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# Stroke
# Current Awareness Bulletin

May 2020

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**Title: Accuracy and clinical utility of comprehensive dysphagia screening assessments in acute stroke: A systematic review and meta-analysis.**

**Citation:** Journal of clinical nursing; May 2020; vol. 29 (no. 9-10); p. 1527-1538
**Author(s):** Benfield, Jacqueline K; Everton, Lisa F; Bath, Philip M; England, Timothy J

**Introduction:** Nurses and other non-specialists in dysphagia are often trained to screen swallowing post-stroke. There are many basic tools that test water only, they are usually conservative, and patients that fail the test remain nil by mouth until a speech and language therapy assessment. More comprehensive tests also allow non-specialists to recommend modified oral intake. Little is known about the accuracy, clinical utility and cost-effectiveness of these tests.
**Methods:** Following PRISMA guidelines, a systematic review was conducted to describe comprehensive swallowing tests that are available for use in acute stroke by nurses or other non-specialists in dysphagia. A meta-analysis was performed to evaluate accuracy and the clinical utility of the tests was considered. Searches and analyses, conducted by two reviewers, included MEDLINE, Embase, trial registries and grey literature up to December 2018. Validated studies were assessed for quality and risk of bias using QUADAS-2.
**Results:** Twenty studies were included, describing five different tests, three of which had undergone validation. The tests varied in content, recommendations and use. There was no test superior in accuracy and clinical utility. Three studies validating the Gugging Swallow Screen provided sufficient data for meta-analysis, demonstrating high sensitivity; 96% (95% CI 0.90-0.99), but low specificity, 65% (95% CI 0.47-0.79), in line with many water swallow tests. Results should be interpreted with caution as study quality and applicability to the acute stroke population was poor.
**Conclusions:** There is no comprehensive nurse dysphagia assessment tool that has robustly demonstrated good accuracy, clinical utility and cost-effectiveness in acute stroke.
**Relevance To Clinical Practice:** Nurses and other clinicians can develop competencies in screening swallowing and assessing for safe oral intake in those with post-stroke dysphagia. It is important to use a validated assessment tool that demonstrates good accuracy, clinical utility and cost-effectiveness.

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**Title: Acute telestroke in France: A systematic review.**

**Citation:** Revue neurologique; Mar 2020
**Author(s):** Ohannessian, R; Schott, A-M; Colin, C; Nighoghossian, N; Medeiros de Bustos, E; Moulin, T

**Background:** Acute telestroke is the use of telemedicine to improve acute stroke care. It has demonstrated to be a safe and effective medical practice. Since 2011, acute telestroke has been promoted by the Ministry of Health in France, and in 2018 many regions were in the process or completion of implementing telestroke. The objective of this study was to describe acute telestroke implementation in France.
**Methods:** A systematic review was conducted using PubMed and ScienceDirect databases. Articles and abstracts in English and French, published between January 1st, 2000 to April 30th, 2018 were used. Studies conducted in France and that had presented

an outcome evaluation of a regional acute telestroke activity were included. No meta-analysis was conducted.
**Results:** A total of 24 studies (14 in French, 10 in English) were included, with 13 published articles (7 indexed on PubMed) and 11 abstracts. Among the 13 published articles, there were seven observational retrospective studies, one quasi-experimental before-after study, one experimental randomised controlled trial, and four medico-economic studies. All telestroke network models of care were drip-and-ship with hub and spoke organisation. The case-control studies did not show a difference with or without telemedicine. The territorial thrombolysis rate was measured in two regions, with an increase in Franche-Comté from 0.2% (2004) to 9.9% (2015), and a relative increase of 76% in Nord-Pas-de-Calais between 2009-2010 and 2012.
**Conclusion:** Implementation of acute telestroke in France had a positive clinical and public health impact but the evaluation remained limited and needs to be supported.

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**Title: Community-Based Interventions for Stroke Provided by Nurses and Community Health Workers: A Review of the Literature.**

**Citation:** The Journal of neuroscience nursing : journal of the American Association of Neuroscience Nurses; Apr 2020
**Author(s):** Magwood, Gayenell S; Nichols, Michelle; Jenkins, Carolyn; Logan, Ayaba; Qunango, Suparna; Zigbuo-Wenzler, Enia; Ellis, Charles

