Options for Managing Recurrent Pleural Effusions

Between 7 and 15% of patients with lung cancer develop a malignant pleural effusion (MPE), a fluid collection outside of the lung in the chest cavity. Very often, if it develops, it recurs frequently. This is typically associated with shortness of breath, also known as dyspnea, so we want to try to manage these recurrent pleural effusions to minimize pulmonary symptoms (although some lung cancer patients have several reasons for shortness of breath and cough and still have symptoms even with effective management of an effusion. We'll review several ways to manage this problem.

It is certain possible to do multiple thoracenteses (reviewed in my prior post), putting a needle into the pleural space to drain off fluid as much as needed, but this tends to be an inconvenient long-term strategy. In one study of 94 patients with MPE (reference here), the median time before recurrence of an effusion was only 4 days, and 97% of patients required a repeat procedure within one month. Each procedure is associated with a small risk of bleeding, infection, and also collapsed lung. While it is a reasonable option, because of the inconvenience associated with multiple serial thoracenteses, this is often done primarily in patients who are not re-accumulating fluid rapidly or for whom a longer-term solution is not needed (i.e., poorer prognosis, short survival anticipated). Another option is to put in a chest tube, a catheter that has one end in the pleural space and one end that goes through the skin and outside of the body, leave it in to drain for a few days, and then remove the chest tube. This approach is effective in approximately 40% of patients.

A very common approach is to cause inflammation and adhesions to tack the outside of the lung to the inside of the chest wall, effectively eliminating the space in which the fluid can collect, a technique called pleurodesis. To do this, a variety of chemicals can be used, and they are administered directly into the pleural space in an operating room at the time of a thoracoscopy, or some can be administered at the bedside through a chest tube. These procedures can use talc, or some antibiotic medications that cause inflammation (previously tetracycline before it was taken off the market in 1992, now commonly doxycycline), or some types of chemotherapy (bleomycin is commonly used but very expensive compared to equally effective approaches), or a few other agents. There are no significant differences among the agents and approaches in wide use, with most providing long-term control and no further effusion in about 65-80% long-term control rate in a majority of studies. These procedures work best when the lung is well-expanded and can rest next to the chest wall after an effusion has drained. A recent large trial (abstract here) with over 500 patients with MPE who were randomized to receive either talc poudrage (direct administration onto lung at thoracoscopy) vs. a bedside administration of a talc slurry through a chest tube showed no difference in effectiveness. An image of talc poudrage is shown here:

(click to enlarge)
There are complications of respiratory failure or even death in a small percentage of patients (5-9%), and fever and pain are also commonly seen. In light of the fact that the procedure is deliberately causing inflammation, fever and pain are not especially surprising complications.

Another approach that has become increasingly popular is the placement of a fenestrated (holes along the length) plastic catheter, known as a Pleurx (PLEUR-ex) catheter, that runs through the pleural space, is tunneled through the chest wall, and then has the other end come out of the chest. It is then attached to a bag or bottle and drained as often as needed, whether daily or every few days, in the outpatient setting. When not draining, the catheter tip is rolled up and kept under a dressing applied to the chest to cover it up. The set-up is shown here:

A Pleurx catheter has the advantage of being useful when the lung can’t re-expand, and it also has the advantages of having minimal risk associated with it and a very short hospital stay, plus the frequency of draining can be tailored for each patient’s needs. On the downside, it involves an external catheter that some people don’t want to deal with, can potentially be a source of infection (up to around 5% of cases), sometimes can get plugged, and requires ongoing draining, while a pleurodesis involves no further interventions if successful. There is a recent trial, CALGB 30102, that attempted to randomize patients with MPE to either a talc slurry through a chest tube at the bedside or placement of a Pleurx catheter, but I understand that this trial recently closed early due to poor accrual due to physicians or patients having too strong a preference or aversion for one approach or the other to be randomized.

Another approach, similar to a Pleurx catheter, is placement of a plastic fenestrated catheter in the pleural space and the other end in the belly (technical name is peritoneum) that collects pleural fluid and diverts, or shunts, the fluid into the abdomen. However, because the pressure is higher in the abdomen than in the chest, the patient needs to use a pump under the skin to draw up the fluid in the chest and transfer it into the abdomen:

It can be inconvenient, since the pump only moves 1 cc of fluid with each cycle (draw and release), so it requires pumping several times per day. It may also require revisions from time to time and can become clogged 10-20% of the time. One advantage is that it keeps the proteins that are in the fluid in the patients body, rather than removing them with the Pleurx drain to the outside world. And patients don't have to have an external component with their
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catheter.

One final option is a significant surgery called a pleurectomy, in which the pleural lining is stripped and removed. This is generally very effective, but the mortality rate (death as a complication of the procedure) is generally reported as between 10 and 25%, which limits the feasibility and appeal of this approach.

Overall, MPE is very common in lung cancer and in most patients needs to be actively managed beyond treating the underlying cancer. For patients with a slow re-acummulation of fluid over time, repeated thoracenteses are feasible, but for people who become symptomatic within just hours or days of drainage, a longer-term solution is needed. Most of my patients undergo pleurodesis or a Pleurx catheter, and the decision on what to favor depends on a patient’s preference for or against a catheter that comes out of the chest wall, as well as prognosis, with pleurodesis being a less optimal approach when our goals are to manage symptoms for a more short term-basis and more attractive as an investment for longer-term control. These issues are managed routinely by a thoracic surgeon, so it is appropriate for anyone facing MPE as more than a short-term concern to speak with one of these specialists about the various options.