

Learning Objectives

1. To describe perioperative management for a patient with a mediastinal mass compressing the right heart and vena cava undergoing a VATS
2. To assess locations for adequate central venous access
3. To employ real-time TEE to view dynamic changes during patient positioning

Background

A patient presented with cough and dyspnea. Chest x-ray revealed an anterior mediastinal mass, later confirmed as a mature teratoma by biopsy.

Mediastinal mature teratomas are benign, slow-growing tumors that can compress and even erode into vital structures like the heart and lungs, causing symptoms. Surgical removal poses anesthetic challenges due to mass effect. Here we discuss perioperative management strategies that became crucial to ensuring patient safety.

Case Presentation

Patient is a 22-year-old woman with history of asthma, who presented with a sudden onset of dyspnea and cough. An x-ray and follow-up MRI revealed an 11.4 × 9.3 x 9.7 cm mediastinal teratoma compressing the superior vena cava, right heart, and right lung. The patient was scheduled for a robotic-assisted resection of the teratoma, where we used general anesthesia with a double lumen tube. To optimize access, we placed a 14G IV in the forearm and two central lines; the first and second MACs were placed in the right internal jugular and left femoral vein, respectively. In addition to standard ASA monitoring, we used a radial arterial line, and CVP from the IJ and femoral veins. We assessed the vena cava compression and heart status prior to and after removal of the teratoma with intraoperative TEE. The patient received a preoperative erector spinal plane block to minimize opioid use and allow for postoperative extubation.

