



## Tuberculous Pseudo aneurysm of the Ascending Aorta with Contained Rupture in a patient with Disseminated Tuberculosis: A Case Report.

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### Abstract

**Background:** Mycotic aneurysms of the ascending aorta secondary to Mycobacterium tuberculosis are rare but life-threatening, and diagnosis is often delayed because their clinical and radiological features overlap with more common mediastinal diseases. **Case Presentation:** We report a 30-year-old man with microbiologically confirmed pulmonary tuberculosis receiving antitubercular therapy, in whom contrast-enhanced CT incidentally detected a saccular ascending aortic pseudoaneurysm. Serial imaging demonstrated rapid enlargement with a surrounding hematoma, consistent with contained rupture. The patient underwent successful excision of the pseudoaneurysm and ascending aortic reconstruction using a Dacron graft. Histopathology revealed necrotizing granulomatous inflammation, supporting tuberculous aortitis in the setting of disseminated tuberculosis despite negative AFB staining of the aortic tissue. Recovery was uneventful. **Conclusion:** Tuberculous pseudoaneurysm of the ascending aorta should be considered in patients with active tuberculosis and mediastinal abnormalities. Tuberculous pseudoaneurysm of the ascending aorta demands aggressive and prompt surgical intervention due to its extreme risk of catastrophic rupture. Despite formidable technical hurdles—including dense adhesions, intraoperative rupture necessitating deep hypothermic circulatory arrest, and active infection—timely surgical excision and graft reconstruction combined with antitubercular therapy successfully achieved anatomical restoration and long-term clinical stability.

**Keywords:** mycotic aneurysm, tuberculosis, ascending aorta, pseudoaneurysm, contained rupture, tuberculous aortitis.



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### INTRODUCTION

Mycotic aneurysms constitute a small proportion of all aortic aneurysms, and tuberculous involvement of the aorta is an exceptionally rare manifestation of extra pulmonary tuberculosis. Tuberculous aortitis most commonly results from contiguous spread of infection from adjacent mediastinal lymph nodes, vertebral foci, or pleuropulmonary disease, although haematogenous dissemination or seeding via the vasa vasorum has also been described. The ensuing destruction of the aortic wall predisposes to pseudo aneurysm formation and rupture. Because the descending thoracic and abdominal aorta lies in closer proximity to mediastina and para-aortic lymph nodes, ascending aortic involvement is distinctly uncommon. Early recognition is essential, as delayed diagnosis carries a high risk of catastrophic rupture, whereas timely surgical intervention combined with ant tubercular therapy is associated with favourable outcomes.

We report a patient with disseminated tuberculosis in whom an incidentally detected ascending aortic psuedoaneurysm demonstrated rapid interval progression to contained rupture, necessitating urgent surgical repair. The case highlights the diagnostic challenges and the importance of integrating radiological, operative and histopathological findings in establishing the diagnosis of tuberculous aortitis.

### MATERIALS AND METHODS

#### History and Initial Presentation

A 30-year-old male, non-smoker, tobacco chewer, with no known comorbidities and a history of TB contact (father, pulmonary TB, treated), presented in October 2025 with dry cough, low-grade fever with chills, and loss of appetite/weight over several weeks. He had no dyspnea or chest pain at onset. Outside evaluation with chest imaging (14/10/2025) showed

bilateral variable-sized cavitory consolidations suggestive of tuberculous etiology, and he was started on four-drug fixed-dose combination ATT (4FDC) under the National TB Elimination Programme on 15/10/2025.

### **Course and Incidental Discovery of Aortic Aneurysm**

The patient was admitted to the Department of Pulmonary Medicine (24/12/2025–01/01/2026) for further evaluation of persistent consolidation and bilateral cervical lymphadenopathy. Sputum CBNAAT (27/12/2025) confirmed MTB detected (very low), rifampicin resistance not detected. During this admission, he was noted to have right-sided facial deviation (upper motor neuron pattern), prompting neurological evaluation.

