Case Report: Mediastinal Mass Following Orthotic Heart Transplant

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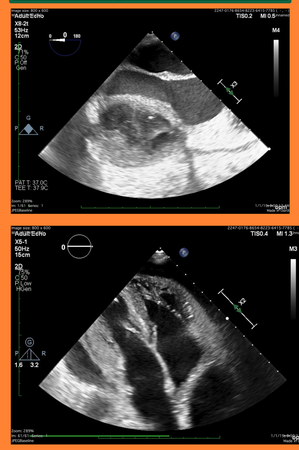
Introduction

- Mediastinal masses increase the risks associated with General Anesthesia (GA) with complications such as hemodynamic compromise and airway collapse.
- Respiratory decompensation is caused by mechanical compression by the mass on the trachea, main bronchi or both. Changes in physiological pressure conditions in the respiratory tract due to positioning of the patient during surgery, or as a result of induction of GA with positive pressure ventilation (PPV), can cause a critical increase in airway pressure with more difficult or even impossible ventilation and consecutive hypoxia.
- Hemodynamic decompensation may occur if the heart or major vessels like the pulmonary artery (PA) or superior vena cava (SVC), are surrounded or infiltrated by the mass. Large masses can directly involve or compress the heart causing arrhythmias or low-output syndrome due to pericardial tamponade.
- Planning and preparing for GA in patients with mediastinal masses is vital for patient safety. Although there are many case reports that describe decompensation following induction of GA in patients with a mediastinal mass, there are no standard protocols available for the perioperative management of this anesthetically relevant disease.
- We present a patient who following an orthotic heart transplant (OHT) presented with a large mediastinal mass compressing heart and surrounding structures.
- Our anesthetic management presents a good example where careful planning and preparation can ensure for safe and successful surgery in a post orthotic heart transplant patient.

Chest CT at Presentation to ER

Intraoperative TEE



Case Report

- 52-year-old female with history of nonischemic cardiomyopathy (NICM), Ejection Fraction (EF) of 5-10%, NYHA functional classification IV stage D biventricular failure with corresponding severe Mitral Regurgitation (MR) and Tricuspid Regurgitation (TR), who had undergone successful OHT with Bicaval Anastomosis. She presented 49 days after transplant with complaints of 1-day history of purulent drainage from sternotomy site and shortness of breath (SOB).
  - Other significant Past Medical History: Chronic Kidney Disease Stage 3 and Atrial Fibrillation
- At time of presentation to Emergency Room patient was found to be hemodynamically stable, afebrile, with a white count of 12.6.
- Computed Topography (CT) of Chest showed post-surgical changes to the mediastinum consistent with OHT, as well as a large collection in the mediastinum abutting the atria (9.5 x 8.0 x 9.0 cm), displacing the heart to the left and compressing the Right Atrium (RA). This collection appeared to communicate with the skin surface via a tract extending beneath the xiphoid into the epigastric soft tissues. The differentials considered were a large seroma, evolving hematoma or abscess considering the purulent drainage.
- 2D Transthoracic Echocardiogram (2D TTE): Noted a large loculated pericardial effusion but no indications of cardiac tamponade.
- Patient taken to surgery for drainage and culture of xiphoid abscess cavity.
- Repeat CT chest demonstrated a large hypoattenuating fluid collection with thickened peripheral enhancing rim (7.1 x 8.7 x 8.6 cm) within the right aspects of the anterior mediastinum, abnormal connection between the pericardial abscess and the anterior inferior chest wall suggesting a cutaneous pericardial fistula. There was significant mass effect upon the RA and Right atrial appendage. Leftward and posterior deviation of the SVA with narrowing of its lumen as it approaches the RA due to the mass effect from the pericardial collection.
- After carefully review of imaging CT and 2D TTE, reassuring for no cardiac tamponade physiology and thorough preoperative evaluation of the patient, the anesthetic plan was formulated and discussed with surgical team
- Pre-induction radial arterial line (A-line) was placed for continuous hemodynamic monitoring and GA was achieved with standard intravenous induction. Arterial Line was reassuring for no tamponade physiology.
  - Preoperative sedation: 2mg midazolam given
  - Standard Intravenous Induction with: 90mg propofol, 100mcg Fentanyl, 60mg rocuronium
- Intraoperative TEE was performed to examine fluid collection and aid in surgical planning. Imaging demonstrated a large fluid collection with intraluminal debris adjacent to the RA without tamponade effect measuring 9.9x6.5cm. This was completely drained by the surgical team under our guidance without complications.
- Emergence:
  - Patient reversed with 200mg suggamadex.
  - Endotracheal tube removed once patient met Extubation criteria
  - Recovered in Post Anesthesia Care Unit and was sent to the floor.

Discussion

- Mediastinal masses require considerable planning for anesthesia, as it is well documented that positive or negative pressure ventilation (NPP) can alter cardiopulmonary physiology causing collapse and placing the patient at risk for death.
- Mass compression on the airways or the great vessels may create a critical respiratory and/or hemodynamic compromise, and therefore the standard of intraoperative management includes induction of anesthesia in the operating room, the use of short-acting anesthetics, avoidance of muscle relaxants and maintenance of spontaneous ventilation.
- In this case, the patient's preoperative studies demonstrated high concern for the possibility of hemodynamic collapse. Imaging demonstrated a large fluid collection compressing the right side of her heart and her SVC. Prior to placing the patient under anesthesia, we performed simple but effective maneuvers to ensure patient could tolerate the transition from NPV to PPV. When creating our anesthetic plan, we also considered the needs of the surgical team which required patient's relaxation and input from our TEE exam.
- In order to adequately treat patients with mediastinal masses, in addition to a careful preoperative diagnosis, surgical treatment and postoperative care are recommended in a clinical setting with the necessary infrastructure and experience.
- As anesthesiologist it is our responsibility to both foresee and plan for any adverse events while balancing our goal of providing a safe and effective environment for surgery.
- Complication-free anesthetic management depends on a high level of cooperation and communication among the members of the interdisciplinary treatment team.

References

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