301-7.

Stroke outcome measures.

Kelly-Hayes M.

Department of Neurology, Boston University School of Medicine, Boston, MA 02118, USA. mkhayes@bu.edu Stroke is the third leading cause of death and the foremost cause of adult neurological disability in the United States. Comprehensive assessment of persons with stroke is necessary for appropriate management of care and evaluation of interventions and outcomes. With the emergence of new effective treatments for stroke, the opportunity to document stroke impairments and disabilities to monitor recovery and to plan for reentry back to the community is a high nursing priority. The utilization of well-validated standardized instruments makes this goal attainable.

Publication Types: Journal Article Review

PMID:15495890

J Clin Epidemiol. 2005; 58(7): 668-73.

The PEDro scale provides a more comprehensive measure of methodological quality than the Jadad scale in stroke rehabilitation literature.

Bhogal SK, Teasell RW, et al.

Department of Physical Medicine and Rehabilitation, University of Western Ontario, St. Joseph's Health Care London, Parkwood Hospital, 801 Commissioners Road, East, London, Ontario N6C 5J1, Canada.

OBJECTIVE: To systematically compare the PEDro scale and the Jadad scale when applied to the stroke rehabilitation literature. STUDY DESIGN AND SETTING: A literature search of multiple databases was used to identify all trials from 1968 through 2002. Each article was reviewed and assigned quality scores according to PEDro and Jadad criteria. Quality scores for both scales were compared using descriptive statistics. The correlation between the scales was estimated using the Pearson product moment correlation coefficient. RESULTS: 272 randomized controlled trials were retrieved and subjected to quality scoring to both the PEDro scale and the Jadad scale. Mean scores (with standard deviation) for the PEDro and Jadad scales were 5.78 (1.4) and 2.46 (1.1), respectively. The Pearson coefficient determined the PEDro and Jadad scales to be significantly correlated ($r = .59$, $P < .01$). Although significant, the correlation was not deemed to be very strong. When applied to physical or rehabilitation therapy studies only, the scales were slightly less correlated ($r = .49$, $P < .01$) than among drug-based studies ($r = .52$, $P < .01$). CONCLUSION: In the stroke rehabilitation literature, where double-blinding studies are often not possible due to the nature of the interventions, breaking down the levels of blinding and accounting for concealed allocation, intention-to-treat, and attrition is important. Accordingly, the PEDro scale provides a more comprehensive measure of methodological quality of the stroke literature.

Publication Types: Journal Article Review PMID:15939217

J Clin Nurs. 2005; 14(8): 995-1003.

The impact of a nurse-led support and education programme for spouses of stroke patients: a randomized controlled trial.

Larson J, Franzen-Dahlin A, et al.

Doctoral student, Department of Nursing, Karolinska Institutet, Stockholm, Sweden.
jenny.larson@omv.ki.se

AIMS AND OBJECTIVES: The aim of the present study was to determine the impact of a nurse-led support and education programme for improving the spouses' perceived general quality of life, life situation, general well-being and health state. **BACKGROUND:** Stroke is a disease with great consequences for the patients and their families. The spouses often feel obligated to care for the patient, providing psychological and physical support and having to cope with the patient's physical and cognitive impairments. This might lead to increased problems, as family members struggle to adapt to their new roles and responsibilities. **DESIGN AND METHODS:** Longitudinal, randomized controlled trial. One hundred spouses were randomly assigned to intervention or control groups, 50 in each group. The intervention group participated in a support and education programme, six times during six months, led by stroke specialist nurses. Both groups were followed for 12 months. **RESULTS:** No significant differences were found, between intervention and control groups, over time. In the sub analyses, we found that the group attending 5-6 times had a significant decrease in negative well-being and increased quality of life over time, while the group attending fewer times had a significant decrease in positive well-being and health state, similar to the control group, which also had a significant decrease in negative and general well-being. **CONCLUSIONS:** A support and education programme might have a positive effect on spouses' well-being, on condition that they attend at least five times. **RELEVANCE TO CLINICAL PRACTICE:** To facilitate the spouses' role as informal caregivers to the stroke patients, further development of the support and education programme used in the present study is needed, including empowerment approach and implementation of coping strategies.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial

PMID:16102151

J Contin Educ Health Prof. 2005; 25(2): 105-15.

Rehabilitation education program for stroke (REPS): learning and practice outcomes.

McEwen S, Szurek K, et al.

Department of Occupational Therapy, University of Toronto, Toronto, ON, Canada.
sara.mcewen@utoronto.ca

INTRODUCTION: New research knowledge acquired from Web-based sources may have a better chance of being translated into practice when accompanied by additional educational strategies. This study was undertaken to investigate that hypothesis. **METHODS:** The Rehabilitation Education Program for Stroke (REPS) combines a self-directed online learning module with support from peer mentors, technical skills workshops, and organizational supports. Participants completed learning tests and practice surveys before and after the program and at a 6-month follow-up. **RESULTS:** Learning and self-reported practice outcomes improved in the areas of assessment, client-centered practice, support for family and caregivers, and detecting depression. Participants also identified and reported specific strategies for individual and programmatic practice change. **DISCUSSION:** A multifaceted, interdisciplinary online education intervention can positively influence stroke rehabilitation practices.

Publication Types: Journal Article

PMID:16078809

J Eval Clin Pract. 2004; 10(2): 241-6.

A multidisciplinary guideline for the acute phase of stroke: barriers perceived by Dutch neurologists.

Van Der Weijden T, Hooi JD, et al.

Department of General Practice, Maastricht University, Maastricht, The Netherlands.
trudy.vanderweijden@hag.unimaas.nl

RATIONALE, AIMS AND OBJECTIVES: Guidelines for stroke management should improve quality of care. Dissemination of guidelines, however, does not guarantee guideline adherence. The aim of this paper is to investigate barriers for guideline adherence to bring about suggestions for possible implementation strategies. **METHOD:** Questionnaire survey among all Dutch neurologists working on neurology wards in general hospitals during the year 2000 in The Netherlands. **RESULTS:** The neurologists expressed a high degree of agreement with the diagnostic and preventive recommendations, but expressed doubts with regard to the therapeutic recommendations, especially for the recombinant tissue plasminogen activator therapy. In general, barriers at the organizational and the multidisciplinary team level were most prominent. **CONCLUSIONS:** Active implementation of the guidelines seems necessary. Implementation

strategies should be focused on the different sources of barriers: the caregiver, the patient and the organization of care.

Publication Types: Journal Article

PMID:15189390

J Eval Clin Pract. 2005; 11(4): 306-14.

Improving clinical practice in stroke through audit: results of three rounds of National Stroke Audit.

Irwin P, Hoffman A, et al.

Stroke Programme Co-ordinator, Clinical Effectiveness and Evaluation Unit, Royal College of Physicians London, London NW1 4LE, UK. penny.irwin@rcplondon.ac.uk

BACKGROUND: The results of three rounds of National Stroke Audit in England, Wales and Northern Ireland are compared. **METHODS:** Audit of the organization of stroke services and retrospective case-note audit of up to 40 consecutive cases admitted per hospital over a 3-month period was conducted in each of 1998, 1999 and 2001/02. The changes in the organizational, case-mix and process results of the hospitals that had participated in all three rounds were analysed. **RESULTS:** 60% of all eligible trusts from England, Wales and Northern Ireland took part in all three audits in 1998, 1999 and 2001/02. Total numbers of cases were 4996, 4841 and 5152, respectively. Case-mix variables were similar over the three rounds. Mortality at 7 and 30 days fell by 3% and 5%, respectively. The proportion of hospitals with a stroke unit rose from 48% to 77%. The proportion of patients spending most of their stay in a stroke unit rose from 17% in 1998 to 26% in 1999 and 29% in 2001/02. Improvements achieved in process standards of care between 1998 and 1999 (median change was a gain of 9%) failed to improve further by 2001/02 (median change was 0%). In all three rounds process standards of care tended to be better in stroke units. **CONCLUSIONS:** Three rounds of national audit of stroke care have shown standards of care on stroke units were notably higher than on general wards. Slowing in the rise of the proportion managed on stroke units mirrors the slow down in improvement to overall national standards of care. To further improve outcomes and national standards of stroke care a much higher proportion of patients needs to be managed in stroke units.

Publication Types: Journal Article

PMID:16011643

J Fam Pract. 2005; 54(6): 536, 538-9.

Clinical inquiries. Which imaging modality is best for suspected stroke?

Biola H, Crowell K, et al.

Department of Family Medicine, University of North Carolina-Chapel Hill, NC USA. holly_biola@med.unc.edu

Publication Types: Journal Article Review PMID:15939006

J Med Screen. 2004; 11(1): 1-2.

Live long and prosper: a mass strategy for treating the factors associated with ischaemic heart disease and stroke.

Aronson JK.

Publication Types: Editorial PMID:15006105

J Med Syst. 2005; 29(6): 595-603.

An evaluation framework for a rural home-based telerehabilitation network.

Demiris G, Shigaki CL, et al.

School of Medicine, University of Missouri-Columbia, Columbia, Missouri 65211, USA. DemirisG@health.missouri.edu

This study was a needs assessment to inform the design and evaluation of a home-based telerehabilitation network for rural elderly patients. We conducted a literature review of telerehabilitation studies and a needs-assessment by interviewing 43 professionals, including homecare nursing staff, members of volunteer organizations and service agencies, social workers, discharge planners, researchers, and rehabilitation therapists. The survey addressed perceived needs, advantages, and disadvantages with the use of telemedicine technologies for rehabilitation services. All respondents agreed that there are unmet needs among elderly people who are discharged from hospital settings, and identified several problems including: medication noncompliance, isolation, limited access to specialists and community-based services. Our findings defined a framework for the development of a client-oriented rural telehealth network that will be used to guide patients discharged to homecare following stroke, through a complex array of health, mental health, and social services, spanning all levels of care.

Publication Types: Journal Article PMID:16235812

J Neurol. 2004; 251(2): 235-9.

The future of stroke neurology.

van Gijn J.

Department of Neurology, University Medical Centre, Utrecht, The Netherlands. J.vanGijn@neuro.azu.nl

Publication Types: Journal Article Review PMID:14991364

J Neurol. 2005; 252(3): 260-7.

Current treatments in neurology: stroke.

Markus HS.

Clinical Neuroscience, St George's Hospital Medical School, Cranmer Terrace, London SW17 0RE, UK. h.markus@sghms.ac.uk

There have been major advances in stroke treatment based on robust evidence from large clinical trials. This review covers both acute treatment and secondary prevention. Thrombolysis is now established as a therapy for ischaemic stroke presenting within 3 hours, and the possibility of extending the time window and refining the selection of suitable patients, is being addressed in further trials. Anticoagulants are of proven benefit in cardioembolic stroke, and particularly atrial fibrillation. For prevention of other stroke subtypes antiplatelet agents appear to have a better risk-benefit ratio. Evidence for the use of dual antiplatelet therapy, including the recent MATCH study, are discussed. Carotid endarterectomy is of proven benefit in patients with >70% symptomatic stenosis. Recent analysis has emphasised the importance of operating as soon after symptom onset as possible. Operating on asymptomatic carotid stenosis remains controversial; even after the recent Asymptomatic Carotid Surgery Trial which showed that by operating on 32 people one disabling stroke or death could be prevented over a 5 years period.

Publication Types: Journal Article Review PMID:15742106

J Neurol Neurosurg Psychiatry. 2005; 76(6): 863-5.

A study of the workload and effectiveness of a comprehensive acute stroke service.

Weir NU, Buchan AM.

Department of Clinical Neurosciences, University of Calgary, Canada T2N 2T9. nicweir@hotmail.com

OBJECTIVE: To study the workload of and use of acute intervention within an established acute stroke service, the Calgary Stroke Programme (CSP). **METHODS:** Prospective record of all acute referrals, diagnoses, and management decisions over a 4 month period. **RESULTS:** The CSP received 572 referrals (median: 32 per week), 88% of which were made between 7 am and midnight. Of the 427 patients seen in person, 29% had not had an acute stroke or transient ischaemic attack (TIA). Fifty percent of patients with suspected acute stroke were referred within 3 h of symptom onset and 11% with acute ischaemic stroke (equating to 35% of those referred within 3 h of onset and seen in person) were treated with thrombolysis. **CONCLUSION:** Centralisation of services facilitates the rapid referral of, and use of acute interventions in, patients with acute stroke and TIA. Centralised services are likely to be busy (although less so at night), to attract large numbers of patients with disorders that mimic stroke and TIA, and yet still likely to treat only the minority of acute strokes using thrombolysis. These observations may help those planning similar services and underline the need to develop more widely applicable treatments for acute stroke.

Publication Types: Journal Article PMID:15897513

J Neurol Neurosurg Psychiatry. 2005; 76(1): 145-6.

Is the rapid assessment stroke clinic rapid enough in assessing transient ischaemic attack and minor stroke?

Widjaja E, Salam SN, et al.

Publication Types: Letter PMID:15608022

J Neurol Sci. 2004; 225(1-2): 1-2.

Optimizing an individual's treatment in acute stroke: is a magnetic resonance map leading us towards the holy grail?

Levine SR.

Publication Types: Editorial PMID:15465078

J Neurosci Nurs. 2004; 36(5): 289-94.

NDT competence of nurses caring for patients with stroke.

Hafsteinsdottir TB, Grypdonck MH.

Division of Neuroscience at the University Medical Center Utrecht, The Netherlands. t.hafsteinsdottir@azu.nl

Neurodevelopmental treatment (NDT) is the most used rehabilitation approach in the treatment of

patients with stroke in the Western world today, despite the lack of evidence for its efficacy. The aim of this study was to conduct an intervention check and measure the nurses' competence, in positioning stroke patients according to the NDT approach. The sample consisted of 144 nurses in six neurological wards who were observed while positioning stroke patients according to the NDT approach. The nurses' combined mean competence scores within the wards was 195 (70%) of 280 (100%) possible, and for each ward the mean score varied between 181 (65%) and 206 (74%). This study indicates that nurses working in hospitals where the NDT approach has been implemented have the knowledge and skills to provide NDT nursing.

Publication Types: Journal Article

PMID:15524247

J Nurs Manag. 2004; 12(5): 309-16.

Quality of care in relation to a critical pathway from the staff's perspective.

Furaker C, Hellstrom-Muhli U, et al.

Institute of Health Care Pedagogics, Goteborg University, SE 405 30 Goteborg, Sweden.
carina.furaker@fhs.gu.se

Specific groups with complex nursing requirements, such as patients suffering from stroke, are in greatest need of a critical pathway. AIM: To study how the critical pathway is reflected in caring work from the staff's perspective. METHOD: Personnel (n = 16): physicians, care developers, speech therapists, physiotherapists, occupational therapists, nurses, assistant nurses. Content analysis has been used. Two main categories were formed: function of the critical pathway and effects of the critical pathway. FINDINGS: The nurse in the stroke ward is seen as the "spider in the web". There is a need for more collaboration, both in and between hospitals and primary health care. Many of the staff members feel that they are working in a learning organization. Others say that they have low job satisfaction caused by low manning and, consequently, less time to spend with the patients. CONCLUSION: The critical care chain has not been fully developed in accordance with the care model. It emerges that patients spend a lot of time waiting while the staff have too little time to spend with patients.

Publication Types: Journal Article

PMID:15315486

J Nurs Res. 2005; 13(2): 117-28.

Identifying factors associated with hospital readmissions among stroke patients in Taipei.

Chuang KY, Wu SC, et al.

School of Public Health, College of Public Health and Nutrition, Taipei Medical University, Taiwan, ROC.

Hospital readmissions contribute significantly to the cost of medical care, and may reflect unresolved problems at discharge or a lack of resources in post-hospital care. The purpose of this paper is to assess the effects of patient characteristics at discharge, the need for nursing care, discharge planning program, post-hospital care arrangements, and caregiver characteristics on readmissions of stroke patients. Patients discharged from neurological wards in seven hospitals in the Taipei area were recruited into the study. Surveys were conducted before their discharge, and at one month after discharge. Of the 489 patients included in the study, 24.3% were readmitted. After controlling for other variables, factors associated with readmissions were number of limitations in activities of daily living (ADL), first incidence of stroke, the need for wound nursing care, the adoption of a care plan, and the discharge locations. Contrary to expectation, age, length of stay, counseling before discharge, and caregiver burden were not associated with readmissions. The findings of this study indicate that ADL limitation is an effective predictor of readmissions. Increasing home nursing resources to meet the demand for wound nursing care may also be effective in reducing readmissions. Discharging patients into institutions for a short period of time may also prove to be more economically viable due to the reduction in readmissions.

Publication Types: Journal Article

PMID:15986313

J Nurs Res. 2005; 13(1): 66-74.

Exploring the associations between long-term care and mortality rates among stroke patients.

Chuang KY, Wu SC, et al.

School of Public Health, College of Public Health and Nutrition, Taipei Medical University.

