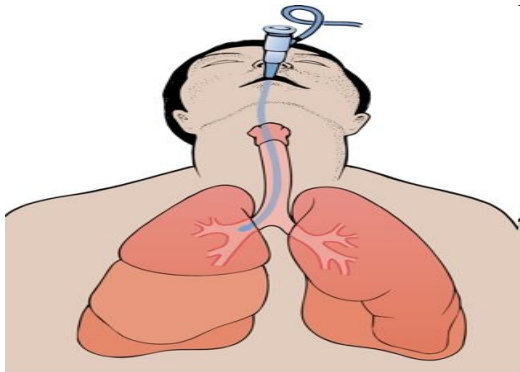


# Flexible Fiberoptic Bronchoscopy

## Chapter 16



# Endoscopy

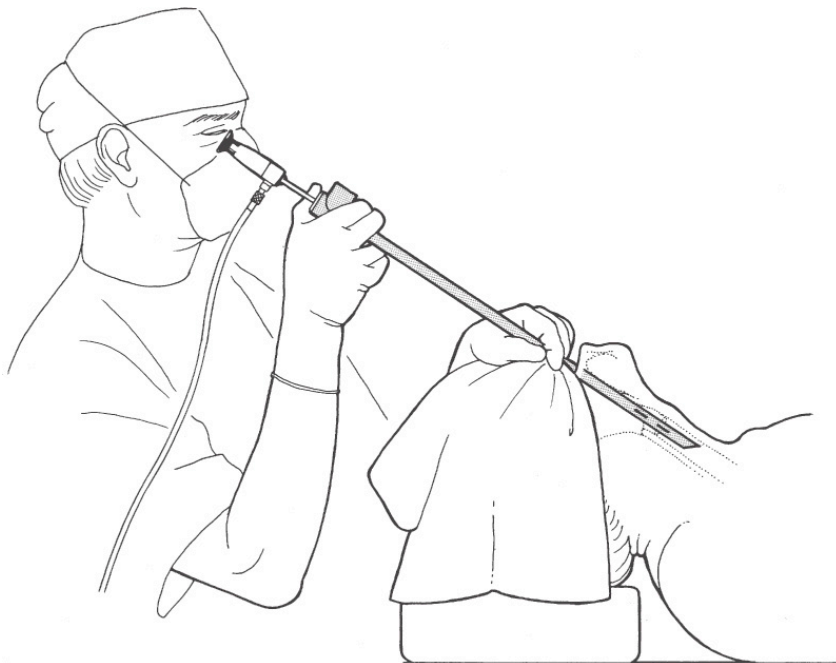
- Procedures that look into the body's tubes and cavities
  - Colonoscopy
  - Esophagoscopy/Gastroscopy
  - Bronchoscopy
- Used to diagnose various diseases and explain conditions

# Bronchoscopy

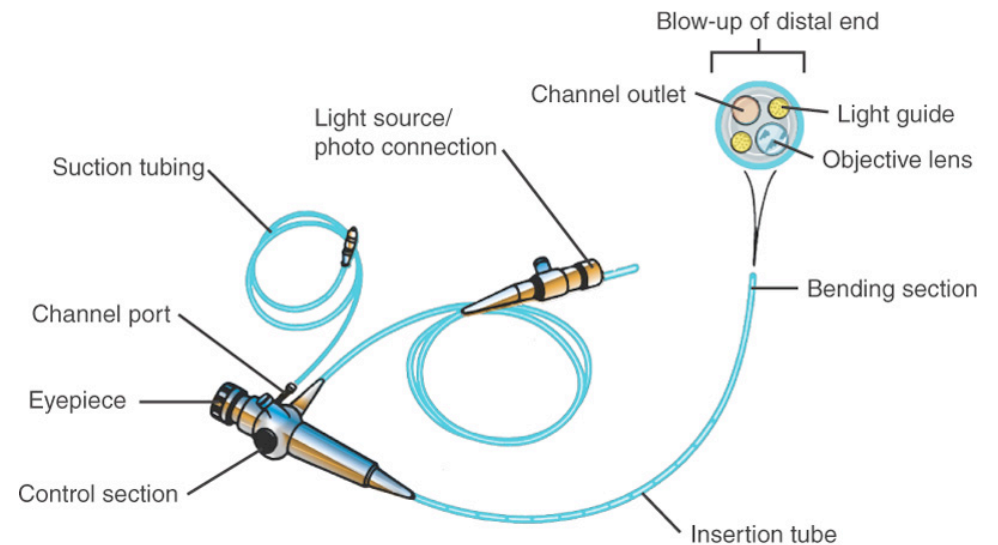
- Allows visualization of the airways (tracheobronchial tree)
- Performed to diagnose problems with the airway or treat problems such as an object or growth in the airway

# Scopes

- Rigid bronchoscope
- Flexible Fiberoptic Scopes



(From Stradling P. *Diagnostic bronchoscopy*, ed 6, New York, 1991, Churchill Livingstone.)



