



## Large Anterior Mediastinal Mass in a Pediatric Patient with an Unusual Presentation

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### Abstract

Anterior Mediastinal Masses (AMM) can range in presentation from an asymptomatic incidental finding to significant cardiorespiratory compromise. Symptoms do not always correlate to the degree of compression. Patients with AMM are at high risk for hemodynamic instability and cardiovascular arrest with induction of anesthesia. This report describes a child with a large AMM, who presented without classic symptoms, but instead with a right orbital cutaneous lesion, requiring anesthesia intervention for diagnostic imaging of the eye. It is imperative, especially in these unexpected presentations, to have a high-index of suspicion.

### Introduction

Anterior Mediastinal Masses (AMM), because of their proximity to many vital structures, are associated with a high risk of perioperative morbidity and mortality. Symptoms frequently do not correlate to the degree of compression; therefore, asymptomatic patients are still at risk for hemodynamic instability and death with induction of anesthesia. We present a case of a child with a large AMM, who did not present with classic symptoms, but with a right orbital cutaneous lesion requiring anesthetic management for appropriate diagnostic imaging.

### Case Presentation

A previously healthy 3-year-old boy presented to the emergency room with worsening right upper eyelid swelling for 3 weeks (Figure 1). His parents reported associated cough, nasal congestion, malaise, fever, and night sweats. While supine for an orbital Computed Tomography (CT), the patient developed tachypnea with stridulous breathing. The anesthesiology service was asked to help facilitate a "quick" orbital CT scan with general anesthesia. A chest radiograph was obtained in the interim, and upon review, demonstrated a large anterior AMM, and small bilateral pleural effusions (Figure 2). The CT request was then expanded to include the chest and abdomen. Due to this new discovery, it was deemed more appropriate to avoid a general anesthetic and instead proceed with sedation for the CT study. On physical exam, the patient was found to have labored breathing, and was lying in the left lateral decubitus position. His right eye was swollen and draining. He was transferred to the CT imaging suite and placed in the left lateral decubitus position and spontaneous ventilation was maintained. The surgical team was called to the bedside by the anesthesiology team. Intravenous sedation was initiated and maintained with a dexmedetomidine infusion at 0.5 mcg/kg/min, and intermittent ketamine boluses up to a total of 20 mg. The CT scan was completed in 6 minutes.

The patient tolerated the CT scan with adequate breathing, oxygen saturations, and blood pressure throughout. The imaging revealed a 10 cm anterior mediastinal mass compressing the brachiocephalic veins and trachea up to the carina. There was an associated large pericardial effusion and small bilateral pleural effusions. He subsequently underwent a mediastinal biopsy under local anesthesia and sedation, again with administration of ketamine and dexmedetomidine. The final pathology results demonstrated an aggressive T-cell lymphoma, mandating initiation of therapy with steroids and chemotherapy.

### Discussion

The mediastinum, bordered by the pleura, diaphragm and thoracic inlet, can be divided into anterior, middle, and posterior compartments. Masses may develop in any of these 3 compartments. The most common causes of anterior mediastinal masses are: thymoma, teratoma, thyroid lesion, and lymphoma [1]. AMMs can pose serious risks to a patient under general anesthesia, such as:

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Figure 1: Right eyelid lesion.



Figure 2: Chest radiograph with large anterior mediastinal mass.

severe airway obstruction, vascular compression, and cardiac collapse. Preoperatively, patients can present with a range of symptoms, including but not limited to: cough, dyspnea, wheezing, orthopnea, and Superior Vena Cava (SVC) syndrome. Those who present with orthopnea, features of SVC syndrome, and bronchial compression, are more likely to have anesthetic complications [2-4]. Pretreatment of the mediastinal mass with steroids, empiric chemotherapy, and/or radiotherapy may relieve the obstructive/compressive symptoms. However, this remains controversial, due to concerns that it may limit the accuracy of tissue diagnosis [5]. Our patient had a large AMM that presented with a rare finding of eyelid swelling. This was eventually diagnosed as cutaneous evidence of the lymphoma. No respiratory or vascular compression signs were noted prior to arrival in the emergency room. However, on presentation, he was noted to have orthopnea, stridor, pleural effusion and pericardial effusions; which are all classic symptoms of AMM.

