

Contents

Foreword	xi
Virginia R. Litle	
Preface: Perioperative Management of the Thoracic Patient Continues to Evolve	xiii
Virginia R. Litle and Robert J. Canelli	
Section I: Preoperative Management	
Preoperative Evaluation for Thoracic Surgery	241
Theofilos Matheos, Lakshmi Ram, and Robert Canelli	
Preoperative evaluation before thoracic surgery aims to separate those patients who will tolerate surgery and those who are not surgical candidates. Predicted postoperative pulmonary function testing helps make this distinction. The preoperative period represents a time for patient engagement and physical optimization to improve postoperative outcomes.	
Prehabilitation of the Thoracic Surgery Patient	249
Aaron R. Dezube, Lisa Cooper, and Michael T. Jaklitsch	
Outcomes after thoracic surgery are better predicted by preoperative evaluation of patients' physiologic reserve (also known as personal biologic age rather than chronological age), using validated assessment tools in multidisciplinary collaboration with geriatricians. Targetable risk factors should be identified, and methods should be utilized to minimize these risks. Prehabilitation has been validated as a tool to increase functional and nutritional status of patients undergoing surgery in other specialties and improve outcomes. Although research is still limited in thoracic surgery, early results are promising.	
Enhanced Recovery After Thoracic Surgery	259
Nathan Haywood, Ian Nickel, Aimee Zhang, Matthew Byler, Erik Scott, Walker Julliard, Randal S. Blank, and Linda W. Martin	
Enhanced recovery pathways (ERPs), used across multiple surgical subspecialties, is a multidisciplinary delivery of perioperative care designed to lessen the psychological stress of patients undergoing surgery. Thoracic ERP has been implemented but is not widespread, and variations exist between programs. Evidence of the benefit of thoracic ERP is emerging. This article presents common components of a thoracic surgery ERP and reviews contemporary outcomes.	
Open, Minimally Invasive, and Robotic Approaches for Esophagectomy: What Is the Approach Algorithm?	269
Tadeusz D. Witek, Thomas J. Melvin, James D. Luketich, and Inderpal S. Sarkaria	
Esophageal cancer requires a multimodality treatment approach, with surgical resection a key component in many cases. When it comes to esophagectomy, several approaches and techniques exist, including transhiatal versus transthoracic	

and open versus minimally invasive. Each approach has its associated risks and advantages. When determining the optimal approach and technique, several variables need to be considered. The key variables include patient and tumor characteristics, as well as surgeon comfort and experience with each approach. Regardless of the approach, the goal should remain the same, that is, performing a safe operation without compromise of oncologic principles.

Section II: Intraoperative Management

Intraoperative Anesthetic Management of the Thoracic Patient

279

Melina Shoni and Gerardo Rodriguez

The intraoperative anesthetic management for thoracic surgery can impact a patient's postoperative course, especially in patients with significant lung disease. One-lung ventilation poses an inherent risk to patients, including hypoxemia, acute lung injury, and right ventricular dysfunction. Patient-specific ventilator management strategies during one-lung ventilation can reduce postoperative morbidity.

Intraoperative Anesthetic and Surgical Concerns for Robotic Thoracic Surgery

293

Travis C. Geraci, Prabhu Sasankan, Brent Luria, and Robert J. Cerfolio

Robotic thoracic surgery continues to gain momentum and is emerging as the optimal method for minimally invasive thoracic surgery. As a rapidly advancing field, continued review of the surgical and anesthetic concerns unique to robotic thoracic operations is necessary to maintain safe and efficient practice. In this review, we discuss the intraoperative concerns as they pertain to pulmonary, esophageal, and mediastinal thoracic robotic operations.

Prevention of Postoperative Prolonged Air Leak After Pulmonary Resection

305

Praveen Sridhar, Virginia R. Litle, Morihito Okada, and Kei Suzuki

Postoperative prolonged air leaks (PALs) occur after thoracic surgery in which lung parenchyma is resected, divided, or manipulated. These air leaks can place patients at risk for intensive care unit readmissions, longer hospital length of stay, and infectious complications. Studies have been conducted to identify patients who are at risk for air leak and several methods have been examined for the prevention and treatment of PALs. A standard method of air leak prevention or treatment has not been established. This article discusses the prophylactic measures that have been studied for the prevention of PALs following lung surgery.

Surgical Adjuncts During Esophagectomy

315

Ammara A. Watkins, Michael S. Kent, and Jennifer L. Wilson

Esophagectomy is a major operation whereby intraoperative technique and postoperative care must be optimal. Even in expert hands, the complication rate is as high as 59%. Here the authors discuss the role of surgical adjuncts, including enteral access, nasogastric decompression, pyloric drainage procedures, and anastomotic buttressing as adjuncts to esophagectomy and whether they reduce perioperative complications.

Interventional Pulmonology: A Brave New World 321

Hardeep S. Kalsi, Ricky Thakrar, Andre F. Gosling, Shahzad Shaefi, and Neal Navani

Interventional pulmonology is a dynamic and evolving field in respiratory medicine. Advances have improved the ability to diagnose and manage diseases of the airways. A shift toward early detection of malignant disease has generated a focus on innovative diagnostic techniques. With patient populations living longer with malignant and benign diseases, the role for interventional bronchoscopy has grown. In cancer groups, novel immunotherapies have improved the prospects of clinical outcomes and reignited a focus on optimizing patient performance status to enable access to anticancer therapy. This review discusses current and emerging diagnostic modalities and therapeutic approaches available to manage airway diseases.

Section III: Postoperative Management**Pain Management in Thoracic Surgery** 339

Kyle Marshall and Keleigh McLaughlin

Thoracic surgery is considered one of the most painful surgical procedures performed. Pain is mediated via several mechanisms and is affected by the surgical approach as well as patient factors. Pain after thoracic surgery can be debilitating and lead to poor outcomes, such as respiratory complications, longer hospital stays, poor quality of life, and chronic post-thoracotomy pain syndrome. A multimodal approach to postoperative pain that combines systemic and regional anesthesia has been shown to be the most effective in optimizing analgesia in these patients.

Management of Complications After Lung Resection: Prolonged Air Leak and Bronchopleural Fistula 347

James M. Clark, David T. Cooke, and Lisa M. Brown

Prolonged air leak or alveolar-pleural fistula is common after lung resection and can usually be managed with continued pleural drainage until resolution. Further management options include blood patch administration, chemical pleurodesis, and 1-way endobronchial valve placement. Bronchopleural fistula is rare but is associated with high mortality, often caused by development of concomitant empyema. Bronchopleural fistula should be confirmed with bronchoscopy, which may allow bronchoscopic intervention; however, transthoracic stump revision or window thoracostomy may be required.

Management of Complications After Esophagectomy 359

Jonathan C. Yeung

Esophagectomy is a complex operation with many potential complications. Early recognition of postoperative complications allows for the best chance for patient survival. Diagnosis and management of conduit complications, including leak, necrosis, and conduit-airway fistulae, are reviewed. Other common complications, such as chylothorax and recurrent laryngeal nerve injury, also are discussed.