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SEPARATE ORIGIN OF THE LEFT INTERNAL AND EXTERNAL CAROTID ARTERY FROM AORTIC ARCH WITH RIGHT INTERNAL CAROTID ARTERY DILATATION AND CONTRALATERAL ACUTE RIGHT MCA ISCHEMIC STROKE

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Abstract :
A Separate origin of internal carotid artery and external carotid artery directly from aortic arch is an extremely rare anatomical variation with Only 87 reported cases up to date [1] , this anomaly have been known to be asymptomatic unless associated with other conditions with recent study suggested relation of this anomaly to cause Contralateral hemodynamic stress [4] , we present a case Report of separate origin of Left internal Carotid Artery and External Carotid Artery with Contralateral Right Internal Carotid Artery Dilatation and Right Acute MCA Ischemic Stroke

Introduction :
A Separate origin of internal carotid artery and external carotid artery directly from aortic arch is an extremely rare anatomical variation, we report A case of middle aged man with Separate origin of Left Internal and External Carotid artery from aortic Arch with contralateral Right internal Carotid dilatation and Right Acute MCA Ischemic stroke raising the possibility of this anomaly to cause contralateral hemodynamic stress and contralateral ischemic insult.

Case Presentation :
A 41 years old male patient not known to have medical illnesses, heavy smoker presented to Emergency Department with three hours history of sudden onset Left sided weakness and slurred speech , stroke code was announced , with National instates of Health Stroke Score Scale of four (NIHSS : 4) and Computed Tomography of (CT of brain) initially excluded intra-cerebral hemorrhage with Alberta Stroke program Early Computed Tomography score (ASPECT Score) of 10 and no contraindications for Intravenous thrombolysis therapy , patient received intravenous thrombolysis with recommended dose based on weight , Computed Tomography Angiography of brain (CTA brain) showed no Large vessels occlusion but interestingly found to have separate origin of Left internal and External Carotid artery directly from aortic arch with uniformly small caliber of Left internal Carotid artery compared to Left External carotid artery with tortuous feature , the Right Internal carotid Artery showed proximal Aneurysmal like dilatation measuring 1.3 centimeter , ,Also, the Left vertebral artery originated directly from aortic archthe rest of the

major intracranial vessels including Circle of Willis were patent with no evidence of segmental occlusion, aneurysm or vascular malformation.
Magnetic Resonance Imaging (MRI brain) done showed multiple small area of restricted diffusion at Right frontal and temporal Cortical and subcortical of a distribution suggestive of showering emboli either of cardiac origin or of artery origin.
Rest of stroke workup was done with slightly elevated Low density lipoprotein of four , Glycosylated hemoglobin /HBA1C was 5.3 , C-reactive protein , Erythrocyte Sedimentation Rate and Anti-nuclear Antibody are all within Normal Ranges , Transthoracic Echocardiogram with bubble study was normal with normal Ejection Fraction of more than 55% and no evidence of thrombus or vegetation.

Discussion :