**Background:** Community-based interventions are vital for facilitating poststroke recovery, increasing community participation, and raising awareness about stroke survivors. To optimize recovery and community reintegration, there is a need to understand research findings on community-based interventions that focus on stroke survivors and their caregivers. Although nurses and community health workers (CHWs) are commonly involved in community-based interventions, less is known about their roles relative to other poststroke rehabilitation professionals (physical therapists, occupational therapists, and speech-language pathologists). Thus, the purpose of this review is to explore research focused on improving community-based stroke recovery for adult stroke survivors, caregivers, or both when delivered by nurses or CHWs.
**Methods:** A systematic review using Scopus, PubMed, EBSCOhost, MEDLINE, CINAHL Complete, and PsycInfo was completed to identify community-based poststroke intervention studies using nurses or CHWs through August 2018.
**Results:** Eighteen studies meeting inclusion criteria from 9 countries were identified. Details regarding nurses' and CHWs' roles were limited or not discussed. Interventions emphasized stroke survivor self-care and caregiver support and were offered face-to-face and in group sessions in the community and home. A wide range of instruments were used to measure outcomes. The results of the interventions provided were mixed. Improvements were observed in perceptions of health, quality of life, knowledge, self-efficacy, self-management, and caregiver support.
**Conclusion:** Nurses and CHWs play a pivotal role in community-based care. Evidence suggests community-based interventions facilitate the necessary support for stroke survivors, caregivers, families, and communities to optimize stroke recovery. Data from this review illustrate a continued need for comprehensive programs designed to address the complex needs of stroke survivors and families when they return to their homes and communities.

**Title: Effectiveness of Hydrotherapy on Balance and Paretic Knee Strength in Patients With Stroke: A Systematic Review and Meta-Analysis of Randomized Controlled Trials.**

**Citation:** American journal of physical medicine & rehabilitation; May 2020; vol. 99 (no. 5); p. 409-419
**Author(s):** Chae, Choong Sik; Jun, Ji Hyun; Im, Sun; Jang, Yongjun; Park, Geun-Young

**Objective:** The aim of the study was to compare the effects of hydrotherapy and land-based conventional therapy on postural balance and knee strength in stroke patients.
**Designs:** A comprehensive search was done via databases (PubMed, EMBASE, and Web of Science) until April 12, 2019, to select randomized controlled trials. The methodological quality was assessed by the PEDro scale. Berg Balance Scale was pooled as the primary outcome and Forward Reach Test, Timed Up and Go test, and paretic knee flexor and knee extensor torque as secondary outcomes.
**Results:** Eleven articles were included. Pooled results showed that hydrotherapy was more beneficial in stroke patients on Berg Balance Scale (mean difference = 1.60, 95% confidence interval = 1.00 to 2.19), Forward Reach Test (mean difference = 1.78, 95% confidence interval = 0.73 to 2.83), Timed Up and Go test (mean difference = -1.41, 95% confidence interval: -2.44 to 0.42), and knee extensor torque (mean difference = 6.14, 95% confidence interval = 0.59 to 11.70) than conventional therapy. In subgroup analysis according to stroke-onset duration, hydrotherapy for chronic stroke patients exhibited significant effectiveness on Berg Balance Scale (mean difference = 1.61, 95% confidence interval = 1.00-.21); no significant effect was observed in subacute stroke patients (mean difference = 1.04, 95% confidence interval = -2.62 to 4.70).
**Conclusion:** Stroke patients showed improvement in postural balance and paretic knee extensor strength with hydrotherapy. Hydrotherapy exhibited significant effects on improving postural balance in chronic patients than in subacute patients.

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**Title: Effects of robotic gait training after stroke: a meta-analysis.**

**Citation:** Annals of physical and rehabilitation medicine; Mar 2020
**Author(s):** Moucheboeuf, Geoffroy; Griffier, Romain; Gasq, David; Glize, Bertrand; Bouyer, Laurent; Dehail, Patrick; Cassoudesalle, Helene

**Background:** Robotic devices are often used in rehabilitation and might be efficient to improve walking capacity after stroke.
**Objective:** First to investigate the effects of robot-assisted gait training after stroke and second to explain the observed heterogeneity of results in previous meta-analyses.
**Methods:** All randomized controlled trials investigating exoskeletons or end-effector devices in adult patients with stroke were searched in databases (MEDLINE, EMBASE, CENTRAL, CINAHL, OPENGREY, OPENSIGLE, PEDRO, WEB OF SCIENCE, CLINICAL TRIALS, conference proceedings) from inception to November 2019, as were bibliographies of previous meta-analyses, independently by 2 reviewers. The following variables collected before and after the rehabilitation program were gait speed, gait endurance, Berg Balance Scale (BBS), Functional Ambulation Classification (FAC) and Timed Up and Go scores. We also extracted data on randomization method, blinding of outcome assessors, drop-outs, intention (or not) to treat, country, number of participants, disease duration, mean age, features of interventions, and date of outcomes assessment.
**Results:** We included 33 studies involving 1466 participants. On analysis by subgroups of intervention, as compared with physiotherapy alone, physiotherapy combined with body-weight

support training and robot-assisted gait training conferred greater improvement in gait speed (+0.09 m/s, 95% confidence interval [CI] 0.03 to 0.15; p= 0.002), FAC scores (+0.51, 95% CI 0.07 to 0.95; p=0.022) and BBS scores (+4.16, 95% CI 2.60 to 5.71; p=0.000). A meta-regression analysis suggested that these results were underestimated by the attrition bias of studies.
**Conclusions:** Robot-assisted gait training combined with physiotherapy and body-weight support training seems an efficient intervention for gait recovery after stroke.

