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ABSTRACT BOOK

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Estonian Ludvig Puusepp Society
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INVITED SPEAKERS' ABSTRACTS

New Strategies for Lipid-Lowering Therapies in Secondary Stroke Prevention

Jori Ruuskanen

Statin treatment, initiated early after ischemic stroke (IS) and maintained at high intensity, offers significant benefits for IS survivors across all etiologies. Guidelines emphasize intensive LDL-cholesterol lowering - targeting <1.4 mmol/l in high-risk individuals. When statin monotherapy fails, ezetimibe is recommended as an add-on, and PCSK9 inhibitors (alirocumab, evolocumab) can be used for further LDL reduction.

While robust evidence in IS exists only for statins, with limited support for ezetimibe, novel agents are expanding therapeutic possibilities. Bempedoic acid, an oral ATP citrate lyase inhibitor, lowers LDL by ~20% and is suitable for statin-intolerant patients due to minimal muscle-related side effects. Inclisiran, a small interfering RNA targeting PCSK9 synthesis, offers ~50% LDL reduction with biannual dosing and is undergoing outcome trials. Additionally, drugs like pelacarsen and olpasiran, which reduce lipoprotein(a), and volanesorsen and evinacumab, which target triglyceride metabolism, are in development and may benefit patients with residual risk.

Emerging strategies aim to personalize IS secondary prevention by integrating pharmacogenetic testing to identify the most effective and well-tolerated statin for each patient. In parallel, therapies are increasingly focused on targeting a broader spectrum of atherogenic lipoproteins beyond LDL cholesterol. These approaches hold particular promise for patients with high-risk lipid profiles or statin intolerance. However, robust real-world studies in IS populations are urgently needed to validate their clinical benefit. Persistent challenges — including adherence and sex-based differences in treatment, as well as discontinuation due to actual or perceived adverse effects - remain relevant, even with newer therapies.

Intracranial Vessel-Wall Imaging MRI: New Insights in Stroke Etiology?

Juhan Reimand

Background and aims: Conventional radiological examinations are used to visualize the vessel lumen, but they lack the capability to characterize changes within vessel walls. Intracranial MRI vessel wall imaging (VWI) provides detailed visualization of the pathological changes within the arterial wall, allowing to differentiate between various pathologies. The aim of this presentation is to discuss the strengths and limitations of VWI and outline the possible role of VWI in stroke evaluation.

Methods: This presentation integrates findings from recent studies and clinical cases to illustrate the application of VWI in stroke diagnostics. Key technical considerations, including imaging protocols and pitfalls are discussed.

Results: VWI changes, such as vessel wall thickening and enhancement, enable the differentiation of various stroke etiologies including intracranial atherosclerosis, dissection, vasculitis, moyamoya syndrome. VWI also presents challenges due to the technical difficulty of imaging small structures and potential variability in interpretation.

Discussion: VWI contributes to a more nuanced understanding of stroke etiology by directly assessing vessel wall pathology. Although standardized diagnostic criteria are not yet established, VWI may be particularly useful in patients with cryptogenic stroke, especially when lumen stenosis is observed on luminal imaging.

Cardiovascular Risk Reduction in Heart Disease and Stroke: Challenges in Multimorbidity and Cardiovascular Prevention

Aleksandra Ekkert

Cardiovascular factors pose a huge risk of stroke. Especial challenges in stroke prevention occur when the person has multiple risk factors, making the prognosis even worse and treatment options more limited due to drug interaction and polypharmacy side effects. In this talk, I share my view on practical management of a typical patient with multiple vascular risk factors: how to manage these complicated cases, and how to prevent the occurrence of multiple vascular risk factors, when possible.

SHORT COMMUNICATIONS ABSTRACTS

Symptoms and Referral Patterns of Patients with a Missed Acute Ischemic Stroke: A Danish Multicentre Cohort Study

Line Bilgrav Nisgaard[1], Rolf Ankerlund Blauenfeldt[2], Niels Hjort[2], Marianne Lisby[1]

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[2] Department of Neurology, Aarhus University Hospital, Denmark

Background and aims: Identifying acute ischemic stroke (AIS) in patients with non-specific symptoms can complicate referrals, often leading to admission at non-stroke departments. This study aims to describe the symptom characteristics and outcomes of AIS patients initially admitted to emergency departments (ED) compared to patients admitted directly to a stroke centre (SC) in Denmark.

Methods: This retrospective cohort study was based on data from a regional stroke database and electronic medical records. The study population consisted of AIS patients admitted to EDs or a SC. Department referral patterns were analysed in relation to baseline clinical features using descriptive and comparative statistics.

Results: From April 2020 to January 2022, a total of 3204 patients were diagnosed with AIS, of whom 19.1% were initially referred to an ED and 80.9% were directed to a SC. A cohort of 435 patients (n = 235 ED, n = 200 SC) was selected for an in-depth review and analysis of their electronic medical records. Non-specific stroke symptoms, such as dizziness, headache, nausea and vomiting, were more common in the ED group, while the SC group exhibited a higher prevalence of focal neurological deficits. Patients referred to the ED experienced longer system delay times (30.6 hours vs. 3.9 hours) and a lower rate of reperfusion therapy (8.1% vs. 39.5%).

Conclusion: AIS patients referred to the ED more frequently exhibited non-specific stroke symptoms, experienced prolonged delays and had lower reperfusion rates compared to those directly referred to a SC.

Ischaemic Stroke and Subtype Diagnoses Clinical Validation in the Estonian Biobank

Sven Laur[1], Karl Jõgi[1], Kristiina Rannikmäe[2], Amy Ferguson[2], Cathie Sudlow[2], Jaak Vilo[1], Riina Vibo[1], Janika Kõrv[1], Lili Milani[1]

[1] University of Tartu
[2] University of Edinburgh

Background and aims: The Estonian Biobank (EstBB) comprises >200,000 volunteer Estonian adults with extensive phenotype and genotype data, linked to electronic health records (EHR). These linkages enable stroke case identification using ICD-10 coded health data. We evaluated the accuracy of coded data in identifying ischaemic stroke and its subtypes.

Methods: We identified all 1283 participants from the EstBB dataset with ≥1 ischeamic stroke code (I63) as primary diagnosis on their EHRs. We developed a segmentation algorithm that categorises individual stroke codes into distinct stroke episodes, and randomly selected 300 episodes for validation, including recurrences. We mapped ischaemic stroke subtype codes to TOAST subtypes: I63.4 cardioembolism (CE); I63.5 small vessel disease (SVD) and I63.3 / I63.0 large-artery atherosclerosis (LVD). Two neurologists reviewed EHRs for each episode and established reference diagnoses for 277 episodes (23 episodes were excluded due to incomplete medical records relating to the specific episode). We calculated the positive predictive value (PPV) for all ischaemic stroke codes and subtypes.

Results: PPV for any stroke was 87% (95% CI: 82% — 91%) and for ischaemic stroke 79 % (95% CI: 74% — 84%). Codes mapped to TOAST subtypes had low PPVs, ranging from 7% (LVD) to 62% (CE), with wide confidence intervals. However, a cardioembolic source was confirmed by a neurologist in 84% of cases with a CE subtype code.

Discussion: Linked coded data reliably identifies ischaemic stroke cases in EstBB with sufficient accuracy for many research studies. From TOAST subtypes only a cardioembolic source has good enough accuracy.

