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# Simultaneous Surgical Management of Anterior Mediastinal Mature Cystic Teratoma and Triple Vessel Coronary Artery Disease in a Patient with Inguinal Hernia: A Case Report

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**ABSTRACT**

We present a case of a 61-year-old diabetic male patient who was incidentally found to have a large anterior mediastinal mature cystic teratoma during a routine chest radiograph performed as part of pre-anaesthesia evaluation for inguinal hernia surgery. Although, the patient was largely asymptomatic, but reported mild exertional dyspnea. Further investigations revealed triple vessel coronary artery disease (TVCAD. A multidisciplinary approach involving thoracic, cardiac and anesthesia teams led to the decision of performing a single-stage surgery. The surgical procedure involved resecting the mediastinal mass and subsequently performing coronary artery bypass grafting (CABG) for the triple vessel disease. The patient's postoperative recovery was smooth, with no significant complications, and he was discharged in stable condition. His histopathological examination confirmed the diagnosis of a mature cystic teratoma. This case shows the importance of a coordinated, multidisciplinary strategy in managing complex coexisting pathologies, showing the feasibility of simultaneous surgical intervention for both mediastinal and coronary conditions.

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## Introduction

Mature cystic teratomas of the anterior mediastinum are rare, benign germ cell tumors, typically containing well-differentiated tissue from two or more of the three embryonic germ layers: ectoderm, mesoderm, and endoderm. These tumors account for approximately 15% of anterior mediastinal masses in adults and 25% in children. While often asymptomatic and detected incidentally during imaging for

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unrelated conditions, symptomatic cases may present with cough, or chest pain due to the mass effect on surrounding structures (1). In serious condition they can rupture into surrounding organs leading to chest pain, hemoptysis, respiratory distress, cardiac tamponade, and pleural effusion (2).

Triple vessel coronary artery disease (TVCAD) is a severe form of ischemic heart disease, resulting in the narrowing of all three major coronary arteries, leading to compromised myocardial blood flow. TVCAD often presents with symptoms such as angina or myocardial infarction, necessitating coronary revascularization through techniques like balloon angioplasty, stent placement, atherectomy, and coronary artery bypass grafting (CABG). The management of patients with TVCAD requires careful consideration of the surgical approach to balance risks and outcomes (3).

Treatment becomes more complicated when coronary artery disease and a mediastinal mass coexist. Surgical management in such cases requires a multidisciplinary approach to address both cardiac and thoracic concerns, ensuring optimal patient care. In addition, the presence of an inguinal hernia further complicates the perioperative management. Herein, we report a unique case of a patient detected with a large anterior mediastinal mature cystic teratoma and triple vessel coronary artery disease, incidentally discovered during pre-anaesthesia workup for inguinal hernia surgery. The case highlights the feasibility of a single-stage surgical approach to address both thoracic and cardiovascular complication and emphasizes its advantages in minimizing patient morbidity and ensuring comprehensive treatment.

## Case presentation

### *1.Clinical Presentation and Management*

A 61-year-old diabetic gentleman was incidentally found to have a large anterior mediastinal mass during a routine chest radiograph performed as part of the pre-anesthesia workup for inguinal hernia surgery. The patient was largely asymptomatic, though on detailed evaluation, he reported mild exertional dyspnoea. His echocardiography revealed akinesis of the mid-posterior basal interventricular septum and basal inferior wall, mild concentric left ventricular hypertrophy, and a left ventricular ejection fraction of 45%. Coronary angiography confirmed triple vessel disease. The contrast-enhanced computed tomography (CT) scan showed a peripherally calcified, fat-containing soft tissue lesion measuring approximately 80 × 75 × 85 mm in the right anterosuperior and middle mediastinum (Figure 1). The mass compressed the underlying right upper and middle lobes and closely abutted the ascending aorta, superior vena cava (SVC), right atrium, and right superior pulmonary veins. Fat planes were grossly preserved, and no obvious enhancing solid component was identified, consistent with a diagnosis of a cystic teratoma.

A multidisciplinary discussion among the thoracic, cardiac, and anesthesia teams led to the decision to perform a single-stage surgery. The plan involved resecting the anterior mediastinal mass, followed by coronary artery bypass grafting (CABG) to address the triple vessel disease. The CABG was planned to bypass the left anterior descending artery and the obtuse marginal branch of the left circumflex artery.

### *2. Surgical Procedure*

The patient underwent fibre-optic bronchoscopy-guided intubation with a 37Fr left double-lumen endotracheal tube. A right internal jugular central line and a left femoral arterial line were placed. Following a median sternotomy, an 11 × 10 cm large, firm anterior mediastinal mass was identified. The mass had flimsy adhesions to the right upper lung lobe and was densely adherent to the pericardium at points of contact. Minimal pericardial fluid was observed, with no pleural effusion, pericardial or pleural nodules, or gross involvement of the lung, major vascular structures, chest wall, sternum, or phrenic nerve. Meticulous dissection using a vessel-sealing energy device was performed to minimize the risk of bleeding, enabling successful resection of the anterior mediastinal mass (Figure 2).

