

Library Current Awareness Bulletin

Stroke – June 2021

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Guidance

[Atrial fibrillation: diagnosis and management](#)

NICE guideline [NG196]

April 2021

[This guideline covers diagnosing and managing atrial fibrillation in adults. It includes guidance on providing the best care and treatment for people with atrial fibrillation, including assessing and managing risks of stroke and bleeding.]

[National Stroke Service Model: Integrated Stroke Delivery Networks](#)

NHS England

May 2021

[This document outlines best practice stroke care; from prevention initiatives aimed addressing health inequalities, more efficient diagnosis through improved imaging services, cutting-edge treatments and innovative rehabilitation and life after stroke services.]

[RapidAI for analysing CT/MRI brain scans in people with suspected acute stroke](#)

Medtech innovation briefing [MIB262]

June 2021

[The technology described in this briefing is RapidAI. It is a platform that uses artificial intelligence to process CT or MRI diagnostic images of people with suspected acute stroke.]

COVID-19: Impact on Stroke Services

[Epidemiological Surveillance of the Impact of the COVID-19 Pandemic on Stroke Care Using Artificial Intelligence.](#)

Nogueira, R.G., Davies J.M., Gupta R., Hassan A.E., Devlin T., Haussen D.C., Mohammad, M.H., Kellner, C.P. et al
Stroke, vol. 52(5) pp.1682-1690

May 2021

[Background and purpose: The degree to which the coronavirus disease 2019 (COVID-19) pandemic has affected systems of care, in particular, those for time-sensitive conditions such as stroke, remains poorly quantified. We sought to evaluate the impact of COVID-19 in the overall screening for acute stroke utilizing a commercial clinical artificial intelligence platform. **Methods:** Data were derived from the Viz Platform, an artificial intelligence application designed to optimize the workflow of patients with acute stroke. Neuroimaging data on suspected patients with stroke across 97 hospitals in 20 US states were collected in real time and retrospectively analyzed with the number of patients undergoing imaging screening serving as a surrogate for the amount of stroke care. The main outcome measures were the number of computed tomography (CT) angiography, CT perfusion, large vessel occlusions (defined according to the automated software detection), and severe strokes on CT perfusion (defined as those with hypoperfusion volumes >70 mL) normalized as number of patients per day per hospital. Data from the prepandemic (November 4, 2019 to February 29, 2020) and pandemic (March 1 to May 10, 2020) periods were compared at national and state levels. Correlations were made between the inter-period changes in imaging screening, stroke hospitalizations, and thrombectomy procedures using state-specific sampling. **Results:** A total of 23 223 patients were included. The incidence of large vessel occlusion on CT angiography and severe strokes on CT perfusion were 11.2% (n=2602) and 14.7% (n=1229/8328), respectively. There were significant declines in the overall number of CT angiographies (-22.8%; 1.39-1.07 patients/day per hospital, P<0.001) and CT perfusion (-26.1%; 0.50-0.37 patients/day per hospital, P<0.001) as well as in the incidence of large vessel occlusion (-17.1%; 0.15-0.13 patients/day per hospital, P<0.001) and severe strokes on CT perfusion (-16.7%; 0.12-0.10 patients/day per hospital, P<0.005). The sampled cohort showed similar declines in the rates of large vessel occlusions versus thrombectomy (18.8% versus 19.5%, P=0.9) and comprehensive stroke center hospitalizations (18.8% versus 11.0%, P=0.4). **Conclusions:** A significant decline in stroke imaging screening has occurred during the COVID-19 pandemic. This analysis underscores the broader application of artificial intelligence neuroimaging platforms for the real-time monitoring of stroke systems of care.]

