

FAST FACTS AND CONCEPTS #157
MALIGNANT PLEURAL EFFUSIONS: INTERVENTIONAL MANAGEMENT

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Background Malignant pleural effusions can cause dyspnea, cough, and reduced exercise tolerance. Over three quarters of malignant pleural effusions are due to lymphomas or cancers of the breast, lung, and ovary. The average survival of patients with refractory cancer and pleural effusions is 4-6 months (1). Survival is considerably worse for patients with poor functional status due to progressive cancer. This *Fast Fact* reviews key facts regarding effusion management.

Symptom Causality and Goals of Care The cause of dyspnea, even in the presence of a known malignant effusion, is not always evident. Common confounding problems include congestive heart failure, chronic obstructive pulmonary disease, pulmonary emboli, pericardial effusions, parenchymal lung metastases, ascites, and radiation lung injury. A 'diagnostic' therapeutic thoracentesis may be indicated to determine if removal of fluid leads to an improvement in the patient's dyspnea. The decision to proceed with thoracentesis should be made after considering the overall goals of care, functional status, prognosis, and presence of co-morbid conditions. Guidelines suggest that no more than 1.5 L of fluid can be safely removed at any one time to prevent reexpansion edema, but some authors suggest that as much as 20ml/kg of fluid can be safely removed (2).

Management Options:

- **Repeated thoracentesis** is appropriate for patients with a short prognosis (weeks). The re-accumulation rate is approximately 98% by 30 days (3). Problems associated with this approach include the need for repeated procedures, pneumothorax, infection, and the development of loculation.
- **Chest tube drainage alone** involves the use of a large-bore tube to drain the pleural cavity followed by the tube's removal, without sclerosis. This prevents re-accumulation in 11-40% of patients at 30 days follow-up (4).
- **Systemic chemotherapy or hormonal therapy** is the best long-term management option for treatment sensitive tumors (see *Fast Facts* #14, 99).
- **Chemosclerosis** requires chest tube insertion followed by instillation of a sclerosing agent. It has a success rate of 70-95% with no fluid re-accumulation at 1 month (if the pleural and parietal surfaces are apposed after drainage and pleural fluid drainage is less than 100 ml/day at the time of instillation) (5). Heavy tumor burden, reflected by low pleural pH (<7.2) or glucose concentration (< 3.3 mmol/L), is associated with a lower success rate and shorter survival (6). Talc is inexpensive and has the lowest re-accumulation rates (3-8% after 30 days), compared to doxycycline and bleomycin (1). Talc is rarely associated with ARDS and systemic embolization; more common side effects are pain and fever. Sclerosis requires a large-bore chest tube which often remains in place for 5-7 days – a major consideration in patients with a short prognosis. Thorascopic installation of talc is the most effective technique in highly selected patients, but it is more costly (7,8). Providing adequate pain management is crucial for chest tube insertion and any sclerosis technique.
- **Small-bore catheters** can be inserted radiologically in the ambulatory setting and connected to a drainage bag for intermittent drainage by nurses or family members at home. Chemosclerosis can be accomplished through the small catheter. When done in the inpatient setting, sclerosis via a small catheter has a success rate of 62 to 95%; outpatient chemosclerosis may be less efficacious but there has been no head-to-head comparison.
- **Tunneled pleural catheters** are similar to small-bore catheters but involve a cuff which is tunneled under the skin to prevent infections. In a 2012 cost analysis, tunneled pleural catheters were found to be the most cost effective management approach when prognosis was 3 months or less (9). A retrospective study showed symptom improvement in 96% of patients at 2 weeks post insertion; spontaneous pleurodesis was noted in 44% of all patients (10).
- **Pleuroperitoneal shunts** are occasionally indicated in patients with intractable effusions and trapped lungs. The shunt drains pleural fluid into the abdomen via a subcutaneous reservoir that the patient must pump ~ 400 times/day. Cost, limited efficacy and frequent malfunctioning all limit

usefulness of this procedure. In addition, the development of malignant ascites can occur if the patient lives long enough.

- **Pleurectomy** is only indicated in patients who are expected to have a prolonged survival. There is significant associated morbidity (20%) and mortality (10%) (11).

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