Case report

Crit Care Shock (2016) 19:54-58

MRSA pneumonia mucus plug burden and the difficult airway

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An 80-year-old female with a past medical history of chronic obstructive pulmonary disease (COPD), diabetes, and hypertension was initially admitted to the hospital for surgical repair of an incarcerated inguinal hernia. She underwent successful herniorrhaphy with mesh placement. Her post-operative course was complicated by a pelvic hematoma requiring evacuation during an exploratory laparotomy. The patient subsequently developed worsening hypoxia and increased work of breathing. She was placed on supplemental oxygen and as part of her work-up, underwent chest-computed tomography (CT) (**Figures A and B**). Subsequently, she was admitted to the Intensive Care Unit (ICU).

Upon arrival to the ICU, the patient was noted to be in acute respiratory failure and was immediately placed on non-invasive positive pressure ventilation. Concern was noted on CT imaging review for a large mucus plug burden in the mid-trachea. A decision was made to proceed with intubation and fiberoptic bronchoscopy. She was intubated without difficulty. Soon after intubation, it was noted that the patient was difficult to ventilate with high peak airway pressure alarms sounding. The patient was removed from the ventilator and attempts at hand bagging demonstrated a high degree of airway resistance. The patient underwent emergent bronchoscopy showing extensive mucus plug burden extending from the trachea into the R mainstem bronchi (**Figure C**). Suction removal was attempted, however portions of the mucus plug became lodged in the endotracheal tube (ETT). This was quickly recognized and unsuccessful attempts were made to pass an airway bougie through the existing ETT. This initial ETT was quickly removed with noted mucus plug blockage (**Figure D**) and the patient was successfully re-intubated without complication. Shortly after re-intubation the patient became hypotensive and hypoxic with decreased breath sides on the left. Emergent bedside ultrasound evaluation showed absent lung-slide consistent with a pneumothorax. Immediate needle decompression (with a rush of air) and left sided thoracostomy tube placement were performed for an acute tension pneumothorax presumably from COPD bleb rupture (**Figure E**). Bronchoalveolar lavage samples grew out Methicillin-resistant Staphylococcus aureus (MRSA) as the cause of her pneumonia.

As this case illustrates, MRSA pneumonia has the potential to create a high mucus secretion burden leading to complicating issues during intubation and subsequent invasive mechanical ventilation. A review of the literature shows cases of both MRSA and Aspergillus pneumonia causing pseudomembranous tracheobronchitis with high mucous burden in severely immunocompromised or in mechanically ventilated patients. (1) The disease pathophysiology can vary from relatively mild tracheobronchitis with cough, fever, dyspnea, and chest pain, to hemoptysis with excess mucus production and ulcerative tracheobronchitis. (1) The differential diagnosis for large mucus plug burden includes non-cystic fibrosis bronchiectasis, which is clinical characterized by a chronic cough, purulent sputum production, and airway dilation. (2) This patient did not have overt radiographic evidence of bronchiectasis on her CT scan but would be at risk due to her primary medical history of COPD. Predisposed individuals have the potential to develop an extensive inflammatory response to pulmonary infection or tissue injury. The inflammation that results can cause structural airway damage and mucus stasis. In bronchiectasis, the mucus itself is often abnormal, more complex, with slower bronchial clearance. Over time, retained sputum can cause mucous plugs and airway obstruction, obliteration, and damage resulting in more advanced bronchiectasis. (1)

If the diagnosis of MRSA pneumonia is suspected, and as this case exemplifies, the managing clinician should be prepared with advanced airway skills and a thorough understanding of the American Society of Anesthesiologists difficult airway algorithm. (3) This patient initially improved with antibiotics and tincture of time, however her underlying COPD made it difficult to wean her from mechanical ventilation and she underwent an elective tracheostomy.

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Figure A.

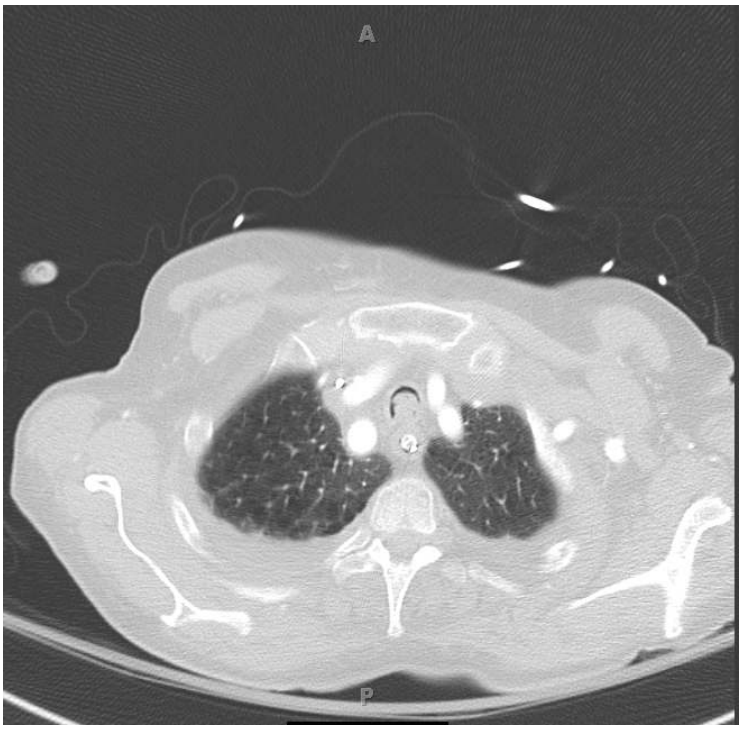

Figure B.

Figure C.

Figure D.

Figure E.

References

1. McShane PJ, Naureckas ET, Tino G, Strek ME. Non-cystic Fibrosis Bronchiectasis. Am J Respir Crit Care Med 2013;188:647-56.
2. Kelesidis T, Osman S, Trayner E, Worthington M, Celli B. Tracheobronchitis caused by methicillin-resistant Staphylococcus aureus as a cause of chronic wheezing in a non-ventilated adult patient with tracheobronchomalacia. Respiration 2010;80:148-56.
3. Apfelbaum JL, Hagberg CA, Caplan RA, Blitt CD, Connis RT, Nickinovich DG. Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. Anesthesiology 2013;118:251-70.