



**Difficult Clinical Scenarios in Thoracic Anesthesia:
Mediastinal Mass with Severe Kyphoscoliosis**

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Disclosure

- Advisory board member of the ET View Medical, Ltd.
- Paid consultant ET View Medical, Ltd.



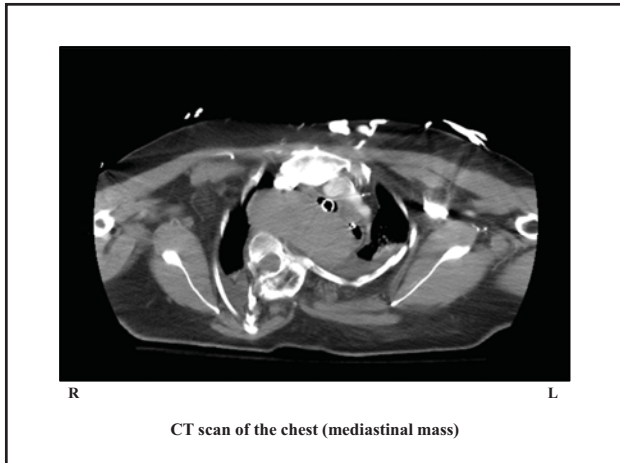
**Mediastinal Mass
with Severe Kyphoscoliosis**

- 46 year old female, 69 kg, height 152 cm, BMI 29.6
- Past medical history: spine surgery for scoliosis at age of 15
- Two weeks prior to surgery she developed severe respiratory failure requiring intubation
- Current CT scan shows mediastinal mass (5.4 x 9.9 x 7.7 cm)
- Pericardial effusion 1.3 cm maximum width

**Mediastinal Mass
with Severe Kyphoscoliosis**

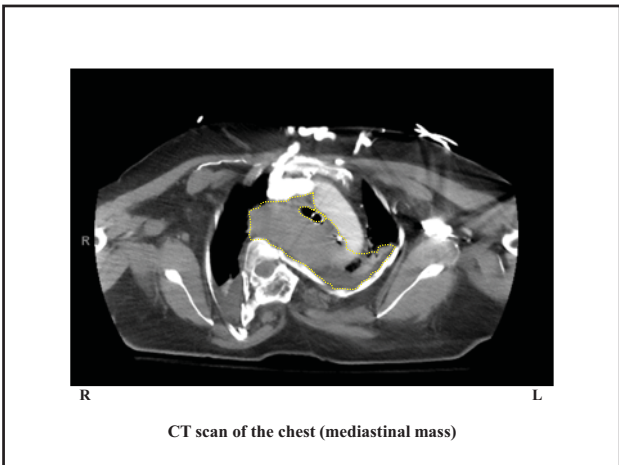
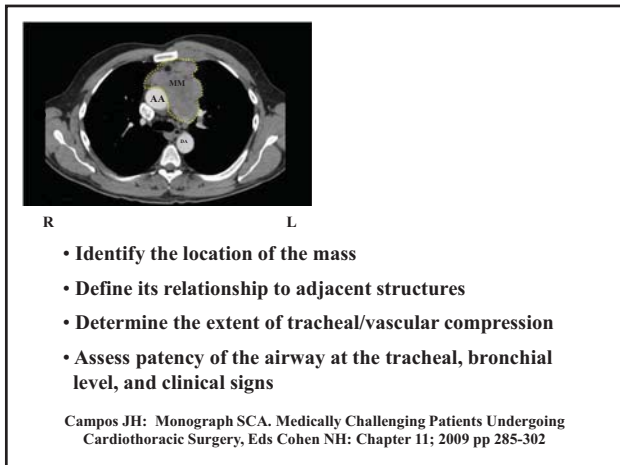
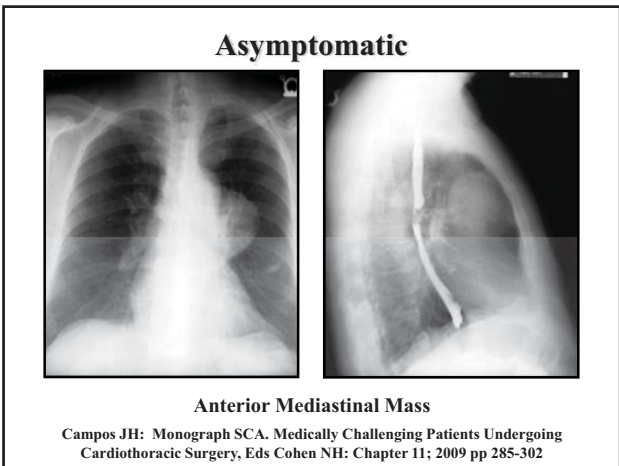
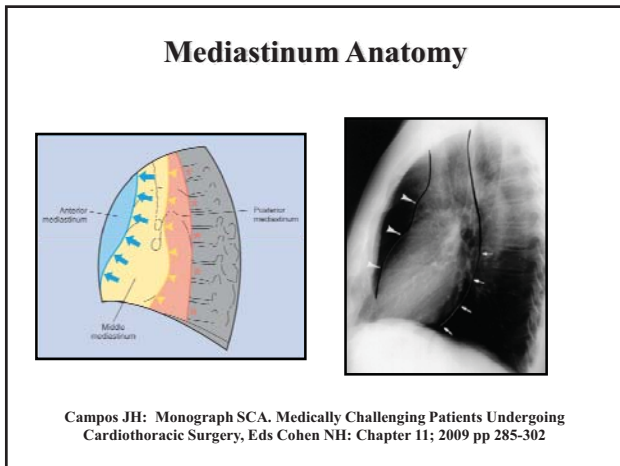
- Airway exam: - Mallampatti III, TM 3FB
 - Mouth opening normal
 - Neck extension very limited due to scoliosis
- Exercise tolerance: 5-6 met
- Scheduled for - right thoracotomy (mass excision)
 - pericardial window