Information on types of long-term care received by stroke patients after hospital discharge is essential for the formulation of long-term care resource development policy. Comparisons of outcomes resulting from different types of long-term care can provide important considerations in the selection of long-term care services. The purpose of this study is to describe the patterns of long-term care received, and to explore if associations exist between long-term care services and mortality status among stroke patients after hospital discharge. Using a longitudinal quasi-experimental study design, this study collected information

on the type of long-term care received at 1, 3, and 6 months after discharge for 714 patients. At one month after discharge, 4.5 % had died, and 22.1 % had regained all functions in activities of daily living and instrumental activities of daily living. The percentage of patients receiving institutional care, home or community-based care, and family care only were 10.4 % , 22.4 % , and 40.7 % respectively. The respective percentages at 3 months after discharge were 11.2 % , 18.7 % , and 38.0 % , and, at 6 months after discharge, 10.3 % , 19.4 % , and 30.9 % . After adjusting for age, sex, previous incidence of stroke, and physical functions, the odds of dying within 6 months after discharge for stroke patients receiving home or community-based care was significantly lower than those in institutions (OR = 0.39; 95 % CI = 0.15 to 0.97). It is not clear why a lower mortality rate was observed among patients receiving home or community-based services. Differences in quality of care and quality of life among users of different types of long-term care services should be investigated. More research is needed to assess the causes of the disparity in mortality rates among users of different types of long-term care services.

Publication Types: Evaluation Studies Journal Article
PMID:15977137

J Rehabil Med. 2005; 37(1): 45-52.

Clinical and administrative outcomes during publicly-funded inpatient stroke rehabilitation based on a case-mix group classification model.

Gagnon D, Nadeau S, et al.

Hopital de Readaptation Lindsay, 6363 Chemin Hudson, Montreal, Quebec, Canada.

OBJECTIVES: To determine efficiency and efficacy of publicly-funded inpatient stroke rehabilitation based on a Case-Mix Group Classification Model, and to analyse the usefulness of this decisional aid in the refinement of rehabilitation services delivery needed to optimize accessibility to inpatient rehabilitation services for individuals with stroke in a publicly-funded healthcare system. **DESIGN:** Individuals with stroke (n=422) who received inpatient rehabilitation through the Montreal Rehabilitation Hospital Network were included in this retrospective study. Clinical (total, motor and cognitive-Functional Independence Measure (FIM) scores, percentage of discharge to community) and administrative outcomes (onset to rehabilitation interval, length of inpatient rehabilitation stay, length of stay efficiency) were measured. **RESULTS:** Across Case-Mix Groups, mean onset to rehabilitation days varied between 16.2 (5.7) and 32.0 (19.4) days whereas the mean length of stay fluctuated between 27.5 (13) and 77.0 (27) days. Best total (41.6 (21.4)) and motor-FIM (38.9 (19.0)) gains were observed in most severely disabled cases (114) whereas the Case-Mix Group 103 presented the best cognitive-FIM gain (5.8 (4.0)). Optimal mean total, motor and cognitive-FIM efficiency rates, found in moderately disabled stroke patients, were 0.668 (0.434), 0.634 (0.377) and 0.15 (0.136), respectively. Majority of patients returned home following rehabilitation in all Case-Mix Groups (63.6% to 96.4%) except for groups 112 and 108. **CONCLUSION:** Moderate to good length of stay efficiencies are observed among all Case-Mix Group following stroke rehabilitation. In fact, individuals with moderate disability present the best rate of recovery. Variations in length of stay efficiency suggest that the use of a Case-Mix Group Classification Model in stroke rehabilitation could represent an innovative approach, especially for program evaluation in publicly-funded and universal-access rehabilitation hospitals.

Publication Types: Journal Article
PMID:15788332

J Telemed Telecare. 2004; 10(2): 108-12.

A feasibility study of remote consultation to determine suitability for surgery in stroke rehabilitation.

Buurke JH, Kleissen RF, et al.

Roessingh Research and Development, Enschede, The Netherlands. j.buurke@rdd.nl

We studied knowledge transfer for the determination of the suitability of stroke patients for a specialist surgical procedure (split anterior tibial tendon transfer). Gait analysis data from patients at a general hospital were discussed with an expert in another country using personal computers, an ISDN connection (128 kbit/s) and TCP/IP-based communication tools. The key issue was whether the staff in the general hospital became better able to determine suitability for surgery. Twelve patients were studied. In three of the first four cases the advice of the remote expert changed the plan for surgery. After that the treatment plans did not change after consultation. After eight cases the local clinicians did not need to ask for further advice. There was a rapid increase in skill in determining suitability for surgery. The experience and skills of the local clinicians were thought to increase more rapidly than would have been the case without the consultations with a remote expert.

Publication Types: Case Reports Journal Article
PMID:15068648

J Thromb Thrombolysis. 2005; 20(2): 127-32.

Antithrombotic therapy for stroke in young adults.

Payne JR, Coull B.

Department of Neurology, University of Arizona, USA.

Stroke in young adults is a markedly heterogeneous disease, and remains an understudied phenomenon. While advances are being made in our understanding of the pathophysiology of its underlying conditions, treatment concerns are controversial, and clinical trials are sorely lacking. This review presents an overview of some of the relevant management issues in hypercoagulable states, migraine, patent foramen ovale, vascular dissection and venous sinus thrombosis.

Publication Types: Journal Article

PMID:16205861

J Vasc Interv Radiol. 2004; 15(1 Pt 2): S133-41.

Management of ischemic stroke in the next decade: stroke centers of excellence.

Dion JE.

Department of Radiology, Section of Interventional Neuroradiology, Emory University Hospital, 1364 Clifton Road, NE, Atlanta, Georgia 30322, USA. jacques_dion@emoryhealthcare.org

Stroke has been increasingly recognized as an important and expensive medical and societal problem during the past 10 years. Currently, organized stroke care is delivered to the American population in only a few cities and hospitals that provide an efficient system for rapid transportation, diagnosis, treatment, and rehabilitation. The Brain Attack Coalition (BAC) has recently proposed the concepts of stroke centers of excellence (akin to trauma level I centers), primary stroke centers, and comprehensive stroke center. The U.S. government, with the Paul Coverdell National Acute Stroke Registry and the Stroke Treatment and Ongoing Prevention Act of 2003, further supports these concepts. Herein, a discussion of the influence that the BAC, the Paul Coverdell National Acute Stroke Registry, and the Stroke Treatment and Ongoing Prevention Acts of 2001 and 2003 will have on the future of stroke therapy in this country during the next 10 years is presented. Also discussed are the elements that are crucial to organized stroke care and the formation of stroke centers of excellence. These include triage and diagnosis in the field, transportation, triage and imaging in the emergency department, prompt transfer to a dedicated stroke unit with focused care, rehabilitation, manpower, prevention and research, reimbursement issues, and politics. The importance of multidisciplinary collaboration on the professional and societal levels and, finally, government- and private sector-sponsored research are also presented.

Publication Types: Editorial Review

PMID:15101522

Jama. 2005; 294(6): 725-33.

Prognosis and decision making in severe stroke.

Holloway RG, Benesch CG, et al.

Department of Neurology, University of Rochester School of Medicine, Rochester, NY 14642, USA. robert_holloway@urmc.rochester.edu

CONTEXT: An increasing number of deaths following severe stroke are due to terminal extubations. Variation in withdrawal-of-care practices suggests the possibility of unnecessary prolongation of suffering or of unwanted deaths. OBJECTIVES: To review the available evidence on prognosis in mechanically ventilated stroke patients and to provide an overall framework to optimize decision making for clinicians, patients, and families. DATA SOURCES: Search of MEDLINE from 1980 through March 2005 for English-language articles addressing prognosis in mechanically ventilated stroke patients. From 689 articles identified, we selected 17 for further review. We also identified factors that influence, and decision-making biases that may result, in overuse or underuse of life-sustaining therapies, with a particular emphasis on mechanical ventilation. EVIDENCE SYNTHESIS: Overall mortality among mechanically ventilated stroke patients is high, with a 30-day death rate approximating 58% (range in literature, 46%-75%). Although data are limited, among survivors as many as one third may have no or only slight disability, yet many others have severe disability. One can further refine prognosis according to knowledge of stroke syndromes, early patient characteristics, use of clinical prediction rules, and the need for continuing interventions. Factors influencing preferences for life-sustaining treatments include the severity and pattern of future clinical deficits, the probability of these deficits, and the burdens of treatments. Decision-making biases that may affect withdrawal-of-treatment decisions include erroneous prognostic estimates, inappropriate methods of communicating evidence, misunderstanding patient values and expectations, and failing to appreciate the extent to which patients can physically and psychologically adapt. CONCLUSIONS: Although prognosis among mechanically ventilated stroke patients is generally poor, a minority do survive without severe disability. Prognosis can be assessed according to clinical

presentation and patient characteristics. There is an urgent need to better understand the marked variation in the care of these patients and to reliably measure and improve the patient-centeredness of such decisions.

Publication Types: Journal Article Review
PMID:16091575

Jt Comm J Qual Patient Saf. 2005; 31(8): 447-54.

Quality improvement for stroke management at the Cleveland Clinic Health System.

Hixson ED, Nadzam DM, et al.

Measurement Services, The Quality Institute, Cleveland Clinic Health System, Cleveland, USA.
hixsone@ccf.org

BACKGROUND: The Cleveland Clinic Health System established a stroke quality improvement (QI) initiative across its nine hospitals. **IMPLEMENTING THE STROKE QI INITIATIVE:** A stroke QI team took a three-pronged approach to QI: professional education, public education, and hospital process improvements. Its activities and subsequent data analysis needs were divided into four cycles (1999-2003). All data were provided to the stroke QI team and then to the Medical Operations Council to review results, consider data integrity issues, and plan dissemination. The dissemination of performance results permitted broad organizational responses to facilitate improvement. Improvement activities included professional education, public awareness, process improvement, focused data collection with routine feedback, protocol refinement, and coordination of clinical personnel within and between hospitals. **RESULTS:** The frequency of brain hemorrhagic complications decreased by more than half, from 13.4% to 6.4%; the rate of intravenous tissue plasminogen activator use increased from 1.5% to 3.9% of all stroke patients; and protocol deviations were reduced from 33% to 17%. **DISCUSSION:** The keys to this initiative's success were the health system's leadership's support, physicians' engagement via multidisciplinary project committees at the health system and hospital levels, and flexibility in implementing locally tailored process interventions.

Publication Types: Journal Article
PMID:16156192

Lancet. 2004; 363(9412): 834-5.

Stroke units: the next 10 years.

Langhorne P, Dennis MS.

Academic Section of Geriatric Medicine, Royal Infirmary, Glasgow G4 OSF, UK.

Publication Types: Journal Article
PMID:15031023

Lancet. 2005; 365(9458): 501-6.

Early supported discharge services for stroke patients: a meta-analysis of individual patients' data.

Langhorne P, Taylor G, et al.

Academic Section of Geriatric Medicine, Level 3, Centre Block, Royal Infirmary, Glasgow G4 OSF, UK.
P.Langhorne@clinmed.gla.ac.uk

BACKGROUND: Stroke patients conventionally undergo a substantial part of their rehabilitation in hospital. Services have been developed that offer patients early discharge from hospital with rehabilitation at home (early supported discharge [ESD]). We have assessed the effects and costs of such services. **METHODS:** We did a meta-analysis of data from individual patients who took part in randomised trials that recruited patients with stroke in hospital to receive either conventional care or any ESD service intervention that provided rehabilitation and support in a community setting with the aim of shortening the duration of hospital care. The primary outcome was death or dependency at the end of scheduled follow-up. **FINDINGS:** Outcome data were available for 11 trials (1597 patients). ESD services were mostly provided by specialist multidisciplinary teams to a selected group (median 41%) of stroke patients admitted to hospital. There was a reduced risk of death or dependency equivalent to six (95% CI one to ten) fewer adverse outcomes for every 100 patients receiving an ESD service ($p=0.02$). The hospital stay was 8 days shorter for patients assigned ESD services than for those assigned conventional care ($p<0.0001$). There were also significant improvements in scores on the extended activities of daily living scale and in the odds of living at home and reporting satisfaction with services. The greatest benefits were seen in the trials evaluating a coordinated multidisciplinary ESD team and in stroke patients with mild to moderate disability. **INTERPRETATION:** Appropriately resourced ESD services provided for a selected group of stroke patients can reduce long-term dependency and admission to institutional care as well as shortening hospital stays.

Publication Types: Journal Article Meta-Analysis
PMID:15705460

Lancet. 2005; 365(9458): 455-6.

Early supported discharge: a valuable alternative for some stroke patients.

Meijer R, van Limbeek J.

Department of Neurological Rehabilitation, Rehabilitation Centre Groot Klimmendaal, 6800 GG Arnhem, Netherlands. r.meijer@grootklimmendaal.nl

Publication Types: Comment Journal Article

PMID:15705442

Lancet Neurol. 2005; 4(7): 432-6.

In pursuit of evidence-based treatments for paediatric stroke: the UK and Chest guidelines.

DeVeber G.

Division of Neurology, Hospital for Sick Children, 555 University Avenue, Toronto, Ontario, M5G1X8, Canada. deveber@sickkids.ca

BACKGROUND: Arterial ischaemic stroke and cerebral sinovenous thrombosis are increasingly seen in infants and children. Incidence ranges from two to six per 100,000 children a year. Adverse outcome including death, neurological deficits, and reduced quality of life affect most children with stroke. Residual neurological deficits last many decades, for the rest of a patient's life. Of major concern is the risk of recurrent stroke, which affects up to 25% of children who have arterial ischaemic stroke after the newborn period. Children with ischaemic stroke are empirically treated with antithrombotics including antiplatelet (aspirin and clopidogrel) and anticoagulant (heparins and warfarin) drugs. No randomised controlled trials have been done besides those in patients with sickle-cell disease and adult trial data are not directly applicable to paediatric stroke due to maturational differences in coagulation and vascular systems as well as different stroke mechanisms. **RECENT DEVELOPMENTS:** National and international networks of clinical and basic researchers focused on paediatric stroke are now developing. Recently published cohort and case-controlled studies are elucidating stroke mechanisms, outcomes, and treatment safety in children. Two sets of guidelines have been published in the past 6 months. These guidelines differ both in the scope of treatments and subgroups of patients with stroke they cover; however, both focus on ischaemic stroke beyond the newborn period. There are areas of agreement-for children with sickle-cell disease and stroke, both guidelines recommend initial and maintenance transfusion therapy to reduce the proportion of sickle-cell haemoglobin to less than 30%. For children with sinovenous thrombosis or arterial stroke due to dissection or cardiac embolism, both guidelines recommend anticoagulant therapy with warfarin or low molecular weight heparin for 3-6 months. However, the guidelines diverge in their recommendations for the initial treatment of non-haemorrhagic arterial ischaemic stroke, one recommending aspirin and the other 5-7 days of anticoagulants. The guidelines also differ in their recommendations for long-term treatment of children after arterial ischaemic stroke, one set recommending maintenance aspirin in all patients and the other only in children with vasculopathy. These differences arise from both a lack of sufficient evidence and the differing views of neurologists and haematologists in the treatment of paediatric cerebral thrombosis. **WHERE NEXT?:** Multicentre studies and networks provide increasingly precise data regarding mechanisms, outcomes, and treatment safety in paediatric stroke. These data and networks will enable clinical trials to address areas of divergent opinion and improve the outcome from childhood stroke in the near future.

Publication Types: Journal Article Review

PMID:15963446

Lancet Neurol. 2005; 4(4): 204-5.

Stroke thrombolysis: we need new data, not more reviews.

Hoffman JR, Cooper RJ.

Department of Medicine, Division of Emergency Medicine, UCLA Emergency Medicine Center, 924 Westwood Blvd, suite 300, Los Angeles, CA 90024, USA. jrh@ucla.edu

Publication Types: Comment Letter

PMID:15778096

Lancet Neurol. 2005; 4(1): 64-8.

What MONICA told us about stroke.

Asplund K.

National Board of Health and Welfare and the Department of Medicine, University Hospital, Umea, Sweden. kjell.asplund@sos.se <kjell.asplund@sos.se>

The WHO MONICA (Multinational Monitoring of Determinants and Trends in Cardiovascular Disease) Project is the world's largest prospective study on cardiovascular disorders. In the stroke component, 34,715 individually validated stroke events were recorded; these happened during 21.7 million years of

observation in 14 populations in Europe, Siberia, and China. Two important questions were addressed. What is driving stroke mortality trends-changes in stroke incidence (risk of stroke) or changes in survival? To what extent do changes in the population burden of classic cardiovascular risk factors affect stroke risk in the population? The seven lessons that I learnt from the MONICA study are described; some were about the limitations of an ecological study for testing of hypotheses and evaluation of community-based intervention programmes. Socioeconomic factors seem more important than classic risk factors for the establishment of stroke trends in the population, best shown by the development of stroke mortality in eastern Europe during the 10 years of the WHO MONICA Project. The simplest, most important, and, for clinicians, the most encouraging of the lessons is that quality of stroke care makes a profound difference, not only to the patient and his or her family but also to the burden of stroke in the population at large.
Publication Types: Journal Article PMID:15620858

Mayo Clin Proc. 2004; 79(10): 1321-9.

