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MAGNETIC RESONANCE IMAGING (MRI) FINDINGS IN CAROTID-CAVERNOUS FISTULA – A CASE REPORT.

Radio-Diagnosis

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ABSTRACT

Carotid-cavernous fistulas (CCFs) are abnormal vascular shunts between carotid arterial system and the venous cavernous sinus. CCFs are further classified as either direct or indirect. Direct CCFs are characterised by a direct communication between the internal carotid artery (ICA) and the cavernous sinus (CS) , whereas indirect CCFs result from an indirect communication involving meningeal branches of internal or external carotid arteries and the CS. Here we present the Magnetic resonance imaging (MRI) findings in a case of CCF .

KEYWORDS

Carotid- cavernous fistulas (CCFs), internal carotid artery (ICA), cavernous sinus (CS)

INTRODUCTION

Carotid-cavernous fistulas (CCFs) are abnormal vascular shunts that can cause various neurologic or orbital symptoms. CCFs present clinically as proptosis, conjunctival injection, chemosis, diplopia, headaches, subjective bruit, visual disturbance and ocular pain. In severe cases, vision loss may be rapid and severe. CCFs are almost always acquired lesions and can be traumatic or non-traumatic in origin. Direct CCFs are high flow lesion and frequently are traumatic in origin and also may be caused by rupture of an internal carotid artery (ICA) aneurysm into the cavernous sinus(CS). The presentation is acute and symptoms develops rapidly. Indirect CCFs are slow flow , low pressure lesion and are thought to be degenerative in origin. Causes include hypertension, fibromuscular dysplasia and Ehlers–Danlos type IV. Onset of symptoms is often insidious.

CASE REPORT

Here we report a case of 53 years old female who presented in ophthalmology department with history of proptosis left eye for 5 months and headache. She had no recent trauma. She had best corrected visual acuity (BCVA) of 6/60 and relative afferent pupillary defect (RAPD)in the left eye with an intraocular pressure of 28 mm of hg. Fundus of left eye showed pale optic disc.

Patient was further evaluated with Magnetic resonance imaging (MRI) brain. On MRI brain there was proptosis left eye and left CS was enlarged with abnormal lateral contour bulging. Multiple signal voids were seen in the region of left CS. Ectatic superior ophthalmic vein (SOV) was seen both on T2-weighted and post-contrast images **[figure 1(a,b,c & d)].** MR angiography also showed dilated SOV **[figure 2(a & b)].**

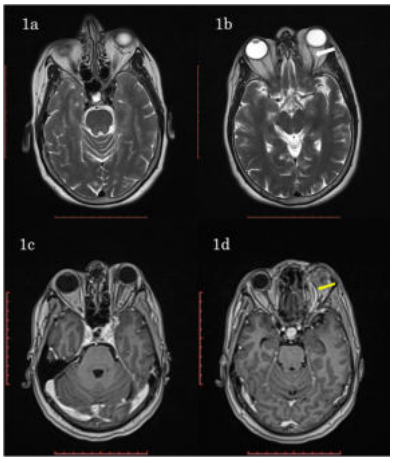

Figure 1. MRI brain T2 weighted axial images showing enlarged left CS with multiple signal voids in the region of left CS (a). Left SOV is dilated (white arrow) with proptosis of left eye (b) . Post contrast axial images (c & d) showing intense enhancement of left CS and dilated left SOV (yellow arrow).

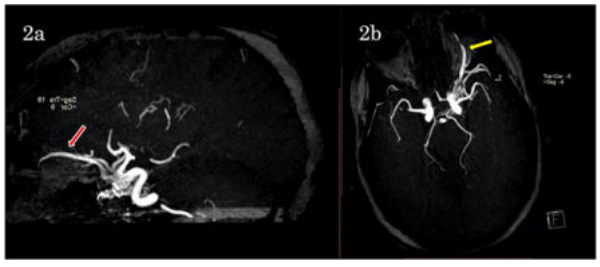

Figure 2: MR angiography images (a & b) showing dilated left SOV(red and yellow arrow).

DISCUSSION

CCFs can be categorised using several criteria. These include classifications systems based on etiology (traumatic vs. spontaneous), hemodynamic (high-flow vs. low-flow shunts), as well as angiographic criteria. The latter was characterised by **Barrow et al**[1] and is based on both the hemodynamic of the shunt as well as the arterial supply to the fistula as demonstrated on angiography. **Type A** CCFs are high-flow direct shunts between the ICA and the CS. **Type B** CCFs are dural shunts between meningeal branches of the cavernous ICA and the CS. **Type C** CCFs are dural shunts between external carotid meningeal branches and the CS. **Type D** CCFs are dural shunts with arterial supply from meningeal branches of both the ICA and ECA.

Initial diagnostic work up includes non-invasive imaging with CT scan and MRI. Degree of proptosis, orbital oedema, engorged tortuous ophthalmic veins and CS enlargement are better depicted on MRI. MRI also helps in evaluation of oedema and congestive brain parenchymal changes in cases where there is suspicion of re-routing of venous drainage. Cross-sectional imaging further helps to rule out other mimics like neoplasms and infective/inflammatory pathologies which may present with similar ocular symptoms[2]. Digital subtraction angiography (DSA) is required for definitive diagnosis and treatment. Complete delineation of the arterial supply and venous drainage pattern is the goal.

CONCLUSION

DSA is gold standard for diagnosis of CCFs allowing diagnostic confirmation, management planning and therapeutic intervention but because of non-invasive modalities such CT , MRI and carotid Doppler ultrasonography , DSA does not have to be considered the first and only investigation to evaluate CCFs.

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