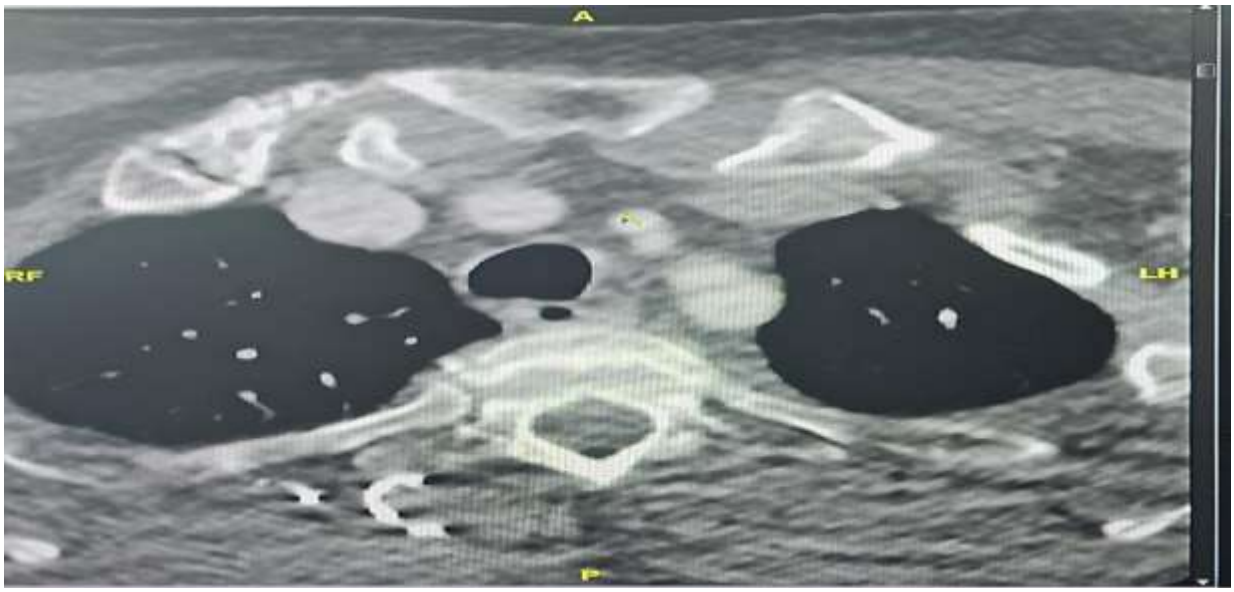
A Separate origin of internal carotid artery and external carotid artery directly from aortic arch is an extremely rare anatomical variation with an estimation incidence of less than 0.1% and 87 reported cases in the literature up to date .[1]

Lie (1968) proposed three developmental theories behind this anatomical variation with most suggestible theory is involution of the third aortic arch and persistence of the ductus arteriosus.[1]
Cakirer (2002) first described that anomaly using contrast enhancement Supra-Aortic Magnetic Resonance Angiography of intracranial vessels in a case report of 68 years old female patient who presented with sudden onset Left sided hemiparesis, they found that beside the separate origin of Left Internal carotid artery and External carotid artery, the Left internal carotid artery was of small caliber and there was a low bifurcation of the right carotid system and it was concluded as .asymptomatic incidental finding [2]

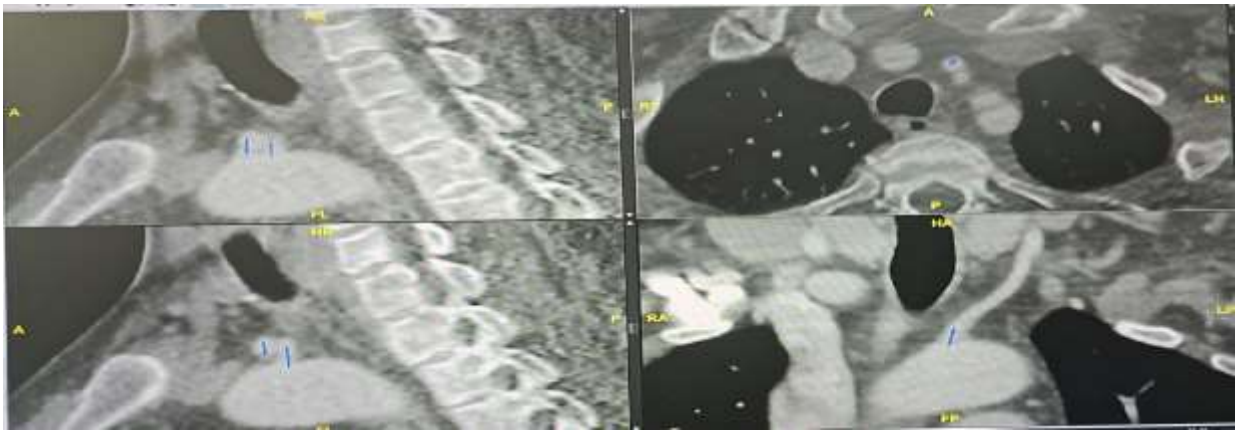
Recently published case report of this anomaly by Arkar (2022) of a 51 years old male patient with known history of Hypertension and hypothyroidism who presented with sudden onset headache, Left sided weakness and slurred speech, Arkar and his colleagues used Magnetic Resonance Angiography -Time Of Flight (MRI-TOF) and Digital Subtraction Angiography (DSA of Brain) to describe this anomaly which also showed uniform small caliber of left internal carotid artery with moderate stenosis of right supra-clinoid Internal carotid artery and it was also concluded as an incidental finding which needs special attention and awareness during evaluation of patients with Acute ischemic stroke .[3]