[Patient Characteristics and Outcomes Associated with Decline in Stroke Volumes During the Early COVID-19 Pandemic.](#)

Wallace A.N., Asif, K.S., Sahlein D.H., Warach S.J., Malisch T., LaFranchise E.F., Geraghty S., Kreitel K.D. et al
Journal of Stroke and Cerebrovascular Diseases, vol. 30(6)

June 2021

[Background and purpose: Delayed evaluation of stroke may contribute to COVID-19 pandemic-related morbidity and mortality. This study evaluated patient characteristics, process measures and outcomes associated with the decline in stroke presentation during the early pandemic. **Methods:** Volumes of stroke presentations, intravenous thrombolytic administrations, and mechanical thrombectomies from 52 hospitals from January 1-June 30, 2020 were analyzed with piecewise linear regression and linear spline models. Univariate analysis compared pandemic (case) and pre-pandemic (control) groups defined in relation to the nadir of daily strokes during the study period. Significantly different patient characteristics were further evaluated with logistic regression, and significantly different process measures and outcomes were re-analyzed after propensity score matching. **Results:** Analysis of 7,389 patients found daily stroke volumes decreased 0.91/day from March 12-26 (p < 0.0001), reaching a nadir 35.0% less than expected, and increased 0.15 strokes/day from March 27-June 23, 2020 (p < 0.0001). Intravenous thrombolytic administrations decreased 3.3/week from February 19-March 31 (p = 0.0023), reaching a nadir 33.4% less than expected, and increased 1.4 administrations/week from April 1-June 23 (p < 0.0001). Mechanical thrombectomy volumes decreased by 1.5/week from February 19-March 31, 2020 (p = 0.0039), reaching a nadir 11.3% less than expected. The pandemic group was more likely to ambulate independently at baseline (p = 0.02, OR = 1.60, 95% CI = 1.08-2.42), and less likely to present with mild stroke symptoms (NIH Stroke Scale ≤ 5; p = 0.04, OR = 1.01, 95% CI = 1.00-1.02). Process measures and outcomes of each group did not differ, including door-to-needle time, door-to-puncture time, and successful mechanical thrombectomy rate. **Conclusion:** Stroke presentations and acute interventions decreased during the early COVID-19 pandemic, at least in part due to patients with lower baseline functional status and milder symptoms not seeking medical care. Public health messaging and initiatives should target these populations.]

Drug Therapy / Stroke Prophylaxis

[Effectiveness and safety of glibenclamide for stroke: Protocol for a systematic review and meta-analysis](#)

Wen L., Tu R., Wan K., Zhang H., Zhang X. and Huang B.

BMJ Open, vol. 11 (5)

May 2021

[Introduction: Despite the continuous improvement in modern medical treatment, stroke is still a leading cause of death and disability worldwide. How to effectively improve the survival rate and reduce disability in patients who had a stroke has become the focus of many investigations. Recent findings concerning the benefits of glibenclamide as a neuroprotective drug have initiated a new area for prospective studies on the effects of sulfonylureas. Given the high mortality and disability associated with stroke, it is essential to weigh the benefits of neuroprotective drugs against their safety. Therefore, the objective of the current study is to conduct a systematic review using meta-analysis to assess the benefits and safety of glibenclamide as a neuroprotective drug. **Methods and analysis:** This study will analyse randomised clinical trials (RCTs) and observational studies published up to 31 December 2020 and include direct or indirect evidence. Studies will be retrieved by searching PubMed, EMBASE, Web of Science, the Cochrane Library and China National Knowledge Infrastructure (CNKI) and WanFang Databases. The outcomes of this study will be mortality, scores from the Modified Rankin Scale and the occurrence of hypoglycaemic events. The risk of bias will be assessed using the Cochrane risk of bias assessment instrument for RCTs. A random-effect/fixed-effect model will be used to summarise the estimates of the mean difference/risk ratio using a 95% CI. **Ethics and dissemination:** This meta-analysis is a secondary research project, which is based on previously published data. Therefore, ethical approval and informed consent were not required for this meta-analysis. The results of this study will be submitted to a peer-reviewed journal for publication.]

[Risk of Stroke Outcomes in Atrial Fibrillation Patients Treated with Rivaroxaban and Warfarin.](#)

Milentijevic D., Lin J.H., Connolly N., Chen Y-W., Kogan E., Shrivastava S., Sjoeland E., Alberts M.J.

