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Research Article

MRI CHARACTERISTICS OF INTERNAL CAROTID ARTERY ANEURYSM

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ABSTRACT

Cerebral aneurysms are pathologic focal dilatations of the cerebrovasculature that are prone to rupture. These vascular abnormalities are classified by presumed pathogenesis. Saccular aneurysm is the most common form of aneurysm whereas Dolichoectatic, fusiform, or arteriosclerotic aneurysms are uncommon. Traumatic injury also may result in dissecting aneurysms in proximal vessels. The purpose of this study was to compare the accuracy of MRI with angiography technique in the identification of intracranial aneurysms. The intracranial vasculature was examined in 5 patients by MRA i The results of this study suggest that MRA can define the circle of Willis sufficiently to allow detection of intracranial aneurysms as small as 3-4 mm. MRA holds promise as a truly noninvasive screening examination of intracranial vasculature in patients at risk for aneurysms.

INTRODUCTION

Cerebral aneurysm affect equal number of women and men younger than 40 years. However women are more commonly affected in older age group with overall female to male ratio is 1.6:1.Most common site of intracranial aneurysm arise either from anterior communicating artery or anterior cerebral artery, whereas junction of ICA with posterior communicating artery is commonest site in female. Saccular aneurysm frequently ruptures into subarachnoid space, accounting for 70-80% of subarachnoid hemorrhages. Advances in neuroimaging techniques have altered the diagnosis of cerebral aneurysm dramatically.MR ANGIOGRAPHY allows detection of characterization of aneurysms and also enables 3Dimensional evaluation of aneurysm morphology and thus may assist in surgical planning.

MATERIALS AND METHODS

a prospective study of 5 cases with history of headache with hypertensionunder went MR BRAIN with angiography using PHILIPS ACHIEAVA 1.5T machine at Bapujihospital, davangere.

Objective: To characterize MRI features of intracranial ICA aneurysm.

RESULTS

In the present study of 5 cases of aneurysm, 3 cases were seen above the age of 50yrs (3 cases 51yrs, 60yrs and 78yrs respectively) and 2 cases were between 40-50 yrs(45 yrs and 49 yrs respectively. Mehdron *et al*[1] in their study of 40 patients with carotid artery aneurysm found age range of 25-77yrs.

Out of 5 cases of aneurysm 3 cases were females and 2 cases were male with female to male ratio of 2:1. Mehdron *et al*[1] found female to male ratio of 2.5:1 in their study. All 5 cases presented with headache, nausea and vominting. Out of 5 cases of internal carotid aneurysm, 4 cases were involving supraclinoid portion of internal carotid artery and 1 case was involving intracavernous portion of internal carotid artery. On MRI all 5 cases were heterogenous in apperence and were showing variable amount of flow void (hypointensity) on both T1W and T2W images. All three cases showed some degree of intramural thrombosis. 3 cases showed peripheral crescent of hyperintensity on T1W images, which is due to methemoglobin. Johnsen *et al*[2] in their study of sellar and parasellar lesions found similar MRI charecteristics in five cases of aneurysms.

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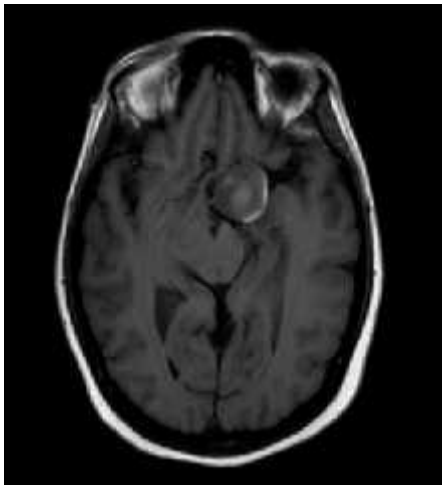