Subsequently, the patient underwent off-pump coronary artery bypass grafting. Two end-to-side anastomoses were performed in

the mid-portion of the vessels using reversed saphenous vein grafts to bypass the left anterior descending artery and the obtuse marginal branch of the left circumflex artery. The patient was shifted intubated to the postoperative cardiac intensive care unit with two mediastinal drains and a right pleural drain connected to a dual-chamber underwater seal bottle, later attached to wall suction.

### *3. Postoperative Course*

The immediate postoperative period was uneventful, except for the need for nitroglycerine infusion to manage transient hypertension and insulin infusion to control elevated blood sugar levels. The patient was extubated on postoperative day 0. Negative suction was discontinued on day 3, and both mediastinal drains were removed. The patient was transferred to the ward, and the right pleural drain was removed on day 4. He was discharged in stable condition on day 6. Histopathological examination confirmed the diagnosis of a mature cystic teratoma.

## Discussion

Anterior mediastinal masses are a diverse group of lesions that can pose significant diagnostic and therapeutic challenges due to their proximity to critical thoracic structures. Teratomas of the mediastinum are rare germ cell tumors, constituting about 10–15% of all anterior mediastinal masses (4). This tumor contains well-differentiated elements from at least two of the three germinal layers: endoderm, mesoderm, and ectoderm (1).