Peripheral Blood Transcriptome Profiling of Young Adults with Acute Cryptogenic Stroke

Teele Tuularu[1], Riina Vibo[2], Martin Pook[3], Ana Rebane[3], Janika Kõrv[4]

[1] University of Tartu
[2] University of Tartu, Department of Neurology and Neurosurgery, Tartu, Estonia
[3] University of Tartu, Department of Biomedicine RNA Biology Research Group, Tartu, Estonia

Background and aims: Stroke in young adults often remains cryptogenic despite thorough diagnostic work-up. Our aim was to identify differentially expressed genes and biological pathways active in the acute phase of cryptogenic stroke using RNA sequencing from peripheral blood.

Methods: Patients aged 18—54 with cryptogenic stroke (n=48), included in the Estonian Young Stroke Registry, had blood samples collected within 72 hours of stroke onset and at 1-year follow-up. After quality control, 41 patients were included for RNA analysis (median age 46 years, IQR 13; 66% male; median NIHSS score 3, IQR 4). RNA sequencing was performed by Novogene; differential gene expression analysis with DESeq2, adjusted p-value <0.05 (NovoMagic by Novogene). Pathway analysis was based on full gene lists of up- or downregulated genes (STRING, Reactome).

Results: Compared to 1 year post-stroke, 286 genes were up- and 223 downregulated in the acute phase. Upregulated genes formed a dense network enriched for innate immune activation, including toll-like receptor signaling and leukocyte recruitment. Examples included TLR2, CXCL10, S100A9, and CD36, reflecting a robust inflammatory response. Downregulated genes were related to transcriptional regulation, RNA processing, and cell cycle control. Among those genes were CRY1, MCM8, XPO1, and KIF3A, suggesting suppressed cellular maintenance during the acute phase.

Conclusions: The acute phase of cryptogenic stroke is characterized by innate immune activation and concurrent downregulation of proliferation- and maintenance-related processes. These findings provide molecular insight into cryptogenic stroke pathophysiology in young adults.

Differences in the Serum Metabolite Levels of Large Artery Atherosclerosis and Cryptogenic Stroke Subtypes of Ischemic Stroke in Young Adults

Liisa Kõrv[1,2], Riina Vibo[1], Kalle Kilk[1], Mihkel Zilmer[1], Janika Kõrv[1]

[1] University of Tartu
[2] North Estonia Medical Centre

Background and aims: The aim of the study was to find differences in the serum metabolite levels between ischemic stroke (AIS) patients with large artery atherosclerosis (LAA) and cryptogenic stroke subtypes.

Methods: We conducted targeted metabolic profiling of serum samples of patients from the Estonian Young Stroke Registry collected within 72 hours from stroke onset and at three months. Analysis was performed using mass-spectrometry and the BIOCRATES MxP® Quant 500 XL kit. Statistical analysis was conducted using linear mixed model for repeated measures adjusting for age, sex, smoking status, hsCRP, creatinine and stroke severity. Strokes were classified using the Causative Classification System for Ischemic Stroke.

Results: We included 51 subjects (38%) with LAA and 85 (63%) with cryptogenic stroke. LAA patients were older (mean age 48 years, SD=5) than those with cryptogenic stroke (43 years, SD=8) ($p<0.001$); 25% in LAA and 38% in cryptogenic subtypes were female. The serum concentrations of 140 metabolites were different ($p<0.05$) between sampling times independently of stroke subtype; 26 metabolites differentiated between stoke subtypes independently of sampling time and 44 differentiated the stroke subtypes time dependently. Notable differences were seen regarding acylcarnitines, amino acids (most significantly tryptophan ($p=0.009$) and tyrosine ($p=0.008$)), hexylceramides, sphingomyelins, and phospholipids. Also, hexose levels significantly differed ($p=0.04$) between the subtypes.

Discussion: Our study shows significant differences in the levels of metabolites in several subclasses between LAA and cryptogenic subtypes of AIS. Further in-depth analysis is ongoing.

No Associations BetweenEnvironmental Wxposures and Stroke Severity in a Low Pollution Area: A Register-Based Study in Sweden

Tamar Abzhandadze[1,2], Peter Molnar[3], Adam Viktorisson[1,4], Mikael Ögren[3], Katharina S Sunnerhagen[1,4], Leo Stockfelt[3,5], Annie Palstam[1,4,6*]

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[6] School of Health and Welfare, Dalarna University, Falun, Sweden

Background and aims: Mounting evidence supports associations between both air pollution and noise exposure and cardiovascular events; however, the relationships at low exposure levels and for stroke severity or stroke type remain uncertain. The aim was to investigate associations between environmental exposures over 1-year and 10-year periods and stroke severity and stroke type in a low-pollution area of Sweden.

Methods: This registry-based cohort study included stroke patients admitted to Sahlgrenska University Hospital (2014-2019). Stroke severity (NIHSS) and stroke type were assessed. Environmental exposures (road traffic noise [LAeq,24h], PM10, and NOx) were assigned using high-resolution dispersion models for 1- and 10-year periods. Binary logistic regression was used.

Results: The mean age of the 4,066 included patients was 74 years. A total of 1,563 patients had moderate to severe stroke, and 3,603 patients had ischemic stroke. There was no significant difference in LAeq,24h, NOx, or PM10 between patients with mild and moderate to severe stroke at admission. Similarly, there was no significant difference between LAeq,24h, NOx, PM10, and the occurrence of ischemic stroke. We did not find any associations between environmental exposures and the odds of having moderate/severe stroke (vs. mild stroke) and odds of ischemic stroke (vs. hemorrhagic stroke). This trend remained in analysis of exposure for 10 years preceding stroke.

Discussion: No significant associations were found between environmental exposures and stroke severity or type. Low exposure levels and variance may explain the findings. Further research with broader exposure ranges is needed.

Trends in Patient Admission for Mechanical Thrombectomy and Outcomes from 2017 to 2023: A Single-Centre Cohort Study

Stefan Elgaard Andersen BSc[1], Nicolaj Grønbæk Laugesen MD[1], Joan Lilja Sunnleyg Højgaard MD[1], Trine Stavngaard MD Ph.D[2], Andreas Hjelm Brandt MD PhD[2], Thomas Truelsen Ph.D, DMSc[1,3]

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[3] University of Copenhagen, Faculty of Health and Medical Sciences, Denmark

Background and aims: Results from randomized clinical trials have expanded eligibility criteria for mechanical thrombectomy (MT) in patients with large vessel occlusion. In combination with possible changes in clinical practice, real life data are needed to evaluate trends in clinical practice, safety, and clinical outcome.

Methods: We conducted an observational, retrospective cohort study including N=2,020 patients treated with MT between 2017 and 2023 at a single tertiary stroke centre covering a catchment area of half the population of Denmark (2.6 M). We analysed changes in baseline characteristics, treatment details, 3-month functional outcomes (modified Rankin Scale, mRS), and 1-year survival using trend analysis (Jonckheere-Terpstra and Cochrane-Armitage statistics).

Results: The annual number of MT-patients increased from N=190 (2017) to N=350 (2023). No significant differences in the population were observed for age 73 (IQR 63-80), sex (44.1% female) and median baseline NIHSS 16 (IQR 10-21). Pre-treatment with intravenous thrombolysis (IVT) decreased from 61-48% (P<0.01). While the median pre-stroke mRS remained stable, the proportion of patients with pre-stroke mRS=0 decreased from 79- 53% (P<0.001). The rate of successful reperfusion (mTICI 2b—3) increased from 80-89% (P<0.001), median NIHSS at 24 hours decreased from 8 (IQR 3-17) to 7 (IQR 2-15), p=0.003, though no difference was observed in the proportions of favourable outcome (mRS 0-2), 55-53%, p=0.46, and the 1-year survival, 74-77%, p=0.31.