Literature-searching strategies to improve the application of evidence-based clinical practice principles to stroke care.

Demaerschalk BM.

Department of Neurology, Mayo Clinic College of Medicine, Scottsdale, Ariz, USA.

The field of cerebrovascular disease is evolving more rapidly than ever. New evidence from primary research in stroke is available and should be guiding global changes in practice. Instead, there is a disappointing and ever-widening evidence-practice gap. Busy health care practitioners are encouraged to practice evidence-based medicine, but their skills in this field are deficient. The purpose of this article is to provide the steps necessary to quickly, efficiently, and independently locate high-quality, valid evidence-based information on stroke that can be applied in a point-of-care setting. A discussion of secondary stroke prevention highlights these steps.

Publication Types: Journal Article Review PMID:15473418

Med Care. 2005; 43(9): 902-10.

Rehospitalization and survival for stroke patients in managed care and traditional Medicare plans.

Smith MA, Frytak JR, et al.

Department of Population Health Sciences, University of Wisconsin-Madison Medical School, Madison, Wisconsin 53705-2397, USA. maureensmith@wisc.edu

BACKGROUND: Stroke affects more than 500,000 older persons each year in the United States, but no studies have compared older stroke patients in Medicare health maintenance organizations (HMOs) and fee-for-service (FFS) after recent changes in FFS reimbursement. **OBJECTIVES:** We sought to compare utilization and outcomes after stroke in Medicare HMO and FFS. **DESIGN:** We reviewed administrative data in 11 regions from Medicare and a large national health plan. **SUBJECTS:** We studied Medicare beneficiaries 65 years and older discharged with ischemic stroke during 1998-2000, ie, 4816 HMO patients and a random sample of 4187 FFS patients from 422 hospitals. **MEASURES:** We measured survival, rehospitalization, length of stay, discharge destination, and warfarin use. **RESULTS:** Overall, HMO patients were younger, male, non-Caucasian, and had fewer comorbid conditions. When compared with FFS patients, HMO patients were more likely to be rehospitalized within 30 days for a primary diagnosis of ischemic stroke (Adjusted Hazard Ratio = 1.45, 95% Confidence Interval [CI] 1.14-1.83) or ill-defined conditions (eg, rehabilitation services) (2.87, 95% CI 1.85-4.46) and less likely to be rehospitalized for fluid and electrolyte disorders (0.54, 95% CI 0.34-0.87) or circulatory/respiratory problems (0.77, 95% CI 0.60-0.98). There were no consistent differences in 30-day mortality or in 1-year rehospitalization or mortality for 30-day survivors. HMO patients also were much less likely to be discharged to rehabilitation facilities, slightly less likely to be discharged to skilled nursing facilities and to have a shorter length of stay, and did not differ in the use of home care services or warfarin use when compared with FFS patients. **CONCLUSIONS:** Traditional measures of quality such as 30-day rehospitalization may not be valid when comparing HMO and FFS patients if differences might reflect an alternative service mix. Utilization of post-acute care for FFS patients appears similar to HMO patients except for discharge to rehabilitation facilities.

Publication Types: Journal Article PMID:16116355

Med Care. 2005; 43(5): 507-15.

Measuring stroke impact with the stroke impact scale: telephone versus mail administration in veterans with stroke.

Duncan P, Reker D, et al.

Rehabilitation Outcomes Research Center, HSR and D, and RR and D Center of Excellence, Malcom Randall VA Medical Center, Gainesville, Florida 32608-1197, USA. pwduncan@hp.ufl.edu

OBJECTIVES: The purpose of this study was to examine response rate, mode effects, and reliability of the Stroke Impact Scale (SIS) in a veteran stroke population using mail and telephone modes of administration. **METHODS:** Patients who had suffered a stroke were identified using national VA administrative data and International Classification of Diseases, 9th Revision codes in 13 participating Veterans Affairs hospital. Stroke was confirmed by reviewing electronic medical records. Patients were randomized to SIS administration by mail or telephone at 12-weeks after their stroke. Comparison of response rate, nonresponse bias, domain scores, administration costs, and instrument reliability were performed. **RESULTS:** Four hundred fifty-eight patients with stroke were identified, validated, and randomly assigned into 2 administration groups. No significant cluster effect was observed. Response rates for mail and telephone were 45% and 69%, respectively. Mail nonresponders were more likely to have had severe strokes, cognitive deficits, and be unmarried. No difference was observed between telephone responders and nonresponders. Responders in mail and telephone modes were not different, and the SIS score distribution did not indicate the presence of mode effects. Test-retest reliability was good to excellent in the mail group (0.77-0.99) except social participation (0.62). Test retest reliability was excellent in the telephone mode (0.90-0.99) except emotion (0.68). **CONCLUSIONS:** Telephone mode of survey administration yielded a higher response rate, less bias in responder selection, and higher test-retest reliability. The cost of telephone administration was 2 times the cost of mail. Mode effects in SIS score distribution were not observed in this study but additional research with larger sample sizes is needed to provide more definitive evidence.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial
PMID:15838417

Med J Aust. 2004; 180(10 Suppl): S92-6.

Towards a Safer Culture: clinical pathways in acute coronary syndromes and stroke.

Ferry CT, Fitzpatrick MA, et al.

NSW Institute for Clinical Excellence, Sydney, NSW. ferryc@ice.nsw.gov.au

Towards a Safer Culture (TASC) aims to provide a safer culture in hospital departments by introducing clinical pathways for the management of patients with acute coronary syndromes or stroke. Specific clinical pathways have been implemented for patients with different levels of risk to guide the most appropriate evidence-based medical care for each patient. Pathways facilitate continuity of care across different clinical departments by identifying gaps in care, and clarifying tasks and responsibilities. A multidisciplinary and interdepartmental approach to managing patients is seen as an effective way of effecting change. A system for "point-of-care" data acquisition, a centralised database and web-based reporting enable benchmarking for participating hospitals. A comprehensive range of educational/training strategies is used to facilitate multidisciplinary teamwork and promote clinical leadership. Phase 1 of TASC was successfully piloted at four hospitals in New South Wales, Victoria and Queensland. TASC is currently being rolled out to 29 hospitals in NSW and three hospitals in Western Australia.

Publication Types: Journal Article

PMID:15139845

<http://www.mja.com.au/public/issues/contents.html>

Med J Aust. 2005; 182(4): 160-3.

Quality of stroke care within a hospital: effects of a mobile stroke service.

van der Walt A, Gilligan AK, et al.

Department of Medicine, The Alfred Hospital, PO Box 315, Prahran, VIC 3181, Australia. annekedonovan@yahoo.com.

OBJECTIVE: An Australian stroke services study (SCOPES) has developed a framework to compare different forms of acute stroke services, the gold standard being localised stroke units. We aimed to use this framework to assess changes in the quality of stroke care over time as a sequential audit process. **DESIGN AND SETTING:** A retrospective medical record audit comparing 100 sequential stroke admissions (July 2002 to June 2003) two years after institution of a mobile stroke service (MSS) with 100 historical controls (September 1998 to October 1999) at a 260-bed hospital in Melbourne. The MSS results were also compared with stroke units in SCOPES. **MAIN OUTCOME MEASURES:** Adherence to quality indicators and standard measures of outcome (complications, length of stay and discharge disability) after implementing the MSS. **RESULTS:** Significant improvements were seen in prophylaxis for deep-vein thrombosis, incontinence management, premorbid function documentation, frequent neurological observations and early occupational therapy. The MSS demonstrated fewer severe complications (9% versus 24%; $P = 0.004$), reduced median length of stay (discharged patients: 12.0 days versus 18.5 days; $P = 0.003$) and more patients were independent at discharge (32% versus 9%; $P < 0.001$). Comparison with SCOPES stroke units showed our MSS could improve in incontinence management and appropriate use of antiplatelet therapy.

CONCLUSION: Institution of the MSS was associated with improvements in the quality of stroke care. This study demonstrates application of an audit procedure for quality improvement in hospital stroke management and the potential to improve stroke services in smaller centres.

Publication Types: Journal Article PMID:15720170
<http://www.mja.com.au/public/issues/contents.html>

N Z Med J. 2004; 117(1190): U798.

The Acute Stroke Unit at Middlemore Hospital: an evaluation in its first year of operation.

Di Matteo M, Anderson C, et al.

Middlemore Hospital, Counties Manukau District Health Board, Auckland, New Zealand.

AIM: Despite strong evidence of benefit, few stroke units exist in New Zealand. In this paper, we describe the process and outcome for the country's first, comprehensive Acute Stroke Unit (ASU), established at Middlemore Hospital in 2001. METHODS: The evaluation comprised: (a) two independent 'before and after' audits of medical records of a random selection of patients (2 x n=100) identified from Diagnostic Related Group (DRG) discharge codes for stroke in 1999 (12 months) and 2001-02 (9 months); (b) a review of all DRG stroke outcome data and internal cost analyses for the study periods; and (c) a 'time-in-motion' study of nursing care requirements. RESULTS: The DRG data showed an increase in separations (538 vs 613); stable re-admissions (8% vs 7%); and declines in average length of stay (6.1 vs 5.4 days), deaths (14.0% vs 8.8%), and referrals for rehabilitation (127 vs 67); while the audit indicated shorter times from admission to brain imaging, and swallow and allied health assessments, for stroke from 1999 to 2001-02. A 1:4 nurse:patient ratio seems to provide an optimum level of care for costs. CONCLUSIONS: The introduction of the ASU has been associated with improvements in several key indicators of quality of care for patients with stroke.

Publication Types: Evaluation Studies Journal Article PMID:15107901
<http://www.nzma.org.nz/journal/117-1190/798/content.pdf>

N Z Med J. 2004; 117(1190): U797.

Changes in stroke care at Auckland Hospital between 1996 and 2001.

Barber A, Charleston A, et al.

Auckland City Hospital Stroke Service and University of Auckland, Auckland, New Zealand.
abarber@adhb.govt.nz

AIMS: In 1996, we performed a descriptive audit of stroke care in Auckland Hospital. Since then, a mobile stroke team has been established. We have repeated the 1996 audit to assess changes in stroke management. METHODS: From 1 June to 30 September 2001, information was prospectively recorded for all patients with stroke. RESULTS: There were 177 strokes in 175 patients (92 men, mean age 70.9, standard deviation [SD] 14.9 years). Ninety-seven percent of patients had cerebral imaging (median 4.5 hours; interquartile range [IQR] 2.7-11.6). Acute aspirin was given to 78% of patients in 2001 and 40% in 1996 (p <0.001). Twenty-four percent of patients were kept 'nil by mouth' for at least 24 hours (46% in 1996, p <0.001). At discharge, 73% of patients were taking antiplatelet or anticoagulant therapy (61% in 1996, p <0.001). Only 50% of the patients with elevated discharge blood pressures were taking antihypertensives. There had been a reduction in the mean length of hospital stay to 16 days (21 days in 1996) but no significant change in mortality (14% compared with 17% in 1996). CONCLUSION: A stroke service may increase the attention to the 'processes' of stroke care and use of therapies, which are shown to be of benefit in randomised controlled trials.

Publication Types: Journal Article PMID:15107900
<http://www.nzma.org.nz/journal/117-1190/797/content.pdf>

N Z Med J. 2004; 117(1192): U863.

New Zealand guideline for management of stroke.

Hanger HC, Wilkinson T, et al.

Publication Types: Letter PMID:15107877
<http://www.nzma.org.nz/journal/117-1192/863/content.pdf>

Neuroimaging Clin N Am. 2005; 15(2): 421-40, xii.

The evolving role of acute stroke imaging in intravenous thrombolytic therapy: patient selection and outcomes assessment.

Sims J, Schwamm LH.

Stroke and Neurovascular Regulation Laboratory, Charlestown, MA, USA.

In early trials of thrombolysis, unenhanced CT was used to exclude patients with brain hemorrhage or large infarctions but was insensitive to stroke pathophysiology or early signs of cerebral ischemia or

infarction. Currently, CT angiography, CT perfusion, and MR imaging can provide information about stroke mechanisms and prognosis, quantify penumbral tissue, and support risk stratification and patient selection. This article reviews the role of neuroimaging in the original intravenous thrombolytic trials, current application of these technologies, and the potential future role of imaging to extend the time window for thrombolysis and to augment therapeutic success.

Publication Types: Journal Article Review

PMID:16198950

Neuroimaging Clin N Am. 2005; 15(2): 245-58, ix.

The evolving role of advanced MR imaging as a management tool for adult ischemic stroke: a Western-European perspective.

Schellinger PD.

Department of Neurology, University of Heidelberg, Heidelberg, Germany. Peter_Schellinger@med.uni-heidelberg.de

New and more advanced diagnostic imaging techniques for acute stroke triage have the potential to not only improve the quality of care but also reduce health care costs. Although sufficiently large and methodologically sound studies with regard to cost effectiveness of MR imaging are lacking, the overall impression is that MR imaging has revolutionized not only the diagnosis but also the open and investigational management of neurologically ill patients.

Publication Types: Journal Article Review

PMID:16198938

Neurol Sci. 2005; 26(2): 81-8.

Stroke units and general wards in seven Italian regions: the PROSIT study.

Candelise L, Micieli G, et al.

Neurological Department, IRCCS Ospedale Maggiore Policlinico, Università degli Studi, Milan, Italy.

PROSIT (research PROject on Stroke services in ITaly) is a study performed to evaluate number and work organisation of acute in-hospital services (stroke units, SU) and general wards (GW), in seven Italian regions (Liguria, Lombardia, Lazio, Veneto, Friuli-Venezia-Giulia, Emilia Romagna, Toscana), which have a population of 29,169,811 inhabitants and a relative ratio of 225/100,000 hospitalisations for acute stroke. The registers of hospital discharges from January to December 1999 were looked at identify to services recording at least 50 acute stroke discharges (DRG14) per year. A structured questionnaire investigating stroke service characteristics was submitted to the doctors in charge of the identified units and completed in the presence of an external observer between October 2000 and February 2001. SUs were identified as units with dedicated beds (at least 80%) and team (at least 1 physician and 1 nurse) for acute stroke patients. SUs are still uncommon in many Italian regions because only, as 7% of the wards evaluated were found to be a SU and less than 10% of acute stroke patients resulted to be admitted to a SU. Great heterogeneity was found between the different regions surveyed. The most striking differences between SUs and GW were related to the staffing and care organisation, with higher number/patients ratio in SUs as far as physicians and nurses, speech therapists and social workers were concerned.

Publication Types: Evaluation Studies Journal Article Multicenter Study

PMID:15995824

Neurol Sci. 2005; 26(2): 72-80.

The economic burden of stroke in Italy. The ECLIPSE Study: Economic Longitudinal Incidence-based Project for Stroke Evaluation.

Gerzeli S, Tarricone R, et al.

Department of Applied Statistics and Economics Libero Lenti, University of Pavia, Pavia, Italy.

Stroke is the second most common cause of death in the world. The aim of this study is to estimate stroke's direct costs and productivity losses in Italy from a societal perspective and to explain cost variability. A prospective observational multicentre cost of illness study was designed. Four hundred and forty-nine consecutive patients admitted because of acute first-ever stroke in 11 Italian hospitals were enrolled. Costs and outcomes were assessed at patients' enrollment, and at 3, 6 and 12 months after discharge. Overall, social costs in the first six months following the attack were euros 11,600 per patient; 53% of this was health care costs, 39% non-health care costs and the remaining 8% productivity losses. Age, level of disability and type of hospital ward were the most significant predictors of six-month social costs. The acute phase counted for more than 50% of total health care costs, leaving the remaining 50% to the post-acute phase, indicating that follow-up should be on the agenda of policy makers also.

Publication Types: Evaluation Studies Journal Article Multicenter Study PMID:15995823

Neurology. 2004; 62(10): 1914; author reply 1914-5.

VA Stroke Study: neurologist care is associated with increased testing but improved outcomes.

Cheng EM, Birbeck G, et al.

Publication Types: Comment Letter

PMID:15159518

Neurology. 2004; 62(1): 77-81.

Burden of first-ever ischemic stroke in the oldest old: evidence from a population-based study.

Marini C, Baldassarre M, et al.

