International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

Aneurysm of Brachiocephalic Artery and Ascending Aorta

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Abstract: ***A 40 years old male with complains of blood in vomitus, bloody sputum and chest pain with X-ray chest suggestive of widened mediastinum. Computed tomography scan indicated saccular aneurysm at the origin of brachiocephalic artery with fusiform aneurysmal dilatation of ascending aorta and compression of superior vena cava (SVC). The surgery performed was ascending aortic aneurysm repair with interposition graft while excising diseased segment of brachiocephalic trunk and placing an interposition graft for the same, relocating it on neo aorta and ligation of fistulous connection. Post-operative there were no hematemesis and hemoptysis. Brachiocephalic artery aneurysm is uncommon and that though with aneurysmal dilatation of aorta is rarely reported.***

Keywords: Superior vena cava, Cardiopulmonary bypass, Ascending aortic aneurysm, Brachiocephalic artery

1. Introduction

Aneurysm of brachiocephalic artery are rarely reported, but might arise due to infection, trauma or atherosclerotic degeneration. Atherosclerosis of brachiocephalic vessels usually results in occlusive disease, however, approximately 4% of total surgeries on the brachiocephalic artery are for aneurysmal disease (1). A brachiocephalic artery aneurysm is usually found as an asymptomatic mass on computerised tomography scan or mediastinal compression symptoms due to aneurysmal enlargement (2). Surgery is indicated due to propensity for these aneurysms to enlarge, rupture, thrombose, embolise or pressure symptoms. A case of saccular aneurysm at the origin of brachiocephalic artery with fusiform aneurysmal dilatation of ascending aorta and compression of SVC is presented with fistulous communication between thrombus sac and right upper lobar bronchus.

2. Case Detail

A 40 years old man was referred to our hospital for evaluation of hemoptysis and hematemesis. He was a known case of hypertension for seven years. Chest X-ray was suggestive of superior mediastinum widening whereas electrocardiogram showed normal findings. Chest computed tomography scan demonstrated saccular aneurysm of 57 x 53 mm^2 at the origin of brachiocephalic artery with aneurysm neck of 18.6 mm showing large perilesional hyperdense lesion (mural thrombosis) with no post contrast enhancement causing depression and compression of SVC to right lateral side. There was atelectasis of right upper lobe and fusiform aneurysmal dilatation of ascending aorta measuring 60 mm in maximal diameter (Figure 1).

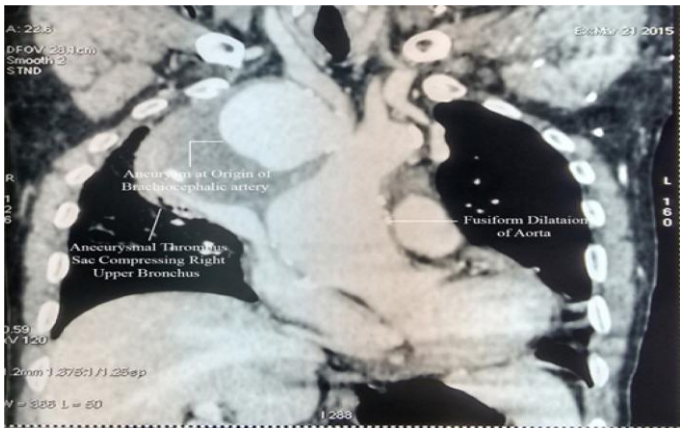

Figure 1: Computerised tomography Angiogram

2 D echo was suggestive of mild AR with Ejection fraction of 55%. We planned for upper gastrointestinal scopy and bronchoscopy. Upper gastrointestinal scopy was suggestive of Grade II-III varices in upper and mid oesophagus; bronchoscopy was suggestive of external compression over right upper and middle lobe bronchus with fistulous connection in right upper lobe bronchus. After banding for oesophageal varices and routine preoperative work up patient was posted for surgery. Surgery performed was ascending aortic aneurysm repair with interposition graft while excising diseased segment of brachiocephalic trunk and placing an interposition graft for the same relocating it on neo aorta with closure of fistulous leak between sac and right upper lobe. Per operative Transesophageal echocardiogram was suggestive of mild AR with normal valve morphology. Cardiopulmonary bypass (CPB) was established after heparinization between the right femoral artery, right axillary artery and right atrial appendage. Temperature was allowed to drift to 28^0C. Aortic cross clamps applied just proximal to arch. Two cross clamps applied 1) distal to the aneurysm over brachiocephalic artery and 2) just proximal to the origin of left common carotid artery (Figure 2), to perfuse both the carotids antegradely to minimize neurological complication.