Discussion: Despite changes in patient characteristics, expanded eligibility criteria, and fewer receiving IVT, 3-months outcome and 1-year survival remained stable.

Concomitant Infectious Diseases in Ischemic Stroke Patients in West Tallinn Central Hospital's Stroke Department

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Background: Concomitant infections are frequent in ischemic stroke patients and are linked to increased morbidity, longer hospital stays, and worse outcomes. This study assessed the incidence, types, management, and clinical impact of infections in ischemic stroke patients at West Tallinn Central Hospital's Stroke Department.

Methods: We retrospectively reviewed 115 ischemic stroke patients (58 females, 57 males) hospitalized during Q1 2025. Infections were categorized by clinical, laboratory, radiological, and microbiological findings, as well as treatments.

Results: Infections occurred in 39 patients (33.9%), with urinary tract infections (UTIs, n=15) being most common, followed by pneumonias (n=8) and combined pneumonia with UTI (n=3). Asymptomatic bacteriuria was noted in 6 patients, and 7 had infections of unknown origin. Causative agents were identified in 7 UTI cases (5 E. coli) and all 3 combined infections. Of all infections, 48.7% were present on admission, while 51.3% developed during hospital stay. Stroke severity and dysphagia were notable contributing factors. Antibiotics were given to 32 patients, most frequently amoxicillin-clavulanate, sulbactam combinations, TMP-SMX, and ciprofloxacin; one case required escalation to reserve therapy. Mean hospital stay was 5.6 days for infected patients versus 4.0 for non-infected, with 82,1% of infected patients being referred to nursing care departments.

Conclusion: Infections, particularly UTIs and pneumonias, are common in stroke patients and prolong hospitalization. Stroke severity and dysphagia increase infection risk. Early detection, targeted treatment, and preventive measures are key to improving outcomes.

The Rate of Hemorrhagic Complications is Not Increased in Patients Thrombolysed on Direct Anticoagulant treatment

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Background and aims: The aim of the study was to evaluate safety of intravenous thrombolysis (IVT) and mechanical thrombectomy in patients on prior intake of direct oral anticoagulants (DOACs) less than 48 hours.

Methods: This was a single centre study of all consecutive stroke patients who received IVT with or without mechanical thrombectomy (MT) from 2019 to 2024. Patients in the DOAC group had intake less than 48 hours versus those without anticoagulation (controls). Safety of IVT on DOACs was evaluated for any hemorrhage including symptomatic intracranial hemorrhage (sICH).

Results: 1328 patients (mean age 75,2 [SD11,7] max 99 min 21) were included. 177 (13,4%) (mean age 80,3 [SD8,9] max 97, min 47) were on DOACs treatment and 1151 (mean age 74,3, [SD12,0] max 99, min 21) were in the control group. Stroke mimics comprised 44 patients in the control group and in 4 patients on DOAC group, none of these patients had hemorrhagic complications. Any hemorrhage occurred 63/1151 (5,5%) in control and 5/177 (2,8%) in DOACs groups. sICH after IVT occurred in 35/ 1151 (3,0%) control group compared to 1/177 (0,56%) in the DOACs group. Hemorrhagic transformation without changes in neurological symptoms occurred 23/1151 (2,0%) in the control group compared to 2/177 (1,1%) in DOACs group. Mechanical thrombectomy was performed in 119/1151 (10,3%) in the control group and in 16/177 (9,0%) patients on DOACs. Hemorrhagic complications were present in 13/119 (10,9%) control group and none in DOAC group after thrombectomy.

Discussion: Prior DOAC therapy did not cause increased number of hemorrhagic complications after thrombolysis in ischaemic stroke.

Estonian Young Stroke Registry: Evaluation of Cognitive Function and Its Association with Risk Factors One Year after Ischemic Stroke

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Background and aims: Ischemic stroke in young patients can result in cognitive deficit, thereby impairing patients' daily activities. We aimed to investigate the association between pre-existing risk factors and cognitive function one year after stroke.

Methods: Patients aged 18-54, who were prospectively included in the Estonian Young Stroke Registry, were assessed using the Montreal Cognitive Assessment (MoCA) test at a one-year follow-up visit. MoCA test score ≤ 25 (maximum 30) indicates cognitive deficit. Statistical analysis were done using Welch's t-test, Chi-square test or Fisher's exact test, as appropriate.

Results: We included 123 patients (mean age 44 years, CI 95% [40.7, 44.9]), 62% male). Distribution of traditional individual risk factors between diagnostic groups (MoCA score ≥26 vs ≤ 25) was as follows: hypertension 66% vs 47% ($p = 0.047$), diabetes 17% vs 13% ($p = 0.50$), dyslipidemia 87% vs 57% ($p < 0.001$), smoking 61% vs 45% ($p = 0.16$), and cardiovascular disease 13% vs 9% ($p = 0.55$). Each additional risk factor was associated with a 1.5-fold increase in risk of cognitive decline one year post ischemic stroke (OR = 1.53, CI 95% [1.11, 2.14]).

Discussion: A higher number of pre-existing risk factors was associated with an increased likelihood of cognitive impairment one year after stroke.

FAST Heroes Iceland: Campaign Implementation and Public Awareness of Stroke Symptoms and Risk Factors

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Background and aims: Stroke is a serious public health issue requiring immediate action. Delayed recognition hinders emergency care, making public education crucial. The mnemonic FAST (Face, Arms, Speech, Time) highlights key symptoms and urgency. The FAST Heroes campaign educates children about stroke and encourages them to share this knowledge, raising awareness across generations. The aim of this study was to map the implementation of FAST Heroes in Iceland (2019—2025) and analyze national survey data on public stroke knowledge and response.

Methods: (1) Descriptive analysis of campaign materials and dissemination via social media and the FAST Heroes website, (2) A national survey was sent to 2,488 individuals, assessing recognition of FAST symptoms, stroke response self-efficacy, and knowledge of modifiable risk factors in August 2023.

Results: (1) Over 4,000 children participated in the campaign. Social media posts with motivational and entertaining content had the highest engagement. (2) Of 935 survey respondents (37.6% response rate), recognition of FAST symptoms was high: slurred speech (96.3%), facial drooping (95.4%), and arm weakness (74.3%). Nearly all knew the emergency number (98%). While 43% felt prepared to respond, only 8.8% were very confident. Just 20.3% identified high blood pressure as a modifiable risk factor.

Conclusion: FAST Heroes has effectively engaged children and increased symptom awareness. However, low public confidence and limited knowledge of risk factors highlight the need for continued education to support.

Recent Alcohol Consumption as a Trigger for Young-Onset Cryptogenic Ischemic Stroke — A Case-Crossover and Serial Blood Biomarker Study

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Background and aims: Although chronic heavy alcohol use is a risk factor for stroke, less is known on short-term triggering effects of recent alcohol consumption, especially in young adults. We investigated whether recent alcohol intake acts as a trigger for cryptogenic ischemic stroke (CIS) in young adults and

whether this association is modified by habitual alcohol use and cardiovascular risk profiles.

Methods: We conducted a case-crossover study within a multicenter, prospective, international study of young-onset CIS. Structured interviews assessed alcohol intake in the 24 hours preceding stroke and usual alcohol consumption over the past year. Conditional logistic regression was used to compare alcohol use in hazard and control periods. Coagulation markers were measured at baseline and 3 months post-stroke.