Contrast-enhanced CT thorax performed as part of TB workup (study date 27/12/2025) incidentally revealed a focal saccular aneurysm arising from the anterior wall of the ascending aorta, approximately 4.3 cm distal to the aortic annulus, measuring 23.4 mm with a neck of 14.7 mm, associated with a large perianeurysmal thrombus extending into the anterior mediastinum ( $7.3 \times 8.9 \times 6.2$  cm), causing compression of the superior vena cava. No active contrast extravasation was noted at this stage.

MRI brain (11/01/2026) performed for the facial nerve findings showed an ill-defined lobulated T2-hyperintense, T1-hypointense lesion in the right pons ( $1.8 \times 1.1$  cm) without diffusion restriction, favored to be infective in etiology.

Repeat CT aortogram three weeks later (19/01/2026) showed interval enlargement of the aneurysm to  $3.8 \times 5.1$  cm with a surrounding hematoma of approximately 250 cc and posterior displacement of mediastinal vessels — findings read as secondary to contained rupture of the aneurysm, with the possibility of mycotic aneurysm specifically raised by radiology. There was still no evidence of active contrast extravasation.

Contrast MRI brain (24/01/2026) showed the pontine lesion unchanged in appearance and reclassified as chronic insult sequelae with no features of active infection or neoplasm; a new incidental ring-enhancing granuloma was noted in the left parietal lobe ( $7 \times 4$  mm), read as suggestive of a TB granuloma in the context of the patient's known disease.

Given the enlarging aneurysm and perianeurysmal thrombus, the patient was started on anticoagulation (rivaroxaban 15 mg BD, later stepped down to 20 mg OD) and referred to the Department of Cardiovascular and Thoracic Surgery for further management.

### **Surgical Management**

The patient was admitted under CVTS on 04/02/2026. Pre-operative 2D echocardiography showed normal biventricular function (LVEF 60%), mild tricuspid regurgitation, and no significant valvular pathology. He underwent excision of the ascending aortic pseudoaneurysm with ascending aortic augmentation using a Dacron graft on 11/02/2026.

Right infraclavicular incision was made at the deltopectoral groove, the right axillary artery was identified and looped, and a 10 mm straight graft was anastomosed to it in an end-to-side fashion for arterial inflow. A midline sternotomy was then performed.

Operative findings included frank pus, a thick-walled pseudoaneurysmal sac, and intra-aneurysmal thrombus. Given the presence of dense interpericardial adhesions forming a mass-like structure over the aorta and the resulting risk of injury on direct sternotomy, arterial cannulation was established peripherally. Adhesiolysis was carried out to expose the right atrium, followed by right atrial purse-string placement and venous cannulation, establishing complete cardiopulmonary bypass. After completion of adhesiolysis, the pseudoaneurysmal sac was opened, releasing frank pus, which was sent for culture. During the process of adhesiolysis, the aneurysm inadvertently ruptured; consequently, the patient was placed on deep hypothermic circulatory arrest (DHCA).

After carefully defining the proximal and distal extent of the lesion, the aortic cross-clamp was applied and antegrade hyperkalemic sanguineous cardioplegia was administered to arrest the heart in diastole. The pseudoaneurysmal sac was opened, releasing frank pus which was sent for culture. Following the removal of intra-aneurysmal thrombus and the excision of the aneurysmal sac, the posterior wall was found to be intact and healthy; therefore, patch augmentation of the anterior wall of the aorta was performed using a Dacron graft with 5-0 Prolene. Thorough saline wash and antibiotic lavage were given prior to closure. The heart reverted to normal sinus rhythm after cross-clamp removal; the patient was weaned from bypass, protaminized, and de-cannulated with satisfactory hemostasis. No intra-aortic balloon pump was required. Cardiopulmonary bypass time was 100 minutes and aortic cross-clamp time was 48 minutes. Standard chest closure was performed over bilateral mediastinal drains, and the patient was shifted to the CVTS recovery room in stable hemodynamic condition for ventilatory support.

