

Navigating One-Lung Ventilation in Anterior Mediastinal Mass Resection
with Complete Left Lung Opacification

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INTRODUCTION

Germ cell tumors are among the most common manifestations of anterior mediastinal masses, whose compressive effects on major airway and cardiovascular structures can cause severe cardiorespiratory problems under general anesthesia (1). In this case involving a patient undergoing both mediastinal mass resection and pneumonectomy, the anesthesiologist must carefully consider the intraoperative risk of airway compromise due to the mediastinal mass and postoperative complications associated with mechanical one-lung ventilation. Among these complications, the incidence of acute lung injury following pneumonectomy is 2-4% (2).

LEARNING OBJECTIVES

To consider the anesthetic and airway management of a patient undergoing anterior mediastinal mass resection and pneumonectomy.

CASE DESCRIPTION

A 32-year-old male with recurrent metastatic nonseminomatous germ cell tumor was found on CT to have a rapidly enlarging anterior mediastinal mass with complete opacification of the left lung and partial compression of multiple thoracic structures. Chemotherapy had no significant effect and patient presented to the hospital for scheduled thoracotomy with mediastinal mass resection and left pneumonectomy. Patient denied dyspnea/orthopnea, cough, dizziness, and hoarse voice, and had normal oxygen saturation on room air during preoperative assessment. After attachment of standard ASA monitors in the OR, patient underwent an intravenous induction of general anesthesia and conventional laryngoscopy with right-sided double lumen tube for one-lung ventilation. Placement was confirmed by fiberoptic exam. A right radial arterial line and LIJ central line were placed and right ventricular function was monitored on TEE. Patient tolerated general anesthesia with neuromuscular blockade and positive pressure ventilation and was extubated awake.



- Demonstration of a large hypoattenuating heterogeneously enhancing mass occupying almost the entire left hemithorax with invasion into the mediastinum.
- Extensive mass effect with severe left to right mediastinal shift and mild narrowing of the left main pulmonary artery, left superior and inferior pulmonary veins.
- Mild lower tracheal narrowing.
- No aeration of the airways in the collapsed left lung beyond the segmental bronchi.

RISK STRATIFICATION OF MEDIASTINAL MASS

History and clinical exam
Chest CT scan
Echocardiography
Pulmonary function testing

LOW RISK: - Asymptomatic or mildly symptomatic - Without postural symptoms - Without radiographic evidence of significant compression of structures	INTERMEDIATE RISK: - Mild to moderate postural symptoms - tracheal compression <50%	HIGH RISK: - Severe postural symptoms, stridor, cyanosis - Tracheal compression>50% - Pericardial effusion or SVC syndrome
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POSTOPERATIVE COURSE

Patient arrived to SICU somnolent but following commands, saturating well on room air, and with L-sided chest tube to water seal. Overnight into POD 1, patient had large serosanguineous chest tube output, overtly orthostatic, and required low dose norepinephrine to maintain MAP>60 mmHg. Hgb 4.6 g/dL on POD2 improved s/p 2u pRBC transfusion. Chest tube removed on POD 3 with extensive clot visualized upon extraction and patient was later hypotensive with SBP 40-50s. There was concern for possible dislodged clot and CT was replaced. Patient continued to require norepinephrine secondary to hemorrhagic shock, received another 2u pRBC for Hgb 5.0. POD 4, MAPs remained stable off pressors and Hgb>7 and patient was transferred to stepdown unit.

DISCUSSION

- For patients with sizable anterior mediastinal masses, it is important to identify the signs and symptoms that predict perioperative risk.
- The case literature indicates a lack of serious complications in patients with low-risk characteristics, who can be given general anesthesia safely with positive pressure ventilation and standard monitoring.
 - Bias toward case reports that describe cardiorespiratory compromise following neuromuscular blockade and/or positive pressure ventilation, as well as cases in which high-risk patients managed with spontaneous ventilation avoided serious complications (3).
- Low-risk patients tolerate conventional general anesthesia with neuromuscular blockade and positive pressure ventilation.

REFERENCES

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