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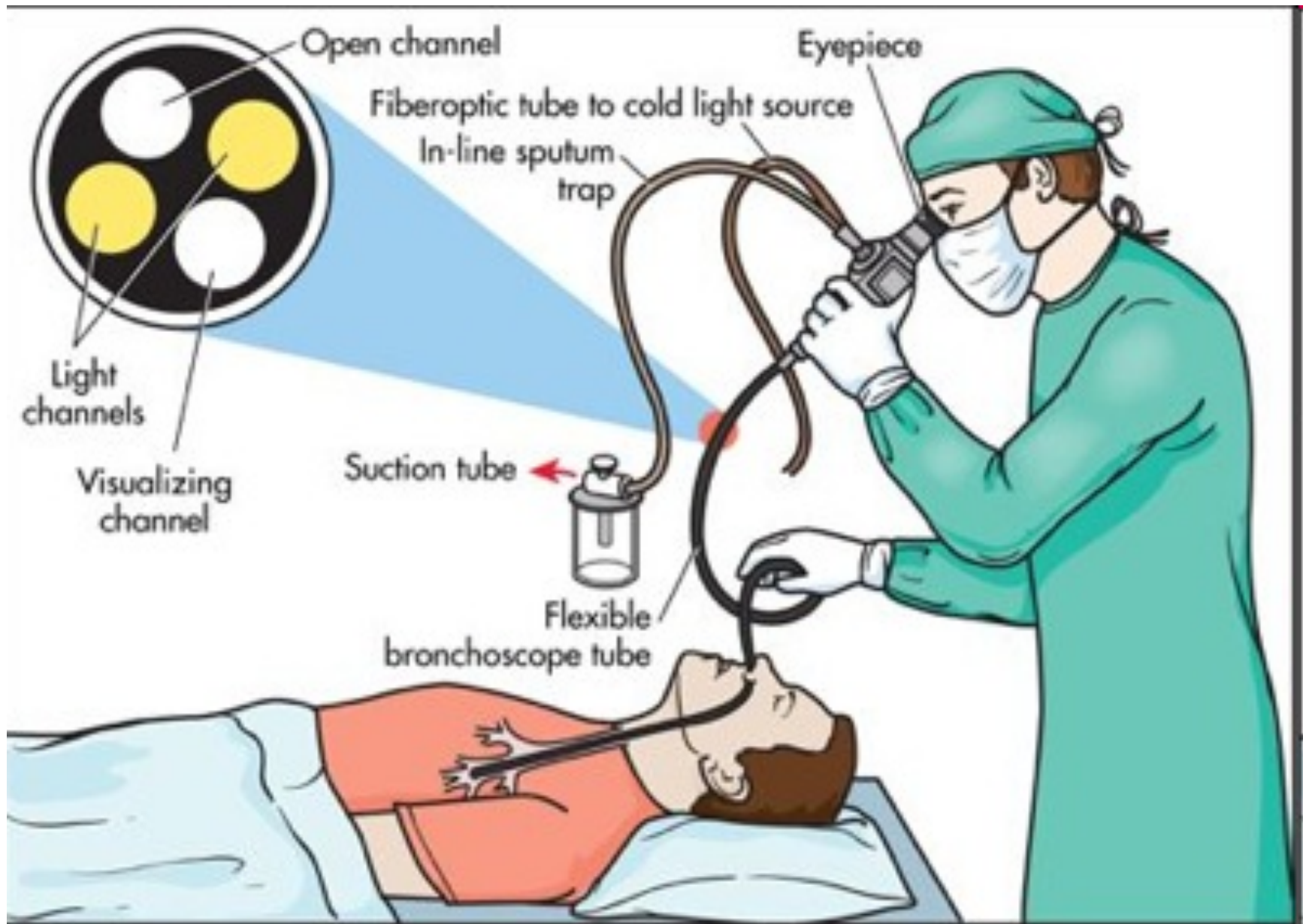
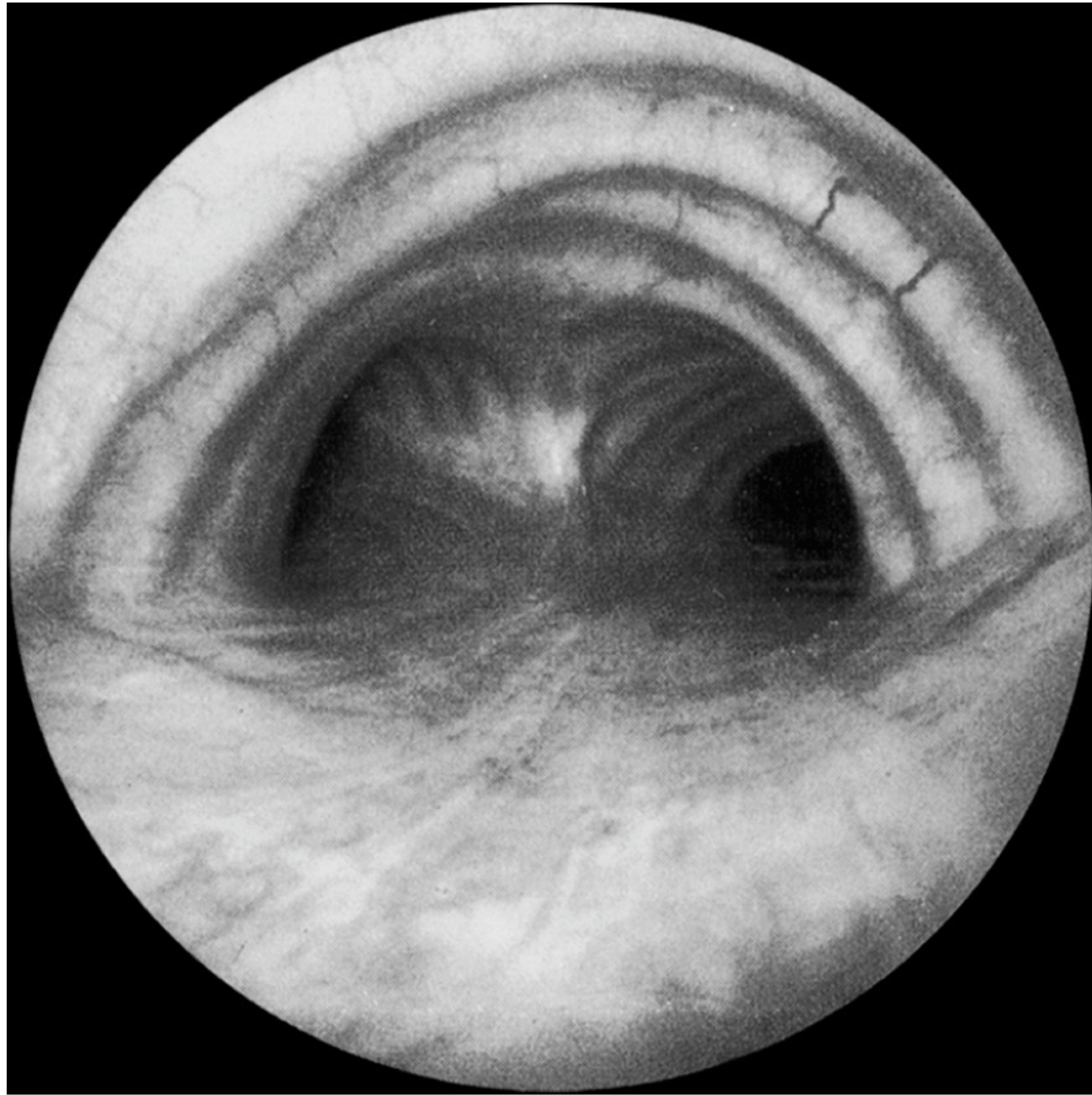


