

Postoperative Management in Lung Cancer Surgery

Subjects: **Respiratory System**

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Postoperative management after major and minor thoracic surgeries is crucial for patient recovery and can be challenging. Major thoracic surgeries, such as extensive pulmonary resections, especially in patients with poor health status, may require intensive surveillance, particularly during the first 24–72 h after surgery. Moreover, thanks to the demographic development and medical progress in perioperative medicine, more patients with comorbidities undergoing thoracic procedures require proper management in the postoperative period to improve prognosis and decrease hospital stay.

lung cancer

postoperative management

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1. Introduction

Postoperative management after major and minor thoracic surgeries is crucial for patient recovery and can be challenging. Major thoracic surgeries, such as extensive pulmonary resections, especially in patients with poor health status, may require intensive surveillance, particularly during the first 24–72 h after surgery. Moreover, thanks to demographic development and medical progress in perioperative medicine, more patients with comorbidities undergoing thoracic procedures require proper management in the postoperative period to improve prognosis and decrease hospital stay.

Several hospital professionals and thoracic surgeons are involved in reaching proper postoperative care, such as anesthetists, cardiologists, pneumologists, physiotherapists, specialized nurses, logopedics, and other specialists. A good collaboration between these figures is essential to improve patient outcomes and manage potential postoperative complications in the best way possible.

2. Pulmonary Infections and Physical Therapy

Pneumonia is the most potentially severe early postoperative complication, particularly for individuals undergoing open surgery. Atelectasis, which results in secretion retention and localized hypoventilation, is a significant risk factor for lung infections. Chest wall pain may decrease pulmonary ventilation during open thoracic procedures, encouraging atelectasis. Preventing pulmonary infections and atelectasis is possible through preoperative preparation and postoperative treatment.

3. Thromboembolism

Venous thromboembolism is another frequent surgical consequence. Early mobilization is a prophylaxis that includes mechanical measures (like elastic compression stockings and intermittent pneumatic compression devices) and pharmaceutical interventions (like low-dose unfractionated or fractionated subcutaneous heparin). The risk of getting deep venous thrombosis is increased for all individuals receiving major surgical interventions. In this instance, elastic compression stockings worn before surgery and early mobilization, typically on the same day or the day after, can reduce the risk of deep venous thrombosis and pulmonary embolism. Mechanical and pharmacological prophylaxis is the best standard of care for preventing deep venous thrombosis in high-risk individuals and can be used in combination. In low-risk patients, the American Society of Clinical Oncology (ASCO) recommends that unfractionated subcutaneous heparin in modest doses (5000 UI) be administered 2 h before surgery and continued every 12 h for at least 7 to 10 days after surgery. Patients who are taking anticoagulants prior to surgery require special consideration. In general, heparin can be administered to these patients 6 to 12 h after surgery, depending on intraoperative blood loss and the need for anticoagulation. Patients with low-risk conditions, such as atrial fibrillation without a past stroke or cardiomyopathy without atrial fibrillation, can begin anticoagulation following hospital discharge. Before discharge, moderate-risk patients (such as those with a mechanical aortic valve) must resume anticoagulant treatment. Patients at high risk (such as those with a mechanical mitral valve or atrial fibrillation with a history of stroke) must be anticoagulated with intravenous heparin as soon as feasible following surgery.

4. Cardiac Arrhythmias

In addition, cardiac arrhythmias, particularly atrial fibrillation, are postoperative problems that a thoracic surgeon should anticipate. Atrial fibrillation can result in palpitations, tiredness, angina or infarction, hypotension, congestive heart failure, stroke, and more extended hospitalization, hence increasing the expenditures associated with hospital stays. Because this complication is more prevalent in cardiac surgery patients, the European Association for Cardio-Thoracic Surgery (EACTS) treatment guidelines might be revised for thoracic surgery patients ^[1]. Electrocardiography should be used to rule out myocardial ischemia as part of the standard of care.

5. Pain Management

Pain after thoracic surgery is frequently severe and usually caused by thoracotomy, injury to the intercostal nerves, fractures or dislocation of the ribs, and chest tube placement; therefore, adequate pain control is essential for early mobilization, deep breathing, and coughing of the patient, as well as for preventing undesirable complications such as respiratory failure, hypoxemia, arrhythmias, ischemia, and the development of post-thoracotomy pain syndrome.

There are numerous methods for managing pain, and a multimodal approach is necessary to keep the patient comfortable. They include preoperative epidural catheter implantation, regional anesthesia, and intravenous

patient-controlled analgesia. In order to prevent problems such as atelectasis and deep vein thrombosis, the chosen form of pain treatment should stimulate participation in mobility and pulmonary rehabilitation.

For patients undergoing minor surgical procedures, video-assisted thoracic surgery (VATS), or patients with coagulopathy, intercostal blocking with longer-acting bupivacaine that can be combined with adrenalin to delay absorption is an additional local anesthetic option to consider.

