



Clinical Update

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A Quick Review Of Lung Surgery Procedures

In recent years, significant advances in the use of new technologies have made thoracic surgery less invasive. With thorascopic surgical techniques, patients have less tissue damage, less postoperative pain, and ideally, fewer post-op complications. Since the pleural space is breached during both open and thorascopic surgery, patients will need chest tubes post-op.

Regardless of the surgical technique (thorascopic or open surgery), understanding the different lung surgery procedures allows the bedside nurse to anticipate common postoperative conditions and individualize patient care.

Exploratory thoracotomy is a procedure in which the surgeon looks in the chest and pleural space. It is done when diagnostic imaging or bronchoscopy is not clear and the surgeon needs to look directly at a lesion, often for a biopsy. Exploratory thoracotomies are relatively common in trauma centers when there isn't time for a work-up and the patient needs prompt, definitive care to stop bleeding in the chest. The number and location of chest tubes present postoperatively will depend on the reason for the exploratory thoracotomy and the procedure done during the operation.

Pneumonectomy is the removal of an entire lung, most commonly to treat lung cancer. For more information about pneumonectomy, see the March 1999 issue of *Clinical Update*.

Lobectomy, the removal of one lobe of one lung, is a relatively straightforward surgical procedure because the demarcation along anatomical borders is clear. This procedure is typically chosen when a lesion is clearly limited to one lobe of one lung — a tumor, cyst, abscess, traumatic injury, or bronchiectasis. Expect one or two chest tubes postoperatively to drain both air and fluid from the chest.

Segmental resection removes one or more segments of a lobe of a lung. As with lobectomy, the tissue removal is guided by anatomical planes, but in this procedure, the dissection is much more extensive. This procedure is often done in patients with borderline pulmonary function in order to preserve as much lung tissue as possible. Segmental resection is typically performed to

remove a bleb, localized abscess, or small tumor. Because of the complexity of this surgery, patients are more likely to have air leaks through the chest tube(s) postoperatively and may have delayed re-expansion of the remaining lung tissue on the surgical side. Therefore, careful attention to postoperative pain control and respiratory care to reduce the risk of atelectasis or nosocomial pneumonia is particularly important. One or two chest tubes may be in place after the procedure. Watch for intermittent bubbling in the water seal chamber which can indicate a persistent air leak along the suture line on the lung.

A **wedge resection** removes a small, triangular piece of lung tissue near the lung surface. This procedure is typically done for lung biopsy or to remove a small, well-defined lesion. Usually a single postoperative chest tube is in place to allow air to escape from the pleural space. Postoperative bleeding is typically minimal.

Lung volume reduction is a procedure designed to treat emphysema, currently under study in a number of select centers across the United States. Removing sections of hyperinflated lung tissue may reduce dyspnea and improve lung function in patients with advanced emphysema. Outcomes have been variable and seem to depend largely on initial patient selection. Chest tubes are required postoperatively; postop air leaks resulting from sutures or staples placed in friable lung tissue can be particularly difficult to manage.

Surgical decortication strips off the thick, fibrinous membrane that can develop over the visceral pleura, the pleural layer attached to the lung. This membrane can form when patients have a chronic pleural infection (empyema) or long-term presence of blood or serous fluid in the pleural space. The goal of surgical decortication is to maximize lung re-expansion. Since the pleural space is entered, a chest tube is required postoperatively to allow air (and possibly fluid) to leave the pleural space.

Thoracoplasty is not technically lung surgery — it is a procedure done on the chest wall in which one or more ribs or rib segments are removed to reduce the size of the thorax. This procedure is rarely done today, but we may care for patients who underwent this procedure in the 1950s when it was a common treatment for chronic tuberculosis.

Knowing these thoracic surgery procedures can help everyone breathe a little easier during the postoperative management of chest drainage in thoracic surgery patients.

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Test Your Knowledge...

Q. What is the difference in placement of a chest tube inserted to evacuate air from the chest and one placed to drain fluid out of the chest?