Journal of Stroke and Cerebrovascular Diseases, vol. 30 (5)

May 2021

[Objectives: In a previous real-world study, rivaroxaban reduced the risk of stroke overall and severe stroke compared with warfarin in patients with nonvalvular atrial fibrillation (NVAF). The aim of this study was to assess the reproducibility in a different database of our previously observed results (Alberts M, et al. *Stroke*. 2020;51:549-555) on the risk of severe stroke among NVAF patients in a different population treated with rivaroxaban or warfarin. **Material and methods:** This retrospective cohort study included patients from the IBM® MarketScan® Commercial and Medicare databases (2011-2019) who initiated rivaroxaban or warfarin after a diagnosis of NVAF, had ≥6 months of continuous health plan enrollment, had a CHA2DS2-VASc score ≥2, and had no history of stroke or anticoagulant use. Patient data were assessed until the earliest occurrence of a primary inpatient diagnosis of stroke, death, end of health plan enrollment, or end of study. Stroke severity was defined by National Institutes of Health Stroke Scale (NIHSS) score, imputed by random forest model. Cox proportional hazard regression was used to compare risk of stroke between cohorts, balanced by inverse probability of treatment weighting. **Results:** The mean observation period from index date to either stroke, or end of eligibility or end of data was 28 months. Data from 13,599 rivaroxaban and 39,861 warfarin patients were included. Stroke occurred in 272 rivaroxaban-treated patients (0.97/100 person-years [PY]) and 1,303 warfarin-treated patients (1.32/100 PY). Rivaroxaban patients had lower risk for stroke overall (hazard ratio [HR], 0.82; 95% confidence interval [CI], 0.76-0.88) and for minor (NIHSS 1 to <5; HR, 0.83; 95% CI, 0.74-0.93), moderate (NIHSS 5 to <16; HR, 0.88; 95% CI, 0.78-0.99), and severe stroke (NIHSS 16 to 42; HR, 0.44; 95% CI, 0.22-0.91). **Conclusions:** The results of this study in a larger population of NVAF patients align with previous real-world findings and the ROCKET-AF trial by showing improved stroke prevention with rivaroxaban versus warfarin across all stroke severities.]

Management of Acute Ischaemic Stroke

[An update on hyper-acute management of ischaemic stroke.](#)

Bhalla A., Patel M., and Birns J.

Clinical Medicine, vol. 21 (3) pp. 215-221

May 2021

[This article aims to provide a comprehensive overview of key advances on various aspects of hyper-acute management of acute ischaemic stroke. These include neuroimaging, acute stroke unit care, management of blood pressure, reperfusion therapy including intravenous thrombolysis, mechanical thrombectomy and decompressive hemicraniectomy for malignant stroke syndrome. The challenge ahead is to ensure these evidence-based treatments are now being delivered and implemented to maximise the benefits across the population.]

[Impact of Early Blood Pressure Lowering in Patients Presenting with Acute Ischemic Stroke.](#)

Maud A., Rodriguez G.J., Vellipuram A., Sheriff F., Ghatali M., Gupta V., Khatri R., and Cruz-Flores S.

Current Cardiology Reports, vol. 23 (6) p. 63

May 2021

[Purpose of review: In this review article we will discuss the acute hypertensive response in the context of acute ischemic stroke and present the latest evidence-based concepts of the significance and management of the hemodynamic response in acute ischemic stroke. **Recent findings:** Acute hypertensive response is considered a common hemodynamic physiologic response in the early setting of an acute ischemic stroke. The significance of the acute hypertensive response is not entirely well understood. However, in certain types of acute ischemic strokes, the systemic elevation of the blood pressure helps to maintain the collateral blood flow in the penumbral ischemic tissue. The magnitude of the elevation of the systemic blood pressure that contributes to the maintenance of the collateral flow is not well established. The overcorrection of this physiologic hemodynamic response before an effective vessel recanalization takes place can carry a negative impact in the final clinical outcome. The significance of the persistence of the acute hypertensive response after an effective vessel recanalization is poorly understood, and it may negatively affect the final outcome due to reperfusion injury. Acute hypertensive response is considered a common hemodynamic reaction of the cardiovascular system in the context of an acute ischemic stroke. The reaction is particularly common in acute brain embolic occlusion of large intracranial vessels. Its early management before, during, and immediately after arterial reperfusion has a repercussion in the final fate of the ischemic tissue and the clinical outcome.]