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**Title: Efficacy of interventions aimed at improving physical activity in individuals with stroke: a systematic review.**

**Citation:** Disability and rehabilitation; Apr 2020; vol. 42 (no. 7); p. 902-917
**Author(s):** Aguiar, Larissa Tavares; Nadeau, Sylvie; Martins, Júlia Caetano; Teixeira-Salmela, Luci Fuscaldi; Britto, Raquel Rodrigues; Faria, Christina Danielli Coelho de Morais

**Purpose:** To identify interventions employed to increase post-stroke physical activity, evaluate their efficacy, and identify the gaps in literature.
**Materials and methods:** Randomized controlled trials published until March 2018 were searched in MEDLINE, PEDro, EMBASE, LILACS, and SCIELO databases. The quality of each study and overall quality of evidence were assessed using the PEDro and the GRADE scales.
**Results:** Eighteen studies were included (good PEDro and very low GRADE-scores). In seven, the experimental groups showed significant increases in physical activity (aerobics, resistance, and home-based training; counseling, aerobics, resistance, and home-based training; electrical stimulation during walking; functional-task training; robot-assisted arm therapy; accelerometer-based feedback, and physical activity encouragement). In seven, there were no significant between-group differences (physical activity plan; stretching, use of toe-spreaders, standard treatment; counseling; circuit video-game; functional-task; counseling and cognitive training). The combined experimental and control groups showed significant declines in physical activity in one study (aerobic training or stretching) and increases in three others (aerobic, resistance or sham resistance training; stroke-with advice or only stroke-counseling; aerobic training, educational sessions, standard treatment, and coaching, or mobilization and standard treatment). A meta-analysis could not be performed, due to heterogeneity.
**Conclusions:** Some interventions improved physical activity after stroke. However, the interpretability is limited.
**Implications for rehabilitation:** Individuals with stroke show low physical activity, which may compromise function and health. The use of interventions aimed at improving and maintaining physical activity of individuals with stroke are recommended. Some interventions, such as aerobic, resistance, and combined home-based training, electrical stimulation during walking, functional task training, and arm robot-assisted therapy, could improve the physical activity after stroke.

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**Title: Factors associated with medication persistence among ischemic stroke patients: a systematic review.**

**Citation:** Neurological research; Apr 2020 ; p. 1-10
**Author(s):** Jang, Dong Eun; Zuñiga, Julie Ann

**Objective:** An investigation of the prevalence of medication persistence and associated factors in order to inform effective strategies for improving medication persistence.
**Methods:** A systematic review of the literature from 2010 to the present was performed, using the PRISMA protocol. Primary and empirical observational studies of adult ischemic stroke or transient ischemic attack patients were included. PubMed, CINAHL, Web of Science, Cochrane Library, and PsycInfo databases were searched using the key terms stroke, ischemic stroke, medication persistence, medication adherence, and patient compliance.
**Results:** Of four hundred twenty-eight journal articles retrieved, a final 18 articles were included. Short-term medication persistence was 46.2-96.7%, and long-term medication persistence was 41.7-93.0%. Identified hospital-related factors for medication persistence were stroke unit care, in-hospital medical complications, and early follow-up visit. Demographic factors for medication persistence were older age, and high/adequate financial status; disease-related factors were disease history, stroke subtype, and symptom severity. Age less than 75, female sex, comorbidity, antiplatelet medication switch, and polypharmacy were identified as factors of medication nonpersistence.
**Conclusions:** Stroke patients' medication persistence decreases over time, and persistence on antiplatelets, anticoagulants, and statin was poor. Several factors were associated with medication persistence, and these factors should be considered in future secondary preventative strategies.

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**Title: Immediate and long-term effects of BCI-based rehabilitation of the upper extremity after stroke: a systematic review and meta-analysis.**

**Citation:** Journal of neuroengineering and rehabilitation; Apr 2020; vol. 17 (no. 1); p. 57
**Author(s):** Bai, Zhongfei; Fong, Kenneth N K; Zhang, Jack Jiaqi; Chan, Josephine; Ting, K H

**Background:** A substantial number of clinical studies have demonstrated the functional recovery induced by the use of brain-computer interface (BCI) technology in patients after stroke. The objective of this review is to evaluate the effect sizes of clinical studies investigating the use of BCIs in restoring upper extremity function after stroke and the potentiating effect of transcranial direct current stimulation (tDCS) on BCI training for motor recovery.
**Methods:** The databases (PubMed, Medline, EMBASE, CINAHL, CENTRAL, PsycINFO, and PEDro) were systematically searched for eligible single-group or clinical controlled studies regarding the effects of BCIs in hemiparetic upper extremity recovery after stroke. Single-group studies were qualitatively described, but only controlled-trial studies were included in the meta-analysis. The PEDro scale was used to assess the methodological quality of the controlled studies. A meta-analysis of upper extremity function was performed by pooling the standardized mean difference (SMD). Subgroup meta-analyses regarding the use of external devices in combination with the application of BCIs were also carried out. We summarized the neural mechanism of the use of BCIs on stroke.
**Results:** A total of 1015 records were screened. Eighteen single-group studies and 15 controlled studies were included. The studies showed that BCIs seem to be safe for patients with stroke. The single-group studies consistently showed a trend that suggested BCIs were effective in improving upper extremity function. The meta-analysis (of 12 studies) showed a medium effect size favoring BCIs for improving upper extremity function after intervention (SMD = 0.42; 95% CI = 0.18-0.66; I2 = 48%; P < 0.001; fixed-effects model), while the long-term effect (five studies) was not significant (SMD = 0.12; 95% CI = - 0.28 - 0.52; I2 = 0%; P = 0.540; fixed-effects model). A subgroup meta-analysis indicated that using functional electrical stimulation as the external device in BCI training was more effective than using other devices

