



Aneurysm of Right Subclavian Artery with Active Tuberculosis - A Complex Management Approach

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Abstract

Upper extremity aneurysms are quite uncommon when compared to other peripheral arterial aneurysms. Among them saccular aneurysms are extremely rare. We report a case of mycotic saccular aneurysm in a patient with active tuberculosis with an updated review of literature. Our case is unique in view of surgical exposure method used (sternotomy with claviclectomy) and infective in etiology. The most common causes of subclavian artery aneurysm are atherosclerosis, trauma and post-stenotic dilated aneurysm secondary to thoracic outlet syndrome, besides, the rare causes include infective etiology. Our patient had active spinal tuberculosis, which was treated prior to surgery. The patient was discharged 14 days later and continued antiplatelet therapy after discharge

Keywords: saccular aneurysm; mycotic aneurysm, tuberculosis, sternotomy

Case report

Our patient is a 40 year old female admitted with h/o back pain for the past 4 months. She also had on and off fever, exertional dyspnea, loss of weight and appetite for the past 6 months. She had h/o pleural tapping for Right sided pleural effusion 2 months back

Initially evaluated for back pain in local GH and MRI spine and CT chest was taken.

Investigations: MRI findings were suggestive of TB spine: Gibbous noted at D11-12 level, ant wedge compression of D11 vertebra, epidural abscess, paravertebral abscess, Left psoas abscess, anterior sub ligamentum abscess.

CT Chest findings : Right sided pleural effusion, consolidation noted in the Right lung upper lobe . Saccular aneurysm arising from anterior margin of Right Subclavian artery, local examination revealed pulsatile swelling of size 4*3 cm in Right supra clavicular region. Normal peripheral arteries.

CT Angio suggestive of: saccular aneurysm of size 3.5cm in max diameter, arising from Right Subclavian artery distal to origin of Right vertebral artery. Compressing on distal artery and vein, sac pointing antero-inferior.

Patient's, basic blood parameters, renal function tests, blood grouping and typing, complete blood counts, chest x-ray, pulmonary function tests, cardiac evaluation were found to be within normal limits. Patient was started on ATT from the day of admission and surgery was planned after 4 weeks of intensive phase of CAT-1 ATT.

Operative procedure

Right supraclavicular incision plus median sternotomy approach, since the aneurysm was located in the intrathoracic space and close to the common carotid and vertebral arteries.

After conventional median sternotomy incision with right supra clavicular extension of the incision was performed the sternum was retracted initially the Innominate vein controls was taken, then the distal Innominate artery controls Right common carotid controls were taken, dissection extended laterally deepening through the Right supra clavicular incision, difficulty in delineating the aneurysmal sac was encountered, so mid portion of the clavicle was skeletonised using a periosteal elevator, and was cut in the middle, using the both edges of the clavicle as the lever, the third part of the Subclavian artery controls were taken, dense adhesion was noted around the peri aneurysmal sac with entire sac adherent to the overlying scalenus anterior and to the underlying brachial plexus, no tissue planes could be identified between the aneurysmal sac and the neural plexus, and the sac was densely adherent to the pleura.

Anticipating very high chances of injury to the underlying pleura, phrenic nerve and the brachial plexus and possibly the Subclavian vein, it was decided to exclude the aneurysm and to perform the extra anatomical, Innominate Subclavian bypass with 6*40 ringed PTFE graft with ligation of the Subclavian proximal and distal to the aneurysm. Tunneling was done anterior to the IJV and behind the sternocleidomastoid muscle in subcutaneous plane. Rt vertebral artery was ligated. After achieving complete hemostasis, wound was closed in layers with retro sternal suction drain.

Patient was in elective ventilation for 48 hours followed by a smooth post operative recovery period. Patient was discharged on the 10th post operative period with continuous anti tuberculous therapy, at one month follow up period repeat duplex USG of the operative site was done showing a functional bypass with no residual flow in the aneurysmal sac.

Discussion

Aneurysms of the SCA are extremely rare.[2] Only 1% of all peripheral aneurysms involve the subclavian and innominate arteries. Vierhout et al. In a 2010 review found <400 cases of SCAA published reports in the world literature.[4] SCAA s can be classified into two groups: (a) intrathoracic and (b) extrathoracic.[4,5] Vierhout et al. Found 39% of scaas in the proximal segment, 25% in the middle segment, and 24% in the distal segment. Each group differs with the other in etiology, presentation, and treatment. The etiology was trauma (37%), atherosclerosis (18%), TOS (18%), and iatrogenic (10%) . Proximal and middle segment scaas were most often caused by atherosclerosis, collagen disorders, and trauma or iatrogenic insults.[6] TOS accounted for almost 15% of cases in the mid segment and almost half in the distal scas (46%).[6] Extrathoracic aneurysms are often related to a TOS or old trauma, intrathoracic aneurysms are often caused by atherosclerotic (as in our reported case) or rarely due to fibrodysplastic, infectious, or traumatic etiologies.[7] Extrathoracic aneurysm usually presents with pulsatile mass