Neuroscience & Neuroimaging

[The Utility of Brain Magnetic Resonance Imaging/Angiography and Neck Magnetic Resonance Angiography in Patients with Suspected Acute Stroke](#)

Harris M., Finger A., Nishimura E., Watabe B., and Yoon H.-C.

The Permanente Journal, vol. 25

May 2021

[Background: In our health maintenance organization, we have seen a trend among our referring physicians to order simultaneous brain magnetic resonance imaging (MRI), head magnetic resonance angiography (MRA), and neck MRA in the evaluation of patients for acute stroke. However, there are little data to demonstrate any improvement in patient care resulting from ordering this triple study. The objective of this study was to analyze the utility of the triple MRI/MRA study for patients who experience stroke-like symptoms. **Method(s):** We reviewed all triple-study cases between January 1, 2013 and December 31, 2016. We recorded whether or not an acute stroke occurred, the presence or absence of a major stenosis in the intracranial and/or neck arteries, subsequent percutaneous endovascular or open surgical intervention within 90 days, and any follow-up computed tomography angiography or carotid ultrasound studies within 30 days. **Result(s):** During the studied period, 591 triple studies were ordered, and 162 patients (27.4%) were found to have moderate or severe stenosis. Of the patients who had an acute stroke, 100 (48.3%) also had a major stenosis. Of 591 patients, only 15 (2.5%) underwent percutaneous endovascular or open surgical intervention within 90 days. Of these, 4 patients had an intervention in less than a week; in all of the cases, the triple study did not need to be ordered simultaneously to achieve the same clinical outcome. **Conclusion(s):** Brain MRI, head MRA, and neck MRA studies should not be ordered simultaneously as a generalized response to patients presenting with acute stroke-like symptoms.]

Prediction of Stroke Outcome

[Modeling and Simulation to Predict the Degree of Disability over Time in Acute Ischemic Stroke Patients](#)

Park S.-I., Lim H.-S. and Kang D.-W.

Clinical and Translational Science, Early View

May 2021

[Disability in acute stroke patients varies over time, with the prediction of outcomes being critical for proper management. This study aimed to develop a model to predict the cumulative probability of each modified Rankin Scale (mRS) score over time with inclusion of significant covariates. Longitudinal data obtained from 193 patients, 1-24 months after onset of acute ischemic stroke, were included for a modeling analysis using NONMEM. After selecting a model that best described the time course of the probability of different mRS scores, potential covariates were tested. Visual predicted check plots, parameter estimates, and decreases in minimum objective function values were used for model evaluation. The inclusion of disease progression (DP) in the baseline proportional odds cumulative logit model significantly improved the model compared to the baseline model without DP. An inhibitory maximum effect (Emax) model was determined to be the best DP model for describing the probability of specific mRS scores over time. In the final model, DP was multiplied with the baseline cumulative logit probability with a baseline adjustment. In addition to differences in lesion volume (DLV), the final model included comorbid diabetes mellitus (DM) and baseline National Institutes of Health Stroke Scale (NIHSS) scores on Emax as statistically significant covariates. This study developed a model including DLV, NIHSS score, and comorbid DM for predicting the disability time course in acute ischemic stroke patients. This model may help to predict disease outcomes and to develop more appropriate management plans for acute stroke patients.]

[Random forest-based prediction of stroke outcome](#)

Fernandez-Lozano C., Hervella P., Sobrino T., Campos F., Castillo J., Mato-Abad V., Suarez-Garaboa S. et al
Scientific Reports, vol. 11 (1)