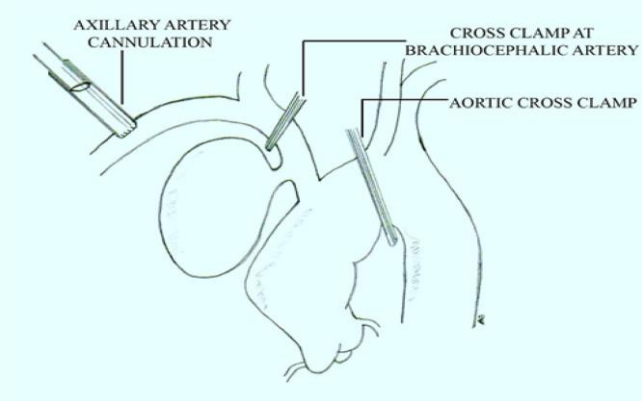

Figure 2: Per operative cross clamp placement

After cross clamping autotomy performed direct osteal cold blood cardioplegia was given. The left ventricle was vented through the right superior pulmonary vein. The aortic valve was normal in morphology. The diseased segment of ascending aorta was excised from sinotubular junction to distal to origin of brachiocephalic artery while replacing it with 22 No. Dacron graft. The brachiocephalic artery aneurysmal sac was opened, cleansed and washed thoroughly and neck of brachiocephalic artery aneurysmal sac was identified (Figure 3).

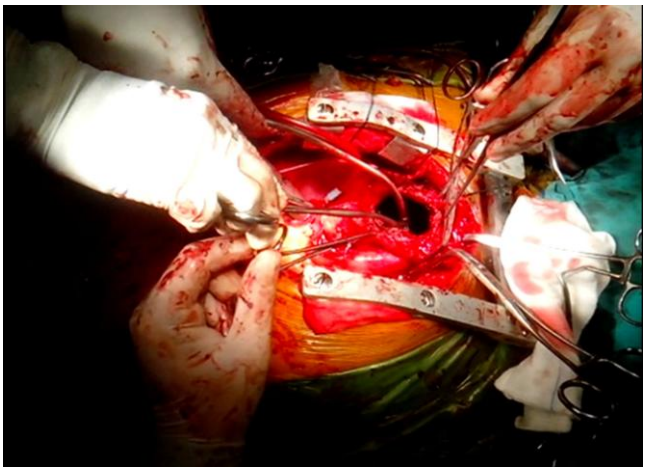

Figure 3: Per operative aneurysmal sac being dissected

Distal part of right brachiocephalic trunk was anastomosed with ePTFE 10mm graft. Its proximal end was anastomosed end to side with newly grafted ascending aorta using button whole technique Left heart desired aortic cross clamp released, gradually weaned off from CPB, all fistulous communication between lung parenchyma and thrombus sac were taken off by continuous prolene suturing, protamine was given, decannulation was done and haemostasis was achieved (Figure 4).

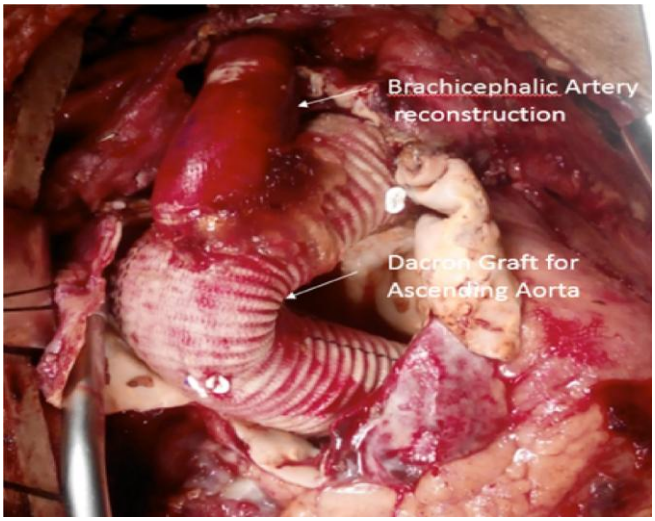

Figure 4: Dacron graft in position

As there was no air leak from right upper lobe, the chest was closed in layers with mediastinal and right pleural drains. Cardiopulmonary bypass time and aortic cross clamp time were 190 and 66 minutes respectively. The patient's postoperative course was uneventful and was discharged on eleventh post-operative day. Pathological diagnosis of specimen was true aneurysm with atherosclerotic plaque and calcification. At the time of discharge CECT Thorax was suggestive of patent graft with no leak (Figure 5). On first follow up patient is doing well, is asymptomatic.

