



# Introduction

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The role of bronchoscopy in the evaluation and treatment of respiratory disease has evolved dramatically over the last decade. It was initially a tool for examining and sampling the central endobronchial tree, and techniques available included simple suctioning of secretions, bronchial washing, bronchial brushing and bronchial biopsies. The latter two are achieved by inserting either a cytology brush or biopsy forceps through the instrument channel and sampling the area of direct interest. During the 1990s, there was a transition from fiberoptic bronchoscopes to video bronchoscopes. The quality of the imaging systems has improved exponentially thanks to advances in video charged coupled devices (CCDs). Initially, there was the development of fluorescence bronchoscopy and NBI for the early detection of cancer. Although these techniques have the potential to identify lesions early, they have become less important with improvements in image quality. The transition to low tar cigarettes with filters means the natural history of lung cancer has also changed from central airway squamous cell carcinomas to more peripheral adenocarcinomas. Techniques have therefore been developed for sampling peripheral lesions, such as radial ultrasound with a guide sheath and computer-aided navigation bronchoscopy (LungPoint (Broncus Medical, Inc., San Jose, CA, USA) and superDimension (Medtronic, Minneapolis, MN, USA)). With the growth in CT scanning, the identification of peripheral nodules and pulmonary abnormalities will further increase, which will in turn increase the demand for sampling in these peripheral abnormalities.

Endosonography and particularly EBUS-TBNA, with the development of the integrated linear ultrasound bronchoscope, have transformed the staging and diagnosis of lung cancer. These techniques allow sampling of multiple mediastinal and hilar lymph node stations as short day-case procedures under conscious sedation. These techniques are also useful for sampling mediastinal lymph nodes in other conditions such as sarcoidosis, and allow sampling of abnormalities adjacent to the central tracheobronchial tree.

Bronchoscopy has now truly reached its potential as a therapeutic tool. Central obstructing tumours can be debulked using either electrocautery, argon plasma photo coagulation, laser ablation or cryo-extraction. Traditional cryotherapy with repeated freeze–thaw cycles can also be used but requires a follow-up bronchoscopy to clear up necrotic tissue. PDT is a further possibility but this requires a photo-sensitiser to be administered intravenously about 72 h followed by PDT at bronchoscopy and a subsequent procedure to remove the

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debris and necrotic tissue. Where there is tumour ingress extrinsically or loss of the airway structure, endobronchial stents may be considered. These primarily have a role in supporting the trachea or main bronchi. Stents are available in a variety of forms, from SEMS (which may be bare, partly or fully covered) to silicon stents.

Bronchoscopic lung volume reduction using endobronchial valves has been established as part of optimal medical treatment, as a treatment for severe hyperinflation and for use in the absence of collateral ventilation. Alternative approaches that are being developed include endobronchial coils, vapour therapy (which uses the fibrotic effects of thermal ablation) and chemical fibrotic agents. In COPD, ablation of the vagus nerve using radio frequency ablation of the nerve plexus surrounding the main bronchi is at an advanced phase of development. Cryospray therapy with liquid nitrogen is also in development for the treatment of chronic bronchitis. Bronchial thermoplasty has been shown to be effective in a wide group of asthma patients and has been available for about 10 years.

Bronchoscopy has evolved from a simple visual tool that relies on light, to an imaging tool with integrated ultrasound that allows sampling of parabronchial and mediastinal abnormalities. Its true potential is the increasing number of conditions that may be treated using a bronchoscopic approach.

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