Fig A

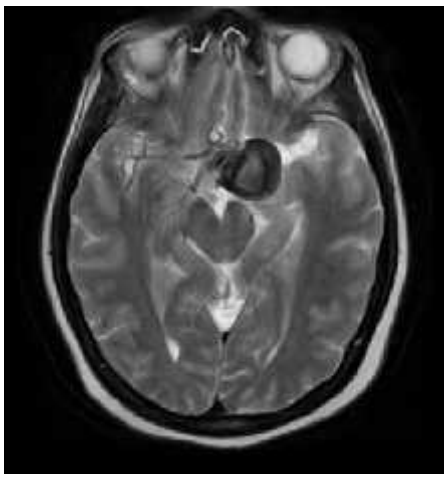


Fig B

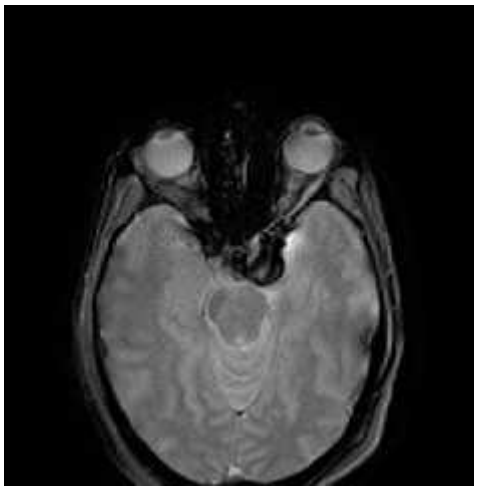
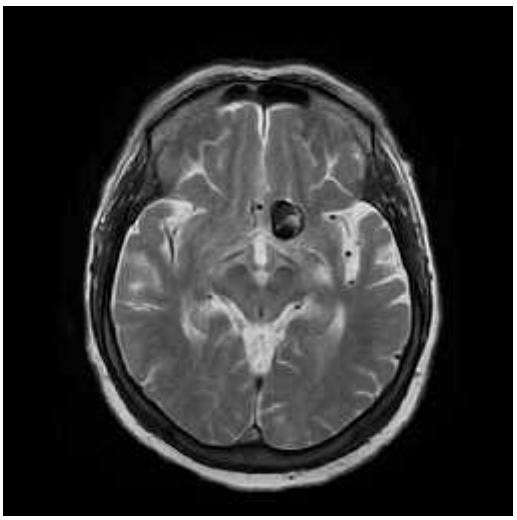
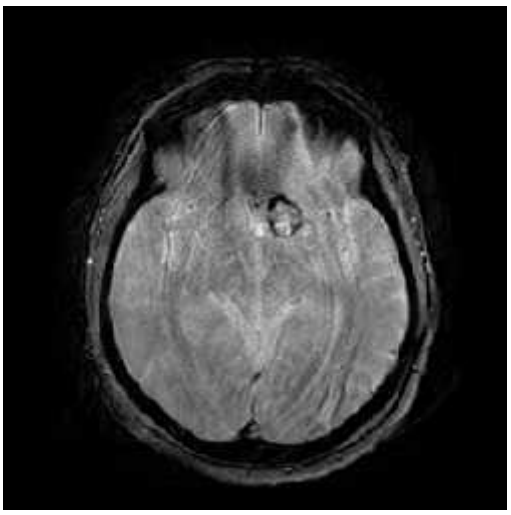