May 2021

[We research into the clinical, biochemical and neuroimaging factors associated with the outcome of stroke patients to generate a predictive model using machine learning techniques for prediction of mortality and morbidity 3-months after admission. The dataset consisted of patients with ischemic stroke (IS) and non-traumatic intracerebral hemorrhage (ICH) admitted to Stroke Unit of a European Tertiary Hospital prospectively registered. We identified the main variables for machine learning Random Forest (RF), generating a predictive model that can estimate patient mortality/morbidity according to the following groups: (1) IS+ICH, (2) IS, and (3) ICH. A total of 6022 patients were included: 4922 (mean age 71.9+/-13.8 years) with IS and 1100 (mean age 73.3+/-13.1 years) with ICH. NIHSS at 24, 48 h and axillary temperature at admission were the most important variables to consider for evolution of patients at 3-months. IS+ICH group was the most stable for mortality prediction [0.904+/-0.025 of area under the receiver operating characteristics curve (AUC)]. IS group presented similar results, although variability between experiments was slightly higher (0.909+/-0.032 of AUC). ICH group was the one in which RF had more problems to make adequate predictions (0.9837 vs. 0.7104 of AUC). There were no major differences between IS and IS+ICH groups according to morbidity prediction (0.738 and 0.755 of AUC) but, after checking normality with a Shapiro Wilk test with the null hypothesis that the data follow a normal distribution, it was rejected with $W=0.93546$ ($p\text{-value}<2.2e-16$). Conditions required for a parametric test do not hold, and we performed a paired Wilcoxon Test assuming the null hypothesis that all the groups have the same performance. The null hypothesis was rejected with a value $<2.2e-16$, so there are statistical differences between IS and ICH groups. In conclusion, machine learning algorithms RF can be effectively used in stroke patients for long-term outcome prediction of mortality and morbidity.]

Rehabilitation

[A Design Method of Tele-Rehabilitation Platforms for Post-Stroke Patients Based on Consumer Technology.](#)

Arrigoni A., Cumetti M., Greco A., Soliveri L., Vitali A.

Studies in Health Technology and Informatics, vol.279 pp. 46-53

May 2021

[Background: Telerehabilitation represents a new cutting-edge method in the treatment of patients suffering from motor and cognitive disorders caused by stroke. Even if there exist dedicated devices able to track patients' movements to evaluate the performed rehabilitation exercises, they require specific settings necessary for a correct and simple use at the patient's home. If we consider the recent pandemic situation and the lockdown condition, which made difficult the access to these products, post stroke patients may be not able to perform home rehabilitation. **Objectives:** the goal of this work is the design of a specific method to develop a tele-rehabilitation platform for post-stroke patients using consumer technologies without involving ad-hoc devices. **Method:** Open-source tools have been investigated for speeding up the development starting with the medical knowledge. **Results:** a group of four healthcare technologies engineering students with no specific skills about computer science has developed a platform in four months using the design method. **Conclusion:** the presented method allowed the development of a clinical knowledge-based web platform for post-stroke patients totally based on consumer technology.]

[Combining robotics with enhanced serotonin-driven cortical plasticity improves post-stroke motor recovery](#)

Conti S., Pasquini M., Lai S., Spalletti C., Giordano N., Mainardi M., Barsotti N., Giorgi A., Pasqualetti M. et al

Progress in Neurobiology, In Press, Corrected Proof

May 2021

[Despite recent progresses in robotic rehabilitation technologies, their efficacy for post-stroke motor recovery is still limited. Such limitations might stem from the insufficient enhancement of plasticity mechanisms, crucial for functional recovery. Here, we designed a clinically relevant strategy that combines robotic rehabilitation with chemogenetic stimulation of serotonin release to boost plasticity. These two approaches acted synergistically to enhance post-stroke motor performance. Indeed, mice treated with our combined therapy showed substantial functional gains that persisted beyond the treatment period and generalized to non-trained tasks. Motor recovery was associated with a reduction in electrophysiological and neuroanatomical markers of GABAergic neurotransmission, suggesting disinhibition in perilesional areas. To unveil the translational potentialities of our approach, we specifically targeted the serotonin 1A receptor by delivering Buspirone, a clinically approved drug, in stroke mice undergoing robotic rehabilitation. Administration of Buspirone restored motor impairments similarly to what observed with chemogenetic stimulation, showing the immediate translational potential of this combined approach to significantly improve motor recovery after stroke.]