Clinica Neurologica, Universita degli Studi di L'Aquila, Italy. marini@cc.univaq.it

OBJECTIVE: To evaluate the contribution of subjects 80 years old or older to the burden of ischemic stroke as compared with subjects younger than 80 years. **METHODS:** All first-ever ischemic strokes occurring in a 5-year period (1994 to 1998) in the population-based L'Aquila registry were traced. Incidence, total health care utilization, disability, and mortality were assessed in patients 80 years old or older, and differences with those younger than 80 years were assessed by univariate and survival analyses. **RESULTS:** One thousand three hundred sixteen of 3,594 first-ever ischemic strokes (36.6%) occurred in patients 80 years old or older, accounting on average for one-third of health care utilization. The crude annual incidence rate was 21.54 per 1,000 (95% CI 20.42 to 22.72). At the 1-year follow-up, 27.7% of patients had mild or no disability, 20.7% had severe disability, and 51.6% had died. With respect to patients under 80 years of age, older patients showed a higher proportion of women (61.3 vs 47.7%), atrial fibrillation (30.2 vs 20.7%), coronary heart disease (31.0 vs 23.4%), and peripheral arterial disease (14.6 vs 10.8%) and a lower proportion of cigarette smoking (15.3 vs 29.2%) and hypercholesterolemia (20.4 vs 29.4%). Thirty-day (34.6 vs 13.4%) and 1-year (51.6 vs 22.3%) mortality were higher in patients 80 years old or older than in those younger than 80, mostly in the presence of atrial fibrillation (hazard ratio [HR] was 1.39 for 30-day mortality and 1.37 for 1-year mortality) and diabetes mellitus (HR was 1.39 for 30-day mortality and 1.31 for 1-year mortality). **CONCLUSION:** The burden of ischemic stroke is high in subjects 80 years old or older, contributing about one-third of health care utilization and 59.8% of deaths within 30 days.

Publication Types: Journal Article

PMID:14718701

Neurology. 2005; 65(3): 371-5.

Population-based study of delays in carotid imaging and surgery and the risk of recurrent stroke.

Fairhead JF, Mehta Z, et al.

University Department of Clinical Neurology, Radcliffe Infirmary, Oxford, OX2 6HE, UK.

BACKGROUND: Benefit from carotid endarterectomy is greatest when performed within 2 weeks of a presenting TIA or stroke and decreases rapidly thereafter. **OBJECTIVE:** To determine the delays to carotid imaging and endarterectomy in Oxfordshire, UK, and the consequences for the effectiveness of stroke prevention. **METHODS:** All patients undergoing carotid imaging for ischemic retinal or cerebral TIA or stroke were identified in two populations: the population of Oxfordshire, UK (n = 680,772), from April 1, 2002, to March 31, 2003, and the Oxford Vascular Study (OXVASC) subpopulation (n = 92,000) from April 1, 2002, to March 31, 2004. The times from presenting event to referral, scanning, and endarterectomy (Oxfordshire population) and the risk of stroke prior to endarterectomy in patients with > or = 50% symptomatic carotid stenosis (OXVASC population) were determined. **RESULTS:** Among 853 patients who had carotid imaging in the Oxfordshire population, median (interquartile range) times from presenting event to referral, scanning, and endarterectomy were 9 (3 to 30), 33 (12 to 62), and 100 (59 to 137) days. Eighty-five patients were found to have 50 to 99% symptomatic stenosis, of whom 49 had endarterectomy. Only 3 (6%) had surgery within 2 weeks of their presenting event and only 21 (43%) within 12 weeks. The risk of stroke prior to endarterectomy in the OXVASC subpopulation with > or = 50% stenosis was 21% (8 to 34%) at 2 weeks and 32% (17 to 47%) at 12 weeks, in half of which strokes were disabling or fatal. **CONCLUSION:** Delays to carotid imaging and endarterectomy after TIA or stroke in the United Kingdom are similar to those reported in several other countries and are associated with very high risks of otherwise preventable early recurrent stroke.

Publication Types: Journal Article

PMID:16087900

Neurology. 2005; 65(3): 360-5.

The impact of standardized stroke orders on adherence to best practices.

BACKGROUND: Standardized order templates have been credited with improving care for several common medical conditions. The authors sought to determine whether use of standard orders would be associated with improvement in stroke care. **METHODS:** All patients with a discharge diagnosis of ischemic stroke

were identified from seven hospitals in California participating in a CDC-sponsored Coverdell Acute Stroke Pilot Registry. The authors tracked six points of care: thrombolysis, receipt of antithrombotic medications within 48 hours, prophylaxis for deep venous thrombosis (DVT), smoking cessation counseling, and prescription of lipid-lowering and antithrombotic medications at discharge. Scoring was based on optimal treatment, defined as receiving or having a valid contraindication to a given intervention. Baseline scores in year 1 were compared to those in year 2, after implementation of an intervention based upon standardized stroke orders. RESULTS: Overall, rates of optimal treatment improved for patients treated in year 2 (n = 226) compared to year 1 (n = 187), with 63% of patients receiving a perfect score in year 2 compared to 44% in year 1 (p < 0.0001). Rates significantly improved in four of six hospitals, when the hospital was considered the unit of intervention, and for four of the six specific measures. A seventh hospital that participated in the registry but did not implement standardized orders showed no improvement in optimal treatment. CONCLUSIONS: Implementation of standardized stroke orders and registry monitoring was associated with improvements in utilization of a number of proven interventions. Although these data are observational, they demonstrate the potential impact of simple system-wide interventions in improving care of stroke.

Publication Types: Journal Article

PMID:16087898

Neurology. 2005; 65(3): 353-4.

Facilitating acute stroke recovery with magnetic fields?

Rossini PM, Johnston CS.

Publication Types: Comment Editorial

PMID:16087896

Neurology. 2005; 64(4): 762-3.

Lower stroke-related mortality in counties with stroke centers: North Carolina Stroke Facilities Survey.

Camilo O, Goldstein LB.

Department of Medicine (Neurology, Duke University, Durham, NC, USA.

Publication Types: Journal Article

PMID:15728319

Neurology. 2005; 64(1): 154-6.

tPA by telephone: extending the benefits of a comprehensive stroke center.

Frey JL, Jahnke HK, et al.

Department of Neurology, Barrow Neurological Institute, Phoenix, AZ, USA.

The use of tissue plasminogen activator (tPA) in community hospitals has been limited by a lack of neurologic support. The authors developed a telephone network to support community emergency departments (EDs) in the use of tPA. Their experience demonstrates equivalent results for patients treated by telephone and those treated in-house. Their number of tPA-treated patients increased 72%. Requirements included willingness of community EDs to use tPA and willingness of the stroke center to provide support.

Publication Types: Journal Article

PMID:15642925

Neurorehabil Neural Repair. 2005; 19(2): 139-47.

Stroke rehabilitation in Switzerland versus the United States: a preliminary comparison.

Stuart M, Ryser C, et al.

Department of Sociology and Anthropology, University of Maryland, Baltimore County, USA. stuart@umbc.edu

This article compares the structure and process of rehabilitation for stroke patients at 2 internationally recognized rehabilitation hospitals, Klinik Valens ("Valens") in Switzerland and the William Donald Schaeffer Rehabilitation Hospital at Kernan ("Kernan") in the United States. Although the patient mix, structure, and process of rehabilitation were similar in many regards, there were some important differences. Most notably, on average, patients at the U.S. hospital were discharged from rehabilitation at approximately the same day poststroke that rehabilitation began in Switzerland. Patients remained in an inpatient setting an average of 40 days longer in Switzerland (for the combination of acute care and rehabilitation) and had significantly higher levels of functioning at discharge when compared to their U.S. counterparts. The authors' findings suggest that Europe may offer opportunities for rehabilitation research that would be difficult to duplicate in the United States and highlight policy-relevant questions for future

studies aimed at developing efficient managed care systems for stroke survivors.

Publication Types: Journal Article

PMID:15883358

Nurs Older People. 2004; 16(7): 18-22.

Reducing deaths from stroke: a focused review of the literature.

Curley C, Devitt P.

Royal Oldham Hospital, Pennine Acute Healthcare Trust.

Publication Types: Journal Article Review

PMID:15500210

Nurs Stand. 2004; 18(33): 43-52; quiz 54, 56.

Stroke: holistic care and management.

Mitchell E, Moore K.

School of Nursing, University of Ulster, Magee Campus, County Londonderry. ea.mitchell@ulster.ac.uk

Stroke can have a devastating effect on a patient's life and that of his or her family. This article discusses the causes and effects of stroke and outlines the role of the nurse in the rehabilitation of a patient after stroke with reference to the National Clinical Guidelines for Stroke (RCP 2002).

Publication Types: Journal Article Review

PMID:15137297

Patient Educ Couns. 2005; 56(3): 257-67.

Intervention studies for caregivers of stroke survivors: a critical review.

Visser-Meily A, van Heugten C, et al.

Rehabilitation Centre De Hoogstraat, Rembrandtkade 10, 3583 TM Utrecht, The Netherlands. a.visser@dehoogstraat.nl

The objective of this review was to evaluate the effectiveness of different types of intervention programs for caregivers of stroke patients. A systematic search using Medline, PsychINFO, AMED and CINAHL till March 2003 was carried out and 22 studies were identified. Four types of support programs could be studied: providing specialist services, (psycho)education, counselling and social support by peers. Many different outcome domains and a variety of measures were used. Ten studies reported positive results on one or more outcome domains: reduction of depression (two studies) and burden (one), improvement of knowledge on stroke (five), satisfaction with care (one), family functioning (one), quality of life (three), problem solving skills (two), social activities (two), and social support (one). Three studies reported a negative result on caregiver outcome. We could not identify sufficient evidence to confirm the efficacy of interventions but counselling programs (3 out of 4) appear to have the most positive outcome.

Publication Types: Journal Article Review PMID:15721967

Patient Educ Couns. 2005; 56(2): 211-7.

Actual and desired information provision after a stroke.

Wachters-Kaufmann C, Schuling J, et al.

Department of General Practice of the University of Groningen, A. Deusinglaan 1, 9713 AV Groningen, The Netherlands. c.s.m.wachters-kaufmann@med.rug.nl

Stroke patients and caregivers have a substantial information need. The study investigates how information was actually provided to stroke patients and caregivers and how they prefer to be informed. The GP, neurologist and physiotherapist are both the actual and desired information providers. The actual and desired information correspond in terms of content, frequency, and method of presentation. However, patients and caregivers prefer to receive information within 24 h and to be informed about, and be given, relevant written information. The information given by the various professional stroke care-providers could be better co-ordinated. The role of the GP as an information provider lagged quite a long way behind. Recommendations for the provision of an improved information system is given. Most of the subjects are relatively young male patients with few disabilities and healthy caregivers. More attention should be paid to encouraging patients and caregivers to actively seek information to supplement the information given by professional stroke care-providers.

Publication Types: Evaluation Studies Journal Article PMID:15653251

Perform Improv Advis. 2004; 8(1): 1-3, 5-6.

Stroke unit decreases patient LOS with care, culture changes.

Publication Types: Journal Article PMID:15011497

Perform Improv Advis. 2005; 9(7): 77-9, 73.

Coordination with EMS improves stroke treatment.

A tight relationship with emergency medical services technicians in the field, as well as increased physician and community education about stroke, has made Harborview Medical Center in Seattle, WA, one of the highest scoring institutions in a national stroke benchmarking project.

Publication Types: Journal Article

PMID:16114481

Phys Ther. 2004; 84(11): 1045-54.

A home program of sensory and neuromuscular electrical stimulation with upper-limb task practice in a patient 5 years after a stroke.

Sullivan JE, Hedman LD.

Department of Physical Therapy and Human Movement Sciences, Feinberg School of Medicine, Northwestern University, 645 N Michigan Ave, Suite 1100, Chicago, IL 60611, USA. j-sullivan@northwestern.edu

BACKGROUND AND PURPOSE: This case report describes a person with upper-extremity (UE) hemiparesis who participated in a home program that included sensory amplitude electrical stimulation (SES) to his involved arm and performance of task-specific exercises with the assistance of neuromuscular electrical stimulation (NMES). **CASE DESCRIPTION:** The patient was a 67-year-old man with stable sensory and motor deficits 5 years after a stroke. Sensory amplitude electrical stimulation was delivered for 2 hours per day. A daily, 15-minute course of NMES was used to help him perform UE tasks. This home program was carried out for 18 weeks and included 6 physical therapist home visits. **OUTCOMES:** The patient's UE score on the Stroke Rehabilitation Assessment of Movement (STREAM) improved from 10/20 to 17/20. The score on the Action Research Arm Test (ARAT) improved from 27/57 to 42/57. The patient reported that he was now able to button buttons, use a knife and fork, and tie simple fishing knots. **DISCUSSION:** A home program combining SES and NMES may be an effective method to increase UE function even 5 years after a stroke.

Publication Types: Case Reports Journal Article

PMID:15509189

Phys Ther. 2005; 85(3): 238-48.

Physical therapy interventions for patients with stroke in inpatient rehabilitation facilities.

Jette DU, Latham NK, et al.

Physical Therapy Program, Simmons College, 300 The Fenway, Boston, MA 02115, USA. diane.jette@simmons.edu

BACKGROUND AND PURPOSE: The purpose of this study was to describe physical therapy provided to patients with stroke in inpatient rehabilitation facilities. **SUBJECTS AND METHODS:** Data were collected from 972 patients with stroke receiving physical therapy services at 6 rehabilitation facilities in the United States. Descriptive statistics were derived to describe physical therapy sessions, including proportion of therapy time spent in specific functional activities and proportion of those activities that included any of 59 interventions. **RESULTS:** Mean length of stay was 18.7 days (SD=10.3), and patients received physical therapy, on average, 13.6 days (SD=7.8). Patients attended, on average, 1.5 (SD=0.3) physical therapy sessions per day, with each session lasting 38.1 minutes (SD=17.1). Gait and prefunctional activities were performed most frequently (31.3% and 19.7% of total treatment time, respectively). For gait activity, physical therapists used balance and postural awareness training in more than 50% of sessions and used strength training for more than 50% of sessions of prefunctional activities. Eighty-six percent of the patients received evaluation, and 84% of the patients and families received education. **DISCUSSION AND CONCLUSION:** Therapists selected an eclectic approach to intervention rather than specific intervention techniques. The approach to patients' care included interventions to remediate impairments and to compensate for functional limitations. Therapists also reported frequently using motor control and motor learning approaches to facilitate all activities. This approach to care is largely consistent with existing stroke care guidelines and advances in the scientific theories of motor control and motor learning.

Publication Types: Journal Article PMID:15733048

Phys Ther. 2005; 85(1): 67-76.

Does the literature indicate that patients who have had a stroke have better outcomes after receiving rehabilitation from an acute rehabilitation facility than from a skilled nursing facility?

Miller D, Ellis T, et al.

DPT Program, Boston University, Boston, Mass.

Publication Types: Case Reports Journal Article PMID:15623363

Qjm. 2004; 97(5): 273-9.

Improving the efficiency of delivery of thrombolysis for acute stroke: a systematic review.

Kwan J, Hand P, et al.

University Department of Geriatric Medicine, Southampton General Hospital, Southampton, UK.
jk@1to1.org

BACKGROUND: Thrombolytic therapy with recombinant tissue plasminogen activator (rt-PA) is licensed for use within 3 h of acute ischaemic stroke. The less the delay to treatment, the more likely it is to be effective. **AIMS:** To assess the effectiveness of interventions designed to overcome barriers to rapid administration of thrombolytic therapy. **DESIGN:** Systematic review of previous clinical studies. **METHODS:** We searched for studies that evaluated the effect of an intervention to reduce delays to administration of rt-PA. We searched MEDLINE, EMBASE, the trials register of the Cochrane Stroke Group, and the Cochrane Controlled Trials Register. We sought randomized and non-randomized controlled trials, before-and-after studies, interrupted time series, and observational studies. **RESULTS:** We identified 10 non-randomized studies that evaluated interventions that could speed up admission to hospital and administration of rt-PA. The types of interventions included: (a) education programmes for the public to improve their knowledge about symptoms of acute stroke; (b) training programmes for paramedical staff to improve their accuracy of stroke diagnosis and hasten transport of the patient to hospital; (c) helicopter transfer of patients to hospital; (d) training programmes in acute stroke therapy for emergency department staff; and (e) re-organization of in-hospital systems to streamline acute stroke care. Several programmes were multifaceted interventions. **DISCUSSION:** We identified important areas that could be targets for interventions to improve the efficiency of delivering thrombolysis for acute stroke. Multifaceted programmes might be more likely to be successful in reducing delays to therapy.

Publication Types: Journal Article Review PMID:15100420

Qjm. 2005; 98(6): 415-25.

Cost-effectiveness of integrated stroke services.

van Exel NJ, Koopmanschap MA, et al.