Results: Among 591 patients with CIS, alcohol consumption within 24 hours before stroke was associated with a significantly increased stroke risk (odds ratio 3.30; 95% confidence interval, 2.14—5.07). The association was strongest among patients with none-to-moderate habitual alcohol use and absent in heavy drinkers. A similar pattern was observed for patients without a history of binge drinking or those with fewer traditional risk factors. Coagulation marker analyses revealed elevated baseline levels of vWF, factor VIII, antithrombin III, and protein S among recent drinkers with none-to-moderate habitual use. These markers declined significantly over 3 months.

Discussion: Recent alcohol intake acts as a short-term trigger for CIS in young adults, particularly among those without habitual heavy drinking, promoting transient prothrombotic changes.

Time-Specific Association of von Willebrand Factor with Early-Onset Cryptogenic Ischemic Stroke

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Background and aims: Elevated von Willebrand Factor (vWF) activity levels are known to increase the risk for thrombosis, but the association with early-onset cryptogenic ischemic stroke (CIS) has gone little studied.

Methods: Multi-center study enrolling patients aged 18-49 with acute CIS and stroke-free controls. Blood samples were obtained at baseline and from patients also at 12 weeks. We used conditional logistic regression, analyzed plasma vWF activity in quartiles, and adjusted for age, comorbidities and lifestyle factors.

Results: A total of 500 patient-control pairs were analyzed. Patients had higher levels of vWF activity shortly after stroke (median 122.0%, IQR 96.0-165.0%) and at 12 weeks (105.0%, IQR 86-128%) compared to controls (100.5%, IQR 80.0-122.7%). During the acute phase, higher vWF activity levels as compared to control group were associated with CIS (Q4 vs Q1 OR, 4.86, 95% CI 2.84-8.29) independently of confounders, but no longer at 12 weeks (Q4 vs Q1 OR 1.53, 95% CI 0.94-2.52).

Discussion: Increased vWF activity was associated with early-onset CIS shortly after the stroke. However, at 12 weeks, the association weakened, suggesting temporal factors or acute phase thrombosis to interact with the levels of vWF.

Association Between Unhealthy Diet and Cryptogenic Ischemic Stroke in Young Adults: A Case-Control Study

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Background and aims: There is limited evidence on the association between unhealthy diet and cryptogenic ischemic stroke (CIS), particularly in young adults whose dietary habits may differ substantially from older stroke populations. This study aims to explore the relationship between dietary quality and early-onset CIS, with subgroup analyses stratified by sex.

Methods: We included patients aged 18—49 years with a first-ever cryptogenic ischemic stroke (CIS), along with sex- and age-matched stroke-free controls from 19 European centers. Participants' dietary habits were evaluated using a modified Mediterranean Diet Score, dichotomized at the median value of 24, with higher scores indicating a healthier diet. Conditional logistic regression was used to assess the association between dietary habits and CIS in two models: the first adjusted for age and level of education, and the second further adjusted for traditional vascular risk factors.

Results: Altogether, 543 patients (median age 41; 47.3% women) and 541 controls were included. Having an unhealthy diet was independently associated with CIS: adjusted odds ratio (aOR) 1.41; 95% confidence interval (CI) 1.05—1.90 when compared to controls. In sex-specific analysis, unhealthy dietary habits were independently associated with CIS in both women and men when adjusting for demographic factors. In fully adjusted sex-specific models, associations remained trend-like, suggesting a potential underlying relationship.

Discussion: Although these associations did not remain statistically significant in the fully adjusted model including vascular risk factors, we observed a consistent trend, suggesting that a true association cannot be excluded.

Long-Term Prognosis of Patients after Subarachnoid Hemorrhage During Pregnancy or Puerperium

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Background and aims: Subarachnoid hemorrhage in pregnancy or puerperium (pSAH) is a significant cause of maternal mortality and morbidity. The aim of this study is to provide knowledge of long-term outcomes after pSAH by studying the patients' survival, recovery, cardiovascular health and recurrence of subarachnoid hemorrhage.

Methods: In this retrospective nationwide, population-based cohort and nested case-control study with chart validation, we used national healthcare registers to identify women with pSAH who survived ≥1 year in Finland in 1987—2016. We matched patients with 3 pregnant, stroke-free controls. Follow-up data was collected until 2016-2022.

Results: During the study period, 50 patients with a median age of 32.0 (IQR 29.8-36.3) years survived and were followed for 7.9 years (IQR 2.3-17.2). A new aneurysm was found in 2 cases (4.0 %) and 3 patients (6.0%) suffered a rebleed. The future risk for major cardiovascular and cerebrovascular events was higher than in the control group (OR 7.9, 95% CI 2.0-32.0). The long-term mortality was 14.0%. At the end of follow-up, 78.0% of patients reached good functional recovery (mRS score of 0—2). However, 22% of patients had a vocational status of pensioner at the end of follow-up, compared to 6.7% in the control group (OR 4.6, 95% CI 1.8-11.8).

Discussion: Future studies are needed to dissect the causes for pSAH patients' high mortality, cardiovascular morbidity, and inferior vocational status to help clinicians with patient guidance and secondary treatment.

Long-Term Neurodevelopmental Outcome after Childhood Stroke

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Aim: The aim of this study was to assess long-term neurodevelopmental outcome in patients with different vascular types of childhood stroke.

Methods: Patients with childhood stroke were collected from the Estonian Pediatric Stroke database. Inclusion criteria were: (1) stroke type arterial ischemic stroke (AIS), hemorrhagic stroke (AHS) or cerebral venous sinus thrombosis (CVST) confirmed by CT or MRI; (2) age at diagnosis of stroke between 29 days to 18 years; (3) follow-up time at least two years after stroke; (4) age at the time of study participation up to 18 years 11 months. Outcome was assessed based on pediatric stroke outcome measure (PSOM, which includes sensorimotor, speech and behavioral/cognitive assessments) and epilepsy.

Results: The long-term outcome data was available for 41 patients with childhood stroke, median time of seven years after stroke. Majority (29/41, 71%) of the survivors of childhood stroke had a moderate to severe neurodevelopmental impairment and/or epilepsy. Sensorimotor deficit was present in 29/41 (71%) of the patients, 12/41 (29%) had speech problems and 21/41 (51%) had cognitive/behavioral problems. The outcome was equally poor for both the AIS and AHS subgroups, but children with AHS were more likely to suffer from epilepsy and had more often problems in the cognition/behavior PSOM subscale compared to children with AIS (77% and 38% respectively, odds ratio (OR)=5.6 95%, p=0.022).

Discussion: The long term outcome in children with childhood stroke was equally poor in all vascular subtypes and survivors of stroke had a moderate to severe deficit and/or epilepsy in 71% of the cases.

Adapting the Post-Stroke Checklist for Structured Stroke Follow-Up in Estonia

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Background: The Post-Stroke Checklist (PSC) is a brief, validated tool designed to identify common post-stroke problems and support structured follow-up care. This study aimed to culturally adapt the PSC for clinical use in Estonia.

Methods: A standardized five-step cross-cultural adaptation process was followed, including forward translation, synthesis, back-translation, expert committee review, and pilot testing. In the second phase, the translated PSC was implemented by experienced stroke nurses at Tartu University Hospital. Feedback was collected using a structured questionnaire and analyzed using both quantitative and qualitative methods. A Delphi-based expert panel finalized the adaptation.

Results: The initial Estonian version of the PSC was developed through professional translation and iterative expert review. Two stroke neurologists and five stroke nurses participated in phase two; one physician and four nurses took part in the panel discussion. Participants proposed linguistic improvements during testing to clarify item wording. After revisions, all respondents found the tool clear and understandable. Most participants (80%) reported that the PSC helped identify post-stroke problems, supported structured discussions, and aided in individualized care planning. However, 67% did not support it as a self-administered tool.