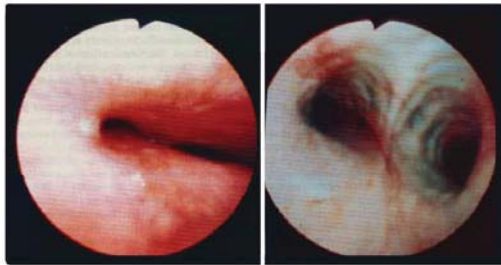
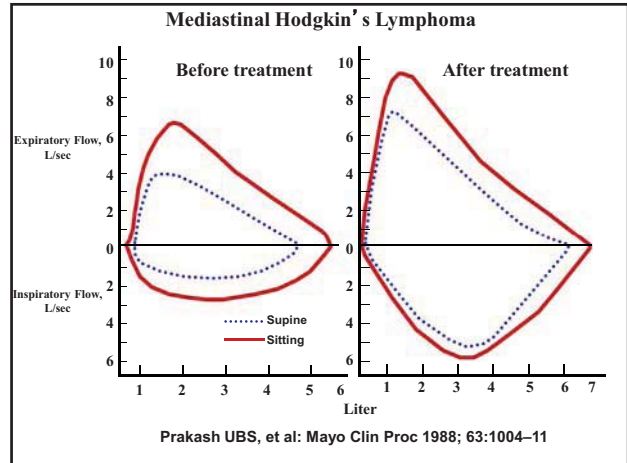
Anesthetic Management

- Recognition of mediastinum anatomy
- Airway implications
- Lung separation techniques
- Intra/post-operative management of mediastinal mass patient
- Post-operative analgesia



Role of Spirometry in Mediastinal Mass

- Is this test indicated ?
- Upright, supine, and sitting position ?
- Correlation with test results and complications



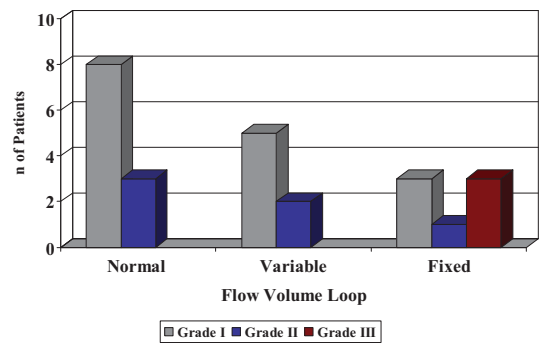
Prakash UB, et al. Mayo Clin Proc 1988; 63:1004-11

