Anesthetic Management of a Child with Severe Mediastinal Compression and Concomitant Acute Laryngotracheobronchitis undergoing a Chamberlain Procedure

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**Introduction**

Mediastinal compression by chest masses present life-threatening challenges for providers, especially anesthesiologists. Particular consideration needs to be given to their compressive effects on major airways and cardiovascular structures given the high incidence of complications in children (7-18%)\(^1\). The following case involving a child with a large mediastinal mass was further complicated by the presence of parainfluenza virus infection, tracheal narrowing and deviation, and cardiovascular compression.

**Case Study**

A previously healthy 12 year old male with a 6-week history of congestive cough and weight loss was investigated by chest x-ray (CXR) and computed tomography (CT) (Figures 1, 2).

Echocardiogram demonstrated dextrocardia by dextroposition, normal biventricular size and function, and compression of the right and left branch pulmonary arteries with peak gradients of 22 mmHg and 19 mmHg, respectively (Figure 3).

His viral respiratory panel was positive for Human Parainfluenza Type 2.

Physical exam was significant for tachycardia and tachypnea with SpO\(_2\) 97% while receiving nasal cannula O\(_2\) at 2 LPM. He had croup, decreased breath sounds over the left lung fields, and orthopnea/dyspnea to 30°.

Urgent left-sided anterior thoracotomy for chest mass biopsy and PICC line placement were planned. A conscious sedation technique was chosen with maintenance of spontaneous ventilation using supplemental nasal cannula O\(_2\), end-tidal CO\(_2\) detection and standard non-invasive ASA monitors. The patient was kept sitting upright with at least 30° elevation and in leftward tilt. Peripheral IVs were utilized for sedation with a dexmedetomidine infusion (0.5-0.7 mcg/kg/hr) and ketamine boluses, along with glycopyrrolate to minimize secretions. Analgesia was supplemented with acetaminophen IV and repeated local anesthetic administration by the surgeon. After a successful intraoperative course he was transported to the pediatric ICU.

**Discussion**

The pediatric population is more susceptible to mediastinal compression by masses and frequently present with sequelae due to smaller airway anatomy and impaired cardiopulmonary function. Vital organs course through the mediastinum and can be easily compressed or distorted by thoracic and mediastinal masses. Simple procedures such as a mass biopsy often require sedation and anesthesia, especially in children. Anesthetic/procedural complication risk should be gauged using multiple variables, including preoperative symptomatology, the severity of compression/deviation/distortion of airways and great vessels determined by diagnostic imaging, and by physical exam findings. An algorithmic approach should be used for anesthetic management of patients with a thoracic or mediastinal mass (Figure 4)\(^4\).

In this patient an open tissue biopsy was performed using local anesthetic under dexmedetomidine and ketamine sedation. This formulation allowed maintenance of spontaneous ventilation which preserves the transpleural pressure gradient and provides sympathomimetic support for hemodynamic stability. The superimposed parainfluenza virus infection reinforced the goal to avoid stimulation of an already sensitive airway.

**References**