Discussion: The adaptation process confirmed the tool's feasibility and acceptability in Estonia. It facilitated meaningful dialogue between clinicians and patients. While professional guidance was deemed essential, the tool proved effective in routine care. Starting January 2025, it is used nationwide as part of the stroke care pathway.

Stroke Mortality and Rehabilitation Continuity in Estonia During 2011–2023

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Background and aims: In 2019, the Estonian post-stroke rehabilitation guidelines were published. However, the continuity of post-acute rehabilitation and mortality of post-stroke care in Estonia has not been researched. This study aims to analyse the continuity and intensity of post-stroke rehabilitation care, mortality, and their temporal trends from 2011 to 2023 in Estonia.

Methods: This population-based observational retrospective cohort study used data from the Estonian Health Insurance Fund. The study included patients aged 18 years and above with an index stroke diagnosis during 2011-2023.

Results: The study population consisted of 34,894 stroke patients with a median age of 75 (IQR 65—82). 86.7% had an ischemic stroke. 36.8% of the patients with two or more episodes of care received continuous rehabilitation during a 6-month follow-up. This proportion increased by 23.1 percentage points [95% CI: 20.9; 25.4] from 2011-2023. The overall mortality estimates for in-hospital, 1-month, and 1-year were 11.1%, 17.5% and 31.3%, with temporal analysis showing a decrease in mortality by 2.3, 3.9, and 4.9 percentage points, respectively, from 2011-2023.

Discussion: To our knowledge, this is the first study describing rehabilitation continuity and mortality in Estonian stroke patients. The majority of stroke patients received non-continuous rehabilitation; however, their proportion decreased over time. The decrease in the overall post-stroke mortality seen can be attributed to the immediate acute care phase.

Patient-Tailored Transcranial Direct Current Stimulation Versus Sham for Upper-Extremity Rehabilitation in Subacute Stroke Patients — A Feasibility and Pilot Randomised Clinical Trial

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Background and aims: Stroke is a leading cause of upper-extremity (UE) motor impairments worldwide. Transcranial direct current stimulation (TDCS) may enhance UE recovery, but response variability remains a challenge. This randomised, blinded feasibility and pilot clinical trial evaluated effects of patient-tailored TDCS versus sham on UE recovery in subacute stroke.

Methods: Patients with subacute ischaemic stroke and UE impairment were randomised to receive either anodal TDCS or sham stimulation, during UE rehabilitation three times weekly for four weeks. Electrode placement was patient-tailored and optimised using electric field modelling and targeted the ipsilesional primary motor hand area (M1-HAND). Primary outcome was Fugl-Meyer Assessment of UE (FMA-UE) score at end-of-intervention (EOT) and 12-weeks follow-up. Feasibility and exploratory clinical outcomes were also assessed.

Results: 24 participants were randomised into real (n=12, mean age 63 years) and sham (n=12, mean age 68 years). At EOT both groups had improved in FMA-UE, however, the improvement was significantly larger in the personalised TDCS group (mean difference 4.5 points, 95% confidence interval (CI) -5.34 to 14.31, p = .011). The differences diminished at 12-week follow-up. Median compliance was 95.8% and 100%, for real and sham groups, respectively, with no severe adverse events.

Discussion: Patient-tailored TDCS over the ipsilesional M1-HAND during UE rehabilitation was clinically feasible and may boost recovery of UE impairment in subacute stroke versus sham. The complex trial setup affected inclusion rate and variability in severity of UE impairment. However, this trial identified a possible framework for optimising protocols of patient-tailored TDCS for larger-scale stroke trials.

Clinicaltrials.gov identifier: NCT05355831

POSTER PRESENTATION ABSTRACTS

Alien Hand Syndrome in Acute Stroke

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Background and aim: Stroke presents frequently with negative symptoms. However, rarely involuntary movements may be the main manifestation of stroke that may be difficult to recognize. Alien hand syndrome is a rare symptom of stroke. Timely diagnosis of acute stroke with atypical symptoms is crucial for using thrombolysis in these patients. The aim of the case report is to present here a case with isolated alien hand syndrome caused by acute stroke

Methods and results: This is a case report of a the 68-year-old male with acute onset of involuntary movements in his left hand. The patient noticed that his left hand is playing with dog´s toys, takes cookies and he was unable to have any control of his hand.
Emergency magnet resonance tomography images (MRI) revealed small infarcts in the region of the right post central gyrus. Patient was given intravenous thrombolysis therapy for acute stroke and his symptoms resolved in few hours.

Discussion: Although stroke is mainly related to negative symptoms, rarely involuntary movements including alien hand maybe the sole manifestation of acute stroke. Prompt recognition of rare clinical features of acute stroke and MRI results enabled successful thrombolysis with complete recovery.

Reasons for Delayed Initiation of Thrombolysis in Acute Ischemic Stroke Patients at North Estonia Medical Centre Foundation in 2023

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Background and aims: Acute ischemic Stroke (AIS) is one of the leading causes of death and disability requiring rapid initiation of revascularization therapy. The effectiveness of thrombolysis is highly time dependent and door to needle time (DNT) is a critical quality indicator in stroke care. Despite established guidelines treatment delays still occur. This study aimed to identify the median DNT and to investigate the reasons for delayed initiation of thrombolysis.

Methods: Retrospective chart review for all AIS patients who received thrombolysis at North Estonia Medical Centre Foundation in 2023 was performed. Reasons for delays to treatment in patients with DNT above median were analyzed.

Results: In total 153 patients were included, of whom 74 had DNT above median. The median DNT was 31 minutes (interquartile range, 20-52), 86% of patients were treated within 60 min of arrival. The most frequent cause of thrombolysis delay was advanced imaging (CT perfusion or MRI), accounting for 35% of delays. Other factors were anticoagulant use 11%, lack of pre-notification by ambulance or self-presentation to emergency department 7%, high blood pressure 6%, in hospital stroke 5%, minor neurological deficit 5% and alternative diagnosis at arrival 4%. In 22% the reason for delayed treatment remained unclear (however in most cases DNT was close to the median).

Discussion: The use of advanced imaging causes delay in DNT, but it helps to identify additional subset of previously excluded patients who may benefit from therapy.

Pediatric Stroke with NOTCH3 Variant

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Background: Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) is a rare genetic small-vessel disease caused by variants in the NOTCH3 gene, typically presenting between ages 20 and 40. We report a pediatric patient with a CADASIL-associated NOTCH3 variant presenting with presumed periventricular infarction (PPVI), highlighting a potential early phenotypic spectrum.

Methods: A 3-year-old boy was hospitalised for observation due to head trauma. A neurologist diagnosed left-sided spastic hemiparesis and speech delay. Neuroimaging at 3,5 years revealed porencephalic widening of the right lateral ventricle, indicating a PPVI sustained between 22 and 32 weeks of pregnancy. The pregnancy was uncomplicated, and the child was born at 38 weeks, weighing 2520 grams (<3SD) with Apgar scores of 9 and 9. The mother smoked during pregnancy and was treated for trichomoniasis at 19 weeks. Family history was unremarkable. Exome sequencing identified a heterozygous pathogenic variant in the NOTCH3 gene NM_000435.2:c.1630C>T p.(Arg544Cys), frequently seen in East Asian populations. Testing revealed the father, aged 53, carried the same variant, had nonspecific white matter hyperintensities on T2-weighted MRI, but displayed no neurological symptoms.