(P = 0.010). Using movement attempts as the trigger task in BCI training appears to be more effective than using motor imagery (P = 0.070). The use of tDCS (two studies) could not further facilitate the effects of BCI training to restore upper extremity motor function (SMD = - 0.30; 95% CI = - 0.96 - 0.36; I2 = 0%; P = 0.370; fixed-effects model).
**Conclusion:** The use of BCIs has significant immediate effects on the improvement of hemiparetic upper extremity function in patients after stroke, but the limited number of studies does not support its long-term effects. BCIs combined with functional electrical stimulation may be a better combination for functional recovery than other kinds of neural feedback. The mechanism for functional recovery may be attributed to the activation of the ipsilesional premotor and sensorimotor cortical network.

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**Title: Mechanical Thrombectomy in Acute Ischemic Stroke: A Meta-Analysis of Stent Retrievers vs Direct Aspiration vs a Combined Approach.**

**Citation:** Neurosurgery; Apr 2020; vol. 86 (no. 4); p. 464-477
**Author(s):** Texakalidis, Pavlos; Giannopoulos, Stefanos; Karasavvidis, Theofilos; Rangel-Castilla, Leonardo; Rivet, Dennis J; Reavey-Cantwell, John

**Background:** Recent randomized control trials (RCTs) established that mechanical thrombectomy is superior to medical therapy for patients with stroke due to a large vessel occlusion.
**Objective:** To compare the safety and efficacy profile of the different mechanical thrombectomy strategies.
**Methods:** A random-effects meta-analysis was performed and the I2 statistic was used to assess heterogeneity according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.
**Results:** Nineteen studies with a total of 2449 patients were included. No differences were identified between the stent retrieval and direct aspiration groups in terms of modified Thrombolysis in Cerebral Infarction (mTICI) 2b/3 and mTICI 3 recanalization rates, and favorable outcomes (modified Rankin Scale [mRS] ≤ 2). Adverse event rates, including 90-d mortality, symptomatic intracerebral hemorrhage (sICH), and subarachnoid hemorrhage (SAH), were similar between the stent retrieval and direct aspiration groups. The use of the stent retrieval was associated with a higher risk of vasospasm (odds ratio [OR]: 2.98; 95% confidence interval [CI]: 1.10-8.09; I2: 0%) compared to direct aspiration. When compared with the direct aspiration group, the subgroup of patients who underwent thrombectomy with the combined approach as a first-line strategy had a higher likelihood of successful mTICI 2b/3 (OR: 1.47; 95% CI:1.02-2.12; I2: 0%) and mTICI 3 recanalization (OR: 3.65; 95% CI: 1.56-8.54), although with a higher risk of SAH (OR:4.33; 95% CI: 1.15-16.32).
**Conclusion:** Stent retrieval thrombectomy and direct aspiration did not show significant differences. Current available evidence is not sufficient to draw conclusions on the best surgical approach. The combined use of a stent retriever and aspiration as a first-line strategy was associated with higher mTICI 2b/3 and mTICI 3 recanalization rates, although with a higher risk of 24-h SAH, when compared with direct aspiration.

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**Title: Pre-treatment cerebral microbleeds and intracranial hemorrhage in patients with ischemic stroke receiving endovascular therapy: a systematic review and meta-analysis.**

**Citation:** Journal of neurology; May 2020; vol. 267 (no. 5); p. 1227-1232

**Author(s):** Wu, Xiumei; Yan, Jiangzhi; Ye, Huirong; Qiu, Jianting; Wang, Jian; Wang, Yujie

**Background and Purpose:** Predicting the risk of intracranial hemorrhage (ICH) is an important aspect for improving the efficacy and safety of endovascular therapy (EVT). We intended to perform a systematic review and meta-analysis to show whether pre-treatment cerebral microbleeds (CMBs) were associated with an increased incidence of ICH in patients with ischemic stroke receiving EVT.
**Methods:** We searched PubMed, EMBASE, Web of Science and Cochrane Library from their dates of inception to December 18, 2018, and also manually searched reference lists of relevant articles. Cumulative prevalence of CMBs and ICH was calculated. Relative risk and 95% confidence interval (CI) were calculated for the incidence of ICH in patients with CMBs versus those without after EVT.
**Results:** Four studies involving 598 patients were included. The pooled prevalence of CMBs was 18% (95% CI 15-21%) and the pooled prevalence of ≥ 5 CMBs was 1% (95% CI 0-2%). The pooled incidence of ICH was 29% (95% CI 8-49%) in all patients, 25% (95% CI 5-45%) in those with CMBs and 29% (95% CI 8-50%) in those without CMBs. The pooled relative risk of ICH was 0.90 (95% CI 0.65-1.25, P = 0.528; I2 = 0%, P = 0.949) in patients with CMBs versus those without CMBs.
**Conclusions:** There is no evidence that pre-treatment CMBs were associated with an increased incidence of ICH in patients with ischemic stroke receiving EVT.

