

Concept: Refractory Pleural Effusions

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Case Scenario: 28-year-old female presented with shortness of breath, cough with mucoid expectoration and right-sided chest pain of 6-months duration. Antibiotics were unsuccessful. IR was consulted for pleural drainage.

Symptoms: dyspnea, cough, reduced exercise capacity

Common mimickers: CHF, COPD, PE, pericardial effusion, lung metastases, ascites, radiation-induced lung injury

Definitions:

- **Transudative effusion:** Mismatch of hydrostatic and oncotic forces usually caused by heart failure or cirrhosis or less commonly nephrotic syndrome, atelectasis, or pericarditis.
- **Exudative effusion:** Defined by Light's Criteria and usually caused by pneumonia, malignancy, or thromboembolic disease.
 - **Light's Criteria:** One or more of the following are present to qualify as an exudative effusion:
 1. Ratio of pleural fluid protein to serum protein is greater than 0.5,
 2. Ratio of pleural fluid lactate dehydrogenase (LDH) to serum LDH is >0.6 .
 3. Pleural fluid LDH level is $>$ than $2/3$ of the upper limit of normal for serum LDH.
 - **Malignant pleural effusion:** Tumor cells invade pleural space as seen on pleural biopsy/ fluid cytology. ($3/4$ due to *lymphoma* or cancer of the *breast, lung, and ovary*).
 - **Paramalignant pleural effusion:** Indirectly related to malignancy, but cancer has not invaded the pleural space (i.e. bronchial obstruction, thromboembolism, SVC syndrome).

Management Options:

Therapy	Comment
Observation	<ul style="list-style-type: none">- For asymptomatic patients- Most will eventually need therapy
Repeat thoracentesis	<ul style="list-style-type: none">- Re-accumulation ~98% by 30 days- High risk of pneumothorax, infection, and loculation
Chest tube drainage	<ul style="list-style-type: none">- Most recur after catheter removed
Chemical pleurodesis	<ul style="list-style-type: none">- Sclerosing agent (i.e. talc, doxycycline, or bleomycin) used to fuse two layers of the pleura- Success rate is 70-95% without fluid reaccumulating at 1 month- Requires large-bore chest tube for 5-7 days → important to consider for patients with short prognosis
Long term indwelling pleural catheter	<ul style="list-style-type: none">- Can be small-bore non-tunneled or tunneled (cuff is tunneled under skin to prevent infections)- Some patients achieve pleurodesis in 2 weeks (median 11 weeks) and can be removed- Intermittent drainage by patient or family at home

Pleural abrasion or pleurectomy	<ul style="list-style-type: none"> - Indicated in patients who are expected to have prolonged survival - ~20% morbidity and ~10% mortality
Pleuroperitoneal shunt	<ul style="list-style-type: none"> - Used in cases of intractable effusions and trapped lungs - Shunt drains pleural fluid into the abdomen via subcutaneous reservoir that patient must pump ~400 times/ day - Problems include cost and malfunction - Can develop malignant ascites.
Chemotherapy	<ul style="list-style-type: none"> - Best long-term option for treatment sensitive tumors
Radiotherapy	<ul style="list-style-type: none"> - May be effective in lymphoma and lymphomatous chylothorax
SVC Stenting	<ul style="list-style-type: none"> - Effective for SVC syndrome-related pleural effusions
Thoracic Duct Embolization	<ul style="list-style-type: none"> - Effective for chylous pleural effusions

Management Approach:

1. Attempt a diagnostic/ therapeutic thoracentesis.
2. Repeat therapeutic thoracentesis if necessary.
3. If the pleural effusion is refractory to thoracentesis or medical management, then consider advanced interventions from the list above.

Important Points about Refractory Pleural Effusions:

- Use interdisciplinary team to help with decision making.
- Treatment approach will depend on etiology of effusion.
- Average survival for patients with untreatable cancer and refractory pleural effusions is 4 to 6 months. Therefore, goals of care discussions are important.
- Can safely remove 1.5 L or 20 ml/kg of pleural fluid per session according to some experts to prevent re-expansion pulmonary edema.

References:

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