Institute for Medical Technology Assessment (iMTA), Erasmus MC, Rotterdam, The Netherlands.
n.vanexel@erasmusmc.nl

BACKGROUND: Randomized trials have shown that integrating services for acute stroke care may lead to organizational improvements, higher efficiency and better patient outcomes in the acute phase. **AIM:** To compare the costs and effects of stroke services in an experimental group of patients compared to a group of patients receiving conventional care. **DESIGN:** Prospective non-randomized controlled trial. **METHODS:** We compared all consecutively hospitalized stroke patients in three experimental stroke service settings (Delft, Haarlem and Nijmegen, n = 411) with concurrent patients receiving conventional stroke care (n = 187) over 6 months follow-up. Main end-points were total costs per patient and total health-adjusted days per 100 patients as measured by the EuroQol-5D score during follow-up. **RESULTS:** Mean total costs per patient were 16,000 Euro (95%CI 14,670 Euro-16,930 Euro): 13,160 Euro in Delft, 16,790 Euro in Haarlem, 20,230 Euro in Nijmegen, and 13,810 Euro in the control regions. Early discharge in Delft saved about 2500 Euro hospital costs per patient. General patient health in Delft was significantly better than in the control regions; Haarlem and Nijmegen showed no difference in health. **DISCUSSION:** Our study confirms the potential to improve stroke outcomes in a cost-effective way in Dutch settings. This was seen in the group of patients in Delft, a complete and relatively simple stroke service, but not in two other regions with more complex stroke services. Important factors are reduction of hospital days and, most likely, adequate multidisciplinary rehabilitation.

Publication Types: Journal Article PMID:15879443

Qual Saf Health Care. 2005; 14(1): 6.

When is a stroke unit not a stroke unit?

McPherson KM, McNaughton HK.

National Institute for Rehabilitation Research, Division of Rehabilitation and Occupation Studies, Auckland University of Technology, Private Bag 92006, Auckland, New Zealand. kathryn.mcpherson@aut.ac.nz

Publication Types: Comment Journal Article PMID:15691996

Rehabil Nurs. 2005; 30(6): 230-8.

Predictors of disorientation among brain injury and stroke patients during rehabilitation.

Alverzo JP.

Kessler Institute for Rehabilitation, West Orange, NJ, USA. jalverzo@kessler-rehab.com

Predictors of temporal disorientation among brain injury and stroke patients undergoing rehabilitation were explored in this descriptive study. Cognitive orientation is a construct of consciousness, and the

Parallel Distributed Processing model provided a framework for conceptualizing consciousness in this study. Data were collected by a retrospective chart review of a convenience sample of stroke and brain injury patients admitted to an acute rehabilitation hospital over 4 months. The dependent variable in the study was the Temporal Orientation Test used as a daily measure in the study hospital. A total of 167 patients were admitted during the time frame, and of those, 114 patients met the study criteria and were included in the data analysis. The independent variables were defined as age, gender, years of education, number of comorbidities, patient diagnosis, orientation status on admission, and use of narcotic/sedative medications. A logistical regression was performed using SPSS Release 11.01. Only one of the six variables-orientation status on admission-reliably predicted the onset of disorientation during the rehabilitation stay with an odds ratio of 0.217, $p < .001$. This indicates that the risk of becoming disoriented after a period of orientation during the rehabilitation stay increased by 78% among patients who are disoriented on admission to rehabilitation, compared with those who are oriented on admission. These findings confirm that temporal orientation is unstable during the period of rehabilitation following a brain injury or stroke.

Publication Types: Journal Article
PMID:16294802

Rev Port Cardiol. 2004; 23(10): 1245-7.

Implementing stroke units.

Ferro J.

Publication Types: Comment Editorial
PMID:15641291

Rev Port Cardiol. 2004; 23(10): 1227-41.

Stroke units. The first-year results of Pulido Valente Hospital Stroke Unit.

Fonseca T, Clara JG.

Unidade de Acidentes Vasculares Cerebrais do Hospital de Pulido Valente, S.A., Lisboa, Portugal.
medicina2@hvp.min-saude.pt

Stroke is a worldwide problem with high incidence, mortality, disability rates and costs. There is clear evidence from systematic reviews of randomized trials that management by a stroke unit saves lives, increases the number of independent survivors and reduces institutionalization. Like coronary care units, stroke units are known to improve outcome by concentrating patients who should be treated by a multidisciplinary stroke team. Despite this clear evidence, only a few patients can benefit from this in Portugal, since the number of beds in stroke units is very small. Here we describe how we established our stroke unit and the encouraging results of the first year's work.

Publication Types: Journal Article
PMID:15641290

Scand J Caring Sci. 2005; 19(2): 140-7.

Stroke Specific Quality of Life Scale: Danish adaptation and a pilot study for testing psychometric properties.

Muus I, Ringsberg KC.

Hilleroed Hospital, Neurology and Rehabilitation Unit, Esboenderup, Denmark. muus@fa.dk

BACKGROUND AND PURPOSE: Stroke has an effect on many aspects of quality of life (QoL) and therefore it is important to measure the magnitude of the impact. Items in the American version of the Stroke Specific Quality of Life (SS-QoL) Scale are developed with help from patients with stroke and include even language impairments. **AIMS:** To translate and culturally adapt the American SS-QoL Scale, version 2.0, a stroke-specific instrument measuring health-related QoL, into a Danish version, and to perform a pilot testing of the psychometric properties of the instrument. **METHODS:** The guidelines recommended by Guillemin et al. (J Clin Epidemiol, 46, 1993, 1417) were followed including two independent forward and one back translation, inclusion of laymen, here patients with stroke and their spouses, pretest, and examining selected items with a probing technique. Four couples were included in the pretest, 14 in the pilot study. The patients for pretest and pilot study were selected strategically with regard to interest for participation, experience as stroke survivors, sufficient capacity of language perception and cohabitant status. **RESULTS:** In the Danish version instructions were made more distinct and formal than in the original American version. Explanatory examples within the items were excluded. One new item adjusted for Danish conditions replaced one in the original version, and the response categories concerning personality were adjusted for cultural differences. The pilot study resulted in a more explicit formulation of the instructions to mark each item only once and on the same line as the item. **CONCLUSIONS:** A Danish version of SS-QoL version 2.0 has been developed and content as well as format has proved relevant and

acceptable to patients with stroke including those with impaired language production. The next step is testing the psychometric properties of the instrument.

Publication Types: Evaluation Studies Journal Article Validation Studies

PMID:15877639

Scott Med J. 2005; 50(2): 69-72.

Timing of aspirin and secondary preventative therapies in acute stroke: support for use of stroke units.

Reid J, MacLeod MJ, et al.

Aberdeen Royal Infirmary, Foresterhill, Aberdeen. johnmreid@doctors.org.uk

BACKGROUND: We aimed to study the timing of aspirin prescription in ischaemic stroke comparing patients admitted to an acute stroke unit (ASU) directly or via a general medical ward. We also analysed prescription of secondary preventive therapies in stroke patients in an ASU. **METHODS:** Retrospective analysis was made of medical notes and prescription records of 69 patients admitted to an ASU over a three month period to establish timing of aspirin prescription with respect to onset of stroke symptoms, CT brain scan and route of admission to the ASU. **RESULTS:** CT brain scans were obtained at a median of 2.1 days post stroke (IQ range 1.3-4.3). Patients directly admitted to the ASU received aspirin earlier post admission compared to those admitted via a medical ward (0.7 vs 2.2 days, $p < 0.01$) and were also more likely to receive aspirin prior to CT scan being performed (57% vs 19%, $p = 0.02$). 86% of stroke patients were discharged on an antiplatelet therapy, 79% on a statin, 37% on a thiazide diuretic and 32% on an ACE inhibitor or angiotensin II antagonist. **CONCLUSION:** Aspirin was given more promptly in acute stroke and more commonly prior to CT scanning in an ASU compared to a medical ward. Statin therapy is used extensively in stroke but there is a much lower rate of initiation of other secondary preventive therapies (e.g. anti-hypertensive therapy) in hospital. These findings demonstrate a hesitancy in early use of aspirin amongst general physicians and lends support for the use of stroke units.

Publication Types: Journal Article

PMID:15977519

Sociol Health Illn. 2004; 26(4): 411-32.

Accommodating health and social care needs: routine resource allocation in stroke rehabilitation.

Allen D, Griffiths L, et al.

Nursing, Health and Social Care Research Centre, School of Nursing and Midwifery Studies, University of Wales College of Medicine, Cardiff CF24 0AB. allenda@cf.ac.uk

This paper explores routine resource allocation processes in health and social care. While there has been a small body of work which has drawn on Lipsky's (1980) insights into street level bureaucracy, few have taken seriously the opportunity offered by ethnography to explore in detail the work of front-line staff as a way of observing policy processes in action. Utilising ethnographic data from research into the continuing care of adults who had suffered a first acute stroke, we analyse how staff accommodated patient need and consider the implications that this had for the quality, equality and equity of service provision.

Publication Types: Journal Article

PMID:15268699

Stroke. 2003; 34(11): 2687-91.

Stroke unit care combined with early supported discharge: long-term follow-up of a randomized controlled trial.

Fjaertoft H, Indredavik B, et al.

Department of Neuroscience and Motion, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway. hild.fjaertoft@medisin.ntnu.no

BACKGROUND AND PURPOSE: Early supported discharge from a stroke unit reduces the length of hospital stay. Evidence of a benefit for the patients is still unknown. The aim of this trial was to evaluate the long-term effects of an extended stroke unit service (ESUS), characterized by early supported discharge. The short-term effects were published previously. **METHODS:** We performed a randomized controlled trial in which 320 acute stroke patients were allocated to either ordinary stroke unit service (OSUS) (160 patients) or stroke unit care with early supported discharge (160 patients). The ESUS consists of a mobile team that coordinates early supported discharge and further rehabilitation. Primary outcome was the proportion of patients who were independent as assessed by modified Rankin Scale (RS) ($RS < \text{or} = 2$ =global independence). Secondary outcomes measured at 52 weeks were performance on the Barthel Index (BI) ($BI > \text{or} = 95$ =independent in activities of daily living), differences in final residence, and analyses to identify patients who benefited most from an early supported discharge service. All assessments were blinded.

RESULTS: We found that 56.3% of the patients in the ESUS versus 45.0% in the OSUS were independent (RS < or =2) (P=0.045). The number needed to treat to achieve 1 independent patient in ESUS versus OSUS was 9. The odds ratio for independence was 1.56 (95% CI, 1.01 to 2.44). There were no significant differences in BI score and final residence. Patients with moderate to severe stroke benefited most from the ESUS. CONCLUSIONS: Stroke service based on treatment in a stroke unit combined with early supported discharge appears to improve the long-term clinical outcome compared with ordinary stroke unit care. Patients with moderate to severe stroke benefit most.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial
PMID:14576376

Stroke. 2004; 35(11): 2477-83.

Immediate computed tomography scanning of acute stroke is cost-effective and improves quality of life.

Wardlaw JM, Seymour J, et al.

Division of Clinical Neurosciences, Western General Hospital, Crewe Rd, Edinburgh, EH4 2XY, UK.
jmw@skull.dcn.ed.ac.uk

BACKGROUND AND PURPOSE: Stroke is very common, but computed tomography (CT) scanning, an expensive and finite resource, is required to differentiate cerebral infarction, hemorrhage, and stroke mimics. We determined whether, and in what circumstances, CT is cost-effective in acute stroke. METHODS: We developed a decision tree representing acute stroke care pathways populated with data from multiple sources. We determined the effect of diagnostic information from CT scanning on functional outcome, length of stay, costs, and quality of life during 5 years for 13 alternative CT strategies (varying proportions and types of patients and rapidity of scanning). RESULTS: For 1000 patients aged 70 to 74 years, the policy "scan all strokes within 48 hours" cost 10,279,728 pounds sterling and achieved 1982.3 quality-adjusted life years (QALYs). The most cost-effective strategy was "scan all immediately" (9,993,676 pounds sterling and 1982.4 QALYs). The least cost-effective was "scan patients on anticoagulants and those in a life-threatening condition immediately and the rest within 14 days" (12,592,666 pounds sterling and 1931.8 QALYs). "Scan no patients" reduced QALYs (1904.2) and increased cost (10,544,000 pounds sterling). CONCLUSIONS: Immediate CT scanning is the most cost-effective strategy. For the majority of acute stroke patients, increasing independent survival by correct early diagnosis, ensuring appropriate subsequent treatment and management decisions, reduced costs of stroke and increased QALYs.

Publication Types: Journal Article

PMID:15459431

Stroke. 2004; 35(6): 1527-30.

Improving quality of care through disease management: principles and recommendations from the American Heart Association's Expert Panel on Disease Management.

Faxon DP, Schwamm LH, et al.

Publication Types: Guideline Journal Article Practice Guideline

PMID:15166404

Stroke. 2004; 35(6): 1497-8.

Editorial comment--what can models teach us about stroke treatment? Sorting out the missing bits.

Matchar DB.

Publication Types: Comment Editorial

PMID:15166403

Stroke. 2004; 35(6): e149-50.

Stroke is best managed by neurologists.

Sacchetti ML.

Publication Types: Comment Letter

PMID:15118185

Stroke. 2004; 35(6): 1368-74.

Health care resource use after acute stroke in the Glycine Antagonist in Neuroprotection (GAIN) Americas trial.

Rundek T, Nielsen K, et al.

Department of Neurology, Neurological Institute, Columbia University, New York, NY, USA.

BACKGROUND AND PURPOSE: To compare 3-month stroke outcomes and stroke-related health care resource use between the US and Canada in the Glycine Antagonist in Neuroprotection (GAIN) Americas

study. Delivery of medical care for stroke patients, often driven by efforts to curb costs, varies substantially between countries. Data on the potential impact of these variations on clinical outcomes are sparse. **METHODS:** The analysis of health care resource included total length of stay (LOS) in hospital, intensive care unit (ICU), and acute-care ward or rehabilitation unit, or both; number of outpatient rehabilitation sessions and visits to a physician; place of residence after discharge; and employment status. Cox proportional hazards models and logistic regression were used to calculate survival hazards and predictors of favorable functional outcome (Barthel Index of 95 to 100). **RESULTS:** One thousand six hundred four patients who were independent before stroke (mean age: 69.9+/-12.7 years, 53% men, 85% ischemic stroke, 69% in the US) were included. Three-month survival and functional outcome did not differ between the US and Canada. Survival rate was 80% in both countries. Favorable functional outcome was achieved in 43% of Canadian and 47% of US patients. Fewer Canadian patients received treatment in ICU (19% versus 63% in the US), and Canadians had longer stays in hospital or rehabilitation facility (median: 33 days versus 16 days in the US). **CONCLUSIONS:** Despite similar 3-month survival and functional outcome, patterns of health care resource varied substantially between the US and Canada. US patients had more intensive early care; Canadian patients had longer hospitalizations and rehabilitation care. Further research is required to determine the most cost-effective treatment and rehabilitation plan for people who have a stroke.

Publication Types: Clinical Trial Journal Article Multicenter Study Randomized Controlled Trial
PMID:15118182

Stroke. 2004; 35(5): 1230-40.

Physical activity and exercise recommendations for stroke survivors: an American Heart Association scientific statement from the Council on Clinical Cardiology, Subcommittee on Exercise, Cardiac Rehabilitation, and Prevention; the Council on Cardiovascular Nursing; the Council on Nutrition, Physical Activity, and Metabolism; and the Stroke Council.

Gordon NF, Gulanick M, et al.

Publication Types: Journal Article Review PMID:15105522

Stroke. 2004; 35(5): 1209-15.

International comparison of stroke cost studies.

Evers SM, Struijs JN, et al.

Care and Public Health Research Institute (CAPHRI) of Maastricht University, Maastricht University, Faculty of Health Sciences, Maastricht, The Netherlands. S.Evers@BEOZ.unimaas.nl

PURPOSE: With the rapid international spread of interventions, there is a need to understand the economic implications of these changes and to interpret these economic implications on the international level. The purpose of this study is to systematically compare total health care expenditures on stroke, the costs of stroke per capita, and the distribution of stroke costs within different countries, with special attention to the allocation of resources among different health care facilities. **METHODS:** Studies for this literature review were selected by conducting a literature search from January 1966 to July 2003. Key methodological, country-related, and monetary issues of the selected stroke cost studies were evaluated using a checklist. **RESULTS:** After selection, 25 stroke cost studies were reviewed. Although the selected cost of illness studies used different methodologies, the estimated expenditures for stroke are approximately similar. The proportion of national health care in the 8 countries studied is unequivocal for the more recent studies, ie, approximately 3% of total health care expenditures. A shift is observed from the inpatient treatment costs (in the first year) toward outpatient treatment and long-term care costs (in the latter years). Furthermore, it is remarkable that in the studies, little attention is paid to costs borne by the patient and family or to the costs of comorbidity. **CONCLUSIONS:** This study highlights the importance of studying the economic consequences of stroke and of interpreting the results on the international level. The results of stroke cost studies provide insight into the distribution of the costs of stroke and the impact of stroke on the national expenditure on health care.

Publication Types: Journal Article Review PMID:15073405

Stroke. 2004; 35(5): 1035-40.

Multicenter comparison of processes of care between Stroke Units and conventional care wards in Australia.

Cadilhac DA, Ibrahim J, et al.