over supraclavicular fossa with or without vascular bruit whereas intrathoracic aneurysm or poststenotic aneurysm compress brachial plexus or upper extremity vessels leading to the edema.[1,4,5] Embolization, rupture, and thrombosis causing ischemic limb were present in 16%, 9%, and 6% of patients, respectively.[6]. The chest CT can detect this condition noninvasively; however, CT or digital subtraction angiography is necessary to plan surgical or endovascular repair.[12] Multiplanar reconstruction of CT angiogram is very helpful in planning the approach for the surgery. The surgical or endovascular principle is to restore inflow and outflow tracts, which would benefit by exposing bilateral ends of aneurysm.[1] Common surgical approaches include (1) posterolateral thoracotomy, (2) third anterior intercostal space thoracotomy (thoracic), (3) T-shaped median sternotomy with transverse extension over the second or third intercostals space, (4) trapdoor thoracotomy (combination of 3 plus supraclavicular incision), and (5) paraclavicular incision.[1]

In our case, as the aneurysm was large with severe inflammatory adhesions to the lung and retrosternal tissues, sternotomy with division of clavicle was used for extensive exposure. Claviculectomy permitted excellent exposure for distal SCA

The overall complication rate was reported to be 26% in the 2010 review by Vierhout et al., of 329 patients who underwent open surgery. There was an overall mortality of 5%, and a variety of complications, including laryngeal nerve palsy, upper limb ischemia, pulmonary problems, (including chylothorax and esophagopleural fistula), cardiac complications, graft occlusion, and brachial plexus injuries.[6] scaas should be treated when encountered; there are no criteria for size, and scaas can be well treated with both open and endovascular techniques.[6] Overall complication rate for endovascular SCAA repair was 28% with a mortality rate of 5%.[6] The durability of endovascular techniques is not yet proven.[6] Beregi et al. Found that 40% of SCAA stent grafts were occluded within 1 year.[15]

Conclusion

Although subclavian aneurysms are rare, their management remains primarily surgical due to proximity of major branches. Sternotomy with partial claviculectomy provides excellent exposure for excision and reconstruction of large scaas. Infective etiology to be ruled out in all cases with appropriate antibiotic treatment initiated before surgical procedure.

References

1. Zhan B, Zhang S, Shao Y. Operation for huge subclavian artery aneurysm: A case report. J Thorac Dis 2010;2:117-20.

2. Dent TL, Lindenauer SM, Ernst CB, Fry WJ. Multiple arteriosclerotic arterial aneurysms. Arch Surg 1972;105:338-44.
3. Dougherty MJ, Calligaro KD, Savarese RP, DeLaurentis DA. Atherosclerotic aneurysm of the intrathoracic subclavian artery: A case report and review of the literature. J Vasc Surg 1995;21:521-9.
4. Vierhout BP, Zeebregts CJ, van den Dungen JJ, Reijnen MM. Changing profiles of diagnostic and treatment options in subclavian artery aneurysms. Eur J Vasc Endovasc Surg 2010;40:27-34.
5. Salo JA, Ala-Kulju K, Heikkinen L, Bondestam S, Ketonen P, Luosto R. Diagnosis and treatment of subclavian artery aneurysms. Eur J Vasc Surg 1990;4:271-4.
6. Mohan IV, Stephen MS. Peripheral arterial aneurysms: Open or endovascular surgery? Prog Cardiovasc Dis 2013;56:36-56.
7. Davidovic LB, Markovic DM, Pejic SD, Kovacevic NS, Colic MM, Doric PM. Subclavian artery aneurysms. Asian J Surg 2003;26:7-11.
8. Windfuhr JP, Schubert D, Remmert S. Aneurysm of the subclavian artery. An unusual cause of dysphagia. HNO 2004;52:1097-102.
9. Pairolero PC, Walls JT, Payne WS, Hollier LH, Fairbairn JF 2nd. Subclavian-axillary artery aneurysms. Surgery 1981;90:757-63.
10. Sahu KK, Thirtha A, Devgarha S, Mathur RM. Giant pseudoaneurysm of right subclavian artery presenting with severe respiratory distress. Ann Vasc Surg 2011;25:1139.e13-5.
11. Bin HG, Kim MS, Kim SC, Keun JB, Lee JH, Kim SS. Intrathoracic aneurysm of the right subclavian artery presenting with hoarseness: A case report. J Korean Med Sci 2005;20:674-6.
12. Schoder M, Cejna M, Hölzenbein T, Bischof G, Lomoschitz F, Funovics M, et al. Elective and emergent endovascular treatment of subclavian artery aneurysms and injuries. J Endovasc Ther 2003;10:58-65.
13. Buscaglia LC, Walsh JC, Wilson JD, Matolo NM. Surgical management of subclavian artery injury. Am J Surg 1987;154:88-92.
14. Lin PC, Jacobowitz GR, Rockman CB. Subclavian artery aneurysm in association with congenital absence of ipsilateral internal carotid artery. J Vasc Surg 2004;39:682-5.
15. Beregi JP, Prat A, Willoteaux S, Vasseur MA, Boularand V, Desmoucelle F. Covered stents in the treatment of peripheral arterial aneurysms: Procedural results and midterm follow-up. Cardiovasc Intervent Radiol 1999;22:13-9.