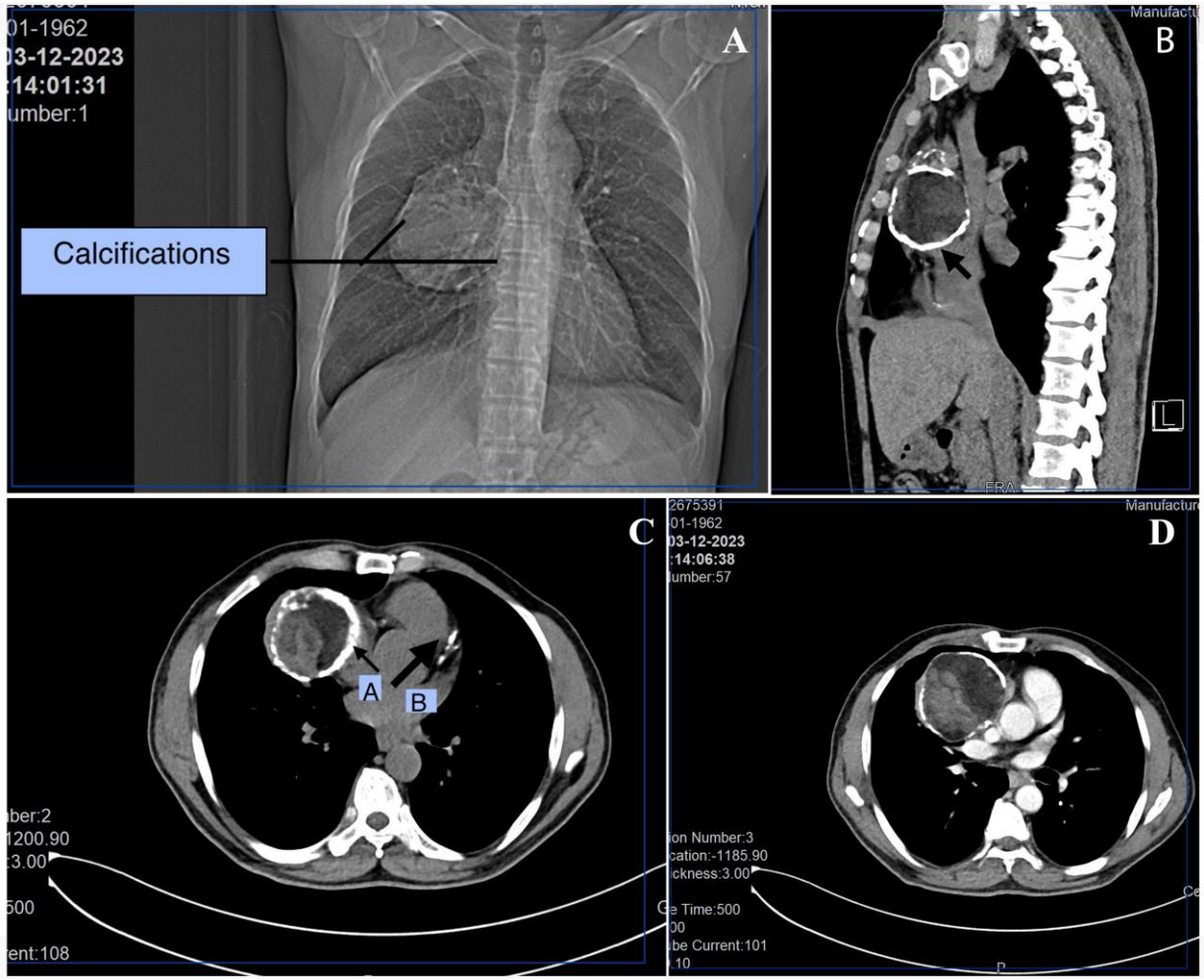


**Figure 1.** Tomographic imaging of the anterior mediastinal mass. (A) Sagittal view showing a large anterior mediastinal mass with calcifications. (B) Transverse view with non-contrast enhancement demonstrating the calcified mass and surrounding structures. (C) Cross-sectional view highlighting the calcifications within the mass and coronary arteries (arrow B). (D) Close-up of transverse sections depicting the relationship of the mass with adjacent structures, including the ascending aorta and superior vena cava.

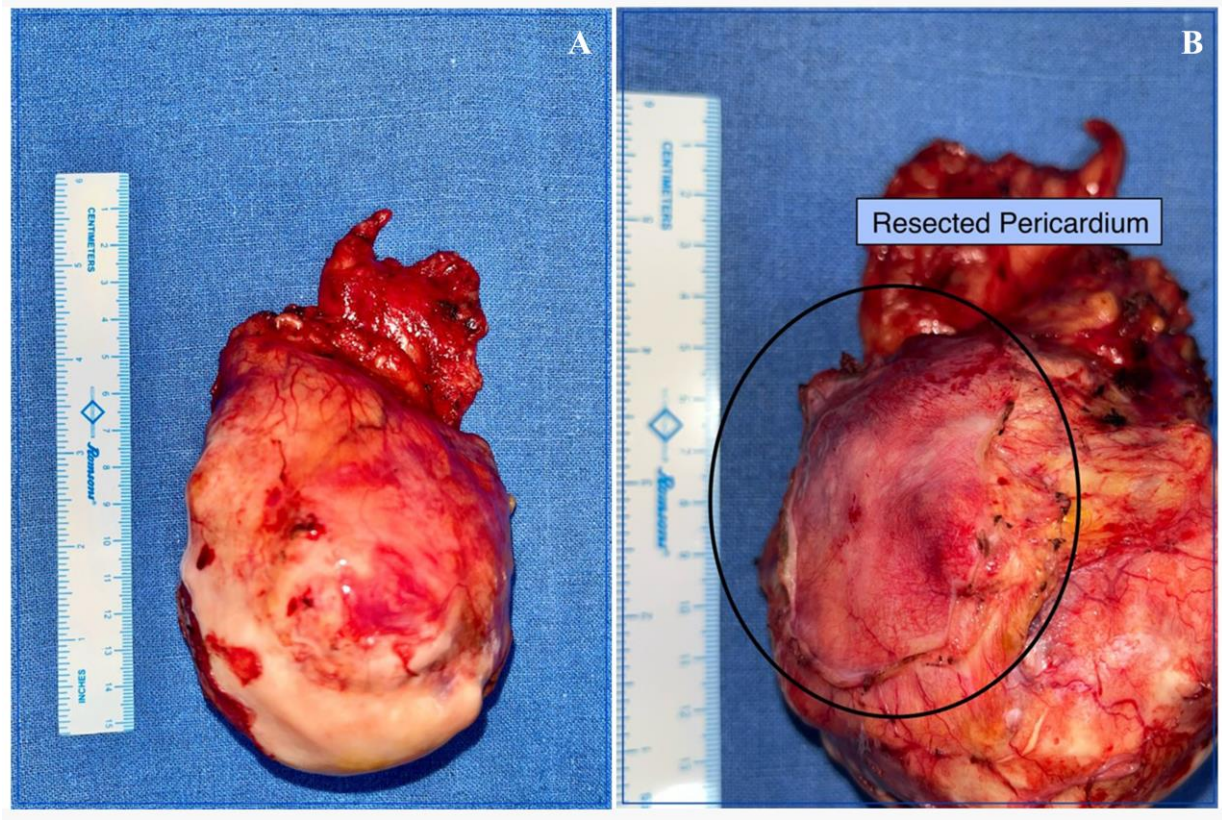


**Figure 2**. Gross pathology of the resected anterior mediastinal mass. (A) Anterior view of the mature cystic teratoma showing a calcified periphery. (B) Posterior view demonstrating the mass with resected pericardium, illustrating areas of dense adhesion.

