

STROKE



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Dear Doctor,

Greetings from Micro Labs. We are happy to bring you “Stroke Newsletter” which contains latest and interesting news in the field of Neuropsychiatry.

This issue contains:

- 1. A study to determine if decreased left atrial rotational flow is independently linked with embolic brain infarctions**
- 2. A study on evaluating stress hyperglycemia predicts futile recanalization in mechanical thrombectomy.**
- 3. A study on assessing the long-term development of aortic arch plaque in older people**
- 4. A rare case of vertebral artery dissection and stroke with persistent primitive trigeminal artery**

Should you require any specific article or medical information, please feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

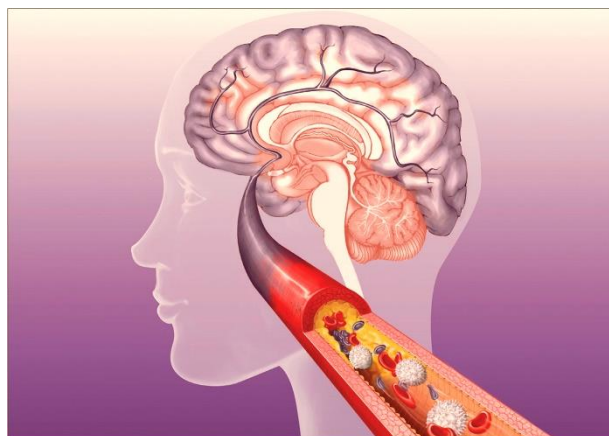
Best Regards,

Medical Team, Micro Labs Ltd



A study to determine if decreased left atrial rotational flow is independently linked with embolic brain infarctions

Introduction: One of the main risk factors for ischemic stroke is atrial fibrillation (AF). It appears that abnormal blood flow within the fibrillating left atrium (LA) predisposes to activation of the coagulation cascade, which increases the risk of cardiac embolic stroke and local thrombus development. CHA₂DS₂VASc (congestive heart failure, hypertension, age 72 [doubled], diabetes, stroke, vascular disease, age 65 to 74, and sex category [female]) represents a clinical risk score that is often used to categorise stroke risk and target antithrombotic medication in patients with AF. However, these risk scores have only moderate predictive power, and stroke rates differ significantly within each point category. In addition, AF or any other known cause accounts for up to 20% to 25% of embolic strokes.¹ ECG-gated time-resolved phase-contrast cardiovascular magnetic resonance (CMR) with 3-directional velocity encoding (4D flow) is an established CMR technology that offers extensive in-vivo visualisation and measurement of cardiovascular flow velocities. Recent proof-of-principle studies have revealed that peak and mean velocity and stasis values generated from LA 4D flow are connected with symptomatic stroke risk in patients in SR with previous AF, and low blood flow velocities have been connected with activation of the coagulation cascade.² To investigate if, independently of AF, the parameters of left atrial (LA) blood flow are related to embolic brain infarcts.