[Effect of post-stroke spasticity on voluntary movement of the upper limb](#)

Lackritz H., Parmet Y., Berman S., Frenkel-Toledo S., Soroker N., Banina M.C., Levin M.F., Solomon J.M. et al

Journal of NeuroEngineering and Rehabilitation, vol. 18 (1)

May 2021

[Background: Hemiparesis following stroke is often accompanied by spasticity. Spasticity is one factor among the multiple components of the upper motor neuron syndrome that contributes to movement impairment. However, the specific contribution of spasticity is difficult to isolate and quantify. We propose a new method of quantification and evaluation of the impact of spasticity on the quality of movement following stroke. Method(s): Spasticity was assessed using the Tonic Stretch Reflex Threshold (TSRT). TSRT was analyzed in relation to stochastic models of motion to quantify the deviation of the hemiparetic upper limb motion from the normal motion patterns during a reaching task. Specifically, we assessed the impact of spasticity in the elbow flexors on reaching motion patterns using two distinct measures of the 'distance' between pathological and normal movement, (a) the bidirectional Kullback-Liebler divergence (BKLD) and (b) Hellinger's distance (HD). These measures differ in their sensitivity to different confounding variables. Motor impairment was assessed clinically by the Fugl-Meyer assessment scale for the upper extremity (FMA-UE). Forty-two first-event stroke patients in the subacute phase and 13 healthy controls of similar age participated in the study. Elbow motion was analyzed in the context of repeated reach-to-grasp movements towards four differently located targets. Log-BKLD and HD along with movement time, final elbow extension angle, mean elbow velocity, peak elbow velocity, and the number of velocity peaks of the elbow motion were computed. Result(s): Upper limb kinematics in patients with lower FMA-UE scores (greater impairment)

showed greater deviation from normality when the distance between impaired and normal elbow motion was analyzed either with the BKLD or HD measures. The severity of spasticity, reflected by the TSRT, was related to the distance between impaired and normal elbow motion analyzed with either distance measure. Mean elbow velocity differed between targets, however HD was not sensitive to target location. This may point at effects of spasticity on motion quality that go beyond effects on velocity. Conclusion(s): The two methods for analyzing pathological movement post-stroke provide new options for studying the relationship between spasticity and movement quality under different spatiotemporal constraints.]

[Non-pharmacological intervention for rehabilitation of post-stroke spasticity: A protocol for systematic review and network meta-analysis.](#)

Hu G., Zhang H., Wang Y., and Cong D.

Medicine, vol. 100 (18)

May 2021

[Background: Post-stroke spasticity (PSS) is a major worldwide health problem, and timely and effective rehabilitation is associated with the risk of diabetes development; there are a variety of non-pharmacological interventions applied to the rehabilitation of PSS in these treatments; however, the relative efficacy and safety of different therapies remain uncertain, and we will conduct a systematic review and network meta-analysis to evaluate different non-pharmacological interventions. The relative efficacy and safety of intervention in PSS rehabilitation, thus providing evidence to support the optimization of the PSS rehabilitation program. **Methods:** We searched the following databases electronically, including four English literature databases (i.e., PubMed, Medline, Embase, and Cochrane Library) and two Chinese literature databases (i.e., China National Knowledge Infrastructure and VIP). We will also search for randomized controlled trials on non-pharmacological interventions for post-stroke spasticity, and the search time limit is from its establishment to May 2020. Two reviewers working independently will screen the titles, abstracts, and full papers. Data extraction will be completed by two independent authors. The primary outcome was the motor function. The secondary outcome was the assessment of daily living ability. We will use RevMan V.5.3 software to compute the data synthesis carefully when a meta-analysis is allowed. We will conduct Bayesian network meta-analysis using the Markov Chain Monte Carlo random effects model in Aggregate Data Drug Information System version 1.16.8 (Drugis, Groningen, NL). **Results:** This study provides a high-quality synthesis to assess the effectiveness and safety of non-pharmacological interventions for patients with PSS. **Conclusion:** The results of this study will provide evidence to judge whether non-pharmacological interventions are effective interventions for patients with post-stroke spasticity. **Ethics and dissemination:** The results of this meta-analysis and meta-regression will be disseminated through publication in a peer-reviewed journal and presented at a relevant conference. The data used in the network meta-analysis did not contain individual patient data. Therefore, ethical approval was not required.]

Risk of Stroke

[Christmas, acute ischemic stroke and stroke-related mortality in Hungary](#)

Folyovich A., Al-Muhanna N., Jarecsny T., Dudas E., Janoska D., Beres-Molnar A.K., Matis R., Palosi M., and Toldi G.