Histopathological examination (Surgical Pathology No. 832/26, reported 23/02/2026) of the excised aneurysmal/perianeurysmal tissue showed an ulcerated aortic wall with a large fibrin thrombus, wall disruption with extensive areas of necrosis, and epithelioid cell granulomas with giant cells — overall features of an aortic aneurysm with fresh fibrin thrombus and necrotising granulomatous inflammation. Special stains for AFB and fungi were both negative. The frank pus drained intraoperatively was also sent for routine (pyogenic) culture, which similarly showed no growth. Although microbiological confirmation could not be obtained from the vascular specimen, necrotizing granulomatous inflammation in the context of microbiologically confirmed pulmonary tuberculosis strongly supported tubercular aortitis.

## Postoperative Course and Follow-up

The postoperative course was uneventful. Post-operative echocardiography showed preserved LV function (LVEF 60%) with trivial mitral regurgitation and mild tricuspid regurgitation. The patient was discharged on 20/02/2026 in stable condition on antitubercular therapy (ATT), antiplatelet therapy with aspirin (Ecosprin) 75 mg once daily, and a structured follow-up plan across CVTS, Cardiology, and Physiotherapy outpatient services. ATT was planned for a total duration of 6 months, comprising a 2-month intensive phase with isoniazid, rifampicin, pyrazinamide, and ethambutol (HRZE), followed by a 4-month continuation phase with isoniazid, rifampicin, and ethambutol (HRE).

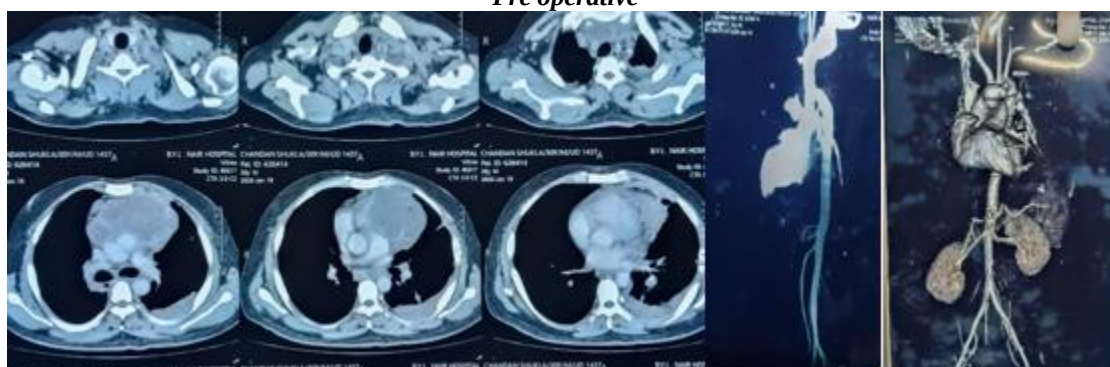
Follow-up 2D echocardiography on 20/03/2026 showed mild aortic regurgitation with the remaining findings consistent with the immediate post-operative study, and no evidence of graft-related complications at that stage. CECT Thorax was done on 30/04/2026 suggestive of significant reduction in size of aneurysm and significantly reduced perianeurysmal thrombus. Focal out pouching of 1.4×0.7cm noted in ascending aorta . Pulmonary changes sequele of old infectious aetiology . At post operative follow up on 07 August 2026 , the patient remained clinically well , was hemodynamically stable and had gained weight and reported no new symptoms. He was advised to continue aspirin 75mg once daily. No evidence of recurrent cardiovascular symptoms was noted during follow up period.