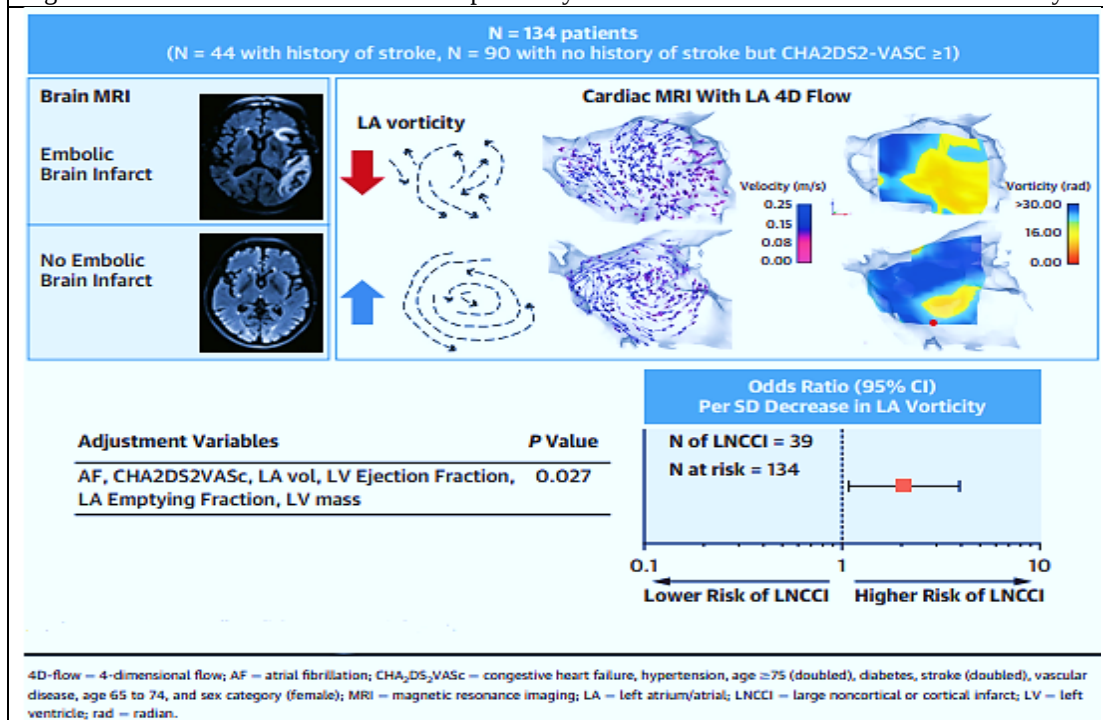


Method: A total of 134 individuals were included, 44 of whom had experienced an ischemic stroke in the past and 90 of whom had no history of stroke but a CHA₂DS₂VASc score ≥ 1 . A questionnaire that was given to all participants was used to assess AF history and the CHA₂DS₂VASc score. Cardiovascular magnetic resonance (CMR) assessed cardiac function and LA 4-dimensional flow parameters, such as velocity and vorticity (a measure of rotational flow), and brain magnetic resonance imaging (MRI) was used to look for large non-cortical or cortical infarcts (LNCCIs) that were likely embolic or non-embolic lacunar infarcts.



Results: Patients exhibited a moderate stroke risk (median CHA₂DS₂VASc = 3, Q1-Q3, 2-4; 41% female; age 70 ± 9 years). Sixty-eight people had been diagnosed with AF, and 58 of them were experiencing it at the time of the CMR. 39 patients had one or less LNCCIs, 20 patients had one or fewer lacunar infarcts without LNCCIs, and 75 patients had no infarcts. After correcting for AF during CMR, AF history, CHA₂DS₂VASc score, LA emptying fraction, LA indexed maximum volume, left ventricular ejection percentage, and indexed left ventricular mass, lower LA vorticity was significantly associated with prevalent LNCCIs (P = 0.027) (Figure 1). In contrast, there was no significant correlation between LNCCIs and LA flow peak velocity (P = 0.21). There was no LA parameter that was connected to lacunar infarcts (P > 0.05).

Figure 1: Embolic Brain Infarcts Are Independently Linked to Reduced LA Blood Flow Vorticity



Discussion: This study demonstrates a strong and independent relationship between lower LA flow vorticity and embolic brain infarcts. According to Spartera, M. et al. found that LA vorticity is repeatable, sensitive to changes in cardiac rhythm, and independently linked with embolic brain infarcts, implying that it might be a potential imaging biomarker of cardio embolism in SR and AF. Regardless of cardiac rhythm, LA blood flow imaging might enhance stroke prediction and the customization of anticoagulant options.³



Conclusion: This study concludes that embolic brain infarcts are strongly and independently correlated with lower LA flow vorticity.

Identification of individuals who could benefit from anticoagulation for the prevention of embolic stroke may be enhanced by imaging left atrium flow characteristics.

References:

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A study on evaluating stress hyperglycemia predicts futile recanalization in mechanical thrombectomy

Introduction: Mechanical thrombectomy (MT) is the therapy of choice for acute ischemic stroke (AIS) caused by large vessel occlusion (LVO). Even though recent studies have demonstrated that 80–90% of acute LVO patients receiving MT can achieve successful reperfusion, as measured by a thrombolysis in cerebral infarction (TICI) score of 2b or 3, about 50% of these patients do not have a favourable outcome, as measured by a modified Rankin scale (mRS) of 0-2, 3 months after stroke. The clinical condition known as fruitless recanalization (FR) is characterised by a successful recanalization without a significant increase in functional outcomes.¹ In individuals with acute ischemic stroke, hyperglycemia was linked to early cerebral impairment. In addition to damaging the blood-brain barrier and aggravating ischemic lesions, hyperglycemia also increases the risk of cerebral infarction-related haemorrhage and shortens the time that an ischemic penumbra lasts.² The purpose of this study was to find factors that might predict fruitless recanalization (FR) in LVO patients receiving MT.