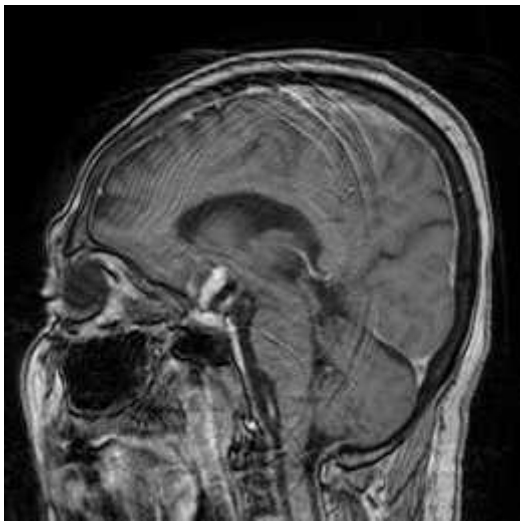
Fig C

Findings

A)T1W axial image, B)T2W axial image and C)T2FFE (gradient) axial images showing a well defined lesion in left parasellar&suprasellar region which is showing flow void in the peripheral of the lesion on all three sequence and variable intensity in the central portion of lesion on T1 and T2 corresponding to thrombosis. Peripheral thin rim of hyperintensity is seen on T1W image suggestive of methhemoglobin.







Findings

A)T2W axial image, B)T2FFE axial image and C)T1FFE Sagittal images showing a well defined lesion in left parasellar&suprasellar region which is showing flow void on T2 and peripheral bloomingon gradient sequence.

DISCUSSION

Intracavernous carotid artery aneurysms comprise 14% of all internal carotid artery aneurysms and 3 to 11% of all

intracranial aneurysms. Intracavernous artery aneurysms account for 3 to 39% of all giant aneurysms in various series. These aneurysms can be classified etiologically in to traumatic, idiopathic, and infectious and morphologically in to the saccular and fusiform sacs. Traumatic aneurysms account for 0.1 to 2.8% of all intracranial aneurysms. Infectious aneurysms constitute 2.6 to 6.5% of all intracranial aneurysms. Infectious aneurysm involving intracavernous carotid artery are rare. In 1989, Endo *et al* reviewed 22 cases described in literature. Infectious aneurysms arise from infectious emboli most commonly from bacterial endocarditis. They may result from local extension from neighboring septic process or meningitis, osteomyelitis of skull, sinusitis or cavernous sinus thrombophlebitis.

In addition to this, the perisellar aneurysm also may be arising from the supraclinoid internal carotid artery. In a series by Johnsen *et al*[2] three out five parasellar aneurysms were arising from intracavernous ICA while two were arising from supraclinoid internal carotid artery. Intracavernous and suprasellar aneurysms may cause cranial nerve complaints and visual disturbances as was case in three patients.One patient were presented with 6th nerve palsy. Small aneurysms are asymptomatic and may be diagnosed incidentally.

Before the advent of MRI, if an enhancing juxtasellar mass was seen at CT a cerebral angiography was always performed. Use of MR imaging obviates angiography and CT in evaluation of virtually every juxtasellar mass [3] because of its marked sensitivity to flow states and hemoglobin degradation products. MR imaging reveals flow void (no signal), caused by rapid flow through the patent lumen, and heterogeneous increased signal intensity in regions of slower turbulent flow .Peripheral, crescentric lamellae of intermediate to increased signal intensity on T1- and T2-weighted images correspond to areas of methemoglobin and hemosiderin in mural thrombus [114].

Signal misregistration artifact in the phase-encoding axis due to disordered or pulsatile flow within the aneurysm is also a characteristic finding. It is not seen in other masses involving the sella. The adjacent cavernous carotid arteries in these other masses may create the same artifact, but it can be localized to the normal artery rather than the mass.

Curvilinear calcification suggests an aneurysm but may be seen in craniopharyngiomas and sphenoid masses, which limits its specificity. CT may show curvilinear calcification with intense enhancement of the residual lumen[4], which is also relatively specific, but differentiation from other masses involving the sella may be difficult on CT scans depending on the timing and degree of vascular enhancement. Hirsch *et al*[5] found that, MRI was superior to CT in differentiating parasellar mass from aneurysm.

CONCLUSION

It is important to accurately determine size, morphology, location and rupture status of cerebral aneurysm and to identify the specific imaging characteristics. MRI with MR angiography depicted aneurysms with an accuracy of about 90%.Being non invasive procedure MRI has got advantage over invasive procedure like DSA and also it is faster and safer than DSA.MRA has also got advantage over CTA as it is devoid of ionizing radiation.

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