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**Title: Pro-inflammatory cytokines are associated with the development of post-stroke depression in the acute stage of stroke: A meta-analysis.**

**Citation:** Topics in stroke rehabilitation; Apr 2020 ; p. 1-10
**Author(s):** Chen, Yue; Pu, Juncai; Liu, Yiyun; Tian, Lu; Chen, Xiang; Gui, Siwen; Xu, Shaohua; Song, Xuemian; Xie, Peng

**Background:** Pro-inflammatory cytokines may be associated with post-stroke depression (PSD); however, results from different studies are inconsistent. Objectives: To investigate whether pro-inflammatory cytokines are associated with the development of PSD in acute stroke.
**Methods:** PubMed, Embase, and Web of science were searched for relevant literature. Meta-analyzes were performed to determine whether the baseline blood concentrations of pro-inflammatory cytokines differed between acute stroke patients with and without depression. Sensitivity analyzes and regression analyzes were conducted to explore sources of heterogeneity.
**Results:** We included 889 acute stroke patients from eight original studies, 312 of whom developed PSD and 577 did not. The serum concentrations of interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α) were higher in the PSD group, compared with the non-PSD group (IL-6: SMD = 1.26, 95% CI = [0.55, 1.97], P < 0.001; TNF-α: SMD = 0.61, 95% CI = [0.13, 1.10], P = 0.010).
**Conclusions:** This study indicates IL-6 and TNF-α as potential biomarkers of PSD in the acute stage of stroke and provides theoretical support for the early prevention and treatment of PSD.

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**Title: Red flags for a concomitant giant cell arteritis in patients with vertebrobasilar stroke: a cross-sectional study and systematic review.**

**Citation:** Acta neurologica Belgica; Apr 2020

**Author(s):** Elhfnawy, Ahmed Mohamed; Elsalamawy, Doaa; Abdelraouf, Mervat; Schliesser, Mira; Volkmann, Jens; Fluri, Felix

**Abstract:** Giant cell arteritis (GCA) may affect the brain-supplying arteries, resulting in ischemic stroke, whereby the vertebrobasilar territory is most often involved. Since etiology is unknown in 25% of stroke patients and GCA is hardly considered as a cause, we examined in a pilot study, whether screening for GCA after vertebrobasilar stroke might unmask an otherwise missed disease. Consecutive patients with vertebrobasilar stroke were prospectively screened for GCA using erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), hemoglobin, and halo sign of the temporal and vertebral artery on ultrasound. Furthermore, we conducted a systematic literature review for relevant studies. Sixty-five patients were included, and two patients (3.1%) were diagnosed with GCA. Patients with GCA were older in age (median 85 versus 69 years, p = 0.02). ESR and CRP were significantly increased and hemoglobin was significantly lower in GCA patients compared to non-GCA patients (median, 75 versus 11 mm in 1 h, p = 0.001; 3.84 versus 0.25 mg/dl, p = 0.01, 10.4 versus 14.6 mg/dl, p = 0.003, respectively). Multiple stenoses/occlusions in the vertebrobasilar territory affected our two GCA patients (100%), but only five (7.9%) non-GCA patients (p = 0.01). Our literature review identified 13 articles with 136 stroke patients with concomitant GCA. Those were old in age. Headache, increased inflammatory markers, and anemia were frequently reported. Multiple stenoses/occlusions in the vertebrobasilar territory affected around 70% of stroke patients with GCA. Increased inflammatory markers, older age, anemia, and multiple stenoses/occlusions in the vertebrobasilar territory may be regarded as red flags for GCA among patients with vertebrobasilar stroke.

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**Title: Reversible diffusion-weighted imaging lesions in acute ischemic stroke: A systematic review.**

**Citation:** Neurology; Mar 2020; vol. 94 (no. 13); p. 571-587
**Author(s):** Nagaraja, Nandakumar; Forder, John R; Warach, Steven; Merino, Jośe G