Methods: MT was performed on 238 individuals who had anterior circulation LVO-related acute ischemic strokes. Patients who received a 2b or 3 on the TICI scale were included.



According to the degree of impairment three months following stroke, patients were separated into two groups: those who had futile recanalization (FR) and those who underwent meaningful recanalization (MR) (FR: mRS score > 2; MR: mRS score 2). Assessing the primary outcome involved looking at variables such as age, sex, vascular risk factors, prior antithrombotic therapy, systolic blood pressure at admission, and laboratory results like stress hyperglycemia. The GAR index (glucose-to-glycated haemoglobin ratio) was used to calculate the prevalence of stress hyperglycemia.

Results: Age (OR 1.05), female sex (OR 2.43), stress hyperglycemia as assessed by the GAR index (OR 1.17), NIHSS at admission (OR 1.15) and time from symptom onset to MT (OR 1.01) were shown to be independent predictors of FR in this study (Table 1). The age, female sex, GAR index, NIHSS at admission, and time from symptom beginning to MT model's AUC was 0.81 (95%, $p < 0.001$) for patients. The GAR index cut-off value that best predicted FR was 17.9.

Futile recanalization	OR	95% CI	p
Age	1.05	1.01–1.09	0.012
Female	2.43	1.12–5.30	0.025
GAR index	1.17	1.06–1.29	0.002
NIHSS at admission	1.15	1.07–1.25	0.001
Time from symptoms onset to MT	1.01	1.00–1.01	0.020

Table.1: Odds ratio (95% confidence intervals) for futile recanalization.

Discussion: In this study, NIHSS at admission, female sex, older age, stress hyperglycemia, and time from symptom beginning to MT were the predictors of FR. Similarly, Deng G. et al.'s research identifies female sex, comorbidities, admission systolic blood pressure, serum glucose, occlusion location, non-bridging medication, and post-procedural complications as predictors of fruitless recanalization.³

Conclusion: This study concludes that FR frequently occurs following MT. The identified baseline NIHSS, female sex, and older age were unchangeable predictors of FR. In contrast, the length of time between the start of symptoms and MT and the level of stress hyperglycemia were both adjustable pre- and post-MT variables.

Time from the beginning of symptoms to Mechanical thrombectomy and stress hyperglycemia were adjustable pre- and post-MT variables, whereas older age, female sex, and baseline NIHSS were unpredictable predictors of fruitless recanalization

References:



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A study on assessing the long-term development of aortic arch plaque in older people

Introduction: The risk of stroke and overall mortality is greatly enhanced in the presence of aortic arch plaques (AAP). Age-related changes in the number and size of AAP are typical in older people as a whole, with individuals who have had embolic events experiencing a particularly high prevalence. Age, hypertension, diabetes, and hyperlipidemia are all established risk factors for atherosclerotic vascular disease and are also risk factors for AAP. Although typically safe, semi-invasive transesophageal echocardiography (TEE) is not appropriate for the regular clinical follow-up of AAP. Other imaging techniques, like CT or MRI, are expensive and require the use of radiation and injectable contrast chemicals.¹ Transesophageal echocardiography (TEE) is helpful for assessing the thickness and shape of aortic plaques, which enables one to estimate serial changes in aortic plaques. To prevent atherosclerotic events and to enhance the prognosis of patients with aortic plaque, it may be necessary to illustrate the dynamic nature of aortic plaque and to define its predictors.² The aim of this study was to investigate the rate of AAP development and associated risk variables in a population-based cohort of older persons using serial imaging of the aortic arch using TTE.

Methods: In this investigation, 300 participants who had TTE with evaluation of aortic arch plaques at both time periods in the Cardiovascular Abnormalities and Brain Lesion study and the Subclinical Atrial Fibrillation and Risk of Ischemic Stroke study were included. Using a suprasternal window, the aortic arch was observed. The section of the aorta between the bend at the end of the ascending segment and the origin of the left subclavian artery was referred to as the aortic arch. A plaque is a distinct protrusion of the intimal surface of the vessel that is at least 2 mm thick, differs in appearance, and is less echogenic than the nearby, healthy intimal



surface. The presence of any increase in AAP thickness from the first to the second examination was recorded.