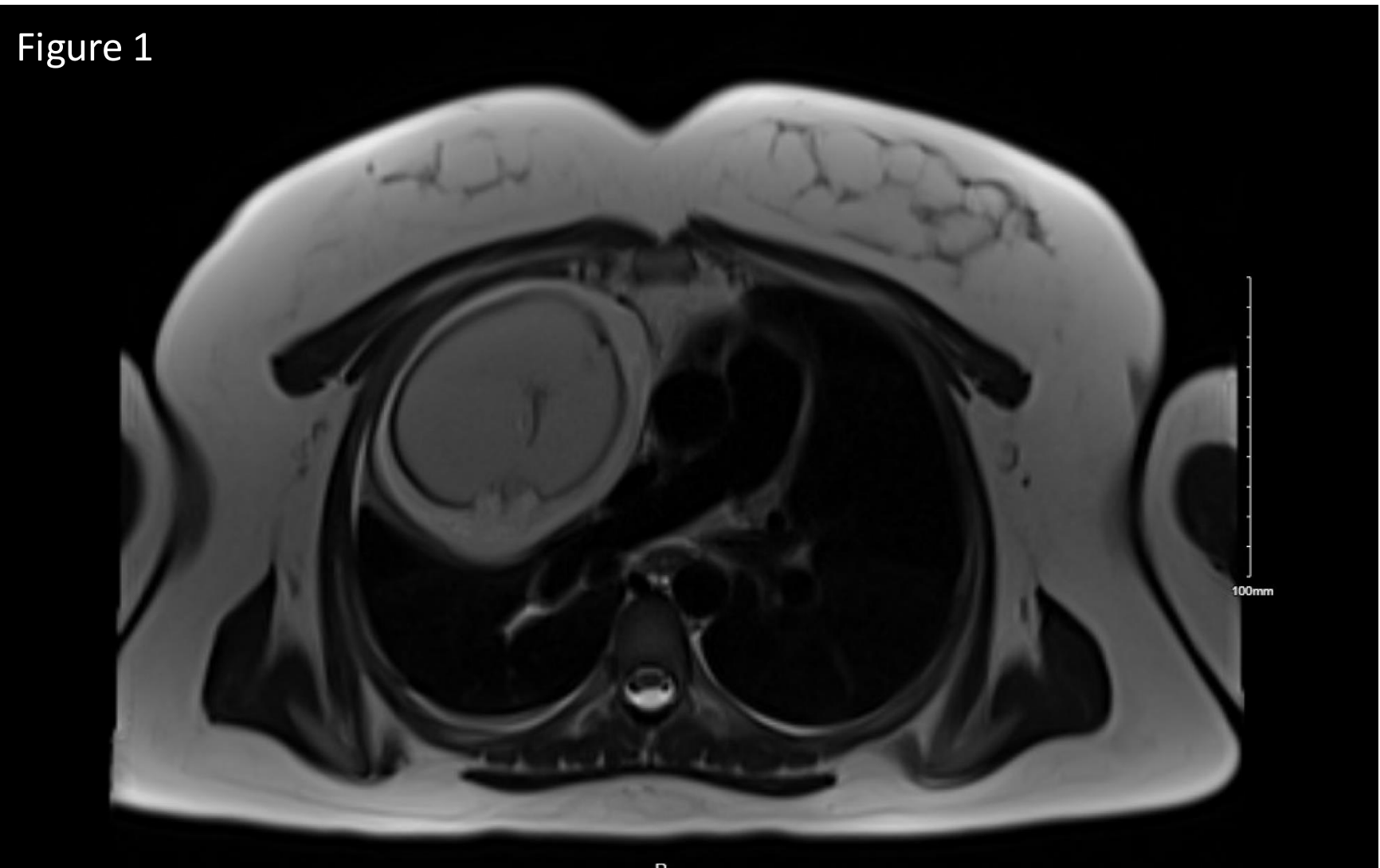
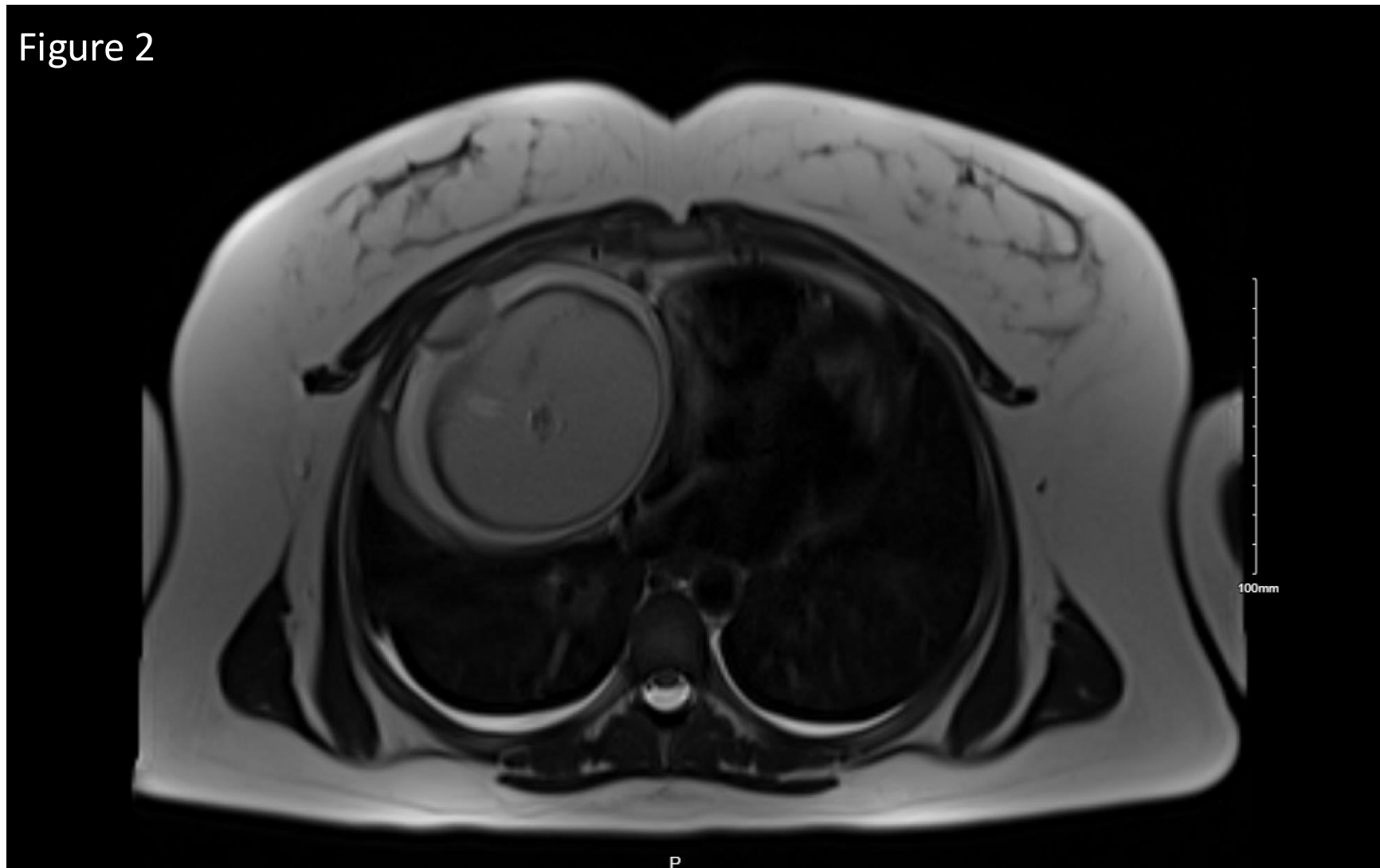


