

## Background

Thymoma is the most common primary neoplasm within the anterior mediastinum in adults, but in childhood comprises only 1% of cases.

Anterior mediastinal masses in children are typically lymphomas, lymphangiomas, and teratomas, while thymomas are extremely rare, and usually do not invade central veins.

Patients can present with symptoms of intrathoracic invasion, exhibit signs of paraneoplastic syndrome, or be asymptomatic with the lesion discovered incidentally on chest radiography.

## Case Report

An otherwise healthy 17 year old, 75 kg male presented with signs of clubbing and weight loss noted during a routine physical exam. CT scan of the thorax showed a large anterior mediastinal mass and narrowing of the SVC secondary to mass effect.

After mask induction, a peripheral intravenous catheter was placed and the airway was secured with a cuffed 6.5 ETT. General anesthesia was maintained with isoflurane, narcotic and muscle relaxation for the remainder of the case.

A median sternotomy approach identified tumor involvement of the right subclavian vein, left innominate vein, and SVC. Invasion within the walls of these vessels by tumor is what prompted the need to perform CPB.

Tumor removal required sacrificing the upper two thirds of the SVC so a homograft was used to replace a portion of the SVC. Any remaining tumor was dissected until clear margins were identified on all structures. The patient was then rewarmed, protamine administered, and all cannulas removed. The patient was weaned off CPB with good hemodynamics on epinephrine 0.01 mcg/kg/min and milrinone 5 mcg/kg/min infusions.

## Discussion

Because thymomas manifest in the anterior mediastinum, compression of cardiopulmonary structures and respiratory compromise pose challenges for anesthetic and surgical management. Sedation and paralysis can result in airway collapse in these patients, so the severity of symptoms as well as the review of CT scan imaging should be carefully assessed preoperatively.

With a lack of symptoms and no tracheobronchial obstruction on imaging, our patient was deemed safe from a high likelihood of airway collapse. In the operating room, mask induction with sevoflurane maintaining spontaneous ventilation was carried out until an intravenous catheter was acquired. Bag-mask assisted ventilation was then initiated manually to assure that positive pressure ventilation was possible, and once confirmed, propofol and rocuronium were administered, and the airway was secured uneventfully with an ETT via direct laryngoscopy.

As opposed to adults, a majority of deaths in children with mediastinal masses are caused by airway obstruction on induction because of their more compliant and compressible airway. In addition, it is difficult to ascertain the severity of symptoms in the younger population. Furthermore, since most mediastinal masses of the tracheobronchial tree lie at the level of the carina, it can be a challenge to place an ETT distal to the obstruction. In such cases, three options are available if airway obstruction occurs:

- Repositioning the patient
- Rigid bronchoscopy
- Surgeon present during induction for immediate sternotomy

Placement of venous cannulas for CPB required a conscientious approach to cannulation. Because the proximal two thirds of the SVC was involved, the right atrium and right innominate vein were cannulated.



## Conclusion

Thymomas are very rare in children and may not present with obstructive symptoms.

Useful information in guiding an anesthesiologist's plan for induction include thorough history taking and review of chest imaging in order to assess for the likelihood of airway obstruction and cardiovascular collapse with general anesthesia.

This unique case posed numerous concerns requiring a collaborative effort from the pediatric subspecialties of general surgery, cardiothoracic surgery, and cardiac anesthesia in order to provide a comprehensive plan for safe and effective perioperative management.

## References

1. Liang, X. Thymoma in children: report of 2 cases and review of the literature. *Pediatr Dev Pathol.* 2010.
2. Fonesca, A. Pediatric thymomas: two cases and comprehensive review of the literature. *Pediatr Surg Int.* 2014.
3. Smith's Anesthesia for Infants and Children, 9th Edition. Peter J. Davis. 2017.
4. Kim, S. Unusual Presentation of Thymic Carcinoma: Hypertrophic Osteoarthropathy. *Korea J Inter Med.* 2003.
5. Marom, E. Imaging Thymoma. *J Thorac Oncol.* 2010.
6. Benveniste, M. Role of Imaging in Diagnosis, Staging, and Treatment of Thymoma. *Rad Soc of N Amer.* 2011.