Upright and Supine Spirometry

Author	n	Results Spirometry	Anesthetic Technique	Outcome
Hnatiuk OW Chest 2001; 120: 1152	37 patients anterior mediastinal mass	<ul style="list-style-type: none"> • 10 had upright and supine spirometry • 4 were abnormal suggesting upper airway obstruction 	<ul style="list-style-type: none"> • 35 received general anesthesia (including 4 with upper airway obstruction) • 2 received local anesthesia 	<ul style="list-style-type: none"> • No correlation with: <ul style="list-style-type: none"> - spirometry & symptoms - abnormal CT scan - anesthetic technique - postoperative complications

Abnormal FVL in Patients with Intrathoracic Hodgkin's Disease

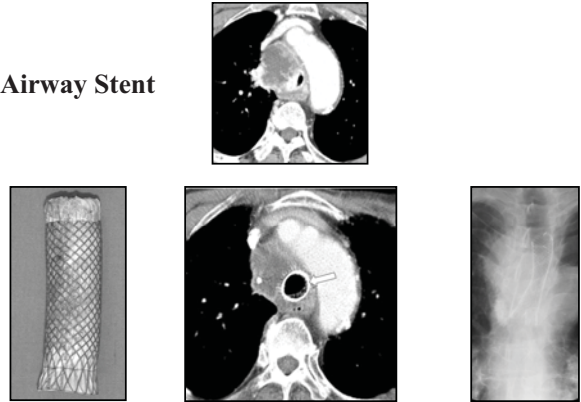
Author	n	Results FVL (prior to tx)	Results FVL (after chemo)
Vander Els NJ: Chest 2000; 117: 1256	• 36 (adults) • 25 (baseline and follow up PFT's)	<ul style="list-style-type: none"> • 14 (56%) abnormal <ul style="list-style-type: none"> - 7 (flattening insp/exp loop) - 7 (flattening insp loop) • 11 (44%) normal 	<ul style="list-style-type: none"> • 6 (25%) abnormal <ul style="list-style-type: none"> - 1 (fixed) - 5 (flattening insp) • 19 (76%) normal



Airway Management and Anterior Mediastinal Mass

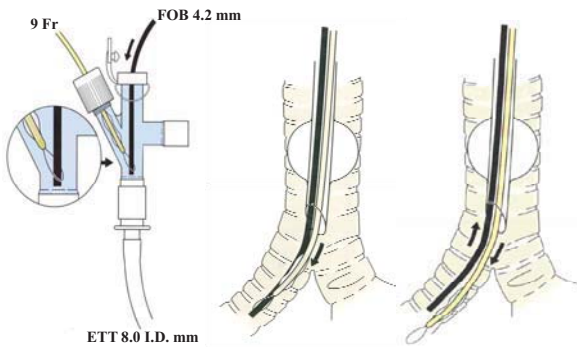
- Rigid bronchoscope always available (an experienced team)
 - McMahon CC: Anaesthesia 1997; 52:158
- Awake fiberoptic bronchoscopy (SLT)
 - Campos JH: Monograph SCA Medically Challenging Patients Undergoing Cardiothoracic Surgery, Eds Cohen NH: Chapter 11; 2009 pp 285-302
- Flexible fiberoptic bronchoscopy SLT (armored)
 - Capdeville M: JCVA 2007; 21:259
- Helium and anterior mediastinal mass
 - Polaner DM: Anesth Analg 1996; 82:208

Airway Stent

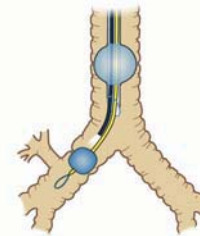


Shin HJ: J Vasc Interv Radiol 2006; 17: 657

Arndt Blocker

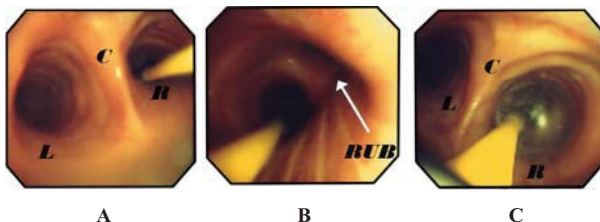


Campos JH: SAJAA 2008; 14: 22-26



Campos JH: Curr Opin Anaesthesiol 2009; 22: 4-10

Right-Sided Spherical Shaped Bronchial Blocker



Campos JH: Curr Opin Anaesthesiol 2009; 22: 4-10

A Comparison of the Cohen Blocker with the Arndt Blocker or Left Sided DLT (Carinal Hook)