Another case report published in 2022 by Hiratsuka and his colleagues of that anomaly using CT Angiography and Digital Subtraction Angiography, also showing the left internal carotid artery of a small caliber, tortuous and dysplastic, however the CT brain of the patient showed contralateral intracerebral hemorrhage and they were suggesting that this anomaly although it is considered asymptomatic, it may cause contralateral hemodynamic stress .[4]\

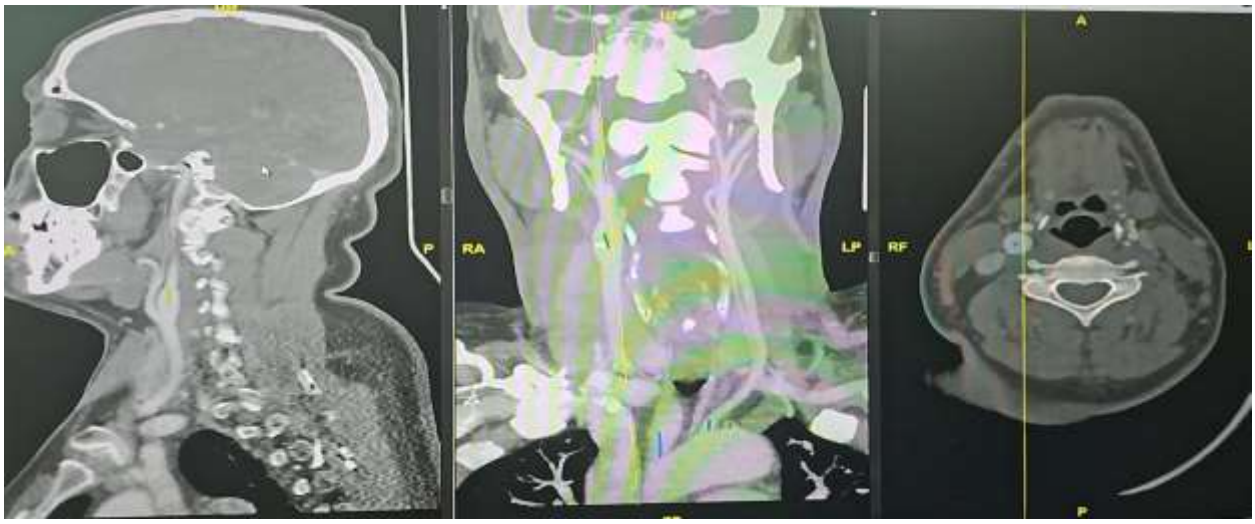
A prior case report of this anomaly with contralateral intracranial giant aneurysm of ICA was reported in 1999 could require special attention to the conclusion of Hiratsuka and his colleagues. [5]
Our Case report of separate origin of Left Internal and External Carotid Artery from Aortic Arch with Contralateral Right Internal Carotid Artery dilatation and Acute Right MCA Ischemic Insult with Previous studies suggest that this anomaly might cause deficits related to contralateral side .with causing contralateral hemodynamic stress



This is an axial CT angiography to show the Separate origin of ECA and ICA from aortic arch; .from Left to Right (Left SCA, Left vertebral, Left ICA, Left ECA and Brachiocephlic arteries)



This is a saggital, axial and coronal views of CT Angiography at the same level to show the seperate origin of ICA and ECA



This is a saggital,coronal and axial views of CT Angiography to show the seperate origin of Left ICA and ECA from aortic arch, also showed that the ICA of small caliber and tortous feature and the Right ICA showed the anurysmal like Dilatation

Conclusion :

Here we report A case of middle aged man with Separate origin of Left Internal and External Carotid artery from Aortic Arch with contralateral Right internal Carotid dilatation and Acute Right MCA Ischemic stroke raising the possibility of this anomaly to cause contralateral hemodynamic .stress and ischemic insult Patient consent taken.

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