Answer on other side

In The Literature

How Ethnicity Affects Drug Metabolism

If you read only one clinical article in the nursing literature this year, make it this one. Elizabeth Connelly Kudzma writes a terrific piece about how a patient's ethnicity can affect how well medications will work for them. For example, did you know that African Americans with high blood pressure will respond better to diuretics than to beta blockers and ACE inhibitors? Or that people of Asian descent often metabolize benzodiazepines more slowly than whites and, therefore, may require lower doses of these medications? Or that Hispanics tend to respond better to lower doses of antidepressants than whites? Dr. Kudzma describes the concept of genetic polymorphism — that people metabolize drugs differently based on inherited genes that control their liver metabolism.

If a medication doesn't seem to be working, don't assume that the patient isn't taking it as prescribed. The lack of a positive response may have nothing to do with what the patient is doing (or not doing), and everything to do with his or her ancestry. With the changing face of the ethnic composition of the US, knowing about ethnicity and drug metabolism will be increasingly important in the years ahead.

Source: Kudzma EC: Culturally competent drug administration. *AJN* 1999;99(8):46-51.

Starting Research-Based Practice

Most of us wish that nurses would incorporate more research into their daily bedside care. But first, nurses need to read and evaluate research findings. A recent article in the *Journal of Emergency Nursing* describes one hospital's plan to get nurses more involved. A task force composed of staff nurses, nurse managers, researchers and clinical nurse specialists designed a research critique tool — a series of 11 categories of questions that provide a road map for analyzing research published in the nursing or medical literature. The guide covers basics, such as how descriptive the title is, as well as the heart of the research — design, sample, methodology and data analysis. The form is reprinted in this article.

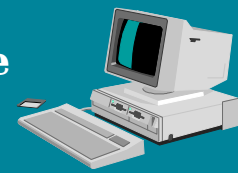
This is a great tool to help nurses who don't participate in research use the literature intelligently. Plus, it would make a great study aid for any nurse going back to school who has to take a research course.

Source: Carlson DS, Kruse LK, Rouse CL: Critiquing nurse research: a user-friendly guide for the staff nurse. *Journal of Emergency Nursing* 1999;25(4):330-332.

Test Your Knowledge...

A chest tube that allows air to escape from the chest will be placed anterior and superior in the chest because air within the pleural space will rise to the highest point in the chest. A chest tube to drain fluid will be placed posterior and inferior because fluid will collect in the most dependent part of the pleural space.

On the World Wide Web...



Nursing organizations have come a long way in beefing up their web presence. Whether or not you're a member, you'll receive plenty of benefits by visiting web sites for these nursing organizations. All have links to a wealth of information, including on-line access (of some sort) to their sponsored journals, information about the organization and the specialty, and how to contact the organization to get specific questions answered.

American Association of Critical-Care Nurse (AACN)
www.aacn.org

Association of periOperative Registered Nurses, Inc. (AORN)
www.aorn.org

Emergency Nurses Association
www.ena.org

More Research On Chest Drainage

The current issue of the *American Journal of Critical Care* contains an article describing research done to determine how tubing position affects fluid drainage from chest tubes. Gordon, et al, published the first study on this topic, but their research was done on a laboratory model; this study examined drainage from pigs to account for intrapleural pressure changes that occur during breathing.

The researchers concluded that both straight and coiled tubing positions (coiling the tubing on the bed, with tubing positioned in a straight line from the bed to the chest drain) are optimal for chest tube fluid drainage. Comparing their results with Gordon's group, these researchers determined that fluctuating intrapleural pressures did not affect the drainage; their results replicated Gordon's group's work.

In summary, this research supports what has long been recommended in the nursing literature: chest tube drainage is facilitated when tubing is coiled on the bed, and straight drainage is maintained between the patient and the chest drain, without any dependent loops. Drainage can be significantly impeded when fluid builds up and is allowed to hang in a dependent loop. If a dependent loop cannot be avoided, such as during transport, periodic lifting and draining of the loop will compensate for the effects the dependent loop has on drainage.

Sources:

Gordon PA et al: Positioning of chest tubes: effects on pressure and drainage. *American Journal of Critical Care* 1997;6:33-38.

Schmelz JO, Johnson D, Norton JM, et al: Effects of position of chest drainage tube on volume drained and pressure. *American Journal of Critical Care* 1999;8(5):319-323.