**Objectives:** To systematically review the literature for reversible diffusion-weighted imaging (DWIR) lesions and to describe its prevalence, predictors, and clinical significance.
**Methods:** Studies were included if the first DWI MRI was performed within 24 hours of stroke onset and follow-up DWI or fluid-attenuated inversion recovery (FLAIR)/T2 was performed within 7 or 90 days, respectively, to measure DWIR. We abstracted clinical, imaging, and outcomes data.
**Results:** Twenty-three studies met the study criteria. The prevalence of DWIR was 26.5% in DWI-based studies and 6% in FLAIR/T2-based studies. DWIR was associated with recanalization or reperfusion of the ischemic tissue with or without the use of tissue plasminogen activator (t-PA) or endovascular therapy, earlier treatment with t-PA, shorter time to endovascular therapy after MRI, and absent or less severe perfusion deficit within the DWI lesion. DWIR was associated with early neurologic improvement in 5 of 6 studies (defined as improvement in the NIH Stroke Scale (NIHSS) score by 4 or 8 points from baseline or NIHSS score 0 to 2 at 24 hours after treatment or at discharge or median NIHSS score at 7 days) and long-term outcome in 6 of 7 studies (defined as NIHSS score ≤1, improvement in the NIHSS score ≥8 points, or modified Rankin Scale score up to ≤2 at 30 or 90 days) likely due to reperfusion.

**Conclusions:** DWIR is seen in up to a quarter of patients with acute ischemic stroke, and it is associated with good clinical outcome following reperfusion. Our findings highlight the pitfalls of DWI to define ischemic core in the early hours of stroke.

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**Title: Role of Colchicine in Stroke Prevention: An Updated Meta-Analysis.**

**Citation:** Journal of stroke and cerebrovascular diseases : the official journal of National Stroke Association; May 2020; vol. 29 (no. 5); p. 104756
**Author(s):** Masson, Walter; Lobo, Martín; Molinero, Graciela; Masson, Gerardo; Lavalle-Cobo, Augusto

**Background:** Colchicine is a microtubule inhibitor with anti-inflammatory properties. As the body and quality of evidence regarding the efficacy of colchicine for cardiovascular prevention is controversial, the aims of this study was to evaluate the effect of colchicine therapy on vascular events.
**Methods:** A meta-analysis was performed of randomized controlled clinical trials of colchicine on high cardiovascular risk populations, reporting data from stroke, myocardial infarction, cardiovascular mortality and all-cause mortality, after searching the PubMed/MEDLINE, Embase and Cochrane Controlled Trials databases. A random-effects meta-analysis model was then applied.
**Results:** Nine eligible trials of colchicine therapy, involving a total of 6630 patients, were considered eligible for analysis (3359 subjects were allocated to receive colchicine while 3271 subjects were allocated to the respective control arms). The stroke incidence was lower in the colchicine group compared with placebo arm (OR,
.33; 95%CI, .15-.70; 6 studies evaluated). We did not find a significant reduction in the incidence of myocardial infarction, cardiovascular mortality or all-cause mortality.
**Conclusions:** Our data suggest that in a population with high cardiovascular risk, the use of colchicine results in significant reduction on stroke risk. Colchicine is an accessible drug that could be successfully utilized for the prevention of atherosclerotic cerebrovascular disease. The tolerability and benefits should be confirmed in ongoing clinical trials.

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**Title: The effectiveness of extracorporeal shock wave therapy to reduce lower limb spasticity in stroke patients: a systematic review and meta-analysis.**

**Citation:** Topics in stroke rehabilitation; Mar 2020; vol. 27 (no. 2); p. 137-157
**Author(s):** Cabanas-Valdés, Rosa; Calvo-Sanz, Jordi; Urrùtia, Gerard; Serra-Llobet, Pol; Pérez-Bellmunt, Albert; Germán-Romero, Ana

**Objective:** To assess the effectiveness of Extracorporeal Shock Wave Therapy (ESWT) to reduce lower limb spasticity in adult stroke survivors.
**Data Sources:** A systematic review of Medline/Pubmed, CENTRAL, CINAHL, PEDro database, REHABDATA, Scielo, Scopus, Web of Science, Trip Database, and Epistemonikos from 1980 to December 2018 was carried out.
Review Methods: The bibliography was screened to identify clinical trials (controlled and before-after) that used ESWT to reduce spasticity in stroke survivors. Two reviewers independently screened references, selected relevant studies, extracted data, and assessed risk of bias by PEDro scale. The primary outcome was spasticity.

**Results:** A total of 12 studies (278 participants) were included (5 randomized controlled trials, 1 controlled trial, and 6 before-after studies). A meta-analysis was performed by randomized controlled trials. A beneficial effect on spasticity was found. The mean difference (MD) was 0.58; 95% confidence interval (CI) 0.30 to 0.86 and also in subgroup analysis (short, medium, and long term). The MD for range of motion was 1.81; CI -0.20 to 3.82 and for lower limb function the standard mean difference (SMD) was

0.34; 95% CI -0.09 to 0.77. Sensitivity analysis demonstrated a better beneficial effect for myotendinous junction. MD was 1.5; 95% CI -2.44 to 5.44 at long-term (9 weeks).
**Conclusion:** The ESWT (radial/focused) would be a good non-invasive rehabilitation strategy in chronic stroke survivors to reduce lower limb spasticity, increase ankle range of motion, and improve lower limb function. It does not show any adverse events and it is a safe and effective method.