For patients with a possible mediastinal mass, the first step is to obtain a chest radiograph. Following the chest radiograph, a CT can help to further delineate the features of the tumor. Additional workup could include: echocardiogram and pulmonary function tests [1,3,4]. Ultimately, tissue diagnosis will be necessary. There is no ideal anesthetic technique for a patient with AMM, as any technique can be associated with morbidity and mortality. However, the overall anesthetic goals should include: maintenance of spontaneous ventilation, coordination of appropriate equipment for airway and cardiac support, and ensuring availability of emergency team members [2]. Based on the presence or absence of respiratory symptoms, degree of tracheal compression, mediastinal mass ratio and other factors, patients may be classified as being at high or low risk (Figure 3). A low risk patient, who does not have any respiratory symptoms or tracheal compression by CT, may proceed with a general anesthetic. However, the management of a high risk patient should include pre-procedure otolaryngology and cardiovascular surgery consults, as well as availability of a rigid bronchoscope, extracorporeal membrane oxygenator and/or cardiopulmonary bypass machine; in the event

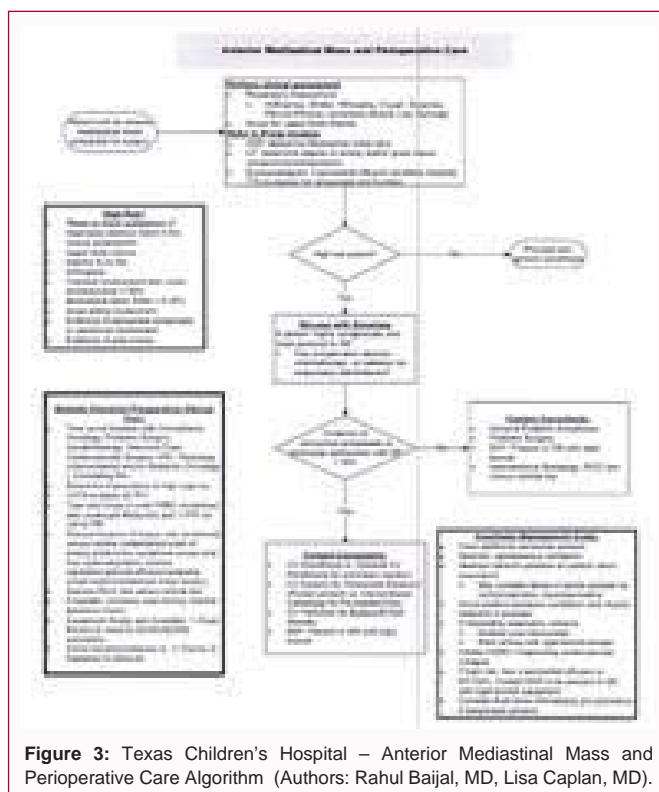


Figure 3: Texas Children's Hospital – Anterior Mediastinal Mass and Perioperative Care Algorithm (Authors: Rahul Bajjal, MD, Lisa Caplan, MD).

that respiratory or cardiovascular collapse occurs/develops during sedation or anesthesia. In addition, the anesthetic management should entail placing the patient in a position of baseline comfort (likely lateral or prone), maintaining spontaneous ventilation, using ketamine and dexmedetomidine [6], and avoiding muscle relaxants or positive pressure ventilation. As this case demonstrates, it is imperative to have a high-index of suspicion for an AMM during the pre-operative evaluation of a child with a cutaneous eye lesion with associated respiratory symptoms. Questions in the history should therefore be targeted towards this possible diagnosis and further workup obtained as deemed necessary [7].

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