## Investigations Summary

**Table! . Investigation**

| Investigation                | Date       | Key Finding                                                                                                                                                                                                  |
|------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sputum CBNAAT                | 27/12/2025 | MTB detected (very low); rifampicin resistance not detected                                                                                                                                                  |
| CECT Thorax                  | 27/12/2025 | Saccular ascending aortic aneurysm (23.4 mm) with perianeurysmal thrombus/mediastinal mass (7.3×8.9×6.2 cm) compressing SVC                                                                                  |
| USG Neck                     | 27/12/2025 | Bilateral cervical lymphadenopathy, largest 1.4 cm, feasible for biopsy                                                                                                                                      |
| MRI Brain + Angio            | 11/01/2026 | Right pontine lesion 1.8×1.1 cm, T2 hyperintense, no restriction — favored infective                                                                                                                         |
| USG Abdomen                  | 29/12/2025 | Hepatosplenomegaly                                                                                                                                                                                           |
| CT Aortogram                 | 19/01/2026 | Aneurysm enlarged to 3.8×5.1 cm with surrounding hematoma (~250 cc) — contained rupture; mycotic aneurysm considered                                                                                         |
| MRI Brain (contrast)         | 24/01/2026 | Pontine lesion unchanged — chronic sequelae; new left parietal ring-enhancing granuloma (7×4 mm), s/o TB granuloma                                                                                           |
| 2D Echo (pre-op)             | 09/02/2026 | LVEF 60%, mild TR, no RWMA, structurally normal valves                                                                                                                                                       |
| Surgery                      | 11/02/2026 | Excision of ascending aortic pseudoaneurysm with augmentation, Dacron graft                                                                                                                                  |
| Histopathology               | 23/02/2026 | Ulcerated aortic wall, necrosis, epithelioid granulomas with giant cells — necrotising granulomatous inflammation; AFB & fungal stains negative                                                              |
| 2D Echo (post-op, follow-up) | 20/03/2026 | Mild AR; findings otherwise stable                                                                                                                                                                           |
| CECT Thorax                  | 30/04/2026 | Significant reduction in size of aneurysm and significantly reduced perianeurysmal thrombus. Focal out pouching of 1.4×0.7cm noted in ascending aorta . Pulmonary changes sequele of old infectious etiology |