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**Title: The effects of exercise on cognition post-stroke: are there sex differences? A systematic review and meta-analysis.**

**Citation:** Disability and rehabilitation; Mar 2020 ; p. 1-18
**Author(s):** Khattab, Shereen; Wiley, Elise; Fang, Hanna; Richardson, Julie; MacDermid, Joy; Tang, Ada

**Purpose:** The aim of this systematic review was to investigate if sex moderated the effect of exercise on cognition in adults post-stroke.
**Methods:** A systematic review was conducted of randomized controlled trials that involved adults ≥18 years with stroke, any exercise intervention, and reported any outcome related to cognitive function. We compared effect sizes of cognitive outcomes between studies of lower and higher proportion of females (CRD42018092757).
**Results:** The effects of exercise did not differ between studies of higher and lower female proportions with respect to memory ($\chi 2 = 1.52$, $p = 0.22$), executive function ($\chi 2 = 0.56$, $p = 0.45$; $Chi2 = 0.00$, $p = 0.98$), language ($Chi2 = 3.17$, $p = 0.08$) or global cognition ($\chi 2 = 0.88$, $p = 0.35$).
**Conclusion:** There were no sex differences in the effects of exercise on memory, executive functioning, language or global cognition in individuals with stroke. Further research is warranted to address sex differences in individuals with stroke to enable better targeting, prevention, and interventions in stroke rehabilitation.
**Implications For Rehabilitation:** Understanding sex differences and potentially similarities in the relationship between exercise and cognition is an important step in enhancing stroke rehabilitation and the development of optimal, sex-specific rehabilitation. Although our findings suggest that there is no clear rationale for incorporating sex into our clinical decision making, it is still imperative to consider sex factors in research and report results in the literature disaggregated by sex to help inform clinical practice.

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**Title: The outcome of acute functional neurological disorder: a meta-analysis of stroke-mimic presentations.**

**Citation:** Journal of neurology; May 2020; vol. 267 (no. 5); p. 1353-1357
**Author(s):** Simhan, Suhas; Thijs, Vincent; Mancuso, Sam; Tsivgoulis, Georgios; Katsanos, Aristeidis; Alexandrov, Andrei V; Kanaan, Richard A

**Objective:** The prognosis of motor functional neurological disorder (FND) is considered poor; however, all data come from chronic cohorts collected by specialists. The aim of this study was to determine the clinical outcome of acute FND, captured as 'stroke-mimics'.
**Methods:** A meta-analysis of studies with outcome data on functional stroke mimics. Authors were contacted to provide more information on their FND mimics, including baseline, discharge and follow-up stroke scales. A random effects meta-analysis of proportion of 'good outcome' was the primary measure of interest, with additional descriptive and statistical analysis. 'Good outcome' employed the usual conventions of modified Rankin Score (mRS) or National Institutes of Health Stroke Scale (NIHSS) ≤ 1.
**Results:** Eight studies with 79 patients were identified and analysed, all of cohorts undergoing thrombolysis. The mean age at presentation was 49.7 years with a 62% female preponderance, and median NIHSS score of 4. The proportion of patients with mRS or NIHSS ≤ 1 changed significantly from admission to discharge or follow up [from 24 (30%) to 50 (63%), $p < 0.001$]. Meta-analysis of the synthesized data showed the pooled standardized mean change (SMC) was statistically significant (SMC = - 1.28, [95% CI = -2.25, - 0.30], $p = 0.010$) indicating good symptomatic outcome for acute FND patients presenting as stroke-mimics. Heterogeneity was large.
**Conclusion:** Patients presenting with acute motor FND have good outcome of their presenting symptoms by discharge and at follow-up, following thrombolysis for presumed stroke, in contrast to specialist cohorts. Demographic differences, in addition to the thrombolysis, are possible explanations for these more favourable results.

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**Title: Trends in Stroke Incidence in High-Income Countries in the 21st Century: Population-Based Study and Systematic Review.**

**Citation:** Stroke; May 2020; vol. 51 (no. 5); p. 1372-1380
**Author(s):** Li, Linxin; Scott, Catherine A; Rothwell, Peter M; Oxford Vascular Study

**Background and Purpose:** Population-based studies provide the most reliable data on stroke incidence. A previous systematic review of population-based studies suggested that stroke incidence in high-income countries decreased by 42% between the 1970s and early 2000s. However, it is uncertain whether this trend of steady decline has been maintained in more recent periods.
**Methods:** Data from OCSP (Oxfordshire Community Stroke Project; 1981-1986) and OXVASC (Oxford Vascular Study; 2002-2017) along with other published population-based stroke incidence studies that reported temporal trends of stroke incidence since 1990 in high-income countries were included. Age-standardized relative incidence rate ratios were calculated for each study and then pooled with inverse-variance weighted random-effects meta-analysis. Projection estimates were calculated for the number of incident stroke patients in the United Kingdom from year 2015 to 2045.
**Results:** In Oxfordshire, stroke incidence fell by 32% from OCSP to OXVASC, with a similar trend before or after year 2000. With the projected aging population, if the age-specific stroke incidence continued to decrease at its current rate (6% every 5 years), there would still be a 13% increase of the number of first-ever strokes in the United Kingdom up to year 2045. Incorporating the Oxfordshire data with other 12 population-based studies, stroke incidence declined steadily between the 1990s and 2010s within each study, resulting in a 28% decline over an average period of 16.5 years (pooled incidence rate ratio, 0.72 [95% CI, 0.66-0.79]; $P<0.0001$). The trend was the same for men (0.69 [95% CI, 0.61-0.77]; $P<0.0001$) and women (0.66 [95% CI, 0.59-0.74]; $P<0.0001$) and remained consistent after year 2010 in OXVASC.