These tumors are typically benign and are often discovered incidentally. In index study, the patient presented for a routine pre-anaesthesia evaluation for inguinal hernia repair, during which a chest radiograph revealed a large anterior mediastinal mass which later diagnosed as mature cystic teratoma and coronary angiography revealed triple vessel disease. Such incidental findings show the importance of thorough preoperative evaluations, as they can uncover clinically silent but potentially significant comorbidities.

The asymptomatic nature of these tumors is due to their small size and slow growth. However, when large, they may compress adjacent structures, causing symptoms such as dyspnea, chest pain, and cough (5). These teratomas can also rupture into neighboring organs leading to chest pain, hemoptysis, respiratory distress, cardiac tamponade, and pleural effusion (2). In index case, the patient was largely asymptomatic, however upon detailed examination he was reported to have exertional dyspnea. Diagnostic imaging plays a crucial role in pre-operative evaluation of a disease. In index study, the chest CT imaging revealed the presence of a peripherally calcified, fat-containing lesion which was consistent with a mature cystic teratoma, later confirmed in histopathology. Also, the absence of significant solid or enhancing components supported the benign nature of the tumor. The management of this case was complicated by the concurrent diagnosis of TVDCAD along with anterior mediastinal mass. While the standard approach often involves staged surgeries for such conditions, a single-stage strategy was deemed optimal after multidisciplinary deliberation. This approach not only reduces the cumulative anesthesia risk but also shorten the overall hospital stay and recovery time.

Surgical resection remains the definitive treatment for mediastinal teratomas, providing symptom relief and eliminating the potential risks of complications such as infection, rupture, or malignant transformation. In a study by Rujuan Wang et al. (2020), it was reported that surgery remains the primary treatment for mediastinal teratomas, regardless of the stage. The combination of surgery with chemotherapy or radiotherapy does not offer

additional benefits and may potentially harm patients (6). Thus, complete resection should be the goal during surgical excision of mediastinal teratomas. However, in cases where dense fibrous tissue is tightly adhered to major vascular structures, it is prudent to leave a small portion of tissue attached to these structures. As the tumor size increases, it may compress surrounding structures or rupture into adjacent organs such as the lung, pericardium, or chest wall. In instances where the teratoma is densely adherent to the mediastinal surface, extra caution is required to protect critical structures like the phrenic nerves, brachiocephalic veins, vagus nerve, recurrent laryngeal nerve, and brachial plexus (7). In index study, the surgical management of this patient posed significant challenges due to the size, location, and adherence of the anterior mediastinal mass with neighboring structures, coupled with the necessity to address concomitant triple vessel coronary artery disease. A meticulous surgical plan was executed, beginning with a median sternotomy, which revealed a large, firm, 11 × 10 cm anterior mediastinal mass. The tumor's flimsy adhesions to the right upper lobe of the lung and dense adherence to the pericardium necessitated precise dissection to avoid damage to adjacent critical structures. The absence of gross involvement of the lung parenchyma, major vascular structures, phrenic nerve, or chest wall facilitated safe tumor resection. Utilizing the advanced vessel-sealing energy devices proved instrumental in minimizing bleeding, ensuring meticulous dissection, and reducing the intraoperative risk.

The decision to perform CABG in the same surgical session added to the technical challenges, particularly given the risk of hemodynamic instability during tumor resection. A study by Kaku et al., (2017) reported that it is safe to perform CABG in patients who are undergoing pulmonary tumor resection (8). Two end-to-side anastomoses using reversed saphenous vein grafts were performed to bypass the left anterior descending and obtuse marginal branches of the left circumflex artery. This approach minimized the risk of myocardial ischemia and other perioperative complications (9). This seamless transition between thoracic and cardiac procedures highlights the value of a multidisciplinary approach in managing complex dual pathologies.

The patient's postoperative course was uneventful, highlighting the effectiveness of the single-stage surgical strategy. Early extubation, efficient management of transient complications such as hypertension and hyperglycemia, and prompt mobilization contributed to a smooth recovery. The patient was discharged in stable condition on postoperative day six. The incidental discovery of this benign tumor underscores the importance of routine diagnostic evaluations, as they can identify asymptomatic yet potentially significant conditions requiring timely intervention.

## Conclusion

In conclusion, the management of large anterior mediastinal teratomas, especially when coexisting with complex conditions such as triple vessel coronary artery disease, requires a multidisciplinary approach. This case highlights the feasibility and benefits of a single-stage surgical strategy, where both the mediastinal mass and CAD were successfully addressed. Timely diagnosis and careful preoperative planning, supported by advanced imaging, are essential in ensuring optimal outcomes. Additionally, while complete resection remains the goal, surgeons must exercise caution when dealing with dense adhesions to vital structures, prioritizing the protection of critical anatomical components to minimize complications. This case underscores the importance of individualized care and coordinated efforts in managing complex, multifaceted conditions.

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