PRCT	Cohen Group (n=16)	Arndt Group (n=16)	DLT Group (n=16)
• Time to Position			
Right main bronchus (mean)	170 s	244	
Left main bronchus (mean)	340 s	253	
• Number of patients requiring at least one additional intraop FOB	8	8	3
• Number of patients requiring 1, 2 or 3 additional intraop FOB	7/1/0	5/2/1	2/1/0

Dumans-Wizard, et al: J Cardiothorac Vasc Anesth 2009; 23: 501-505

Intra/Post Operative Course

- Right thoracotomy and drainage of pericardial effusion
- Successful lung isolation (Arndt® blocker)
- Findings: cyst mass 8.0 cm diameter

Perioperative Cardiorespiratory Complications in Adults with Mediastinal Mass

- A cohort study of adults with mediastinal mass
- Objective to evaluate the incidence of perioperative complications
- Clinical signs and symptoms, radiologic evaluation and PFT evaluation in the assessment of anesthetic and perioperative risk

Bécharard P, et al: *Anesthesiology* 2004; 100: 826-34

Anesthetic Management

- n=97/105 have received general anesthesia
 - 79/97 received neuromuscular blockade (NMB)
 - 15/97 spontaneous ventilation NMB CV
- n=3/97 received general anesthesia/spontaneous ventilation
- n=8 local anesthesia and sedation

Bécharard P, et al: *Anesthesiology* 2004; 100: 826-34

Perioperative Cardiorespiratory (CR) Complications

Author	n	Intraop CR compl	Postop CR compl	Airway collapse	Life threatening compl post.
Hnatiuk OW, et al: <i>Chest</i> 2001; 120: 1152	37	1 (unrelated)	0	0	0
Bécharard P, et al: <i>Anesthesiology</i> 2004; 100: 826	97	4/97	11/97	0	7/97

Campos JH: *Monograph SCA. Medically Challenging Patients Undergoing Cardiothoracic Surgery*, Eds Cohen NH: Chapter 11; 2009 pp 285-302

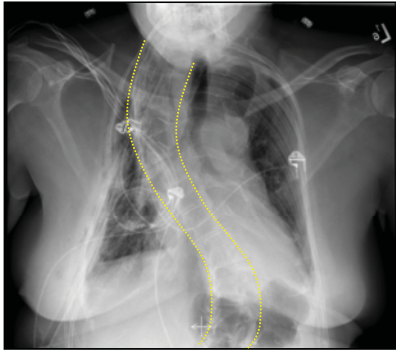
Perioperative Complications and Outcome

- Pericardial effusion on preop CT scan associated with intraop complications (OR 19.8; 95% CI, 4.0 - 97.4)
- Postoperative complications were associated with tracheal compression > 50% on preop CT scan (OR, 7.4; 95% CI, 1.5 - 38.1)
- Incidence of intraop airway obstruction was 0%

Bécharard P, et al: *Anesthesiology* 2004; 100: 826-34

Intra/Post Operative Course

- Transfer intubated to PACU
- Extubated successfully, 3 hrs later
- PCA analgesia

