

RTBoardReview

Simulation 26 – 65 Year-Old Man with Worsening Postoperative Hypoxemia Condition/Diagnosis: Abdominal Aortic Aneurysm Repair, Atelectasis

Take-Home Points:

Assessment/Information Gathering

- Postoperative atelectasis is associated with co-morbidities (e.g., COPD, obesity), inadequate pre-operative instruction, exposure to dry anesthetic gases/high FIO₂s, postoperative pain, lack of early ambulation, analgesic medications, and failure to coordinate care with analgesia.
- Signs and symptoms include mild fever (in some, not all patients), progressive hypoxemia, dyspnea, decreased breath sounds and a dull percussion note over the affected area; lobar or whole lung atelectasis also may cause the mediastinum to shift *toward* the areas of collapse.
- Diagnosis usually made based on clinical presentation (above) and X-ray findings:
 - Opacification of the collapsed lobe(s) or segment(s)
 - Mediastinal shift toward the side of collapse
 - Elevation of the hemidiaphragm on the side of collapse
 - Hyperlucency of the remaining well-aerated lobes
- Differential diagnosis: postoperative or aspiration pneumonia, pleural effusion, pulmonary embolism, pneumothorax.

Treatment/Decision-Making

- Early mobilization/ambulation as tolerated
- O₂ therapy as needed to maintain SpO₂ ≥ 90%
- Deep breathing/lung volume expansion therapy
 - Initially hourly coached deep breathing exercises or incentive spirometry (IS)
 - Consider mask CPAP as an alternative expansion therapy; continuous application over hours likely more effective than intermittent treatments
 - If deep breathing IC < 33% predicted or VC < 10 mL/kg consider IPPB or BiPAP
- Combine deep breathing with directed coughing (e.g., huff cough/FET); be sure to coordinate therapy with appropriate analgesia
- Ensure supportive care, e.g., adequate hydration and nutrition.
- If atelectasis persists and/or there is evidence of mucous plugging:
 - Initially consider adding an aerosolized mucolytic (acetylcysteine or DNase) and postural drainage, percussion and vibration to the treatment regimen
 - If aggressive lung volume expansion and bronchial hygiene therapies do not resolve the problem, recommend fiberoptic bronchoscopy; mucous plugs can be removed (with forceps or basket) or broken up using saline or mucolytic lavage and removed by suctioning through the scope.

Follow-up Resources:

Standard Text Resources:

Des Jardins, T & Burton G.G. (2011). Postoperative atelectasis (Chapter 42) in *Clinical manifestations and assessment of respiratory disease*. 6th Edition. St. Louis: Elsevier

Useful Web Links:

American Association for Respiratory Care (2013). Clinical practice guideline: Effectiveness of nonpharmacologic airway clearance therapies in hospitalized patients. *Respir Care*, 58, 2187-2193. <http://rc.rcjournal.com/content/58/12/2187.full.pdf>

American Association for Respiratory Care (2011). Clinical practice guideline: Incentive spirometry. *Respir Care*, 56, 1600–1604. <http://rc.rcjournal.com/content/56/10/1600.full.pdf>

American Association for Respiratory Care (2003). Clinical practice guideline: Intermittent positive pressure breathing - 2003 revision & update. *Respir Care*, 48, 540–546. <http://www.rcjournal.com/cpgs/pdf/05.03.0540.pdf>

American Association for Respiratory Care (2007). Clinical practice guideline: Bronchoscopy assisting. *Respir Care*, 52, 74-80. http://www.rcjournal.com/cpgs/pdf/bronchoscopy_assisting.pdf

Branson, RD. (2013). The scientific basis for postoperative respiratory care. *Respir Care*, 58, 1974-1984. <http://rc.rcjournal.com/content/58/11/1974.full.pdf>

Madappa, T. (2013). *Atelectasis*. E-Medicine/Medscape <http://emedicine.medscape.com/article/296468-overview>

Smetana, G.W. (2009). Postoperative pulmonary complications: Update on risk assessment and reduction. *Cleveland Clin J Med*, 76, S60-S65. http://www.ccjm.org/content/76/Suppl_4/S60.full.pdf

Yoder, MA. (2013). *Perioperative Pulmonary Management*. E-Medicine/Medscape <http://emedicine.medscape.com/article/284983-overview>