Brain and Behavior, vol. 11 (5)

May 2021

[Objectives: Risk factors for stroke include psychological effects, such as depression. Festive occasions (such as Christmas in Hungary) may carry a significant emotional impact and may therefore contribute to increased cardiovascular risk. Thrombolytic treatment of acute ischemic stroke has a narrow time window and allows for the precise assessment of stroke incidence. **Material(s) and Method(s):** We analyzed anonymized national data of the number of thrombolytic treatments for acute ischemic stroke and the number of stroke-related deaths between 1 January 2007 and 31 December 2016 in Hungary within 2-day, 5-day, and 1-month periods preceding and following 24 December each year. Analysis of subgroups based on age (below and over 65 years) and sex was also performed. **Result(s):** The number of thrombolytic treatments was higher in all three periods preceding Christmas compared to the corresponding period that follows the feast. This increase was particularly prominent in men below 65 years of age. While overall stroke-associated mortality was increased 1 month after Christmas, the death rate was higher a month before rather than after Christmas in men below 65 years of age and in women both below and over 65 years of age 5 days before Christmas. **Conclusion(s):** These findings may predominantly relate to emotional and psychological factors. In case of women, the anxiety secondary to festive preparations, while in men below 65 years, the increased psychological stress of providing financial security for the celebration may play an important role.]

Thrombectomy/Endovascular treatment

[Adaptive Approach to Endovascular Management of Large Vessel Occlusion During the COVID-19 Pandemic.](#)

Tabibian B.E., Howell S.G., Salehani A., Bakradze E., and Harrigan, M.

Journal of Stroke and Cerebrovascular Diseases, vol. 30(5)

May 2021

[Introduction: The COVID-19 pandemic has resulted in unprecedented strain on the health care system. An adaptive strategy for the handling of thrombectomy for patients with large vessel occlusion has evolved at our center to optimize patient care while also minimizing risk of virus transmission. The purpose of this study was to evaluate the effects of the new thrombectomy protocol by comparing thrombectomy times and patient outcomes during the pandemic and pre pandemic period. **Methods:** A retrospective cohort study was conducted on patients who underwent emergent thrombectomy from April 4th, 2020 to August 25th, 2020 (pandemic period) and between December 2nd, 2019 to April 3rd, 2020 (pre-pandemic period). The new protocol centered on a standardized approach to airway management in patients considered 'high-risk' for infection. An array of patient-specific factors and outcomes were compared between the two groups. **Results:** A total of 126 patients were included in the study. There was no significant difference in door-to-recanalization or other time parameters between the two groups (138 minutes during the pandemic vs. 129 minutes pre-pandemic; $p=0.37$). However, outcomes measured as discharge modified Rankin Scale (mRS) were worse for patients during the pandemic (mRS ≤ 2 , 10/58; 17.2% during pandemic vs. 24/68; 35.3% pre-pandemic, $p = 0.02$). No neurointerventional providers have been found to contract COVID-19. **Conclusion:** Our approach to mechanical thrombectomy during the COVID-19 era was associated with similar recanalization rates but worse clinical outcomes compared to pre pandemic period. Further studies are necessary to identify factors contributing to worse outcomes during this ongoing pandemic.]

[Analysis of frailty in geriatric patients as a prognostic factor in endovascular treated patients with large vessel occlusion strokes](#)

Schnieder M., Bahr M., Maier I., Liman J., Kirsch M., von Arnim C.A.F., Behme D., Riedel C.H., Psychogios M.-N. et al
Journal of Clinical Medicine, vol. 10 (10)