National Stroke Research Institute, Level 1 Neurosciences Building, Repatriation Hospital, 300 Waterdale Road, Heidelberg Heights, Victoria, Australia 3081. cadilhac@austin.unimelb.edu.au

BACKGROUND AND PURPOSE: Approximately 23% of Australian hospitals provide Stroke Units (SUs). Evidence suggests that clinical outcomes are better in SUs than with conventional care. Reasons may

include greater adherence to processes of care (PoC). The primary hypothesis was that adherence to selected PoC is greater in SUs than in other acute care models. METHODS: Prospective, multicenter, single-blinded design. Models of care investigated: SUs, mobile services, and conventional care. Selected PoC were related to care models and participant outcomes. Data were collected at acute hospitalization (median 9 days) and at medians of 8 and 28 weeks after stroke. RESULTS: 1701 patients were screened from 8 hospitals, 823 were eligible, and 468 participated. Response rate was 96% at final follow-up. Mean age was 73 years (SD 14). Overall PoC adherence rates for individual care models were SU 75%, mobile service 65%, and conventional care 52% ($P < 0.001$). The adjusted odds of participants being alive at discharge if adhering to all or all but 1 PoC was significant (aOR 3.63; 95% CI: 1.04 to 12.66; $P = 0.043$). Important trends at 28 weeks were found for being at home (aOR 3.09; 95% CI: 0.96 to 9.87; $P = 0.058$) and independent (aOR 2.61; 95% CI: 0.96 to 7.10; $P = 0.061$), with complete PoC adherence. CONCLUSIONS: Adherence to key PoC was higher in SUs than in other models. For all patients, adherence to PoC was associated with improved mortality at discharge and trends found with independence at home, providing support for the need to increase access to stroke units.

Publication Types: Journal Article Multicenter Study
PMID:15060326

Stroke. 2004; 35(5): 1041-6.

Trial application of a Model of Resource Utilization, Costs, and Outcomes for Stroke (MORUCOS) to assist priority setting in stroke.

Moodie ML, Carter R, et al.

National Stroke Research Institute, Health, Heidelberg Heights, Australia. mmoodie@unimelb.edu.au

BACKGROUND AND PURPOSE: Cost-effectiveness data for stroke interventions are limited, and comparisons between studies are confounded by methodological inconsistencies. The aim of this study was to trial the use of the intervention module of the economic model, a Model of Resource Utilization, Costs, and Outcomes for Stroke (MORUCOS) to facilitate evaluation and ranking of the options. METHODS: The approach involves using an economic model together with added secondary considerations. A consistent approach was taken using standard economic evaluation methods. Data from the North East Melbourne Stroke Incidence Study (NEMESIS) were used to model "current practice" (base case), against which 2 interventions were compared. A 2-stage process was used to measure benefit: health gains (expressed in disability-adjusted life years [DALYs]) and filter analysis. Incremental cost-effectiveness ratios (ICERs) were calculated, and probabilistic uncertainty analysis was undertaken. RESULTS: Aspirin, a low-cost intervention applicable to a large number of stroke patients (9153 first-ever cases), resulted in modest health benefits (946 DALYs saved) and a mean ICER (based on incidence costs) of US 1421 dollars per DALY saved. Although the health gains from recombinant tissue-type plasminogen activator (rtPA) were less (155 DALYs saved), these results were impressive given the small number of persons (256) eligible for treatment. rtPA dominates current practice because it is more effective and cost-saving. CONCLUSIONS: If used to assess interventions across the stroke care continuum, MORUCOS offers enormous capacity to support decision-making in the prioritising of stroke services.

Publication Types: Journal Article

PMID:15031457

Stroke. 2004; 35(5): 1216-24.

Sample size calculations in acute stroke trials: a systematic review of their reporting, characteristics, and relationship with outcome.

Weaver CS, Leonardi-Bee J, et al.

Institute of Neuroscience, University of Nottingham, UK.

BACKGROUND AND PURPOSE: Only a few randomized controlled trials in acute stroke have shown a treatment-related benefit. Inadequate trial design, especially low sample size, may partly explain this failure. We investigated sample size calculations (SSCs) in a systematic review of acute stroke trials. METHODS: Full reports of nonconfounded randomized controlled trials that recruited patients within 1 week of stroke onset and were published before the end of 2001 were identified from the Cochrane Library and other bibliographic databases. Information on the SSC and outcome event rates was collected for each trial. RESULTS: Of 189 identified trial reports, 57 (30%) reported $>$ or $=$ 1 components of the SSC, phase II 14/129 (11%) versus phase III 43/60 (72%) ($P < 0.001$), with 32 (56%) giving all the required parameters. Significance (α) was mentioned in 54 (96%) reports; 53 used a significance level of $\alpha = 0.05$. And 55 (98%) reports gave the power ($1 - \beta$) of the study (median [25th and 75th percentile] 0.80 [0.80, 0.90]). The anticipated percentage of control subjects having a primary outcome event was given in 24 (42%) articles: case fatality 21.8% (11.8%, 23.5%, $n = 4$) and combined death or disability/dependency 55.5% (44.5%, 66.3%, $n = 20$); 25 studies used other outcomes and 8 studies gave

insufficient information. Four of the 22 trials achieved a control rate within 5% of their prediction. 49 (86%) reports gave the anticipated treatment effect; case fatality: anticipated 9.5% (1.1%, 12.5%, n=6), achieved -0.3% (-4.1%, +2.4%); combined death or disability/dependency: anticipated 13.0% (10.0%, 16.0%, n=25), achieved 1.8% (-0.5%, +5.4%). The median calculated sample size was 600 (198, 995, n=54). CONCLUSIONS: Too few trial publications report the assumptions underlying their SSC. Most trials were underpowered, ie, power <0.90, used inappropriate assumptions for event rates, and were grossly overoptimistic in their expectation of treatment effect. These deficiencies will together have resulted in trials being far too small and reduced their chance of being able to detect real treatment effects.

Publication Types: Journal Article Review

PMID:15031455

Stroke. 2004; 35(4): e85-6.

Who should care for stroke patients?

Kazmierski R, Pawlak MA, et al.

Publication Types: Comment Letter

PMID:15001793

Stroke. 2004; 35(4): 1018-9.

Stroke unit design: intensive monitoring should be a routine procedure.

Steiner T.

Department of Neurology, University of Heidelberg, Im Neuenheimer Feld 400, Heidelberg, Germany.
thorsten_steiner@med.uni-heidelberg.de

Publication Types: Journal Article

PMID:14988570

Stroke. 2004; 35(4): 1019-20.

Intensive monitoring should not be the routine.

Indredavik B.

Stroke Unit, Department of Medicine, University Hospital of Trondheim, N 7006 Trondheim, Norway.

Bent.Indredavik@medisin.ntnu.no

Publication Types: Comment Journal Article

PMID:14988569

Stroke. 2004; 35(4): 1022.

Therapy-based rehabilitation for stroke patients living at home.

Legg L, Langhorne P.

Academic Section of Geriatric Medicine, Glasgow Royal Infirmary, Glasgow University, UK.

Lynn@Legg80.freeserve.co.uk

Publication Types: Journal Article Review PMID:14988566

Stroke. 2004; 35(3): 770-5.

Estimating the cost-effectiveness of stroke units in France compared with conventional care.

Launois R, Giroud M, et al.

Reseau d'Evaluation en Economie de la Sante, Paris, France. launois.reesfrance@wanadoo.fr

BACKGROUND AND PURPOSE: The incidence of stroke in France is estimated at between 120 000 and 150 000 cases per year. This modeling study assessed the clinical and economic benefits of establishing specialized stroke units compared with conventional care. **METHODS:** Data from the Dijon stroke registry were used to determine healthcare trajectories according to the degree of autonomy and organization of patient care. The relative risks of death or institutionalization or death or dependence after passage through a stroke unit were compared with conventional care. These risks were then inserted with the costing data into a Markov model to estimate the cost-effectiveness of stroke units. **RESULTS:** Patients cared for in a stroke unit survive more trimesters without sequelae in the 5 years after hospitalization than those cared for conventionally (11.6 versus 8.28 trimesters). The mean cost per patient at 5 years was estimated at 30 983 for conventional care and 34 638 in a stroke unit. An incremental cost-effectiveness ratio for stroke units of 1359 per year of life gained without disability was estimated. **CONCLUSIONS:** The cost-effectiveness ratio for stroke units is much lower than the threshold (53 400) of acceptability recognized by the international scientific community. This finding justifies organizational changes in the management of stroke patients and the establishment of stroke units in France.

Publication Types: Journal Article PMID:14976321

Stroke. 2004; 35(2): 397-400.

Health policy and outcome research in stroke.

Rudd AG, Matchar DB.

Clinical Effectiveness and Evaluation Unit, Royal College of Physicians, London, UK.

Publication Types: Editorial Review

PMID:14757891

Stroke. 2004; 35(2): 383-5.

What's new in stroke rehabilitation.

Teasell RW, Kalra L.

Physical Medicine and Rehabilitation, St Joseph's Health Care, London, Ontario, Canada.

robert.teasell@sjhc.london.on.ca

Publication Types: Editorial

PMID:14757887

Stroke. 2004; 35(1): 196-203.

Alternative strategies for stroke care: cost-effectiveness and cost-utility analyses from a prospective randomized controlled trial.

Patel A, Knapp M, et al.

Centre for the Economics of Mental Health, Health Services Research Department, David Goldberg Centre, Institute of Psychiatry, De Crespigny Park, London SE5 8AF UK. a.patel@iop.kcl.ac.uk

BACKGROUND AND PURPOSE: Although stroke units reduce mortality and institutionalization, their comparative cost-effectiveness is unknown. **METHODS:** Healthcare, social services, and informal care costs were compared for 447 acute stroke patients randomly assigned to stroke unit, stroke team, or domiciliary stroke care. Prospective and retrospective methods were used to identify resource use over 12 months after stroke onset. Cost-effectiveness and cost-utility analyses were undertaken. **RESULTS:** Mean healthcare and social care costs over 12 months were 11 450 pounds sterling for stroke unit, 9527 pounds sterling for stroke team, and 6840 pounds sterling for domiciliary care. More than half the costs were for the initial episode of care. Institutionalization was a large proportion of follow-up costs. Inclusion of informal care increased costs considerably. When informal care was excluded, the incremental cost-effectiveness ratio per percentage point in deaths or institutionalizations avoided in the first year was 496 pounds sterling for the stroke unit over domiciliary care; incremental cost per quality-adjusted life year quality-adjusted life year gained was 64 097 pounds sterling between these 2 groups. The stroke team was dominated by domiciliary care. **CONCLUSIONS:** Cost perspectives, especially those related to long-term and informal care, are important when stroke services are evaluated. Improved health outcomes in the stroke unit come at a higher cost.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial

PMID:14684783

Stroke. 2004; 35(1): 203-4.

Editorial comment--stroke cost-effectiveness research: are acceptability curves acceptable?

Holloway R, Dick AW.

Publication Types: Comment Editorial

PMID:14684768

Stroke. 2004; 35(1): 205-11.

William M. Feinberg Lecture: stroke therapy in the year 2025: burden, breakthroughs, and barriers to progress.

Broderick JP.

Division of Neurology, University of Cincinnati College of Medicine, 231 Bethesda Ave, Mail Location 525, Cincinnati, Ohio 45242, USA. joseph.broderick@uc.edu

BACKGROUND: More than 700 000 strokes occurred in the United States during 2002, of which approximately 500 000 are first-ever strokes and 200 000 recurrent strokes. If we would decrease the enormous burden of stroke throughout the world, we first need to know the barriers that we have to overcome. These are quite similar to the barriers that we have tried to surmount during the last 25 years. **STROKE PREVENTION:** We have developed many successful primary and secondary therapies to prevent stroke over the past 25 years and have begun to understand some of the genetic risk factors underlying stroke. Yet, the incidence rate of stroke in Rochester, Minn, remained unchanged from 1975 to the mid-1990s, and mortality rates for Ohio have changed little for men, women, blacks, and whites over the past decade. The primary reason that we have made little progress in decreasing the burden of stroke is that

we have made little progress in modifying the primary risk factors for stroke in the population. Other barriers of improved stroke prevention in the future include costs of therapy and aging of blood vessels and brain, which is the most important risk factor for stroke. ACUTE STROKE: Breakthroughs in acute stroke treatment are likely to follow the steps of cardiology with the primary focus for ischemic stroke on the restoration of oxygenated blood flow to ischemic brain as quickly as possible. To improve acute stroke therapy in the year 2025, we need to have more focused messages sent to the lay public about stroke warning signs, better and safer methods to open arteries quickly, truly effective neuroprotection in the setting of reperfusion, regional organization for acute stroke therapy, and large randomized trials to find clinically important but smaller benefits. A scientifically proven treatment for treatment of acute intracerebral hemorrhage is another major goal. RECOVERY AFTER STROKE: Brain recovery after stroke is the area of scientific discovery with the largest potential for advances far into the next century. Obstacles that block effective therapies in the recovery from stroke include the extent of initial injury from stroke, the brain plasticity of a given patient, and, most importantly, understanding the "neural code"-how the brain is organized and how cells communicate with one another.

Publication Types: Lectures

PMID:14671248

Stroke. 2004; 35(1): 127-33.

Randomized controlled trial of an early discharge rehabilitation service: the Belfast Community Stroke Trial.

Donnelly M, Power M, et al.

Department of Epidemiology and Public Health, Queen's University Belfast, Belfast, UK.
m.donnell@qub.ac.uk

BACKGROUND AND PURPOSE: To compare a community-based multidisciplinary stroke team (CST) approach with hospital-based rehabilitation in terms of hospital stay, functioning, quality of life, and service use and costs. **METHODS:** Stroke patients who met pre-agreed criteria were allocated randomly to the CST service (n=59) or to usual inpatient rehabilitation and follow-up care (n=54). Assessments were completed at randomization and 12 months later. Caregiver strain and satisfaction (n=55) were also assessed. Cost data were collected for a subsample of 38 patients. **RESULTS:** Almost 80% of surviving patients (n=691) were discharged home and a small number (n=55) were readmitted. Approximately 17% (113/649) were randomized. There were no statistically significant differences in hospital duration, costs, or outcome measures at baseline and 12 months except for higher satisfaction reported by CST patients. Overall, both groups recorded improvement in most domains over time. Carers reported a high level of satisfaction although the level of strain among carers is cause for concern. The community group (n=18) cost less than the hospital group (n=20). **CONCLUSIONS:** A mixed model of hospital-based and community-based rehabilitation services is likely to lead to increased patient choice and satisfaction and a potential reduction in bed pressures for less severe stroke patients.

Publication Types: Clinical Trial Journal Article Randomized Controlled Trial

PMID:14671238

Stroke. 2004; 35(1): e22-3.

Acute ischemic stroke in hospitalized medicare patients: evaluation and treatment.

Roychoudhury C, Jacobs BS, et al.

Michigan Peer Review Organization, Plymouth, Mich 48170, USA. croychou@mpro.org

BACKGROUND AND PURPOSE: This study describes several quality indicators of care in hospitalized stroke patients in Michigan from 1998 to 1999. **SUMMARY OF REPORT:** Median times from admission to head CT/MRI (89.5 minutes) and thrombolysis (113 minutes) exceeded recommended guidelines. Deep venous thrombosis prophylaxis was used in only 13.8% of eligible patients. **CONCLUSIONS:** Timing for brain imaging and acute ischemic stroke symptom onset need to be better documented, along with more provider education for routine deep venous thrombosis prophylaxis.

Publication Types: Journal Article

PMID:14657452

Stroke. 2005. Dec 8; [Epub ahead of print]

Time Is Brain--Quantified.

Saver JL.

From the Stroke Center and Department of Neurology, University of California, Los Angeles.

BACKGROUND AND PURPOSE: The phrase "time is brain" emphasizes that human nervous tissue is rapidly lost as stroke progresses and emergent evaluation and therapy are required. Recent advances in quantitative neurosterology and stroke neuroimaging permit calculation of just how much brain is lost

per unit time in acute ischemic stroke. **METHODS:** Systematic literature-review identified consensus estimates of number of neurons, synapses, and myelinated fibers in the human forebrain; volume of large vessel, supratentorial ischemic stroke; and interval from onset to completion of large vessel, supratentorial ischemic stroke. **RESULTS:** The typical final volume of large vessel, supratentorial ischemic stroke is 54 mL (varied in sensitivity analysis from 19 to 100 mL). The average duration of nonlacunar stroke evolution is 10 hours (range 6 to 18 hours), and the average number of neurons in the human forebrain is 22 billion. In patients experiencing a typical large vessel acute ischemic stroke, 120 million neurons, 830 billion synapses, and 714 km (447 miles) of myelinated fibers are lost each hour. In each minute, 1.9 million neurons, 14 billion synapses, and 12 km (7.5 miles) of myelinated fibers are destroyed. Compared with the normal rate of neuron loss in brain aging, the ischemic brain ages 3.6 years each hour without treatment. Altering single input variables in sensitivity analyses modestly affected the estimated point values but not order of magnitude. **CONCLUSIONS:** Quantitative estimates of the pace of neural circuitry loss in human ischemic stroke emphasize the time urgency of stroke care. The typical patient loses 1.9 million neurons each minute in which stroke is untreated.

