

Successful Repair of a Post-opcabg Distal Ascending Aortic Pseudoaneurysm through Lateral Thoracotomy – A Case Report

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Abstract:

A large ascending Aortic pseudoaneurysm is a rare life threatening complication after off pump coronary artery bypass surgery. We herein describe such a case of massive ascending Aortic pseudoaneurysm, with

impending rupture which was adherent to undersurface of sternum, was successfully treated by us at Square Hospitals Limited.

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Introduction:

Pseudoaneurysm, (false aneurysm) of the thoracic aorta usually results from transmural disruption of the aortic wall, and the leak is contained by surrounding mediastinal structures. Previous cardiac surgery is one of the most frequent cause¹; (occurs in fewer than 0.5% of all cardiac surgical cases)² Other causes are trauma³ or infection⁴, vasculitis, and arteriosclerosis³. Pseudoaneurysms are usually located at earlier anastomotic sites, aortotomy sites, cannulation and venting sites⁵. infection, poor anastomotic technique, and intrinsic aortic wall disease are also associated.

Surgical treatment may differ according to pathologic features of the pseudoaneurysm, and surgical interventions can be challenging, in the presence of infection or previous cardiac surgery. Aortic pseudoaneurysm has a high mortality rate due to the

high pressure of the edematous aortic wall, which usually causes the rupture^{6,7}. A result this disease should be treated as soon as it is diagnosed. We hereby describe a case of large thoracic aortic pseudoaneurysm with a high risk for rupture during median sternotomy successfully treated by us in a post OPCAB male patient.

Case Report:

Mr. X, 54 years, male diabetic, hypertensive gentleman got admitted to our hospital with a pulsatile chest wall swelling, diagnosed as a case of pseudo aneurysm of ascending aorta. He had a h/o CABG×03 grafts on January, 2020 elsewhere. Later on he developed chest wound infection that required multiple procedures to heal on July, 2020 and then he developed dysphagia and CT scan of chest revealed pseudo aneurysm of distal

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ascending Aorta. Endovascular closure of aneurysm with glue and gel foam was attempted on Sep, 2020 but failed and the very next morning patient developed stroke with right sided hemiparesis (RSH).

General examination revealed emaciated patient, with mild anemia with dull chest pain, not radiating but only relieved by drugs (NSAIDs). He also developed dysphagia and hoarseness of voice for last six months.



Fig.-1: X-ray Chest PA view showing gross dilatation of Aorta

Pre-operative Blood Routine Examination, RBS, ECG, S. Electrolytes were normal except CRP (256) and ESR (113 mm at the end of 1st hour). Serum Total Protein, S. Albumin, TSH (1.13) were normal too. No growth was seen in blood CS.

Pre-operative echocardiogram showed large aneurysmal sac (58×78 mm), anterior to ascending aorta communicating with it via a narrow neck (8mm), 35 mm distal to aortic annulus. Spontaneous echo contrast seen in aneurysmal sac. Grade I AR, Trivial TR (PASP-50 mm of Hg). Fair LV systolic function (LVEF-55%). Good RV function. No pericardial effusion / intra-cardiac thrombus seen.

On Nov 2020, after optimization of patient condition, patient was brought to OT and after proper positioning CPB was established through right fem-fem cannulation after achieving ACT. With deep hypothermic circulatory arrest at 22 °C, Aorta was approached through right antero-lateral thoracotomy at 4th ICS using MIDCAB retractor. Pseudoaneurysm was found hugely dilated & adherent with undersurface of the sternum. LV vent was introduced through right superior pulmonary vein from outside of pericardium.

Aneurysm was decompressed and entry point was secured with double patch (Dacron with glutaraldehyde treated pericardium). Wound was packed with gauze pieces and chest closed in layers keeping drain tubes. Discharging sinus tract of previous MS wound was excised off and wound was packed with povidone soaked gauze piece. On the subsequent day chest wound was re-opened through previous incision, gauze pack removed and one minor bleeding point seen and secured with polypropylene and pledgets. After hemostasis chest was closed in layers.