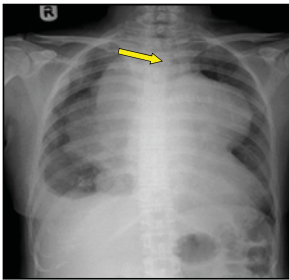


- Post mediastinal mass resection
- PACU portable chest radiograph

Mediastinal Mass and Cardiopulmonary Bypass

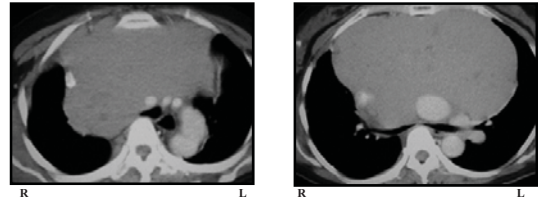
- Cannulation of femoral vessels (airway)
Petruzzelli GJ, et al: Otolaryngol Head Neck Surg 1990; 103: 484
- Standby CPB before induction (mediastinal mass)
Tempe DK, et al: J Cardiothorac Vasc Anesth 2001; 15: 233
- Use of CPB (mediastinal mass)
Soon JL, et al: J Cardiothorac Vasc Anesth 2007; 21:867-9
- Important facts:
 - 5-10 min. to cannulate and establish CPB
 - Femorofemoral CPB

Peripheral CPB for Thymoma Resection



- 52 yo ♀, Tumor size 15 x 9 cm
- SVC and tracheal compression
- RA and RV collapse

Soon JL, et al: J Cardiothorac Vasc Anesth 2007; 21:867-9



Soon JL, et al: J Cardiothorac Vasc Anesth 2007; 21:867-9

Recommendations

- Management will depend upon the size and location of the mass
- Patients with mediastinal mass can be at risk of upper airway obstruction
- Spirometry has no impact on the choice of anesthesia and outcomes
- CT of the chest (tracheal compression >50%) potentially will increase postoperative complications
- Fixed obstruction on FVL (flattening pattern insp/exp) may increase the risk of intra/postoperative complications

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Reference List

1. Campos JH: Monograph SCA. Medically Challenging Patients Undergoing Cardiothoracic Surgery Anterior Mediastinal Mass, Eds Cohen NH: Chapter 11; 2009 pp 285-302
2. Prakash UBS, et al: Mediastinal mass and tracheal obstruction during general anesthesia Mayo Clin Proc 1988; 63:1004-11
3. Hnatiuk OW: Spirometry in surgery for anterior mediastinal masses Chest 2001; 120: 1152
4. Vander Els NJ: Abnormal flow volume loops in patients with intrathoracic Hodgkin's disease Chest 2000; 117: 1256
5. McMahon CC: Central airway compression. Anaesthetic and intensive care consequences Anaesthesia 1997; 52:158
6. Capdeville M: The management of a patient with tracheal compression undergoing combined resection of an anterior mediastinal mass and aortic valve replacement with coronary artery bypass graft surgery: utility of the laryngeal mask airway and Aintree intubation catheter JCV 2007; 21:259
7. Polaner DM: The use of heliox and the laryngeal mask airway in a child with an anterior mediastinal mass Anesth Analg 1996; 82:208

Reference List

8. Shin HJ: Treatment of tracheobronchial obstruction with a polytetrafluoroethylene-covered retrievable expandable nitinol stent *J Vasc Interv Radiol* 2006; 17: 657
9. Campos JH: How to Achieve Successful Lung Separation *SAJAA* 2008; 14: 22-26
10. Campos JH: Update on tracheobronchial anatomy and flexible fiberoptic bronchoscopy in thoracic anesthesia *Curr Opin Anaesthesiol* 2009; 22: 4-10
11. Dumans-Wizard, et al: A comparison of the deflecting-tip bronchial blocker with a wire-guided blocker or left-sided double-lumen tube *J Cardiothorac Vasc Anesth* 2009; 23: 501-505
12. Bécharad P, et al: Perioperative cardiorespiratory complications in adults with mediastinal mass: incidence and risk factors *Anesthesiology* 2004; 100: 826-34
13. Petruzzelli GJ, et al: Extrinsic tracheal compression from an anterior mediastinal mass in an adult: the multidisciplinary management of the airway emergency *Otolaryngol Head Neck Surg* 1990; 103: 484
14. Tempe DK, et al: Mediastinal mass resection: Femorofemoral cardiopulmonary bypass before induction of anesthesia in the management of airway obstruction *J Cardiothorac Vasc Anesth* 2001; 15: 233
15. Soon JL, et al: Peripheral cardiopulmonary bypass-assisted thymoma resection *J Cardiothorac Vasc Anesth* 2007; 21:867-9