Results: At baseline, the mean age was 67.8 ± 7.5 years; at follow-up, it was 76.7 ± 6.8 years; 65.7% were women. At the beginning of the study, 10.3% of patients showed evidence of a big ($\geq 4\text{mm}$) AAP, 60.7% had evidence of a small (2.0-3.9mm), and 29 percent had no significant AAP. AAP was progressing in 52.3% of the patients at the time of the follow-up examination, with mild progression in 23.3% patients and severe development in 29% patients (Figure 2). Except for baseline plaque thickness, which was noticeably smaller in the group with AAP advancement, neither demographic nor clinical factors were significant predictors of AAP progression.

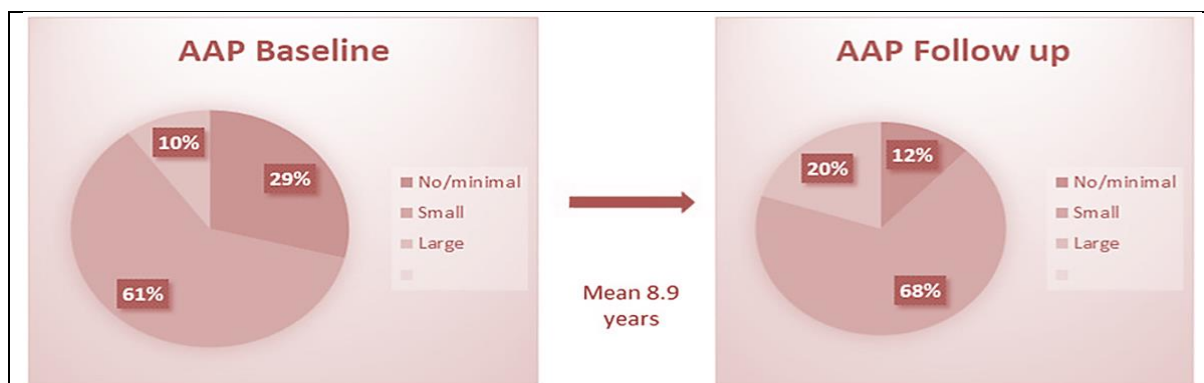


Figure.2: Aortic arch plaques progression baseline to follow up

Discussion: In this study, risk variables for AAP advancement have been more challenging to detect and appear to be separate from risk factors associated with AAP incidence. Age and a history of hypertension were related to AAP at baseline. According to a study by Kaiser Y. et al., cardiovascular risk factors are comparable to those that cause aortic stenosis in that they appear to differ from those that cause the condition to worsen.³

Conclusions: This study concludes that the population-based cohort of older persons with a high frequency of AAP progression had a high prevalence of AAP on TTE examinations. TTE is a helpful test for baseline and follow-up imaging of AAP, even in people who have nil or minimal AAP at baseline.

Transesophageal echocardiography from a suprasternal view is useful for assessing and monitoring Aortic arch plaques

References:



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A rare case of vertebral artery dissection and stroke with persistent primitive trigeminal artery

Introduction: Stroke occurs more frequently in older people than in younger people, which goes against all expectations. Cervical artery dissection, defined as the splitting of the arterial wall of the carotid or vertebral arteries, is responsible for up to 20% of strokes in young people. The yearly incidence rate of vertebral artery dissections is 0.97 per 100,000, compared to 1.72 per 100,000 for internal carotid artery (ICA) dissections. Localised occipital headache and neck pain symptoms can be found in both young and elderly individuals.¹ The most frequent of these persistent foetal anastomoses is the persistence of the primitive trigeminal artery (PPTA). The incidence ranges from 0.1 to 0.68%. Prior to the formation of the posterior communicating and vertebral arteries, the persistent trigeminal artery (PTA) nourishes the basilar artery in utero. The PTA originates at the point where the internal carotid artery (ICA)'s petrous and cavernous segments meet, and it proceeds posterolaterally across the trigeminal nerve, or it may cross over or pass through the dorsum sellae.² In this case, the patient has a right parietal ischemic infarct as a result of a dissected left vertebral artery and a right PPTA.

Case presentation:

A 37-year-old male patient presented to the emergency department with rapid loss of consciousness, severe left-sided weakness, numbness of the left upper limb, dizziness, dysphasia, and impaired vision within 2 hours of the beginning of these symptoms. The most recent incident's history describes how the presenting symptoms appeared out of nowhere when the person was sitting at rest. There was no fall or traumatic injury to the cervical spine, forceful coughing or sneezing, chiropractic activity, or other activities. The patient was conscious, had no hemodynamic instability, and his temperature was 36.4°C with a systolic blood pressure of 110 mmHg and a heart rate of 70 bpm. Neurological evaluation revealed dysarthria, left hemiparesis, loss of two-point discrimination in the left upper extremity, and right-sided facial



paralysis. Cardiolipin Ig, Cardiolipin IgM, and ANA IgG were all normal on the autoimmune screen. On an electrocardiogram, the sinus rhythm was normal. No pericardial effusion, no valvular disease, and normal left ventricular wall motion were detected by echocardiography.

