

Case Report

Intracranial Unruptured Right Internal Carotid Artery Aneurysm in a Cadaver: A Case Report

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ABSTRACT

Background: Dilatations of localised segments of the artery are called 'aneurysms. Approximately 80% of aneurysms form in anterior circulation of circle of Willis. While 20% form in the posterior circulation of the brain. All aneurysms can cause symptoms because of compression of surrounding structures, thrombosis, rupture of emboli.

Material and Methods: During routine dissection for I MBBS students in Department of Anatomy, JSS Medical College during intracranial dissection we encountered unruptured saccular aneurysm of intracranial internal carotid artery on right side

Case report: Aneurysm of intracranial internal carotid artery was seen on right side of middle cranial fossa in a male cadaver. The aneurysm was close to right optic nerve and measured about 2.2 cm in width and 1.8 cm antero-posteriorly. No other intracranial pathology or anatomical variations were noted.

Conclusion: The anatomical knowledge of aneurysm is important to Neurosurgeons, Endovascular surgeons, ENT surgeons and interventional Radiologists.

KEYWORDS: Internal carotid artery, aneurysm, intracranial, subarachnoid haemorrhage.

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INTRODUCTION

Internal carotid artery a branch of common carotid artery has four parts- cervical, petrous, cavernous and intracranial. Cervical part passes through carotid canal and enters the middle cranial fossa, runs along the medial wall of cavernous sinus and turns upwards on medial aspect of anterior clinoid process [1]. After piercing the dura mater, the internal carotid artery turns back below the optic nerve to run between it and the oculomotor nerve. The internal carotid arteries and their major

branches supply blood to most of the forebrain and forms anterior circulation of circle of Willis. Aneurysms are balloon-like swellings which occur on arteries because of defects in the vessel wall. Aneurysms can be classified as saccular, fusiform, giant and traumatic. They can either be true aneurysms, containing the three layers of artery (tunica intima, media and adventitia) or false aneurysms, having a single layer of fibrous tissue as seen in traumatic aneurysm [2]. The risk of aneurysm rupture is about 1% but may

be higher or lower depending on the size and location of the aneurysm; however, when a rupture occurs there is a 50% risk of death. Aneurysms on the internal carotid artery near its termination may compress the lateral aspect of the optic chiasma, and compromise axons derived from the temporal side of the ipsilateral retina, which causes a defect in the nasal visual field [3]. These aneurysms found around the circle of Willis can cause subarachnoid hemorrhage [4]. Based on its size it can lead to compressive neuropathies. Here we report aneurysm of intracranial right internal carotid artery in a male cadaver.

CASE REPORT

During routine dissection for I MBBS students in Department of Anatomy, JSS Medical College, during intracranial dissection we encountered unruptured saccular aneurysm of intracranial internal carotid artery on right side of middle cranial fossa in a male cadaver aged around 65 yrs. The aneurysm was close to right optic nerve and measured about 2.2 cm in width and 1.8 cm antero-posteriorly. (Figure 1). No other intracranial pathology or anatomical variations were noted. The wall of aneurysm of internal carotid artery was subjected to histopathology section and H&E staining. On microscopic examination (olympus microscope) under 10x objective, it was observed that thinning of tunica intima, fibrosis of tunica media, thinning of tunica adventitia and also intramural haemorrhagic spots was seen. (Figures 2).

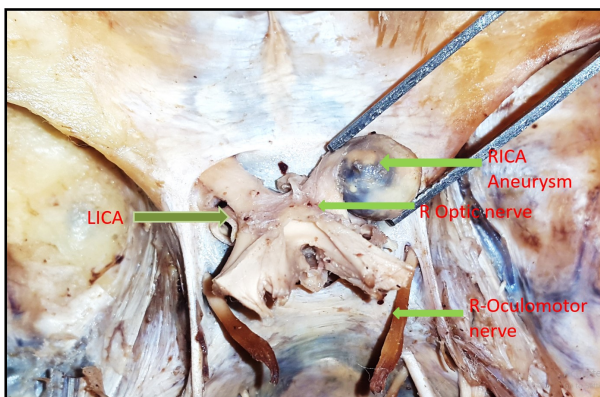


Fig. 1: Showing aneurysm of right internal carotid artery, RICA- right internal carotid artery, LICA – left internal carotid artery, Right optic nerve and Right oculomotor nerve.