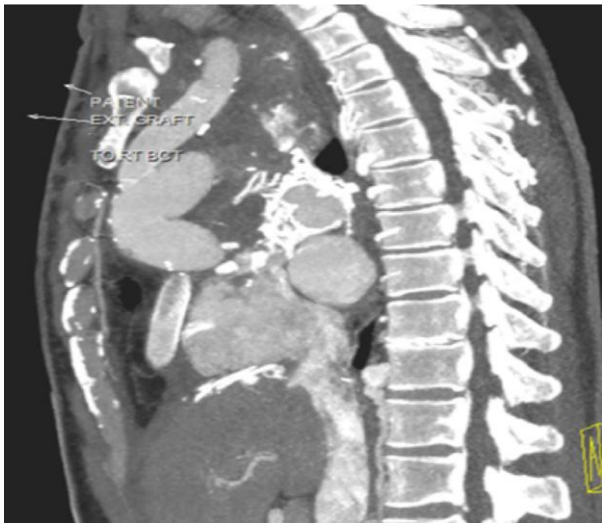

Figure 5: Post-operative computerized tomography angiogram showing patent graft

3. Discussion

Pathologic changes in the brachiocephalic vessels from atherosclerosis generally lead to occlusive lesions or to aneurysmal dilatation on the aortic arch with involvement of brachiocephalic trunk. A brachiocephalic artery aneurysm is usually seen as an asymptomatic mass on chest X-ray but may present with neurologic symptoms from emboli or mediastinal compression due to aneurysmal dilatation.(2) When diagnosed, a brachiocephalic artery aneurysm needs surgical management to prevent the complications related to aneurysm, i.e., enlargement, thrombosis, rupture, or embolization. Anurysm of brachiocephalic artery with

fistulous communication to upper lobe bronchus is rarely reported in literature Kieffer et al. mentioned that patients with isolated asymptomatic aneurysms who are at high surgical risk should undergo surgery when the aneurysms are saccular or when their maximum transverse diameter is more than 3 cm.(3) Various surgical approaches have been suggested for the treatment of the brachiocephalic artery aneurysm and include ligation alone,(4) patch angioplasty,(5) resection with end-to-end anastomosis,(6) and bypass with either saphenous vein,(2) or prosthetic grafts.(1) Multiple placements of the aortic cross-clamp may potentiate the risk of intimal damage or embolization in an atherosclerotic aorta. In our case, we used single placement of two cross clamps to avoid neurological complication.

4. Conclusion

In this case, the aneurysm was involving the brachiocephalic artery and proximal aorta, surgery performed was ascending aortic aneurysm repair with interposition graft while excising diseased segment of brachiocephalic trunk and placing an interposition graft for the same relocating it on neo aorta. Preoperative detection of the origin and termination of aneurysm is important to plan surgery.

References

[1] Brewster DC, Moncure AC, Darling RC, Ambrosino JJ, Abbott WM. Innominate artery lesions: problems encountered and lessons learned. J Vasc Surg 1985; 2: 99–112.
[2] Schumacher PD, Wright CB. Management of arteriosclerotic aneurysm of the innominate artery. Surgery 1979; 85: 489–95.
[3] Kieffer E, Chiche L, Koskas F, Bahnini A. Aneurysm of the innominate artery: surgical treatment of 27 patients. J Vasc Surg 2001; 34: 222–8
[4] Greenough J. Operations on the innominate artery: report of a successful ligation. Arch Surg 1929; 19: 1484.
[5] Thomas TV. Intrathoracic aneurysms of the innominate and subclavian arteries. J Thorac Cardiovasc Surg 1972; 63: 461–71.
[6] Kirby CK, Johnson J. Innominate artery aneurysm treated by resection and end-to-end anastomosis. Surgery 1953; 33: 562–6.

Author Profile

Dr. Jignesh Kothari has received his M.Ch degree from SGPGI MS, Lucknow in 2001 December. DNB from the same institute in same year 2001 December. Currently He is working with U.N.Mehta Institute of Cardiology & Research Center, Civil Hospital, Ahmedabad as a Associate Professor (Cardio vascular thoracic surgery) since last twelve years.