

**Physiotherapy icu 6<sup>th</sup> semester 3<sup>rd</sup> year  
Pre and post operative thoracic surgeries**

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# Pre operative

- Pre operative assessments
- Breathing exercises
- Cough and huff
- Chest techniques

# Factors that increase the risk of pulmonary complications after thoracic surgery

## ☐ **Chest pain**, which leads to

- chest wall immobility,
- poor lung expansion
- an ineffective cough.
- In addition, pulmonary secretions are greater than normal after surgery.
- Therefore, the patient is more likely to accumulate pulmonary secretions and develop secondary pneumonia or atelectasis.

## □ **General Anesthesia**

- Decreases the normal ciliary action of the tracheobronchial tree
- Depresses the respiratory center of the central nervous system, which causes a shallow respiratory pattern (decreased tidal volume and vital capacity)
- Depresses the cough reflex

## ❑ Intubation (Insertion of an Endotracheal Tube)

- Causes muscle spasm and immobility of the chest
- Irritates the mucosal lining of the tracheobronchial tree, which causes increased production of mucus
- Decreases the normal action of the cilia in the tracheobronchial tree, which leads to pooling of secretions

## □ Pain Medication

- Although pain medication administered postoperatively diminishes incisional pain, it also:
- Depresses the respiratory center of the central nervous system
- Decreases the normal ciliary action in the bronchial tree

## ❑ **General Inactivity, Postoperative Weakness and Fatigue**

- Pooling of secretions, particularly in the posterior basilar segments of the lower lobes, because of inactivity
- Decreased effectiveness of the cough pump because of postoperative weakness and fatigue

## **❑ Other risk factors not directly related to the surgery**

- Patient's age (age more than 50)
- History of smoking
- History of COPD or restrictive pulmonary disorder because of neuromuscular weakness
- Obesity
- Poor mentation and orientation



# Thoracic Surgery: Operative and Postoperative Considerations during Management

- ❑ Many factors contribute to a patient's postoperative impairments, any one of which influences postoperative management.
- A patient who has undergone thoracotomy for a pulmonary or cardiac condition typically is hospitalized for a week or less.
- Therapeutic interventions begin on the first postoperative day and include breathing and coughing exercises, shoulder ROM, posture awareness training,

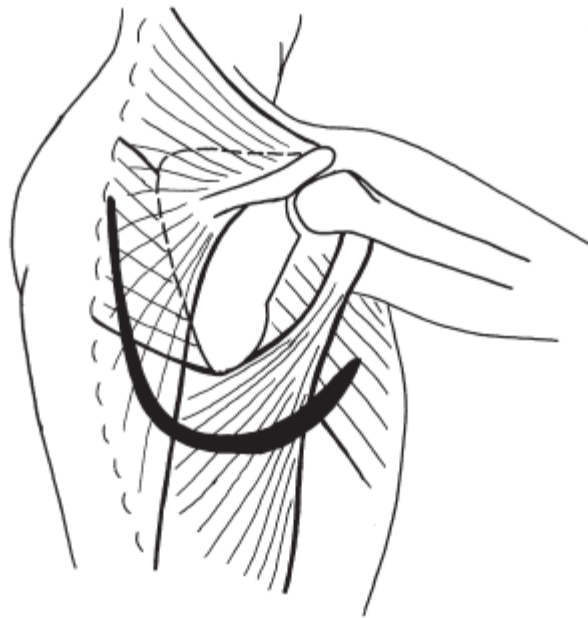
# Co-morbidities and Related Dysfunction

- In addition to the primary pulmonary or cardiac pathology (e.g., a malignant tumor, lung abscess, coronary artery disease)
- the patient also may have related cardiopulmonary conditions, such as angina, congestive heart disease, chronic bronchitis, or emphysema.
- The patient with a long history of cardiac disease may have preoperative pulmonary dysfunction such as hypoxemia, dyspnea on exertion, orthopnea, or pulmonary congestion.
- Such co-morbidities and related pulmonary or cardiac dysfunction can complicate postoperative rehabilitation.

# Surgical Approach

- Pulmonary surgery typically involves a large posterolateral, lateral, or anterolateral chest incision.
- A standard posterolateral approach (Fig. 25.40), for example, is performed by incising the chest wall along the intercostal space that corresponds to the location of the lung lesion.
- The incision divides the trapezius and rhomboid muscles posteriorly and the serratus anterior, latissimus dorsi, and external and internal intercostals laterally.

# Surgical Approach



**FIGURE 25.40** A posterolateral approach commonly used in thoracic surgery incises and divides the trapezius, rhomboids, latissimus dorsi, serratus anterior, and internal and external intercostal muscles.

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# Surgical Approach

❑ Many patients, complain of a great deal of

- shoulder soreness on the operated side.
- Loss of range of shoulder motion
- and postural deviations are possible

because of the disturbance of the large arm and trunk musculature during surgery.