Publication Types: Journal article

PMID:16339467

Stroke. 2005. Dec 1; [Epub ahead of print]

Recruiting Subjects for Acute Stroke Trials. A Meta-Analysis.

Elkins JS, Khatabi T, et al.

From the University of California, San Francisco.

BACKGROUND AND PURPOSE: Recruitment rate is a major determinant of the duration, cost, and feasibility of acute stroke trials. **METHODS:** We performed a meta-analysis of all randomized, controlled trials of ≥ 300 subjects that were designed to evaluate the efficacy of a medical intervention for the treatment of acute ischemic stroke. Data about trial recruitment, organization, and inclusion/exclusion criteria were abstracted independently by 2 reviewers who applied predefined criteria. Recruitment efficiency was defined as the number of subjects enrolled per study center per month of recruitment. **RESULTS:** Of 32 trials meeting inclusion criteria, the average recruitment efficiency was 0.79 subjects per center per month (range 0.08 to 3.7). Recruitment efficiency did not vary by geographic region ($P=0.36$), but trials conducted in 1 country had more efficient recruitment than international studies ($P=0.03$), and recruitment efficiency declined with each percentage increase in the total number of study centers ($P=0.002$). The primary study entry criteria that predicted reduced recruitment efficiency were the maximum allowable time from stroke to study enrollment ($P=0.002$) and the exclusion of mild strokes ($P=0.009$). Trials with a treatment window >6 hours had approximately double the recruitment rates of trials that used treatment windows ≤ 6 hours (1.03 versus 0.52 patients per center per month). **CONCLUSIONS:** Recruitment rates for acute stroke trials are influenced by organizational structure and study entry criteria. Characterizing predictors of recruitment may help optimize future trial design.

Publication Types: Journal article

PMID:16322489

Stroke. 2005; 36(12): 2756-63.

Dysphagia after stroke: incidence, diagnosis, and pulmonary complications.

Martino R, Foley N, et al.

Graduate Department of Speech Language Pathology, University of Toronto, Ontario, Canada. rosemary.martino@utoronto.ca

OBJECTIVE: To determine the incidence of dysphagia and associated pulmonary compromise in stroke patients through a systematic review of the published literature. **METHODS:** Databases were searched (1966 through May 2005) using terms "cerebrovascular disorders," "deglutition disorders," and limited to "humans" for original articles addressing the frequency of dysphagia or pneumonia. Data sources included Medline, Embase, Pascal, relevant Internet addresses, and extensive hand searching of bibliographies of identified articles. Selected articles were reviewed for quality, diagnostic methods, and patient characteristics. Comparisons were made of reported dysphagia and pneumonia frequencies. The relative risks (RRs) of developing pneumonia were calculated in patients with dysphagia and confirmed aspiration. **RESULTS:** Of the 277 sources identified, 104 were original, peer-reviewed articles that focused on adult stroke patients with dysphagia. Of these, 24 articles met inclusion criteria and were evaluated. The reported incidence of dysphagia was lowest using cursory screening techniques (37% to 45%), higher using clinical testing (51% to 55%), and highest using instrumental testing (64% to 78%). Dysphagia tends to be lower after hemispheric stroke and remains prominent in the rehabilitation brain stem stroke. There is increased risk for pneumonia in patients with dysphagia (RR, 3.17; 95% CI, 2.07, 4.87) and an even greater risk in patients with aspiration (RR, 11.56; 95% CI, 3.36, 39.77). **CONCLUSIONS:** The high incidence for

dysphagia and pneumonia is a consistent finding with stroke patients. The pneumonia risk is greatest in stroke patients with aspiration. These findings will be valuable in the design of future dysphagia research.

Publication Types: Journal Article

PMID:16269630

Stroke. 2005; 36(12): 2748-55.

Risk of myocardial infarction and vascular death after transient ischemic attack and ischemic stroke: a systematic review and meta-analysis.

Touze E, Varenne O, et al.

Department of Neurology, Hopital Sainte-Anne, Universite Paris-Descartes, Faculte de Medecine, Paris Cedex 14. e.touze@ch-sainte-anne.fr

BACKGROUND: Whether stroke patients should be investigated for asymptomatic coronary artery disease remains matter of debate. Absolute risks of myocardial infarction (MI) and vascular death after a stroke have not been accurately assessed. We performed a systematic review and a meta-analysis to determine the risk of MI and nonstroke vascular death after transient ischemic attack (TIA) and ischemic stroke. Cohort studies of TIA or ischemic stroke patients were included if they were published between 1980 and March 2005, reported risk of MI and nonstroke vascular death, enrolled >100 patients, and had at least 1 year of follow-up. We included 39 studies in a total of 65,996 patients with mean follow-up of 3.5 years. Two reviewers independently carried out data extraction using a standardized form. Absolute annual risks were estimated through weighted meta-regressions with a random effect. To test the predictions of expected event rates derived from our analysis, we used individual patient data. **SUMMARY OF REVIEW:** The annual risks were 2.1% (CI 95%: 1.9 to 2.4) for nonstroke vascular death, 2.2% (1.7 to 2.7) for total MI, 0.9% (0.7 to 1.2) for nonfatal MI and 1.1% (0.8 to 1.5) for fatal MI. The time course of risk was linear. Estimated risks fitted well with observed risks at the individual level. There was no heterogeneity in the absolute risks according to baseline study characteristics. **CONCLUSIONS:** Patients with TIA or stroke have a relatively high risk of MI and nonstroke vascular death. Additional research is needed to identify the determinants of coronary artery disease in stroke patients.

Publication Types: Journal Article

PMID:16254218

Stroke. 2005; 36(11): 2514-22.

Supporting family caregivers in stroke care: a review of the evidence for problem solving.

Lui MH, Ross FM, et al.

The Nethersole School of Nursing, The Chinese University of Hong Kong, Hong Kong, People's Republic of China.

BACKGROUND AND PURPOSE: Teaching effective problem-solving skills to family caregivers of patients with chronic disease has been shown to be useful for promoting physical and psychosocial well-being. However, the use and effectiveness of problem solving for supporting caregivers in stroke care has not been reviewed. This article aims to identify and review studies that have examined the effectiveness of teaching problem solving skills to caregivers in stroke care, highlight gaps in the evidence base, and recommend avenues for additional research. **METHODS:** A structured review of literature identified from nursing, medicine, and psychology databases from 1970 to 2004 was conducted. Eleven articles reporting the development or evaluation of effective problem-solving interventions for caregivers of patients with stroke were critically appraised using recognized quality criteria. **RESULTS:** The results of this review show that the strength of evidence for problem-solving interventions for caregivers of stroke patients is limited. Because some studies used small samples and varied methods and interventions, making a comparison was difficult. Caregivers' problem-solving abilities were rarely measured, and the theoretical concepts and framework underpinning most studies were unclear. **CONCLUSIONS:** Evidence from the review suggests a need to additionally study the link between theoretical concepts of effective problem solving and outcomes using standardized measures and to examine also the processes involved in implementing the intervention using multimethod designs, including both quantitative and qualitative approaches.

Publication Types: Journal Article

PMID:16210553

Stroke. 2005; 36(9): 1977-83.

Use of time by stroke patients: a comparison of four European rehabilitation centers.

De Wit L, Putman K, et al.

Department of Rehabilitation Sciences, Faculty of Kinesiology and Rehabilitation Sciences, Katholieke Universiteit Leuven, Belgium. Liesbet.Dewit@faber.kuleuven.be

BACKGROUND AND PURPOSE: Differences exist between European countries in the proportion of patients

who die or become dependent after stroke. The aim of the present study was to identify differences in the use of time by stroke patients in 4 rehabilitation centers in 4 European countries. **METHODS:** In each of the 4 centers, 60 randomly selected stroke patients were observed at 10-minute intervals using behavioral mapping. Observations took place on 30 weekdays selected at random, on equal numbers of morning, afternoon, and evening sessions. A logistic generalized estimating equation model with correction for differences in case mix and multiple testing was used for the analysis. **RESULTS:** Overall time available from different professions was the highest in the United Kingdom, but patients in the United Kingdom spent on average only 1 hour per day in therapy. This was significantly less than patients in Belgium and Germany, who spent approximately 2 hours, and patients in Switzerland who spent approximately 3 hours per day in therapy. In all centers, patients spent less than half their time in interactions and >72% of the time in nontherapeutic activities. **CONCLUSIONS:** Important differences in the use of time were established, which appeared dependent on management decisions rather than the number of staff available. Patients in the Swiss and German centers spent more time in therapy, possibly because of the structured organization of rehabilitation. Further studies will verify whether this has an effect on outcome.

Publication Types: Journal Article

PMID:16081860

Stroke. 2005; 36(8): 1808-13.

Enhancing the development and approval of acute stroke therapies: Stroke Therapy Academic Industry roundtable.

Fisher M, Albers GW, et al.

UMass/Memorial Healthcare Center, 119 Belmont St, Worcester, MA 01605, USA. fisherm@umhmc.org

BACKGROUND: Previous Stroke Therapy Academic Industry Roundtable (STAIR) meetings focused on preclinical evidence of drug efficacy and enhancing acute stroke trial design and performance. A fourth (STAIR-IV) was held to discuss relevant issues related to acute stroke drug development and regulatory approval. **SUMMARY OF REVIEW:** The STAIR-IV meeting had 3 main focus areas. The first topic was novel approaches to statistical design of acute stroke trials and appropriate outcome measures. The second focus was the need for better cooperation among participants in stroke therapy development that may be addressed through a national consortium of stroke trial centers in the United States and elsewhere. Lastly, regulatory issues related to the approval of novel mono and multiple acute stroke therapies were discussed. **CONCLUSIONS:** The development of additional acute stroke therapies represents a large unmet need with many remaining challenges and also opportunities to incorporate novel approaches to clinical trial design that will lead to regulatory approval. The STAIR-IV meeting explored new concepts of trial methodology and data analysis, initiatives for implementing a US clinical trialist consortium, and pertinent regulatory issues to expedite approval of novel therapies.

Publication Types: Congresses

PMID:16020764

Stroke. 2005; 36(7): 1358-9; author reply 1359.

Organizing stroke systems of care.

Rymer MM.

Publication Types: Comment Letter

PMID:15994449

Stroke. 2005; 36(7): 1597-616.

Recommendations for comprehensive stroke centers: a consensus statement from the Brain Attack Coalition.

Alberts MJ, Latchaw RE, et al.

Northwestern University Medical School, 710 N Lake Shore Dr, Room 1420, Chicago, IL 60611, USA. m-alberts@northwestern.edu

BACKGROUND AND PURPOSE: To develop recommendations for the establishment of comprehensive stroke centers capable of delivering the full spectrum of care to seriously ill patients with stroke and cerebrovascular disease. Recommendations were developed by members of the Brain Attack Coalition (BAC), which is a multidisciplinary group of members from major professional organizations involved with the care of patients with stroke and cerebrovascular disease. **SUMMARY OF REVIEW:** A comprehensive literature search was conducted from 1966 through December 2004 using Medline and Pub Med. Articles with information about clinical trials, meta-analyses, care guidelines, scientific guidelines, and other relevant clinical and research reports were examined and graded using established evidence-based medicine approaches for therapeutic and diagnostic modalities. Evidence was also obtained from a

questionnaire survey sent to leaders in cerebrovascular disease. Members of BAC reviewed literature related to their field and graded the scientific evidence on the various diagnostic and treatment modalities for stroke. Input was obtained from the organizations represented by BAC. BAC met on several occasions to review each specific recommendation and reach a consensus about its importance in light of other medical, logistical, and financial factors. **CONCLUSIONS:** There are a number of key areas supported by evidence-based medicine that are important for a comprehensive stroke center and its ability to deliver the wide variety of specialized care needed by patients with serious cerebrovascular disease. These areas include: (1) health care personnel with specific expertise in a number of disciplines, including neurosurgery and vascular neurology; (2) advanced neuroimaging capabilities such as MRI and various types of cerebral angiography; (3) surgical and endovascular techniques, including clipping and coiling of intracranial aneurysms, carotid endarterectomy, and intra-arterial thrombolytic therapy; and (4) other specific infrastructure and programmatic elements such as an intensive care unit and a stroke registry. Integration of these elements into a coordinated hospital-based program or system is likely to improve outcomes of patients with strokes and complex cerebrovascular disease who require the services of a comprehensive stroke center.

Publication Types: Journal Article PMID:15961715

Stroke. 2005; 36(7): 1616-8.

Organized stroke care: the core of effective stroke care provision.

Norrving B.

Publication Types: Comment Editorial PMID:15961714

Stroke. 2005; 36(6): 1227-31.

Improved quality of stroke care for hospitalized Medicare beneficiaries in Michigan.

Jacobs BS, Baker PL, et al.

Department of Neurology, Wayne State University School of Medicine, Detroit, Michigan, USA. bjacobs@med.wayne.edu

BACKGROUND AND PURPOSE: We reported previously that acute ischemic stroke patients encountered delays in obtaining neuroimaging and receiving thrombolysis, and that deep venous thrombosis prophylaxis was used only in a minority of eligible patients. We investigated whether these and other measures improved after a quality improvement initiative. **METHODS:** Medicare fee-for-service ischemic stroke and transient ischemic attack discharges in 136 acute care hospitals in Michigan were identified by International Classification of Diseases, 9th Revision, Clinical Modification codes. Only patients with stroke symptoms persisting for >1 hour and present on arrival were included in the analysis. Seven quality indicators were abstracted from chart review at baseline (discharges between July 1, 1998, and June 30, 1999) and at remeasurement (discharges between January 1, 2001, and June 30, 2001) after an intensive quality improvement initiative throughout Michigan hospitals. Quality indicators were compared at baseline and remeasurement. **RESULTS:** Indicators of care were determined in 5146 patients at baseline and 4980 patients on remeasurement. Four quality-of-care indicators showed significant improvement on remeasurement: antithrombotic prescribed at discharge (81.9 baseline versus 83.7% remeasurement; $P=0.026$), avoidance of sublingual nifedipine in patients with acute ischemic stroke (97.1 versus 99.7%; $P<0.0001$), documentation of a computed tomography (CT)/MRI during hospitalization (98.0 versus 99.1%; $P=0.024$), and appropriate deep venous thrombosis prophylaxis (13.8 versus 26.9%; $P<0.0001$). Time to CT/MRI did not significantly change, but time to thrombolysis improved (113 versus 88.5 minutes; $P=0.045$). **CONCLUSIONS:** Improvement occurred in several indicators of quality of care in Michigan Medicare beneficiaries presenting with acute stroke symptoms.

Publication Types: Journal Article PMID:15879336

Stroke. 2005; 36(6): 1348-1349.

In-Hospital Care Pathways for, Stroke: An Updated Systematic Review.

Kwan J, Sandercock P.

Elderly Care Research Unit, Level E (MP 807), Southampton General Hospital, Tremona Road, Southampton, SO16 6YD, UK. jk@1to1.org.

Publication Types: Journal article PMID:15860750

Stroke. 2005; 36(3): 690-703.

Recommendations for the establishment of stroke systems of care: recommendations from the American Stroke Association's Task Force on the Development of Stroke Systems.

Schwamm LH, Pancioli A, et al.

Publication Types: Guideline Journal Article Practice Guideline PMID:15689577

Stroke. 2005; 36(2): 360-6.

Are cost benefits of anticoagulation for stroke prevention in atrial fibrillation underestimated?

Miller PS, Andersson FL, et al.

AstraZeneca, HEOR/Clinical Science, Parklands FE2 D/4, Alderley Park, SK10 4TG UK.
Paul.Miller3@astrazeneca.com

BACKGROUND AND PURPOSE: Stroke outcomes in patients with atrial fibrillation (AF) tend to be worse than those in patients without AF. The objective of this study was to evaluate whether the cost benefits of anticoagulation for stroke prevention in AF may currently be underestimated by existing economic models that do not distinguish between different stroke outcomes. **METHODS:** A literature review was conducted in 3 areas: (1) studies comparing stroke outcomes in AF and non-AF patients; (2) studies providing long-term cost of stroke estimates; and (3) studies modeling the cost-effectiveness of anticoagulation with a vitamin K antagonist (eg, warfarin) in AF patients. **RESULTS:** There is considerable evidence that stroke in AF patients has a worse outcome than in patients without AF, including higher mortality, severity, and recurrence rates, and greater functional impairment and dependency. Estimates of the long-term cost of stroke of different severities were between US 24,991 dollars for a mild stroke over 5 years and US 142,251 dollars for a major ischemic stroke over a lifetime (2004 prices). The cost of a severe ischemic stroke may typically be 3-times that of mild stroke. However, cost-effectiveness models for anticoagulation in patients with AF have used average (not AF-specific) cost-of-stroke data, and most have used stroke severity distributions derived from clinical trials, which may differ from those in clinical practice. **CONCLUSIONS:** Existing economic models underestimate the cost benefits of anticoagulation for stroke prevention because they do not adjust for poorer outcomes associated with cardioembolic strokes.