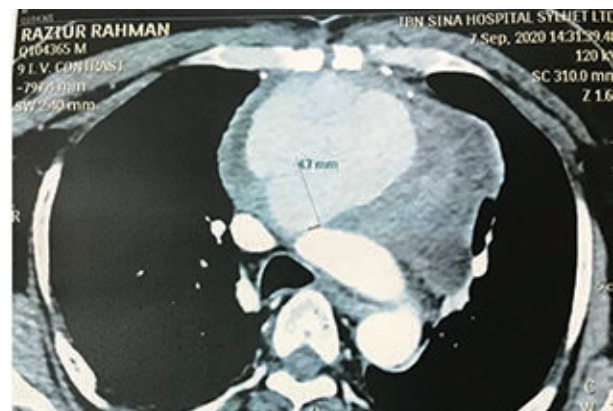
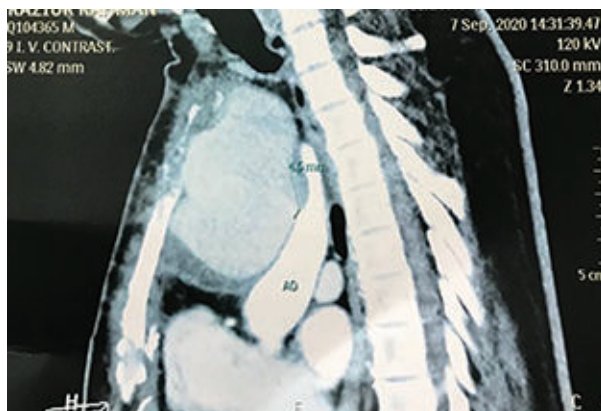


Fig.-2: Pre-op CT scan showing adherence of aneurysm with posterior wall of sternum

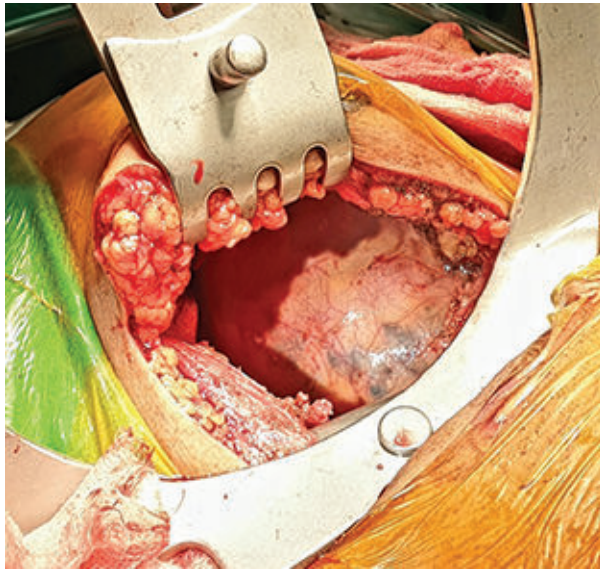


Fig.-3: Per-operative picture showing large aneurysm just before decompression and repair

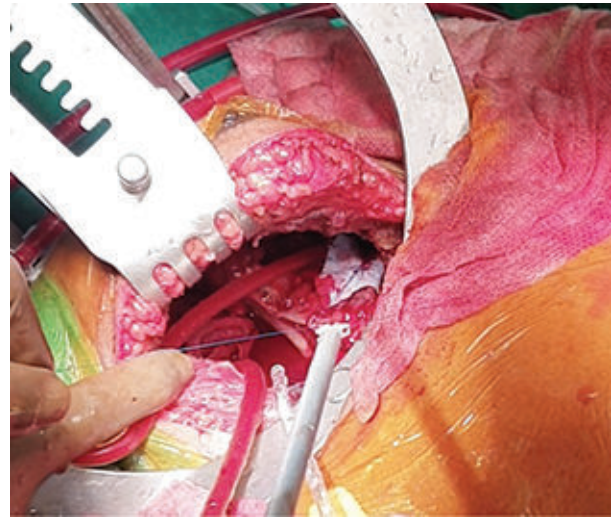


Fig.-5: Per-operative picture showing on going patch repair while aneurysm is decompressed



Fig.-4: Per-operative picture showing on going patch repair while aneurysm is decompressed

His post-operative days in ICU and step down was eventless. He was extubated from mechanical ventilation on 2nd POD without any residual abnormality.

Post-operative blood investigations showed nothing abnormal and ESR came down to 20mm at the end of 1st hour and CRP came down to 7.2. Post-operative S. Creatinine became normal on 7th POD which raised up to 2.3 mg/dl on 1st POD.