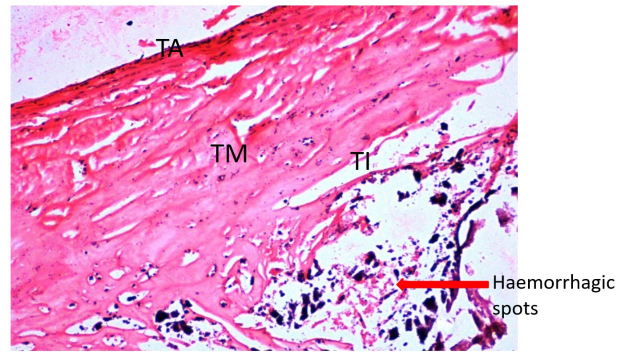


Fig. 2: Showing histology section of aneurysm of right internal carotid artery, TA – tunica intima, TM – tunica media, TA- tunica adventitia

DISCUSSION

Intracranial aneurysms affects 5–10% of the general population and 3.6 - 6.5% aged over 30 years. Women may be more likely to have an aneurysm than men (3:1 ratio of women compared with men. Unruptured aneurysms are more common (2.7 million per year) than ruptured (20,000 per year) The causative factors for aneurysms are congenital defects in the wall of a blood vessel, atherosclerotic changes, trauma, or infectious emboli. The most important inherited conditions associated with aneurysms include Ehlers-Danlos IV, Marfan’s syndrome, neurofibromatosis NF1, and polycystic kidney disease [5].

Bindu Aggarwal and others reported a unruptured berry aneurysm at the junction of anterior cerebral artery and anterior communicating artery in a male cadaver and aneurysm measured about 1.2 cm in its biggest diameter [6].

Multiple aneurysms was reported in the intracranial arteries and abdominal aorta of an 87-year old female cadaver, whose cause of death was cholangiocarcinoma. Multiple aneurysms were observed in the abdominal aorta, anterior cerebral artery and at the bifurcation of middle cerebral artery. The anterior cerebral aneurysm measured 6.8×5.5×3.7 mm and aneurysm of middle cerebral artery measured 4.3×2.8×3.2 mm [7]. Traumatic left internal carotid artery pseudoaneurysm was reported in a 40 year old male patient after post-mortem CT Angiogram and MRI. Ruptured aneurysm extended to sphenoid sinus and haemorrhage in the

sphenoid sinus and nasal cavity were detected. The microscopic examination of aneurysm revealed a large amount of fibrous tissue and haemorrhages in the cyst wall with inflammatory changes [8].

Contrast enhanced CT showed left internal carotid artery aneurysm in a 27-year-old male patient with complaints of blurred vision in left eye. The aneurysm through digital subtraction angiography measured around 8mm and compressed 3rd, 4th and 6th cranial nerves on left side resulting in ophthalmoplegia on left side [9].

Digital subtraction angiogram performed in a 40 year old male patient revealed right Internal carotid artery agenesis, anastomosis from the right ascending pharyngeal artery to the petrous portion of the Internal carotid artery, aneurysm of left middle cerebral and a ruptured aneurysm in the right medial posterior choroidal artery [4].

A case of internal carotid artery aneurysm along with carotid body tumour in neck was reported in a 60 year old man which was detected under CT Angiogram. The aneurysm measured about 1.0 × 1.7 cm and surgical resection of carotid tumour was performed safely without any vascular or nerve injuries [10]. Ophthalmic artery aneurysm was observed in a 69 year old male cadaver measuring about 3 x 2.5 mm in size, aneurysm was filled with thrombus and atherosclerotic changes were observed in both ophthalmic artery and internal carotid arteries [11].

Bilateral unruptured intracranial internal carotid artery aneurysms were reported in a 44-year-old woman, she presented with a chronic headache associated with progressive loss of visual acuity, blurring of vision and photophobia. MRI of brain showed bilateral aneurysm causing optic nerves compression and left region of optic chiasma [12].

In our case report unruptured internal carotid aneurysm was very close to right optic nerve which is partially in concordance with this case. Systemic hypertension is one of factor for formation of intracranial internal carotid artery aneurysm leading to diplopia, retroorbital pain and unilateral headache

followed by CN III and CN VI paralysis [13]. Treatment of intracranial aneurysms are quite challenging, the use of stents across the aneurysm neck for the reconstructive endovascular treatment in combination with intra-aneurysmal filler materials, leads to favourable outcome of procedure [14].

CONCLUSION

Cerebral or brain aneurysms may remain asymptomatic. Often it is an incidental finding noticed under radiological investigations. Larger-sized aneurysms with increasing in size may pose a substantial risk of undergoing rupture intracranially resulting in serious clinical complications. The present internal carotid arterial vascular aneurysm lying closely with the cavernous sinus is one of the less commonly encountered cadaveric findings during preclinical phase of teaching and learning. This case report is a base for understanding other similar vascular anomalies like arteriovenous fistula presented with pulsatile exophthalmos, proptosis, visual impairment under early clinical exposure.

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