Figure 1 (left): Coronal section of chest MRI showing the mature teratoma in the anterior right paramediastinal region. This mass causes mass effect upon the superior vena cava and right cardiac region. Figure 2 (right): Compression against right atrium.



	Preoperative	Intraoperative	Postoperative
Visualization	Imaging (X-ray, MRI) to assess baseline mass effect and to devise surgical plan	TEE during positioning to visualize compression of intrathoracic structures and ensure positioning does not cause additional cardiopulmonary compression	Repeat TEE to verify resolution of heart function and integrity of surrounding structures. Additional imaging (x-ray) for comparison.
Cardiopulmonary function and hemodynamic stability	Assessment of cardiopulmonary history and status to evaluate anesthetic risk (PFT, ECHO, EKG)	Central lines above and below the heart to account for issues that may arise in SVC or IVC	Standard post-anesthesia care per ASA
Pain management	Regional block to reduce postoperative opioid use and allow for extubation	Multimodal pain management PRN	Multimodal pain management PRN

Table: Perioperative management checklist for resection of mediastinal masses.

Discussion

Thoracic teratomas can cause potential mass effect and compromise of structures such as the aorta, vena cava, heart, and lungs. For this case, we managed this with a 14G IV in the forearm and two central lines, one in the right internal jugular vein and the other in the left femoral vein, to provide access to both upper and lower vasculature and account for potential compromise with IVC or SVC repair or damage. Intraoperative TEE provided a few advantages over preoperative TTE. It allowed for high quality visualization the right heart chambers and vena cava. It also provided for streamlined intraoperative safety checks at two critical timepoints: first during left lateral decubitus positioning under robotic manipulation, in which the teratoma or medical equipment could further compress the heart ultimately decreasing cardiac output and perfusion to vital organs, and second, after resection of the teratoma to confirm restoration of right heart function and absence of iatrogenic trauma i.e. pneumothorax. Preoperative erector spinae plane block can serve to minimize post-operative pain, opioid use, and allow for extubation at end of case.

Learning Points

1. Place 2 central lines, one above the heart, the other, below, to account for any issues that may arise with either IVC or SVC repair or damage
2. Employ TEE during positioning to enable visualization of the extent of RA compression and post-resection to ensure resolution of heart compression
3. Perform a preoperative block to help minimize opioids and allow extubation at end of case

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