Publication Types: Journal Article Review

PMID:15637326

Stroke. 2005; 36(2): 218-21.

Secondary prevention of recurrent stroke.

Hankey GJ.

Stroke Unit, Department of Neurology, Royal Perth Hospital, School of Medicine & Pharmacology, University of Western Australia, Perth, Australia. gjhankey@cyllene.uwa.edu.au

Publication Types: Journal Article Review

PMID:15637323

Stroke. 2005; 36(2): 215-7.

What's new in stroke rehabilitation: back to basics.

Teasell RW, Kalra L.

Physical Medicine and Rehabilitation, St. Joseph's Health Care, London, Ontario, Canada.
Robert.teasel@sjhc.london.on.ca

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Telemedicine for safe and extended use of thrombolysis in stroke: the Telemedic Pilot Project for Integrative Stroke Care (TEMPiS) in Bavaria.

Audebert HJ, Kukla C, et al.

Department of Neurology, Städtisches Krankenhaus München-Harlaching, Munich, Germany.
neuro.audebert@khmh.de

BACKGROUND AND PURPOSE: Systemic thrombolysis represents the only proven therapy for acute ischemic stroke, but safe treatment is reported only in established stroke units. One major goal of the ongoing Telemedic Pilot Project for Integrative Stroke Care (TEMPiS) in Bavaria is to extend the use of tissue plasminogen activator (tPA) treatment in nonurban areas through telemedic support. **METHODS:** The stroke centers in Munich-Harlaching and in Regensburg established a telestroke network to provide consultations for 12 local hospitals in eastern Bavaria. The telemedic system consists of a digital network that includes a 2-way video conference system and CT/MRI image transfer with a high-speed data transmission up to 2 Mb/s. Each network hospital established specialized stroke wards in which qualified teams treat acute stroke patients. Physicians in these hospitals are able to contact the stroke centers 24 hours per day. **RESULTS:** A total of 106 systemic thrombolyses were indicated via teleconsultations between February 1, 2003, and April 7, 2004. During the first 12 months, the rate of thrombolyses was 2.1% of all stroke patients. Mean age was 68 years, and median National Institutes of Health Stroke Scale score was 13. Mean delay between onset and hospital admission was 65 minutes, and door-to-needle time was on average 76 minutes, which included 15 minutes for the teleconsultation. Symptomatic hemorrhage

occurred in 8.5% of patients, and in-hospital mortality was 10.4%. CONCLUSIONS: The present data suggest that systemic thrombolysis indicated via stroke experts in the setting of teleconsultation exhibits similar complication rates to those reported in the National Institute of Neurological Disorders and Stroke trial. Therefore, tPA treatment is also safe in this context and can be extended to nonurban areas.

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A randomized controlled trial of early supported discharge and continued rehabilitation at home after stroke: five-year follow-up of patient outcome.

Thorsen AM, Holmqvist LW, et al.

Division of Physiotherapy, Karolinska Institutet, Stockholm, Sweden.

BACKGROUND AND PURPOSE: The optimal organization of rehabilitation services after discharge from a stroke unit has not been determined. This study sought to evaluate the effect of early supported discharge and continued rehabilitation at home (ESD), in terms of patient outcome 5 years after stroke and changes in selected data over time. METHODS: Eighty-three patients from Southwest Stockholm, mildly or moderately impaired 5 to 7 days after acute stroke, were enrolled in a randomized controlled trial. The core components of the ESD service were initial treatment in a stroke unit and the involvement of an outreach team to deliver and coordinate home-based rehabilitation in partnership with the patient. At the 5-year follow-up, measures used to assess patient outcome included survival, motor capacity, dysphasia, activities of daily living (ADL), social activities, subjective dysfunction, and self-reported falls. RESULTS: Fifty-four patients (30 in the intervention group and 24 in the control group) were evaluated 5 years after stroke, at which time a significantly larger proportion of patients in the intervention group were independent in extended ADL and active in household activities. CONCLUSIONS: This ESD service has a beneficial effect on extended ADL 5 years after stroke for mildly to moderately impaired patients.

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Stroke unit care and outcome: results from the 2001 National Sentinel Audit of Stroke (England, Wales, and Northern Ireland).

Rudd AG, Hoffman A, et al.

Stroke Programme, Clinical Effectiveness and Evaluation Unit, Royal College of Physicians London, Guys and St Thomas' Hospitals NHS Trust London. anthony.rudd@kcl.ac.uk

BACKGROUND AND PURPOSE: Stroke unit care is one of the most powerful interventions available to help stroke patients. There are limited data available to assess the impact of stroke units in routine clinical practice outside randomized clinical trials. This article uses data from the 2001 to 2002 National Stroke Audit to assess the effectiveness of stroke unit care in England, Wales, and Northern Ireland in delivering effective processes of care and in reducing case fatality and disability. METHODS: An observational study of the organization, structure, process of care, and outcomes for stroke in 2001. Case fatality after stroke in England was compared using data from the audit and routinely collected data from the Department of Health. 240 hospitals (196 Trusts) from England, Wales, and Northern Ireland took part in the 2001 to 2002 National Stroke Audit, a response rate of >95%. These sites assessed a total of 8200 patients using the Royal College of Physicians Intercollegiate Working Party Stroke Audit Tool. RESULTS: The availability of stroke unit care varies hugely across the country. Case fatality after stroke was higher in Trusts with least availability of stroke unit care. These differences persisted after control for case mix. The process of care was better for patients managed on stroke units compared with other settings. Overall, the risk of death for patients who received stroke unit care was estimated to be approximately 75% that of the risk for those having no stroke unit care (95% CI, 60 to 90). CONCLUSIONS: Stroke unit care as provided in routine clinical practice in England, Wales, and Northern Ireland reduces case fatality by approximately 25%, which is in line with the figures obtained from systematic analysis of stroke unit trial data.

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Stroke rehabilitation at home using virtual reality, haptics and telemedicine.

Rydmark M, Broeren J, et al.

Mednet, The Sahlgrenska Academy at Goteborg University. martin.rydmark@mednet.gu.se

The objective of this pilot study is to identify the level of difficulty in which subjects with left hemisphere damage in the acute phase after stroke can start practicing in a virtual environment. Second, to test an

application of Virtual Reality technology to existing occupational treatment methods in stroke rehabilitation and develop a platform for home rehabilitation controlled telemedically. The findings indicate that the system shows potential as an assessment and training device. The feasibility study setup is working well likewise the assessment method. Developing and increasing the complexity of the tasks must be based on the patient individual neurology, and that the cinematic motion patterns of the patient's are the basis for exercise design.

Publication Types: Journal Article

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Top Stroke Rehabil. 2004; 11(2): 60-8.

Closing the gap between research and clinical practice.

Dean-Baar S, Pakieser-Reed K.

College of Nursing, University of Wisconsin-Milwaukee, USA.

Evidence-based practice and the application of research findings to practice is a major focus of attention in health care today. The quantification of variations in service delivery and the economic implications of these variations contribute to the pressure on clinicians to provide evidence-based care whenever possible. Awareness of the development of evidence-based practice (EBP), the need for EBP, factors that affect EBP, the methods used to translate research into practice, EBP quality indicators, barriers to EBP, and benefits of EBP will assist clinicians in the effective use of evidence-based information in the care of their patients.

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Top Stroke Rehabil. 2005; 12(2): 57-64.

A new approach to patient-centered care.

Newman E, Ellis C, et al.

National Rehabilitation Hospital, Washington, DC, USA.

An opportunity existed at our rehabilitation hospital, in preparation for Medicare's Prospective Payment System (PPS) in acute medical rehabilitation, to develop an integrated inpatient care model using all available resources. The results have been an improved practice of all staff, increased efficiency and productivity, and increased staff and patient satisfaction. This article discusses the drivers for changing the team model within a large rehabilitation hospital. It includes an overview of the process of data gathering prior to changing the team model, how the new team model functions, and follow-up data collection 9 months after to provide evidence on what changes worked and what areas required further change to meet the objectives.

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Top Stroke Rehabil. 2005; 12(2): 49-56.

Management of communication disorders using family member input, group treatment, and telerehabilitation.

Baron C, Hatfield B, et al.

Speech-Language Pathology Service, National Rehabilitation Hospital, Washington, DC, USA.

Today, speech-language pathologists (SLPs) practice stroke rehabilitation in environments where they have less time to manage the communication impairments of patients who are more medically fragile than ever before. Many SLPs have creatively adapted their practice to maximize functional outcomes for their patients. This article highlights three techniques designed to enhance functional SLP outcomes: maximizing family member input; providing group treatment; and providing treatment in remote, functional settings via telepractice technology.

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Top Stroke Rehabil. 2005; 12(2): 36-48.

Opening the black box of stroke rehabilitation with clinical practice improvement methodology.

Conroy BE, Hatfield B, et al.

Stroke Recovery Program, National Rehabilitation Hospital, Washington, DC, USA.

Although stroke survivors are the largest consumer group for postacute rehabilitation services, there has been little quantification of the details of poststroke rehabilitation (PSR), with the major exception of the AHCPR Clinical Practice Guidelines #16 of 1995. The gold standard research methodology of a randomized controlled trial cannot practically encompass PSR. Using clinical practice improvement (CPI), a

statistically based, validated research methodology, a mathematical representation of the inpatient stroke rehabilitation experience has been constructed. This article examines the principle aspects of CPI methodology and how it was adapted to a multicenter study of inpatient PSR.

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Top Stroke Rehabil. 2005; 12(2): 4-14.

Medicare reform and the American devolution.

DeJong G.

National Rehabilitation Hospital, and Department of Rehabilitation Medicine, Georgetown University School of Medicine, Washington, DC, USA.

The Medicare Modernization Act of 2003 (MMA'03) did more than introduce a prescription drug benefit for Medicare beneficiaries; it also laid the groundwork for several far-reaching changes in the Medicare program. These changes must be considered in the context of the "American devolution"--a much larger shift in American health and social policy that is changing how Americans manage their health and wealth as more tasks and responsibilities devolve to individuals in managing their personal affairs and their lives in the workplace. The devolution presents a special challenge to those who have diminished capacities for self-direction, including many stroke survivors who are especially dependent on the Medicare program for their rehabilitation and management of their diminished health status. This article calls for a massive investment in information technology and brokerage that will enable all Americans to effectively navigate the brave new world that the changes in the Medicare program portend.

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Top Stroke Rehabil. 2005; 12(2): 1-3.

Shift happens: using outcomes to survive and thrive under PPS.

Rao P, Boradia P, et al.

Clinical Services, Quality Improvement, and Corporate Compliance, National Rehabilitation Hospital, Washington, DC, USA.

In the post prospective payment system (PPS) era, acute rehabilitation providers are presented with multiple challenges and opportunities. All inpatient rehabilitation facilities (IRFs) face the requisite demands for improved efficiency (e.g., reduced length of stay for persons with stroke) and the re-institution of monitoring for compliance with the 75% rule. However IRFs also now have a dramatic opportunity to shift the paradigm of "how we do business" by adopting cutting edge technology and continuous quality improvement methodology and by rethinking and revising how we evaluate a stroke program. Today, more than ever before in our industry, providers have an opportunity to evolve to a consumer-driven program evaluation model with the resultant modification of rehabilitation outcomes, indicators, and metrics. The article argues for a climactic and dramatic change in how acute rehabilitation providers market for patients, deliver care, and report on their outcomes. In the current context of PPS and the 75% rule, we are quite literally considering the survival of the industry as we know it. Improved rehabilitation processes and revised rehabilitation report cards (customized for the various stakeholders) hold the key to market share and organizational success. If patient access, quality outcomes, patient safety, and functional gains are to be achieved, the industry needs to change the way it does business and as a consequence the way it evaluates its programs.

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Top Stroke Rehabil. 2005; 12(1): 69-75.

Applying the transtheoretical model to the exercise behaviors of stroke patients.

Garner C, Page SJ.

Mental Health and Substance Abuse Services of the Berkshires, Pittsfield, Massachusetts, USA.

Individuals with disabilities, including stroke, are frequently deconditioned. A variety of factors, including infrequent exercise participation, may be responsible for the deconditioning observed. According to the transtheoretical model (TTM), individuals progress through cognitive processes, termed stages, that indicate their readiness to undertake a particular healthy behavior, such as exercise. Our study examined 178 community-dwelling stroke patients' readiness to initiate an exercise program and their current exercise patterns. Using the Stages of Change Questionnaire, we found over 75% of respondents to be in the exercise preadoption stages of precontemplation, contemplation, or preparation. Moreover, participants classified in the postadoption stages of maintenance and action reported exercising significantly more than those in the preadoption stages. Individuals in the postadoption stages were also

participating in significantly more sessions of strenuous or moderate exercise than those in the preadoption stages. It was concluded that the TTM is a valid theoretical framework to measure stroke patients' readiness to participate in exercise. However, additional research examining the psychosocial and functional factors mitigating these attitudes, and the stability of these attitudes, needs to be performed.

Publication Types: Journal Article PMID:15736002

Top Stroke Rehabil. 2005; 12(1): 45-57.

Task-oriented aerobic exercise in chronic hemiparetic stroke: training protocols and treatment effects.

Macko RF, Ivey FM, et al.

Department of Neurology, Division of Gerontology, Baltimore Veterans Affairs Medical Center and University of Maryland School of Medicine, Baltimore, MD, USA.

Stroke is the leading cause of disability in older Americans. Each year 750,000 Americans suffer a stroke, two thirds of whom are left with neurological deficits that persistently impair function. Principal among them is hemiparetic gait that limits mobility and increases fall risk, promoting a sedentary lifestyle. These events propagate disability by physical deconditioning and "learned non-use," with further functional declines accelerated by the sarcopenia and fitness decrements of advancing age. Conventional rehabilitation care typically provides little or no structured therapeutic exercise beyond the subacute stroke recovery period, based on natural history studies showing little or no further functional motor recovery beyond 6 months after stroke. Emerging evidence suggests that new models of task-oriented exercise have the potential to improve motor function even years after stroke. This article presents treadmill as a task-oriented training paradigm to optimize locomotor relearning while eliciting cardiovascular conditioning in chronic stroke patients. Protocols for exercise testing and longitudinal aerobic training progression are presented that provide fundamental formulas that safely approach the complex task of customizing aerobic training to gait deficit severity in the high CVD risk stroke population. The beneficial effects of 6 months task-oriented treadmill exercise on cardiovascular-metabolic fitness, energy cost of hemiparetic gait, ADL mobility task performance, and leg strength are discussed with respect to the central and peripheral neuromuscular adaptations targeted by the training. Collectively, these findings constitute one initial experience in a much broader neuroscience and exercise rehabilitation development of task-oriented training paradigms that offer a multisystems approach to improving both neurological and cardiovascular health outcomes in the chronic stroke population.

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Value Health. 2004; 7(2): 144-52.

Resource utilization and costs of stroke unit care in Germany.

Dodel RC, Haacke C, et al.

Department of Neurology and Institute of Medical Biometry and Epidemiology, Philipps-University, Marburg, Marburg, Germany. richard.dodel@ukb.uni-bonn.de

OBJECTIVES: Stroke imposes a considerable economic burden on the individual and society. Recently, the concept of an integrated stroke unit has been established in several countries to improve the outcome of patients. This study evaluates the costs of acute care of the different cerebrovascular insults in a stroke unit. **METHODS:** The study population included 340 patients who were consecutively admitted to the Department of Neurology, Philipps University Marburg, with the diagnosis of stroke or transient ischemic attack (TIA) between January 1 and June 30, 2000. Clinical status and course were evaluated by using the Barthel index and the modified Rankin scale. Employing a "bottom-up" approach, we calculated the costs from the perspective of the hospital and the third-party payer using data from provider departments and other published sources. **RESULTS:** Inpatient costs were 3020 euros (3290 US dollars) for TIA, 3480 euros (3790 US dollars) for ischemic stroke (IS), and 5080 euros (5540 US dollars) for intracerebral hemorrhage (ICH) and differed significantly among these subgroups ($P < .05$). Patient subgroups ranked in the same order for average length of stay at 9.4 days for TIA, 10.2 days for IS, and 11.9 days for ICH ($P > .05$). Approximately 30% of the hospital costs are due to physician charges and care. Imaging amounted to 10% and lab investigations to 14% of total costs, independent of the diagnosis. Postacute treatment, including inpatient rehabilitation, cost 9880 euros per patient. Across all diagnostic groups, a mean clinical improvement was observed at time of discharge. **CONCLUSIONS:** Care of patients with cerebrovascular events in a stroke unit causes a high demand of resources and has a considerable impact on health-care expenditure. Therefore, investigations comparing the stroke unit concept with other strategies in stroke care are necessary to evaluate the stroke unit concept for a rational use of available resources in patients with cerebrovascular events.

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