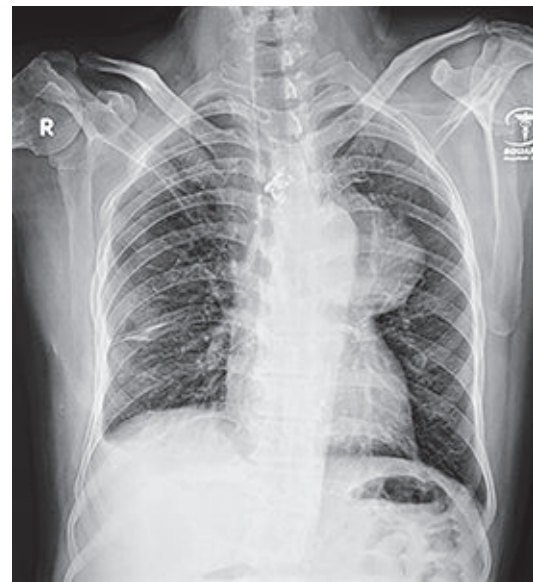


Fig.-6: Post-operative X-ray showing remaining aneurysmal sac just before discharge

Post-operative echocardiogram showed status post patch closure of aneurysm. No residual flow noted across aorta. Mild AR, Trace TR (PASP-35 mm of hg). Normal LV systolic function (LVEF-60%). Good RV function. No pericardial effusion / intra-cardiac thrombus seen.

Discussion:

A large ascending Aortic pseudoaneurysm is a rare life threatening complication following OPCAB surgery. We

herein described a case report of a pseudoaneurysm with a high risk for rupture during median sternotomy. The massive pseudoaneurysm in our patient was dilated and widely adherent to the posterior sternum. In our case, a safe redo sternotomy was to be the crucial factor for a successful reoperation. But, redo sternotomy may injure the aneurysm in our case, causing rupture so we chose to approach the aorta through lateral thoracotomy rather than median sternotomy.

This days endovascular procedures have been more commonly used for the treatment of aortic arch pseudoaneurysm^{6,8,9,10}. Compared with conventional open surgery, endovascular stent-grafting is less invasive, needed no dissection, less bleeding and a relative shorter procedural time and length of hospital stay. However, long-term clinical outcome of this operation have not been confirmed so far^{6,8,11}. In this patient endovascular closure with glue and gel foam was attempted with failure and moreover patient developed CVD with RSH on the subsequent day. We, once considered thoracic endovascular aortic repair (TEVAR) with stent, but in this case TEVAR appeared to be difficult as a result of the narrow access arteries, high flow zone, the large aneurysm and adhesion from the past sternotomy. As a result, in spite of the advancement of endovascular surgery, we had to choose surgical treatment.

In any re-do surgery a safe strategy for establishment of CPB is to be sought pre-operatively and thus appropriate perfusion strategy was crucial for successful treatment. According to Malvindi et al, an elective CPB should be started before redo-surgery in the presence of less than 2 cm retrosternal space¹². One key thing was that, we believed rapid cooling by CPB may result in ventricular fibrillation (VF) before the brain is cooled sufficiently, as a result we spent more than 30 min for systemic cooling at 22°C.

McCullough¹³ et al. conveyed that at 25°C the safe duration of hypothermic circulatory arrest is 14 min. Even due to rupture of the aneurysm during entering the chest or due to uncontrolled left ventricle distension after developing VF, if the cerebral perfusion was stopped, there is ample time to open the aneurysm and introduce selective cerebral cannulas from the aortic lumen under circulatory arrest at 25°C.

The pseudoaneurysm is associated with a high mortality rate of 61% if not treated surgically, due to documented rupture¹⁴. Conventional open surgery for pseudoaneurysm remains a surgical challenge and it's also

associated with a high rate of mortality (7–17%) and neurological complications (4–12%)^{6,8,15,16}. Long-term survival after surgical treatment yet to be known. In our case patient was doing excellent at 6 months' follow-up.

Conclusion:

Aortic pseudoaneurysm is rare life threatening disease. Proper planning with such complex cases like elective CPB with controlled cooling and availability of appropriate instrument provides the team with the confidence to deal with any complications that may arise. Surgical team should be proficient and experienced enough to deal such cases. Involvement of other specialties is required in some cases, like nephrology, neurology, and hematology, due to various postoperative complications.

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