The right vertebral artery emerging from the right subclavian artery was seen on a contrast computerised tomography (CT) of the head and neck; however, it is tiny in calibre, a little opaque, and contains a dissection flap. On the right side, a PPTA is evident, but no concomitant brain aneurysms or vascular abnormalities are seen. Right middle cerebral artery territory, a right PPTA, and diffuse narrowing of the visible portion of the right vertebral artery—possibly hypoplastic were all visible on a cerebral axial diffusion-weighted magnetic resonance imaging (MRI) (Fig. 3) that was consistent with clinical findings.

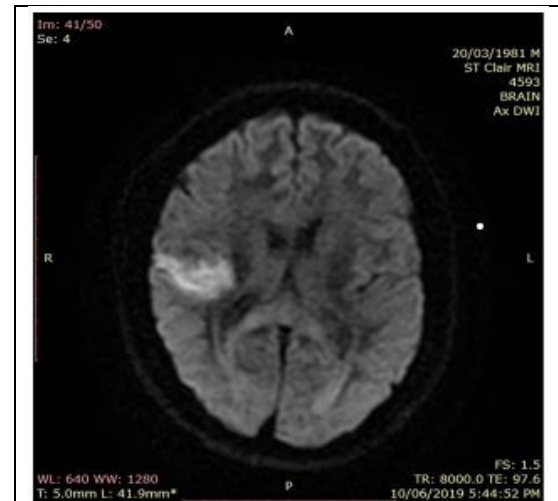


Figure 3. Right parietal lobe hyperintensity around the Sylvian fissure is shown on an axial DWI MRI.

A 1.5 Tesla 3D-TOF MRA revealed a crescent sign in the left vertebral artery, indicating dissection and PPTA between the right internal carotid artery and distal basilar artery with normal diameters for both ICAs (Fig. 4). Intravenous heparin was used to treat the patient's clotting complications, which led to a quick but insufficient improvement in their symptoms. For long-term administration, this initial anticoagulation was combined with oral antiplatelet treatment using aspirin and clopidogrel. A second contrast MRI performed 10 days later as a follow-up revealed a hypoplastic right vertebral artery. Additionally, a colour duplex ultra-sonogram of the vertebral arteries showed an intra-foraminal left vertebral artery flap that was reliant on cardiac cycling. After one week, the patient's left-side motor and sensory functions were fully recovered, and their subjective judgement of their speech was that it was only minimally slurred.

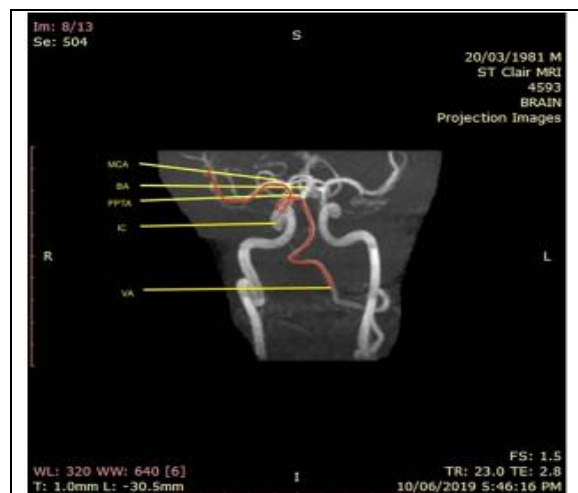


Figure 4. MRA demonstrating the presumed embolism course from the vertebral artery through the PPTA, the right ICA, and the right MCA



Discussion: Patients in this study reported neurologic symptoms of a right parietal lobe infarction as well as evidence of vertebral artery dissection and chronic carotid-vertebrobasilar anastomosis. According to Engelhardt J. et al., a stroke caused by a traumatic dissection of the internal carotid artery in the neck may have been restricted by a persistent trigeminal artery.³

Conclusion: A persistent primitive trigeminal artery can act as a conduit for emboli from a vertebral artery dissection, resulting in an anterior circulation stroke rather than a conventional posterior circulation stroke.

The persistent primitive trigeminal artery serves as a possible channel for emboli from the vertebral artery dissection.

References:

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