Results: The patient began a rehabilitation program with a speech therapist, special education teacher, and physiotherapist. Neuroimaging revealed no new ischemic events, and genetic counseling was provided.

Discussion: This case highlights the CADASIL spectrum, with possible perinatal onset. Early recognition may aid management and counseling.

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Remote-Controlled CT Enables Timely Thrombolysis in Rural Stroke

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Background and aims: Delivering timely IVT in rural areas remains challenging due to limited access to CT imaging and stroke expertise. This study evaluates a novel model using remotely controlled CT scanning to deliver prehospital IVT at a district medical center (DMC) over a three-year period.

Methods: Since November 2021, paramedics in the DMC catchment area have assessed suspected stroke patients, guided via audio/video link by stroke specialists at a central stroke center (SC). Radiographers at the SC remotely control the CT scanner at the DMC, while stroke physicians review imaging and clinical data to make treatment decisions. DMC nurses administer IVT on-site. We compared time metrics for patients treated at the DMC and SC from November 2021 to mid-September 2024, and assessed air ambulance use before and after implementation.

Results: Of 39 patients evaluated at the DMC, 17 received IVT. Median door-to-needle time (DNT) was 20 minutes (IQR 16—26), and onset-to-treatment time (OTT) was 101 minutes (IQR 67—162). At the SC, 164 patients received IVT (DNT 20 min, IQR 14—30; OTT 129 min, IQR 82—178). No significant differences were found. Air ambulance use in the DMC area decreased from 67% to 26% ($p < 0.001$).

Discussion: Remotely controlled CT enabled timely and effective IVT delivery in rural areas over three years, with outcomes comparable to those of stroke centers and reduced reliance on air transport.

Implementation of Standardized Nursing Protocol for Stroke Patients in Tartu University Hospital: A Quality Improvement Initiative

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Background: This study aimed to evaluate whether implementing a standardized nursing protocol improves stroke patient management and if improvements are sustained over time.

Methods: Quality improvement audits were conducted in two periods. Period I (PI) consisted of initial audit (IA) in September 2020 (60 patients), followed by implementation of a standardized management protocol for fever, hyperglycemia, and swallowing (FeSS), and finally a follow-up audit (FUA) in September 2021 (56 patients). Period II (PII) included IA from January to May 2024 (136 patients) followed by protocol reinforcement and a FUA from September to November 2024 (187 patients). Data were collected using ResQ registry.

Results: During PI, temperature monitoring improved on day three from 52% to 88% ($p<0.001$). Blood glucose monitoring increased from 67% to 95% on day one ($p<0.001$) and from 20% to 89% ($p<0.001$) on day two. Swallowing screening, antipyretic and blood glucose management were effectively implemented already during the IA and maintained at the FUA.
By the beginning of Period II, there were no significant changes in the proportions of monitored FeSS domains compared to the FUA results from Period I. Swallowing screening improved constantly through the whole study period from 73% to 96% ($p<0.0001$).

Conclusion: Implementation of a standardized nursing protocol improved stroke patient management in all FeSS domains. Follow-up audits showed that most protocol elements maintained high adherence. This study demonstrates how systematic implementation of evidence-based protocols enhances stroke care quality.

Safety and Efficacy of Patent Ovale Closure: A Retrospective Analysis

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Background and aims: Patent foramen ovale (PFO) is associated with cryptogenic stroke, particularly in young adults with atrial septal aneurysms (ASA), prompting consideration of PFO closure for secondary stroke prevention. The study aims to analyze the efficacy and safety of PFO closure procedures performed at a university hospital in Estonia.

Methods: A retrospective chart review was conducted for patients who underwent PFO closure procedures between 01.01.2008 and 31.12.2023. Data were gathered from electronic medical records, and a data collection form was completed for each patient, including demographic information, cardiovascular risk factors, indications for the procedure, procedural details, and echocardiography findings.

Results: PFO closure procedures were performed on 99 patients aged 18 to 83 (median age 45, IQR 22), of which 47% were male. Ninety percent of patients were referred by neurologists, with 82% stroke and/or transient ischemic attack. An ASA was present in 38% of patients, and 23% of bubble test shunts were deemed large. Most complications (9%) were local, but there was a 3% risk of post-procedural arrhythmias. Eighty patients completed at least one echocardiography during the first year follow-up: positive residual shunt was documented in 3 (4%) patients, positive bubble test in 3 (4%), and two patients (3%) had both.

Conclusions: The procedure is relatively safe with self-limiting complications. However, monitoring for residual shunts is necessary. Further study is in place to assess long-term outcomes.

Time from Acute Cerebrovascular Event to Transcatheter PFO Closure: A Single-Centre Retrospective Study

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Background, aims: PFO closure reduces recurrent stroke risk by 60%. Guidelines recommend PFO closure within 6 months after index stroke. This study evaluated time from cerebrovascular events to PFO closure, analysing delay causes and the recurrent events during the waiting period.

Methods: We retrospectively analysed clinical, demographic, logistic data of patients aged 18-60 who had ischemic stroke (IS) and/or transient ischemic attack (TIA), and underwent PFO closure at Vilnius University Hospital Santaros klinikos (VUH SK) May 2011 — January 2025.

Results: 86 patients (55.8% female), median age 38.7±8.1. 74 (86%) had IS, 8 (9.3%) TIA, 4 (4.7%) both. 38 (44.2%) on the acute event were treated at VUH SK. Median from IS/TIA to closure: 319 days (IQR 221-417). The delay of diagnostic waiting times was shorter for patients initially treated at VUH SK vs. other hospitals, median days (IQR): cTCD 5 (2.5-27.5)/81.5 (6-157), TEE 148.5 (44-253)/209 (84.5-333.5), thrombophilia test 93.5 (71-116)/111.5 (61.5-161.5), multidisciplinary meet 123.5 (88.5-158.5)/158.5 (97-220). Differences, except thrombophilia test, were significant ($p<0.05$, Mann-Whitney U). Long delay was TEE to closure (177 (73.5-280.5)/96.5(38.8-154.6). A positive correlation was found between the year of closure and the duration of delay ($\rho=0,328$, $p<0,05$ Spearman), linear regression showed delay increase by 11.9 days annually, most in 2020. 1 patient had a recurrent event before PFO closure.

Discussion: PFO closure waiting time exceeded guidelines. Patients treated at VUH SK had shorter diagnostic waiting times, but delay increased annually, significantly from TEE to closure. 1 recurrent ischemic event happened.

Beyond Recovery: Addressing Psychological Trauma, Anxiety, Depression and Shame in Post-Stroke Rehabilitation

Anna Stoljarova

SHL OÜ

Background and aims: Emotional consequences of stroke—including anxiety, depression, trauma-related symptoms, and shame—are highly prevalent and can significantly affect rehabilitation outcomes. These experiences often remain underrecognized, contributing to lower adherence, social withdrawal, and reduced engagement in recovery. While neurological and physical aspects receive immediate attention, psychological recovery is frequently delayed or fragmented. This presentation aims to highlight the complexity of post-stroke emotional reactions and introduce practical approaches for psychological support that can be integrated into multidisciplinary care.

Methods: The presented material is grounded in experience within inpatient and outpatient rehabilitation settings and supported by current literature. It outlines psychological patterns observed among stroke survivors at different recovery stages and describes interventions used in clinical practice. Approaches include psychoeducation, trauma-informed communication, narrative techniques, and basic strategies for addressing emotional avoidance and self-stigma.