## Pre operative



### Intra operative



### Post Operative

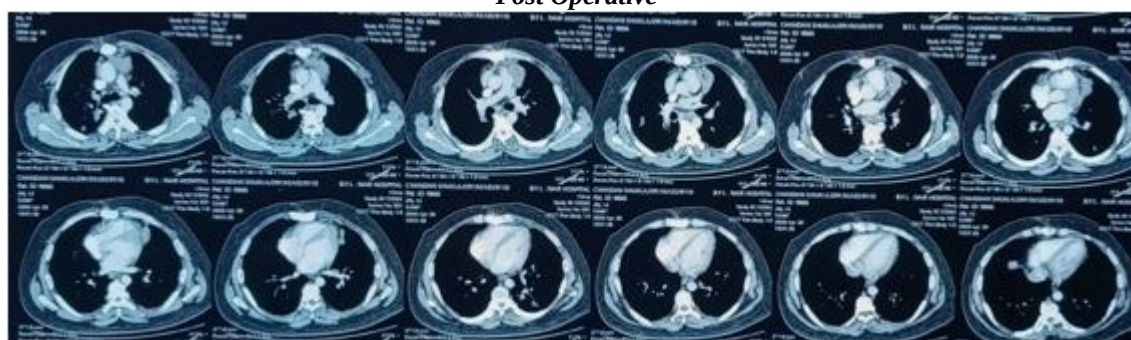


**Table 2. Timeline of Clinical Events**

| Date                    | Clinical Event                                                                                                                                                                                                                                                                                                                   |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>October 2025</b>     | Patient presented with dry cough, low-grade fever, anorexia, and weight loss.                                                                                                                                                                                                                                                    |
| <b>14 October 2025</b>  | Chest imaging demonstrated bilateral cavitory pulmonary lesions suggestive of tuberculosis.                                                                                                                                                                                                                                      |
| <b>15 October 2025</b>  | Four-drug antitubercular therapy (HRZE) initiated under the National TB Elimination Programme.                                                                                                                                                                                                                                   |
| <b>24 December 2025</b> | Admitted for evaluation of persistent pulmonary consolidation and bilateral cervical lymphadenopathy.                                                                                                                                                                                                                            |
| <b>27 December 2025</b> | Sputum CBNAAT detected <i>Mycobacterium tuberculosis</i> (rifampicin sensitive). Contrast-enhanced CT thorax incidentally revealed a 23.4-mm saccular ascending aortic pseudoaneurysm with a large perianeurysmal thrombus causing superior vena cava compression. Ultrasonography confirmed bilateral cervical lymphadenopathy. |
| <b>29 December 2025</b> | Ultrasonography of the abdomen demonstrated hepatosplenomegaly.                                                                                                                                                                                                                                                                  |
| <b>11 January 2026</b>  | MRI brain revealed a right pontine lesion, initially considered infective in etiology.                                                                                                                                                                                                                                           |
| <b>19 January 2026</b>  | CT aortogram demonstrated rapid enlargement of the pseudoaneurysm (3.8 × 5.1 cm) with a surrounding hematoma consistent with contained rupture.                                                                                                                                                                                  |
| <b>24 January 2026</b>  | Contrast-enhanced MRI brain showed a left parietal ring-enhancing granuloma suggestive of central nervous system tuberculosis.                                                                                                                                                                                                   |
| <b>04 February 2026</b> | Admitted under the Department of Cardiovascular and Thoracic Surgery for definitive surgical management.                                                                                                                                                                                                                         |
| <b>09 February 2026</b> | Preoperative transthoracic echocardiography demonstrated preserved biventricular function (LVEF 60%) without significant valvular disease.                                                                                                                                                                                       |
| <b>11 February 2026</b> | Excision of the ascending aortic pseudoaneurysm with ascending aortic augmentation using a Dacron graft. Intraoperative findings included a thick-walled pseudoaneurysm containing thrombus and frank pus.                                                                                                                       |
| <b>13 February 2026</b> | Routine microbiological culture of intraoperative pus showed no bacterial growth.                                                                                                                                                                                                                                                |
| <b>20 February 2026</b> | Discharged in stable condition on antitubercular therapy, aspirin, and scheduled multidisciplinary follow-up.                                                                                                                                                                                                                    |
| <b>23 February 2026</b> | Histopathological examination demonstrated necrotising granulomatous inflammation with epithelioid granulomas and giant cells; AFB and fungal stains were negative.                                                                                                                                                              |

|                       |                                                                                                                                                                                                                   |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>20 March 2026</b>  | Follow-up echocardiography showed mild aortic regurgitation with preserved ventricular function and no graft-related complications.                                                                               |
| <b>30 April 2026</b>  | Follow up CT suggests significant reduction in size of aneurysm and significantly reduced perianeurysmal thrombus.                                                                                                |
| <b>07 August 2026</b> | Outpatient follow-up demonstrated a satisfactory clinical recovery. The patient was hemodynamically stable , had gained weight , remained asymptomatic , and was advised to continue tab aspirin 75mg once daily. |

## DISCUSSION

Mycotic aneurysms account for fewer than 1% of all aortic aneurysms requiring surgical repair, and tuberculous involvement of the aorta represents one of the rarest etiologies within this group [9,10]. Tuberculous pseudoaneurysm of the ascending aorta is particularly uncommon; in the largest pooled series of 88 reported cases, only 9 (10.2%) involved the ascending aorta, whereas the descending thoracic and abdominal aorta were affected far more frequently [4]. This distribution is thought to reflect the anatomical proximity of the descending thoracic and abdominal aorta to mediastinal, paravertebral, and para-aortic lymph nodes, which serve as the usual source of contiguous spread [2,3,6]. Consequently, ascending aortic involvement remains limited largely to isolated case reports [1,5].

Our patient demonstrates several important clinical features of tuberculous ascending aortic pseudoaneurysm. First, the lesion was discovered incidentally during imaging performed for evaluation of active pulmonary tuberculosis, despite the absence of cardiovascular symptoms. Similar clinically silent presentations have been described previously, emphasizing that tuberculous pseudoaneurysm should be considered whenever a mediastinal or para-aortic mass is identified in a patient with active or previous tuberculosis [1,3,6]. Second, serial imaging demonstrated rapid enlargement of the pseudoaneurysm with development of a large perianeurysmal hematoma consistent with contained rupture over only three weeks. This aggressive progression reflects the well-recognized natural history of infective aneurysms, which have a substantially greater propensity for rupture than degenerative aneurysms, highlighting the importance of close radiological surveillance and timely surgical intervention once diagnosed [9–11].

