Case studies of Patients with Pleural Effusions

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CASE 1

- 77 year old woman with hx of COPD
- 2 week history of URI symptoms
- Zpak and then 10 days antibiotics
- Hospitalized with 3 day history of fever to 39.0 °C, shaking chills, nausea and large pleural effusion. Weight loss 15 lbs in one month
- PF is a transudate; culture negative
CASE 1 (continued)

• Transfer to WMC with presumed Pulmonary Embolus

• Repeat thoracentesis of 1 liter of cloudy pleural fluid. Severe pain during thoracentesis

• Pleural fluid cell count: WBC 9817 86% PMN/14% Mono, RBC 1458

• Pleural fluid chemistry: glucose<20, LDH 3208 (serum 426), protein 4.5, amylase<30, PH 6.8

• Gram stain positive for organisms

• PF culture: strep intermedius
CASE 1 (continued)

- CT placed under CT guidance
- Fluid partially loculated
- WBC 44 K, Fever 39.9°C, Na 128
- 3 days of intrapleural TPA given
- CXR shows no resolution of Pleural effusion
- Day 5 decortication via VATS
Light’s criteria for Exudates

- PF protein/serum protein is >0.5
- PF LDH/serum LDH is > 0.6
- PF LDH is >0.6 or \( \frac{2}{3} \) times the normal upper limit for serum LDH
- Sensitivity 98% and specificity 80%
- 20% transudative effusions are misidentified as exudative effusions.
Light’s criteria Corollary

• If difference between the serum albumin and PF >1.2 g/dL (12 g/L), transudative pleural effusion

• whether PF is a transudate/exudate is based not on chemical analysis of the fluid, but on diagnosis of the disease that produces the fluid.
Risk for Poor outcome in Parapneumonic effusions

- **category 1**: small size **VERY LOW**
- **category 2**: size > 10-mm thickness and < one-half the hemithorax. Gram stain /cx negative. pH >7.2 or glucose level >60 mg/dl. **LOW**
- **category 3**: one-half the hemithorax, loculated, thickened parietal pleura. Gram stain /cx positive or pH <7.20 or glucose <60 mg/dl. **MODERATE**
- **category 4**: pus. **HIGH**
CASE 2

- 42 year old male with hx of liver cirrhosis
- Shortness of breath for 2 months
- Recurrent ascites with monthly therapeutic paracentesis
- Compliant with medical management
- No hx of renal insufficiency or encephalopathy
Complete lung collapse
tension hepatic hydrothorax
Hepatic Hydrothorax

- prevalence 5-10% in ESLD
- $[^{99}\text{Tcm}]$ human albumin studies – unidirectional flow of ascites to pleural cavity
- negative intrathoracic pressure favors transfer of fluid across defects and often pts. have minimal ascites

Hepatic Hydrothorax

clinical features

•Usually right unilateral pleural effusion

•Transudative pleural effusion - Cell count <500 PMN cells/mm³ if uncomplicated

•Total protein and albumin may be higher than ascitic fluid (different mechanisms of fluid absorption in pleural space)
 CASE 2 (continued)

- Pleural fluid cell count: 120 WBC, 40\% PMN, 60\% Monocytes, RBC 500
- PF chemistry: Consistent with transudate
- Therapeutic thoracentesis of 4 liters with albumin replacement
- Discharged to home on aggressive diuretic regimen
CASE 2 (continued)

- Increasing shortness of breath over one month
- Follow-up labs show BUN/CR increased
- Recurrent large pleural effusion
- Placement of bilateral chest tube
- F/u trapped lung and restrictive lung disease
Bilateral chest tubes
2 months later
Chest tube placement in cirrhotics

- 80% morbidity from placement
- Bleeding, infection, hemothorax
- Protein and electrolyte depletion
- Difficulty removing the tube due to persistent portal hypertension

VATS with Pleurodesis

Recurrence in 43.7% within three months

- fever, chest pain, empyema, incomplete re-expansion, pneumonia and wound infection

- morbidity (57.1%) and mortality (38.9%)

Management of Hepatic Hydrothorax

Na+ restriction diuretics

Improvement

Repeated thoracentesis

Improvement

TIPS

Response?

consider repeat thoracentesis

Liver Transplant

Bleeding
Pleural fibrosis
Malnutrition
Poor healing

CT and pleurodesis

VATS/laser

?
Transudative pleural effusions

• CHF
• Hepatic Cirrhosis
• Hypoproteinemia
• Nephrotic syndrome
• Acute atelectasis
• Myxedema
• Meig’s syndrome
• Obstructive uropathy
53 y.o. male

- Smoker
- Severe COPD
- Routine CXR -> R Lung nodule
- 2/03 TTNA -> NSCLC
- Rx -> XRT till 4/03
53 y.o. male (cont.)

- Asymptomatic pleural effusion 6/03
- Symptomatic 8/03 and underwent thoracentesis-bloody exudate, hct 8%
- Nondiagnostic thoracentesis and remained symptomatic
- Pleuroscopy for Dx and Rx
Role of Thoracentesis in MPE

- Only 50-60% of MPE are bloody
- <5% transudates are secondary to MPE
- 53% positive cytology with single sample
- 64%, 69% and 72% positive cytology with subsequent thoracentesis
- 10 ml of PF is adequate for diagnosis

Salyer, WR et al. 1975
Sallach SM et al. Chest 2002
pH and pleurodesis in MPE

- Pleurodesis may fail in up to 40% of pts
- Median survival after successful pleurodesis is 4 months
- pH fluid values less than 7.20 associated with failure of pleurodesis and survival
- Low pH associated with improved diagnostic yield with cytology/pleural Bx
- Incidence of pH < 7.30 in MPE is 30-40%