Results: Observed themes included fear of stroke recurrence, emotional lability, reduced self-worth, and identity disruption. These symptoms often co-occur and may be misinterpreted as cognitive or behavioral issues. When emotional experiences were addressed through psychological techniques, patients showed improved therapeutic engagement, emotional stability, and motivation for recovery.

Discussion: Psychological support is a vital part of post-stroke care. Its early integration into rehabilitation improves engagement, emotional well-being, and long-term outcomes.

Aphasia and Emotional Well-Being after Stroke: Interdisciplinary Collaboration Between Speech Therapist and Psychologist in Rehabilitation

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Background and aims: Post-stroke aphasia affects not only communication but also emotional well-being and participation. Patients with aphasia are at elevated risk of depression and anxiety, often intensified by limited ability to express feelings. Addressing these needs requires interdisciplinary collaboration. This presentation explores joint work between speech therapist and psychologist to develop accessible, individualized support.

Methods: Collaboration took place within an outpatient rehabilitation setting. The speech therapist assessed language comprehension and expressive abilities. Based on communication capacity, personalized visual supports were developed, including simplified emotion charts, topic boards, and scripts for emotionally relevant situations. These tools were used in speech sessions and shared with the psychologist. The psychologist adapted emotional support using brief prompts, non-verbal validation, co-regulation strategies, and visual or gestural aids. Sessions were held individually or jointly, depending on needs. Weekly team meetings ensured shared goals, material adjustment, and follow-up on progress.

Results: Patients showed greater emotional engagement when communication tools were integrated. Supported expression became more accessible. Co-facilitated sessions improved affect recognition, autonomy, and trust. Families reported better interaction and less tension in daily communication.

Discussion: Cooperation between speech therapists and psychologists enables emotional needs to be addressed through communication-accessible approaches. This interdisciplinary model promotes emotional recovery and communicative empowerment after stroke.

Cognitive Function in Survivors with Cerebellar Stroke

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Background and aims: The cerebellum may contribute to the modulation and integration of cognitive processes, but patients with cerebellar strokes are often presumed cognitively intact. We aimed to map cognitive screening practices and assess cognitive function in cerebellar stroke survivors (cases) compared to non-cerebellar stroke survivors (controls).

Methods: This cross-sectional, nested case-control study analyzed data from three acute stroke units in Gothenburg, Sweden (2014—2019). Controls were matched 1:3 with cases by sex, age, stroke type, and severity (assessed via the National Institutes of Health Stroke Scale [NIHSS]). Cognitive screening was performed during hospitalization using the Montreal Cognitive Assessment (MoCA) or during activity performance, at a median of 7 days post-stroke onset. Impaired cognition was defined as a MoCA score ≤25.

Results: We included 935 patients (mean age: 68 years; 62% male; mean NIHSS score: 2; 74% ischemic stroke), comprising 240 cases and 695 controls. Cognitive screening rates were similar between cases and controls (45% vs. 44%, p=0.76). Reasons for not performing MoCA included lack of time (18% vs. 16%), perceived irrelevance (18% vs. 14%), and pre-existing dementia (11% vs. 8.5%). Among screened patients, mean MoCA scores were higher in cases than controls (25 vs. 24, p<0.01). Cognitive impairment was observed in 38% of cases and 57% of controls (p<0.001), correlating with older age and higher stroke severity.

Discussion: Cognitive screening rates were comparable, but cognitive impairment was more prevalent in controls. These findings suggest that MoCA may be more sensitive to cognitive deficits linked to cerebral strokes than cerebellar strokes.

Diagnostic Accuracy of a New Screening Procedure for Spatial Neglect: Results from a Prospective Cross-Country Study

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Background: The National Institute of Health Stroke Scale (NIHSS) underestimates right-hemisphere deficits like spatial neglect (SN). This study evaluates a modified NIHSS Item 9 (n-NIHSS-9) for the simultaneous screening of aphasia and SN.

Methods: A prospective study enrolled consecutive patients within seven days of stroke onset. The adapted n-NIHSS-9, using an A4-sized "Cookie Theft" picture, served as an index test for the dual assessment of aphasia and SN. Additional index tests included the Star Cancellation Test (SCT) and the Line Bisection Test (LB). The simplified Catherine Bergego Scale (sCBS) served as the reference standard.

Results: Analysis included 632 hemispheric stroke patients (51.7% male, mean age 70.4 years, SD = 12.88, range 24—103). Ischemic strokes accounted for 89.4% of cases. The overall prevalence of SN was 27.5% (left-sided 19.7% vs. right-sided neglect 7.8%). The n-NIHSS-9 demonstrated a sensitivity of 78.29% (95% CI: 70.18—85.07) and a specificity of 98.47% (95% CI: 98.11—99.64). Sensitivity was similar for left-sided (78.79%; 95% CI: 69.42—86.36) and right-sided SN (79.17%; 95% CI: 57.85—92.87). Overall accuracy was 93.65% (95% CI: 91.16—95.61) with a non-completion rate of 19.6%, primarily due to aphasia and impaired consciousness. The n-NIHSS-9 required <30 seconds to administer. In comparison, the sensitivity of SCT was 75.51% and LB 36.36%, with non-completion rates of 29.2% and 32.9%, respectively.

Discussion: The n-NIHSS-9 is a practical and time-efficient tool for routine SN screening, helping reduce the bias in stroke severity scoring between left- and right-hemisphere strokes, and may lead to fairer access to treatment.

Parental Cardiovascular Events and Carotid and Femoral Intima-Media Thickness Among Patients and Partners — The First and Second Generation in the Norwegian Stroke in the Young Study (NOR-SYS)

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Background and aims: Family history (FH) of cardiovascular disease (CVD) such as stroke, coronary artery disease (CAD) and peripheral artery disease (PAD), is a wellknown, non-modifiable risk factor. However, the impact of FH on atherosclerosis in young ischemic stroke patients is less studied.

Methods: Study participants (SP) were 639 ischemic stroke patients (15-60 y) and their partners. Atherosclerosis was assessed in several vascular areas as intima-media thickness in carotid and femoral arteries (cIMT/fIMT), electrocardiogram ischemia, abdominal aortic plaques (AAP) and ankle-arm index ≤0.9 (AAI). FH-CAD/PAD was either reported (FHr) by SP or verified (FHv) by parents or by medical records. Only FH-positive and negative results were included.

Results: There were more FHr than FHv results (90 vs 50%). FHr/v-CAD/PAD was related to cIMT and fIMT. FHr/v-CAD was also related to AAP and FHr-PAD to AAI. Sex had no impact. The effect decreased after adjusting for age, hypertension, dyslipidemia, diabetes mellitus and smoking, showing FHr-PAD related to cIMT and AAI, and FHv-PAD to fIMT.

Discussion: FH-CAD/PAD is related to atherosclerosis in the second generation, emphasizing the value of asking about FH of CVD in individuals´ risk assessment.

Structured Follow-Up after Stroke – Health Care Professionals' Perspective

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Background and aims: Structured long-term follow-up after stroke in the municipality setting is lacking. The aim was to gain an understanding of health care professionals experience of a new structured multidisciplinary follow-up process for patients with stroke.

Metohods: This is a qualitative focus group study. Health care professionals (n = 27) in a multidisciplinary team shared their experiences of structured team-based follow-up after stroke, using Stroke Health and Post stroke Checklist. Prior to the discussions, all health care had to conduct the procedure of the structured follow-up after stroke (>3 months since stroke) at least once. Data was analyzed in accordance with Krueger's focus group methodology.

