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ADVANCES IN ANESTHESIA

Anesthesia and Upper and Lower Airway Management for Advanced Diagnostic and Therapeutic Bronchoscopy

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Keywords

• Bronchoscopy • Lower airway management • Silicon stents • Metallic stents • EBUS • ENB • Anesthesia

Key points

- Advanced diagnostic and therapeutic bronchoscopy is evolving.
- Pulmonologists and anesthesiologists should stay abreast of these advances.
- Most patients having bronchoscopic surgery are high risk.
- Flexibility is needed to tailor and modify the anesthetic techniques to match patient and procedure needs.
- Bronchoscopic procedures take the concept of sharing the airway to a new level.
- The key to favorable outcomes lies in deep understanding of the underlying lung disorder, open 2-way communication between anesthesiologists and pulmonologists, understanding the nature of the procedure, and above all, vigilance and preparedness.

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INTRODUCTION

Advanced Diagnostic Bronchoscopy is a relatively new term that describes several new bronchoscopic techniques. Over the last decade advancements in the optical capabilities of the flexible bronchoscope and adjunctive catheter-based imaging tools have created new windows into the lung. Autofluorescence, Narrow-Band imaging (NBI), probe-based confocal light endomicroscopy (pCLE) are in various levels of clinical utility and investigation. Endobronchial Ultrasound (EBUS) is now replacing mediastinoscopy and combined with conventional or navigational bronchoscopy is now the preferred route for diagnosis and staging lung cancer [1–3]. Navigational Bronchoscopy is a group of similar technologies that incorporate additional image guidance. These can be in the form of virtual bronchoscopy, real-time CT guidance, and adjunctive peripheral endobronchial ultrasound. Electromagnetic guidance is combined with specific catheters and probes to reach peripheral lung lesions. While many studies regarding these technologies have used what is described as ''moderate sedation'', the evolving practice of multimodality bronchoscopy favors the use of general anesthesia [4,5]. This is because these techniques often require a longer duration than simple diagnostic bronchoscopy, precise positioning, and often a large diameter bronchoscope with complex instrumentation. We describe some of these advanced diagnostic procedures in more detail along with their anesthetic considerations and management.

Therapeutic bronchoscopic procedures aim at either relieving central airway obstruction, management of tracheobronchial defects such as fistulas and/or dehiscence of anastomosis (e.g post lung transplant), or endobronchial treatment of severe asthma. Central airway obstruction can result from relatively benign conditions like Wegner's granulomatosis (now known as granulomatosis with polyangiitis), a complication of tracheostomy or tracheal intubation related trauma, or as a result of a malignant process. However, the principles of management are somewhat similar; thus for the sake of simplicity we will focus on discussing malignant central airway obstruction to demonstrate principles of therapeutic interventional bronchoscopy and the anesthetic management.

ADVANCED DIAGNOSTIC BRONCHOSCOPY

Endobronchial optical advanced diagnostic techniques

Autofluorescence (AF) bronchoscopy is a technique that is based on the observation that dysplasia and carcinoma in situ show less fluorescence than normal tissue when stimulated with wavelengths of light between 380 and 460 nm. This so-called blue light bronchoscopy has been shown to be more sensitive than standard white light bronchoscopy for detecting malignant and premalignant endobronchial lesions [6]. However, this is a nonspecific test in that it can be abnormal with any inflammation or prior injury [7]. At present there are no available AF systems in the United States.

Narrow band imaging is another use of different wavelengths of light in the blue and green spectrum (415 nm and 540 nm) to enhance abnormal airway findings.