Anaesthetic Management of a Child with a Large Posterior Mediastinal Mass

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Background
In high-risk patients with a mediastinal mass, cardiorespiratory collapse can occur with sedative pre-medications, induction of anaesthesia, changes in posture, muscle relaxation, positive pressure ventilation (IPPV) and tumour manipulation. A posterior mass causing significant compression may be asymptomatic, but progress to profound cardiorespiratory compromise with the changes associated with anaesthesia. Case reports mostly focus on anterior mediastinal masses, but those originating posteriorly can become large and occupy more than one compartment causing many adverse effects.

Case
A previously well 3-year-old female presented with a year history of intermittent difficulty breathing and a palpable right sided neck mass. CT showed:
- A large lobulated mass (10.7 x 6.5 x 5.0 cm) from C1 to T4/5 disc level involving the posterior neck, middle and posterior mediastinum bilaterally.
- Tracheal compression and narrowing at the thoracic inlet (diameter 2.5 x 5mm) with displacement inferior of the right main bronchus and left sided shift.
- Vascular involvement with compression and non-visualisation of the left brachiocephalic vein and superior vena cava and displacement of the great vessels including the right carotid and right innominate arteries and obliteration of the right internal jugular vein.
- Transsthoracic echo was normal
- Biopsy revealed a ganglioneuroma, not responsive to chemotherapy or steroids.

Surgery
• Resection via neck dissection and median sternotomy as a joint case with ENT, cardiovascular, general and thoracic surgeons.

Anaesthesia
• Gas induction with titration of sevoflurane in oxygen/nitrous oxide mix with spontaneous ventilation (SV)
• Difficult airway equipment (incl 1.8mm rigid bronchoscope) was available and cannula on standby.
• An initial episode of stridor and desaturation resolved with continuous positive airway pressure (CPAP).

CT Scan
Mass measuring 10.7 x 6.5 x 5.0 cm

Discussion
The most common paediatric mediastinal masses are lymphomas, neurogenic and germ cell tumours. Ganglioneuromas are rare, benign tumours of the autonomic nervous system arising from neural crest sympathogonia. They are fully differentiated neural tumours and do not contain immature elements. They are typically asymptomatic, causing symptoms depending on their anatomical location, size and nearby structures affected.

This case presented many anaesthetic and surgical challenges:
• A large posterior mediastinal mass with no option for pre-operative optimisation causing intermittent severe respiratory distress.
• Difficulties balancing separation anxiety versus respiratory depression/relaxation with pre-operative sedation.
• The inability to perform fibre-optic intubation and arterial and central venous cannulation without the use of sedation in a paediatric patient.
• Marked tracheal compression at the thoracic inlet limiting choice of ETT size
• The inability to perform muscle relaxation also allowed the use of a nerve stimulator intra-operatively to avoid neurological injury.

Conclusions
Anesthesiologists should be aware of the potential cardiorespiratory compromise associated with large posterior masses even in the absence of overt clinical symptoms. Maintenance of spontaneous ventilation, avoidance of muscle relaxation and a coordinated team approach are all methods to reduce risk in these patients.

References
1. Hammer GB Anaesthetic management for a child with a mediastinal mass Pediatric Anesthesia 2004;14:95-7