May 2021

[Frailty is associated with an increased risk of adverse health-care outcomes in elderly patients. The Hospital Frailty Risk Score (HFRS) has been developed and proven to be capable of identifying patients which are at high risk of adverse outcomes. We aimed to investigate whether frail patients also face adverse outcomes after experiencing an endovascular treated large vessel occlusion stroke (LVOS). In this retrospective observational cohort study, we analyzed patients ≥ 65 years that were admitted during 2015-2019 with LVOS and endovascular treatment. Primary outcomes were mortality and the modified Rankin Scale (mRS) after three months. Regression models were used to determine the impact of frailty. A total of 318 patients were included in the cohort. The median HFRS was 1.6 (IQR 4.8). A total of 238 (75.1%) patients fulfilled the criteria for a low-frailty risk with a HFRS < 5.72 (22.7%) for moderate-frailty risk with an HFRS from 5-15 and 7 (2.2%) patients for a high-frailty risk. Multivariate regression analyses revealed that the HFRS was associated with an increased mortality after 90 days (CI (95%) 1.001 to 1.236; OR 1.112) and a worse mRS (CI (95%) 1.004 to 1.270; OR 1.129). We identified frailty as an impact factor on functional outcome and mortality in patients undergoing thrombectomy in LVOS.]

[Histological evaluation of acute ischemic stroke thrombi may indicate the occurrence of vessel wall injury during mechanical thrombectomy](#)

Mereuta O.M., Abbasi M., Fitzgerald S., Dai D., Kadirvel R., Arturo Larco, J.L., Savastano L., Cloft H.J. et al
Journal of Neurointerventional Surgery, Online First

May 2021

[Background: Several animal studies have demonstrated that mechanical thrombectomy (MT) for acute ischemic stroke (AIS) may cause vessel wall injury (VWI). However, the histological changes in human cerebral arteries following MT are difficult to determine. **Objective(s):** To investigate the occurrence of VWI during MT by histological and immunohistochemical evaluation of AIS clots. **Method(s):** As part of the multicenter STRIP registry, 277 clots from 237 patients were analyzed using Martius Scarlett Blue stain and immunohistochemistry for CD34 (endothelial cells) and smooth muscle actin (smooth muscle cells). **Result(s):** MT devices used were aspiration catheters (100 cases), stentriever (101 cases), and both (36 cases). VWI was found in 33/277 clots (12%). There was no significant correlation between VWI and MT device. The degree of damage varied from grade I (mild intimal damage, 24 clots), to grade II (relevant intimal and subintimal damage, 3 clots), and III (severe injury, 6 clots). VWI clots contained

significantly more erythrocytes ($p=0.006^*$) and less platelets/other ($p=0.005^*$) than non-VWI clots suggesting soft thrombus material. Thrombolysis correlated with a lower rate of VWI ($p=0.04^*$). VWI cases showed a significantly higher number of passes (2 [1-4] vs 1 [1-3], $p=0.028^*$) and poorer recanalization outcome ($p=0.01^*$) than cases without VWI. **Conclusion(s):** Histological markers of VWI were present in 12% of AIS thrombi, suggesting that VWI might be related to MT. VWI was associated with soft thrombus consistency, higher number of passes and poorer revascularization outcome. There was no significant correlation between VWI and MT device.]

[Mortality after large artery occlusion acute ischemic stroke](#)

Karamchandani R.R., Rhoten J.B., Strong D., Chang B. and Asimos A.W.

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[Despite randomized trials showing a functional outcome benefit in favor of endovascular therapy (EVT), large artery occlusion acute ischemic stroke is associated with high mortality. We performed a retrospective analysis from a prospectively collected code stroke registry and included patients presenting between November 2016 and April 2019 with internal carotid artery and/or proximal middle cerebral artery occlusions. Ninety-day mortality status from registry follow-up was corroborated with the Social Security Death Index. A multivariable logistic regression model was fitted to determine demographic and clinical characteristics associated with 90-day mortality. Among 764 patients, mortality rate was 26%. Increasing age (per 10 years, OR 1.48, 95% CI 1.25-1.76; $p<0.0001$), higher presenting NIHSS (per 1 point, OR 1.05, 95% CI 1.01-1.09, $p=0.01$), and higher discharge modified Rankin Score (per 1 point, OR 4.27, 95% CI 3.25-5.59, $p<0.0001$) were independently associated with higher odds of mortality. Good revascularization therapy, compared to no EVT, was independently associated with a survival benefit (OR 0.61, 95% CI 0.35-1.00, $p=0.048$). We identified factors independently associated with mortality in a highly lethal form of stroke which can be used in clinical decision-making, prognostication, and in planning future studies.]

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