On the other hand, intravenous infusion of opioid medicines or oral narcotic compounds could reduce pain, particularly in patients having open thoracic surgeries or with sensitivities to acetaminophen or nonsteroidal anti-inflammatory treatments.

Different administration tactics for intravenous narcotics include hourly infusion, patient-controlled analgesia (PCA), and continuous infusion of medicines such as tramadol. Each of these methods can provide a minimally acceptable level of pain alleviation.

Oral opioids, such as oxycodone and codeine, are frequently used to treat withdrawal from epidural or intravenous treatment. In addition, these medications are typically necessary for a few days to a few weeks after hospital discharge, depending on patient factors such as adverse effects, the type of surgical technique, and the efficacy of symptom control.

Lastly, it is essential to remember that opioids can induce undesirable effects such as excessive drowsiness, confusion (especially in senior patients), respiratory depression, addiction, urine retention, and constipation difficulties that can lead to obstipation, perforation, and even death. Given that constipation is a common reason for readmission after thoracic surgeries, several preventative measures are available, such as stool softeners, early mobilization, and a progressive laxative regimen to protect bowel function soon after surgery.

6. Fluid Management

Patients undergoing lung resection procedures, particularly pneumonectomy, might develop interstitial and alveolar edema, which limits oxygen diffusion capacity. Restrictive fluid management is essential during and after thoracic surgery operations until IV fluids are replaced with oral fluids and nutrition. In patients undergoing pulmonary resections, excessive fluid replacement should not be administered. Lung parenchyma is deflated during thoracic procedures, which may compromise pulmonary lymphatic drainage and increase extravascular lung water due to disruption of the alveolar–capillary membrane. Excessive fluid administration can cause pulmonary edema, decreased alveolar gas permeability, atelectasis, and hypoxia. In this view, a proper assessment of fluid balance is essential, including the amount of fluid administered with drugs.

During surgery, particular concern must be given to patients with renal failure and considerable blood loss or fluid resuscitation. Close monitoring of urine output, serum electrolytes, calcium and magnesium, blood urea nitrogen, and creatinine is required in these instances. In addition, nephrotoxic medications such as non-steroidal anti-

inflammatory drugs (NSAID) or angiotensin-converting enzyme inhibitors must be reevaluated or discontinued to reduce the risk of kidney damage.

Radiological examinations and laboratory testing could be used routinely on all patients to detect potential consequences of fluid imbalance and its treatment. Radiographs of the chest are essential for identifying pulmonary edema and pleural effusion. Low serum electrolyte levels may be associated with severe arrhythmias; therefore, periodic monitoring is required, particularly for diuretic-treated patients.

7. Chest Tube Management

The drainage tubes must be evaluated daily for functionality, air leakage, and drainage. After thoracic surgery, most surgeons insert one or two chest tubes to empty the pleural space and encourage pulmonary re-expansion. These tubes are connected to drainage systems that can give suction if the surgeon desires. The use of suction remains controversial in the literature; conversion to a standard water seal without suction is required only when considerable air leaks (>1500 mL/min) are detected. Patients having pneumonectomy are the only exception to aggressive suction at any moment. Regarding secretions, the removal of chest tubes appears to be well tolerated, even in the presence of a daily secretion greater than 450 mL [2][3]. Once the lung has fully expanded, and the air leak has ceased, chest tubes are also removed.

Due to the likelihood of malfunction and clogging, care must be taken with the drainage system. Generally, water seal and respiratory movements are synchronized in the drainage system; a blockage will hinder the water column and the respiratory motions. If this occurs, the external tube system must be examined for clamping or obstructions caused by purulent material, blood, or fibrin in the lumen of the chest tube. In this instance, the clog can be removed with irrigation, or the drainage tube can be replaced totally.

Air leaks, defined as leaking from the lung parenchyma into the pleural space, continue to be one of the most prevalent consequences of thoracic surgery. The bubbling of the water column during respiration suggests the presence of an air leak. Air leaks from the drainage system must be ruled out first, which can be accomplished by sequentially clamping the system. Once the clamp is positioned distal to the leak, the bubbling ceases.

Managing prolonged air leaks is possible through a variety of methods. Chest tube suction is modest or unnecessary if complete pulmonary re-expansion cannot be achieved. Fixing an air leak can take a while, so patience is required. In these instances, Heimlich valves allow patients to be discharged with minimal air leakage and uncomplicated access to hospital care. If this strategy is not feasible, reoperation may be undertaken to repair air leaks and prevent nosocomial infections.

Chest tubes are one of the leading sources of postoperative discomfort caused by intercostal nerve injury, and their removal appears to hasten recovery. Upon removal of the chest tube, pulmonary ventilation, mobility, and discomfort may improve. After the chest tube is removed, a chest radiograph is typically performed to determine if pleural apposition has been achieved.

References

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