Histopathological examination of the excised specimen revealed extensive necrosis with epithelioid granulomas and multinucleated giant cells, consistent with necrotising granulomatous inflammation. Although special stains for acid-fast bacilli and fungi were negative, this finding does not exclude tuberculous aortitis because extrapulmonary tuberculosis is frequently paucibacillary, making direct demonstration of organisms within vascular tissue difficult [7,8]. In the present case, microbiologically confirmed pulmonary tuberculosis together with cervical and axillary lymphadenopathy, hepatosplenomegaly, and a radiologically suspected intracranial tuberculoma provided strong clinicopathological evidence supporting a tuberculous etiology despite the absence of organism identification within the aortic specimen [7,8]. Similarly, sterile microbiological cultures of the intraoperative pus argued against superadded pyogenic infection and were consistent with an inflammatory collection associated with tuberculosis.

The presence of disseminated tuberculosis further supports either contiguous extension from mediastinal disease or hematogenous dissemination as the underlying mechanism of aortic involvement, although the precise route cannot be determined in an individual patient [3,6]. Regardless of the mechanism, this case illustrates the importance of maintaining a high index of suspicion for vascular involvement in patients with active tuberculosis who demonstrate unusual mediastinal abnormalities on cross-sectional imaging.

Surgical excision with vascular reconstruction remains the cornerstone of treatment for tuberculous pseudoaneurysms because of their high risk of rupture and catastrophic hemorrhage [9–11]. Surgical management presented exceptional technical challenges. The procedure required navigating dense interpericardial adhesions forming a mass-like structure over the aorta, which created a high risk of catastrophic injury upon direct sternotomy. To mitigate this, meticulous peripheral cannulation via a right axillary artery cutdown and a 10 mm straight graft was mandatory prior to opening the chest. Despite these formidable operative hurdles, surgical excision with ascending aortic augmentation using a Dacron graft successfully addressed the life-threatening lesion. In our patient, ascending aortic augmentation using a Dacron graft resulted in an uncomplicated postoperative recovery, while continuation of antitubercular therapy addressed the underlying infection. Successful management required close collaboration among pulmonologists, cardiothoracic surgeons, radiologists, pathologists, and neurologists, emphasizing the multidisciplinary nature of care in such complex presentations.

On subsequent outpatient follow-up, the patient remains clinically well, vitally stable, and compliant with his antitubercular therapy (ATT) and antiplatelet regimen. Serial follow-up CT imaging demonstrates a significant reduction in the size of the aneurysm/graft area, confirming a favorable anatomical and physiological response.

Overall, this case highlights the profound diagnostic and surgical challenges posed by tuberculous pseudoaneurysm of the ascending aorta and underscores the importance of integrating clinical, radiological, operative, and histopathological

findings to establish the diagnosis. Early recognition, prompt surgical intervention, and appropriate antitubercular therapy remain essential to achieving favorable outcomes in this rare but potentially fatal condition.

## CONCLUSION

Tuberculous pseudo aneurysm of the ascending aorta is a rare but serious complication of disseminated tuberculosis that can present incidentally and progress rapidly to contained rupture. Early recognition, prompt surgical repair and continued antitubercular therapy remains the cornerstone of successful management of tuberculous ascending aortic pseudoaneurysm. Granulomatous inflammation on histopathology, interpreted alongside confirmed systemic TB, is adequate support for a tuberculous etiology even in the absence of organism isolation from the aortic tissue itself.

## Declarations

- Consent: Not applicable / Not required.
- Conflict of interest: None declared.
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- Author contributions: All authors contributed to the clinical management, preparation, and review of the manuscript.

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