Ultrasound for Critical Care Physicians: Characteristic Findings in A Complicated Effusion

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Case Presentation

A 60-year-old man with right sided invasive Stage IIB squamous lung carcinoma, presented with a one week history of progressively worsening shortness of breath, fever, and chills. On admission, the patient was hemodynamically stable on 5L nasal cannula with an oxygen saturation at 90%. Physical exam was significant for a cachectic male in moderate respiratory distress using accessory muscles but able to speak in full sentences. His pulmonary exam was significant for severely reduced breath sound on the right along with dullness to percussion. His initial laboratory finding showed a mildly elevated WBC count 15.3 K/mm3, which was neutrophil predominant and initial chest x-ray with complete opacification of the right hemithorax. An ultrasound of the right chest was performed (Figure 1).

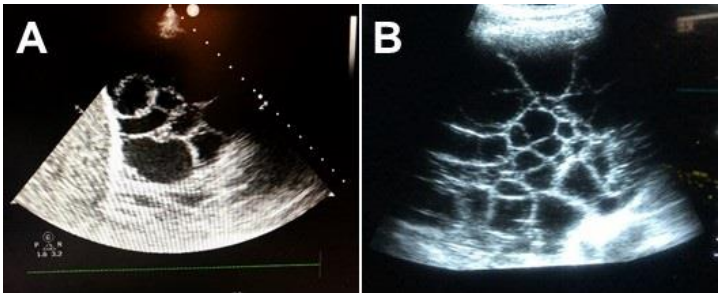

Figure 1. Ultrasound of the right chest, mid axillary line, coronal view.

Based on the ultrasound image shown what is the ***likely cause*** of the patient's opacified right hemithorax?

1. Consolidation
2. Exudative pleural effusion
3. Pneumothorax
4. Transudative pleural effusion

Correct!
2. Exudative pleural effusion

Due to initial hypoxic presentation and large pocket of fluid, the patient underwent therapeutic thoracentesis with immediate improvement of oxygenation status post removal of 2 liters of fluid. Following his thoracentesis patient had complaints of acute pain, which was concerning for possible trapped lung. Chest x-ray and thoracic CT scan of the chest showing re-accumulation of fluid in the right hemithorax with findings of tumor invasion in the right mainstem bronchus (Figure 2).

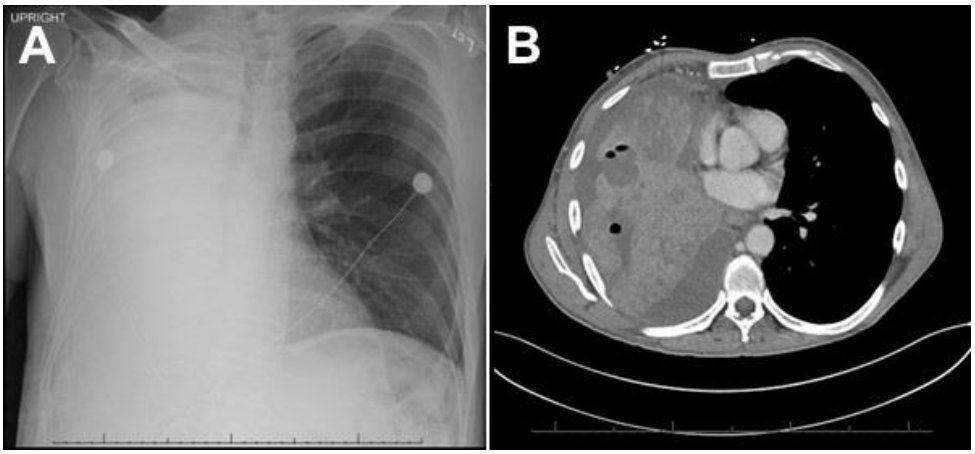

Figure 2. Panel A: chest x-ray post-thoracentesis showing reaccumulation of fluid. Panel B: representative panel from thoracic CT scan in soft tissue windows.

Pleural fluid analysis showed: Total nucleated cell 1,424 /mm3, RBC 9,369 / mm3, Seg 19 %, Lymphs 80% Total Protein 3.7 g/dL, Glucose 258 mg/dL, Lactate Dehydrogenase 258 IU/L, Adenosine Deaminase 12.5. Cytology was negative but insufficient sample was sent however cell count and patient history were highly concerning for a malignant pleural effusion.

It is important to recognize that loculations on imaging are suggestive of an exudative effusion. The images presented demonstrate a complex, septated loculation of the pleural fluid on Ultrasound. Ultrasound is the most sensitive imaging modality to identify a “complex septated” pleural effusion (2,3). Characteristic findings on ultrasound include: anechoic (black), complex non-septated (black with white strands), complex septated (black with white septa), or homogeneously echogenic (white) (1). Anechoic fluid is typically a transudate, complex septated fluid is usually an exudate, while complex non-septated can be either (4). This case highlights utility and importance of point of care ultrasound in better characterizing complicated pleural effusion for risk stratification and timely chest tube placement.

References

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