Results: Five focus group discussions were conducted, and three main themes were created; a new workflow to identify health problems, structured teamwork increases knowledge and overcame obstacles and preparations before a tailored follow-up visit. The health care professionals' experiences were that structured follow-up after stroke were feasible to identify health care problems in patients with stroke. Structured teamwork was experienced to contribute to a more interprofessional approach, to facilitate to share knowledge within the health care professionals. The health care professionals also experience that next of kin were a support during the meeting with the patient.

Discussion: The structured team-based follow-up after stroke in a municipal primary care setting was found feasible by the health care professionals. To include next of kin as support was deemed as important.

Life after a Severe Stroke – Outcomes at Hospital Discharge and after 3 Months

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Background and aims: People who suffer a severe stroke have a higher incidence of acute complications associated with poorer recovery and higher mortality. Studies on people with severe stroke are scarce. The aim was to investigate functional status, discharge destination, length of hospital stays, and mortality at hospital discharge and after three months in patients with severe stroke.

Methods: This study is a register-based cross-sectional study. We included adult patients with stroke who were admitted to three stroke units in Gothenburg, 2014-2019. Stroke severity on admission was assessed using the NIH Stroke Scale (dichotomized into severe and mild/moderate). Comparison between groups were analyzed and mortality was analyzed with survival analysis, Kaplan-Meier.

Results: The study included 5945 patients of whom 902 had a severe stroke and were included in the outcome analyses. Of 902 patients investigated, 73% needed support with personal care at discharge, while 56% were independent after three months. At discharge 55% were discharged to a nursing home, and 37% were still living in a nursing home after three months. Overall mortality after three months was 41%, while mortality among patients who lived in a nursing home before suffering a stroke was 73%.

Discussion: Severe strokes were more prevalent among elderly patients and were associated with increased dependence in activities of daily living, living in a nursing home, higher mortality and shorter length of hospital stay compared to the younger patients. This study can provide information to meet the needs of patients with severe strokes.

High Sensitivity in Spontaneous Intracranial Hemorrhage Detection from Emergency Head CT Scans Using Meta-Learning Approach

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Background and aims: Spontaneous intracranial hemorrhages represent a high disease burden. With increasing medical imaging volumes, technological tools are needed to aid in image interpretation. We developed and evaluated a deep learning (DL) system for detecting spontaneous intracranial hemorrhage types—namely intracerebral, intraventricular, and subarachnoid hemorrhages—on head CT scans.

Methods: The DL system consisted of four convolutional neural network base models trained on 300 CT scans. A metamodel was trained on their combined outputs, followed by rule-based post-processing to improve diagnostic accuracy. Performance was evaluated on a consecutive dataset of emergency head CTs from ten emergency clinics.

Results: The validation dataset comprised 7,797 head CT scans, of which 118 CTs had spontaneous hemorrhage. The DL system achieved 89.8% sensitivity and 89.5% specificity for the hemorrhage detection. Among patients imaged within 12 hours of symptom onset, all 78 hemorrhages were correctly identified.

Discussion: A meta-learning-based DL approach achieved high diagnostic accuracy in spontaneous intracranial hemorrhage detection and enables clinicians to develop effective DL systems using a limited amount training data.

Contributing Factors to Missed Thrombolysis in Acute Ischemic Stroke: A Comparative Analysis

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Background and aims: Ischemic stroke remains a major cause of global morbidity and mortality. While intravenous thrombolysis (IVT) effectively reduces post-stroke disability, many eligible patients do not receive treatment. This study aims to identify and analyze clinical, systemic, and organizational factors associated with missed IVT among patients with indication for treatment.

Methods: Potential factors contributing to missed intravenous thrombolysis (IVT) were identified through a structured literature review and expert consensus. These were applied to patient-level data from ICESTROKE 2022, a nationwide retrospective cohort of all ischemic stroke admissions in Iceland (n = 403). The analysis focuses on patients receiving IVT (n = 50) and patients missing treatment despite indication. Descriptive statistics will quantify the prevalence of contributing factors, and logistic regression will assess associations with missed treatment.

Results: Analyses will characterize the frequency, distribution, and typology of factors linked to missed IVT to uncover patterns and key predictors of treatment omission. These insights are expected to reveal critical points of failure in the acute stroke pathway and inform targeted clinical and organizational interventions to enhance IVT delivery.

Discussion: This study contributes to the ongoing effort to reduce unwarranted variation in stroke care by systematically examining the drivers of IVT underutilization. By identifying modifiable barriers within clinical workflows and healthcare systems, the findings aim to inform quality improvement strategies in Iceland and offer transferable insights for other health care systems.

Vertebrobasilar Artery Dolichoectasia Presenting as Brainstem Ischemic Stroke

Triin Helin Unt

West-Tallinn Central Hospital

A 68-year-old man presented to the emergency department with binocular diplopia, dizziness, nausea, and imbalance. Computed tomography angiography (CTA) revealed a markedly dolichoectatic vertebrobasilar artery without evidence of thrombosis or dissection. The maximal diameter measured 1.4 cm at the vertebrobasilar junction and 1.1 cm at the basilar tip. The dolichoectatic vessel appeared to compress the brainstem. MRI identified multiple small ischemic lesions in the brainstem. The patient's history included hypertension. Given the high procedural risk, neurosurgeons and interventional radiologists opted against surgical or endovascular intervention. The patient was admitted to the stroke unit and discharged after five days with conservative management. Six months later, the patient was readmitted with symptoms of recurrent ischemic stroke, including dysarthria and right arm ataxia. CTA revealed a thrombus occluding approximately 50% of the lumen within the dolichoectatic segment of the basilar artery. MRI showed acute ischemic lesions in the pons with a DWI-FLAIR mismatch. The patient underwent successful intravenous thrombolysis, while thrombectomy was again deemed too risky. He was discharged after four days on permanent anticoagulation.

Conclusion: In patients with giant vertebrobasilar dolichoectasia, strict blood pressure control is critical to prevent complications. Although surgical or endovascular interventions may improve outcomes, they often carry significant risk. This case illustrates that thrombolysis can be a safe and effective treatment option in selected patients.

Experiences of Using the Previsit Tool "Stroke Health" Before a Follow-Up Visit – People with Strokes Perspective

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Background: Structured follow-up visits should be offered after a stroke with a person-centered approach enabling shared decision-making. To support this process, a pre-visit tool ("Stroke health") was co-designed to ensure people with stroke can prepare well in advance. The tool is based on the questions in the Post-stroke checklist together with health information.

Objective: To explore people with strokes' experiences of using the digital pre-visit tool before the follow-up visit and how well their stroke related health issues was captured.

Methods: Individuals were recruited prior to a scheduled follow-up visit after stroke. After completing the previsit tool, individual interviews were conducted with 33 participants (23 men, median age 67) regarding their experiences of using the previsit tool. Reflexive thematic analysis was used to analyse the data. The findings were a basis for decisions in the subsequent co-design workshops, to improve the previsit tool.

Results: The findings highlights several aspects that are important to consider when receiving and completing the digital previsit tool. First, when initiating the follow-up process, the purpose needs to be clearly expressed to enhance the motivation. Second, the response process can be enhanced by explanatory texts and additional free-text. However, optimizing the simplicity and user-friendliness was emphasized. Third, the previsit tool was perceived as a support for identifying needs with potential to enhance the dialogue at the visit. Overall, findings shows the previsit tool was easy to use. However, revised information was suggested to better capture health problems e.g., give examples of different types of pain. In the co-design workshops findings were discussed and a final version of the tool was completed.

Conclusions: Findings suggests that the digital previsit tool Stroke health was perceived as useful by people with stroke before a follow-up visit. Minor amendments were suggested to further improve the tool.

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