



Case Report

# Anesthetizing a child for a large compressive mediastinal mass with distraction techniques and music therapies as the sole agents<sup>☆</sup>



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**Abstract** Anesthetic management of the child with an anterior mediastinal mass is challenging. The surgical/procedural goal typically is to obtain a definitive tissue diagnosis to guide treatment; the safest approach to anesthesia is often one that alters cardiorespiratory physiology the least. In severe cases, this may translate to little or no systemic sedatives/analgesics. Distraction techniques, designed to shift attention away from procedure-related pain (such as counting, listening to music, non-procedure-related talk), may be of great benefit, allowing for avoidance of pharmaceuticals. In this report, we present an approach in children where the anesthetic risk is deemed excessive.

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## 1. Introduction

Children with anterior mediastinal masses (AMMs) can be very challenging for the anesthesiologist tasked with providing care to these patients. Numerous reports identify both clinical and radiologic signs and symptoms that afford greater anesthetic risk for these patients. We describe a patient requiring anesthetic care for pericardiocentesis after presenting with a large mediastinal mass causing hemodynamically significant pericardial effusion. After careful preoperative evaluation,

we proceeded with music and distraction therapy as the sole “anesthetic” after deeming the risk of sedation to be excessive. We review the literature related to anesthetic management and perioperative evaluation in children with mediastinal masses and suggest approaches to coaching children through medical procedures without anesthesia or sedation.

Verbal consent for publication was provided by the patient’s legal guardian.

## 2. Case description

An 11-year-old previously healthy girl presented to the emergency department with sudden-onset stabbing chest pain. On examination, she was mildly tachycardic and tachypneic at 110 beats per minute and 32 breaths per minute, respectively. Orthopnea was present at head elevations of  $<30^\circ$ . Physical examination revealed profound cervical and supraclavicular lymphadenopathy and facial plethora. Laboratory testing was significant for a white blood cell count of 63 000/ $\mu\text{L}$ , of which 57% were blast cells. An electrocardiogram demonstrated electrical alternans (Fig. 1). The anterior-posterior (AP) chest radiograph identified an enlarged mediastinum and right pleural effusions (Fig. 2).

Based on these findings, a bedside ultrasonography was performed in the emergency department, revealing a large pericardial effusion with right atrial compression. Cardiology was consulted, and a diagnostic and therapeutic pericardiocentesis under general anesthesia was recommended. To further evaluate the mediastinal mass, a computed tomographic (CT) scan of the neck and chest was ordered as part of the pre-anesthetic evaluation. This scan was performed without sedation and revealed a mediastinal mass with significant aortic encasement, tracheobronchial compression, superior vena cava compression, a large pericardial effusion, and right atrial enlargement (Fig. 3).

Based on the above findings, we determined the risk for cardiopulmonary collapse with general anesthesia to be significant, and an approach of minimal anesthetic intervention was deemed optimal. After a long discussion with the patient and her family, we elected to pursue local anesthesia and

avoidance of procedural sedation as the primary approach. The procedure and what to expect were reviewed with the patient and her mother. We used the assistance of a child life specialist to allow the anesthesia providers to focus on hemodynamic assessment without having communication with the patient lapse. Together with the cardiology team and a child life specialist, the patient was taken back to the catheterization laboratory and positioned with her head elevated so that she was comfortable. The child life specialist remained with the patient throughout the procedure and provided headphones for the patient to listen to music of her choosing. Topical local anesthetic cream was applied to the subxyphoid region 45 minutes prior to the procedure. Local anesthetic was carefully infiltrated to ensure adequate local anesthesia. With constant communication, reassurance, and distraction techniques, she tolerated the pericardiocentesis without incident. Her tachycardia and tachypnea resolved following the aspiration of 380 mL of pericardial fluid. Treatment for T-cell leukemia was initiated once the histopathologic diagnosis was confirmed. Follow-up with the patient and her family revealed satisfaction with the methods used to usher her through the procedure.

## 3. Discussion

Anesthetic care of the patient with an AMM can be one of the most challenging scenarios for pediatric anesthesia providers. In particular, the inability of many pediatric patients to cooperate with approaches that are feasible in adults makes management of these cases difficult.

### 3.1. Anesthetic planning for mediastinal mass

Preoperative evaluation should focus on identification of risk factors associated with anesthetic complications, specifically airway collapse and cardiovascular compromise. The preoperative assessment should also identify the child’s ability to cooperate and whether premedication is indicated. A review by Anghelescu et al [1] identified risk factors for anesthetic complications in children with mediastinal masses. Risk



Fig. 1 Electrocardiographic rhythm strip demonstrating electrical alternans.

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