Proportion of disabling or fatal stroke also decreased over time (early versus later period, 53.6% versus 46.1%; P=0.02).
**Conclusions:** Stroke incidence is continuing to decline with steady rate in Oxfordshire and in other high-income settings. However, the absolute number of strokes occurring is not falling.

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**Title: Virtual reality therapy for upper limb rehabilitation in patients with stroke: a meta-analysis of randomized clinical trials.**

**Citation:** Brain injury; Mar 2020; vol. 34 (no. 4); p. 456-465
**Author(s):** Mekbib, Destaw B; Han, Jiawei; Zhang, Li; Fang, Shan; Jiang, Hongjie; Zhu, Junming; Roe, Anna W; Xu, Dongrong

**Background:** Stroke is a major cause of life-long disability in adults, associated with poor quality of life. Virtual reality (VR)-based therapy systems are known to be helpful in improving motor functions following stroke, but recent clinical findings have not been included in the previous publications of meta-analysis studies.
**Aims:** This meta-analysis was based on the available literature to evaluate the therapeutic potential of VR as compared to dose-matched conventional therapies (CT) in patients with stroke.
**Methods:** We retrieved relevant articles in EMBASE, MEDLINE, PubMed, and Web of Science published between 2010 and February 2019. Peer-reviewed randomized controlled trials that compared VR with CT were included.
**Results:** A total of 27 studies met the inclusion criteria. The analysis indicated that the VR group showed statistically significant improvement in the recovery of UL function (Fugl-Meyer Upper Extremity [FM-UE]: n = 20 studies, Mean Difference [MD] = 3.84, P = .01), activity (Box and Block Test [BBT]: n = 13, MD = 3.82, P = .04), and participation (Motor Activity Log [MAL]: n=6, MD = 0.8, P = .0001) versus the control group.
**Conclusion:** VR appears to be a promising therapeutic technology for UL motor rehabilitation in patients with stroke.

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**Title: What Interventions Do Physical Therapists Provide for Patients With Cardiorespiratory Conditions, Neurological Conditions, and Conditions Requiring Acute Hospital Care? A Systematic Review.**

**Citation:** Physical therapy; Apr 2020
**Author(s):** Zadro, Joshua R; Cheng, Sonia; O'Keeffe, Mary; Maher, Christopher G

**Objective:** The aim of this systematic review was to determine what percentage of physical therapists provide interventions that are of high value, low value, or unknown value for cardiorespiratory conditions, neurological conditions, or conditions requiring acute hospital care. Whether an intervention was considered high or low value was determined by reference to guidelines or systematic reviews.
**Methods:** Searches of numerous databases were performed by combining terms synonymous with "practice patterns" and "physical therapy" until April 2018. Studies that investigated what interventions physical therapists provide for any cardiorespiratory condition, neurological condition, or condition requiring acute hospital care through surveys and audits of clinical notes were included. Through the use of medians and interquartile ranges, the percentages of physical therapists who provided interventions that were of high value, low value, or unknown value were summarized.

**Results:** Twenty-six studies were included. The median percentages of physical therapists who provided interventions of high value, low value, and unknown value for chronic obstructive pulmonary disease ranged from 78% to 96%, 67% to 100%, and 56% to 91%, respectively. These percentages ranged from 61% to 97%, 87% to 98%, and 83% to 98% for adults who were critically ill in intensive care units; 70% to 93%, 38% to 50%, and 8% to 95% before or after cardiac/thoracic surgery; 25% to 96%, 23% to 84%, and 96% for acute stroke; and 11% (high value) and 13% (unknown value) for Parkinson disease.
**Conclusions:** This review found patterns of physical therapist practice for cardiorespiratory conditions, neurological conditions, and conditions requiring acute hospital care that were both evidence based and not evidence based. A concern is that a substantial percentage of physical therapists provided interventions that were of low value or unknown value, despite the availability of high-value interventions. IMPACT This systematic review is the first to summarize the percentage of physical therapist treatment choices that were high value versus low value for cardiorespiratory conditions, neurological conditions, and conditions requiring acute hospital care. The findings highlight areas of practice where low-value care could be replaced with high-value care-such as in the management of patients who have chronic obstructive pulmonary disease or who are in intensive care-and identify an urgent need to develop and test strategies to ensure that patients with these conditions receive the interventions most likely to improve their outcomes.

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