# Surgical Approach

- The most common incision used with cardiac surgery is a *median sternotomy*.
- *A large incision extends along the* anterior chest from the sternal notch to just below the xiphoid.
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- The sternum is then split and retracted so the chest cavity can be exposed. After completion of the surgical procedure, the sternum is closed with stainless steel sutures.
- Postoperatively, there is less incisional pain after a median sternotomy than after a posterolateral thoracotomy, but deep breathing and coughing are still painful.
- After a median sternotomy, a patient tends to exhibit rounded shoulders and is at risk for developing shortened pectoralis muscles bilaterally.

# Additional Considerations

- After any type of thoracotomy one or two chest drainage tubes are put in place at the time of the surgery to prevent a *pneumothorax (apical tube)* or a *hemothorax (basal tube)*
- While these tubes are in place, crimping, clamping, or traction on the tubes must be avoided during postoperative interventions
- Fatigue occurs easily during the first few postoperative days, so treatment sessions should be short but frequent.
- The duration of treatment sessions should be increased gradually during the patient's hospital stay.

# Additional Considerations

- ❑ Check the patient's chart regularly to note any day-to-day changes in vital signs or laboratory test results.
  
- ❑ Always monitor vital signs such as
  - heart rate and rhythm,
  - respiratory rate,
  - and blood pressure
  
- ❑ prior to, during, and after every treatment session.



# list of Impairments

- Reduced lung expansion or an inability to take a deep inspiration because of incisional pain
- Decreased effectiveness of the cough because of incisional pain and irritation of the throat from intubation
- Possible accumulation of pulmonary secretions either preoperatively or postoperatively

# list of Impairments

- Decreased chest wall and upper extremity mobility
- Poor postural alignment because of incisional pain or chest tubes
- Increased risk of deep vein thrombosis and pulmonary embolism
- General weakness, fatigue, and disorientation

# Physiotherapy management

## Plan of Care

- Ascertain the status of the patient before each treatment.

## Interventions

- Evaluate orientation, color, respiratory rate, heart rate, breath sounds, sputum , drainage into chest tubes.

## Plan of Care

- Promote relaxation and reduce postoperative pain.

## Interventions

- Position the patient in a semi-Fowler's position (head of bed elevated to 30 and hips and knees slightly flexed).
- This position reduces traction on the thoracic incision.
- Coordinate treatment with administration of pain medication.

## ❑ **Plan of Care**

- Optimize ventilation and re-expand lung tissue to prevent atelectasis and pneumonia

## ❑ **Intervention**

- Begin deep-breathing exercises on the day of surgery as soon as the patient is conscious; diaphragmatic breathing; segmental expansion.
- Add incentive spirometry or inspiratory resistance exercises to improve inspiratory capacity.
- Emphasize a deep inhalation followed by a 3- to 5-second hold and then relaxed exhalation.
- Continue deep-breathing exercises postoperatively, with six to ten consecutive deep breaths per hour until the patient is ambulatory.

## **Plan of Care**

- Assist in the removal of secretions.

## **Intervention**

- Begin deep, effective coughing as soon as the patient is alert and can cooperate.
- Implement early functional mobility (getting up to a chair, early ambulation).

## ❑ **Plan of Care**

- Maintain adequate circulation in the lower extremities to prevent deep vein thrombosis and pulmonary embolism.

## ❑ **Intervention**

- Begin active exercises of the lower extremities, with emphasis on ankle
- pumping exercises on the first day after surgery.
- Continue leg exercises until the patient is allowed out of bed and is ambulatory.

## ❑ **Plan of Care**

- Regain ROM in the shoulders

## ❑ **Intervention**

- Begin relaxation exercises for the shoulder area on the first postoperative day.
- These can include shoulder shrugging or shoulder circles.
- Initiate active-assistive ROM of the shoulders, being careful not to cause pain.
- Reassure the patient that gentle movements will not disturb the incision.
- Progress to active shoulder exercises on the succeeding postoperative days to the patient's tolerance until full active ROM has been achieved.

## **Plan of Care**

- Prevent postural impairments.

## **Intervention**

- Reinforce symmetrical alignment and positioning of the trunk on the first postoperative day when the patient is in bed.

## **NOTE :**

- The patient will tend to lean toward the side of the incision.
- Instruct the patient in symmetrical sitting posture when he or she is allowed to sit up in a chair or at the side of the bed.



## **Plan of Care**

- Increase exercise tolerance

## **Intervention**

- Begin a progressive and graded ambulation or stationary cycling program as soon as the chest tubes are removed and the patient is allowed out of bed.

# Precautions

- Monitor vital signs throughout treatment.
- Be certain to show the patient how to splint over the incision to minimize incisional pain during coughing.
- Avoid placing traction on chest tubes when moving the patient.
- To prevent dislodging a chest tube for the patient who has a lateral incision, limit shoulder flexion to 90 on the operated side for several days until the chest tube is removed
- Do not use percussion over the incision.
- When turning a patient, use a logroll technique to minimize traction on the incision.

**Thank you**