Figure 4-4 Flexible fiberoptic bronchoscope. The four channels consist of two that provide a light source, one vision channel, and one open channel that accommodates instruments or allows administration of an anesthetic or oxygen.



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# Indications

- Abnormal CXR
- Excessive bronchial secretions
- Acute smoke inhalation injuries
- Hemoptysis
- Pneumonia
- Unexplained Cough
- Tracheal disease, stridor and localized wheezing
- Intubation damage
- Atelectasis
- Laser excision
- Removal of foreign bodies
- Lung lavage
- Difficult intubations
- Suctioning of excessive secretions, mucus plugs
- Selective lavage
- Management of life threatening hemoptysis

# Classifications

- Direct visualization of the tracheobronchial tree for abnormalities (e.g., tumors, inflammation, strictures)
- Biopsy of tissue from observed lesions
- Aspiration of “deep” sputum for culture and sensitivity and for cytologic determinations
- Direct visualization of the larynx for identification of vocal cord paralysis, if present. With pronunciation of “eeee” the cords should move toward the midline.
- Aspiration of retained secretions in patients with airway obstruction or postoperative atelectasis
- Control of bleeding within the bronchus
- Removal of foreign bodies that have been aspirated
- Brachytherapy, which is endobronchial radiation therapy using an iridium wire placed via the bronchoscope
- Palliative laser obliteration of bronchial neoplastic



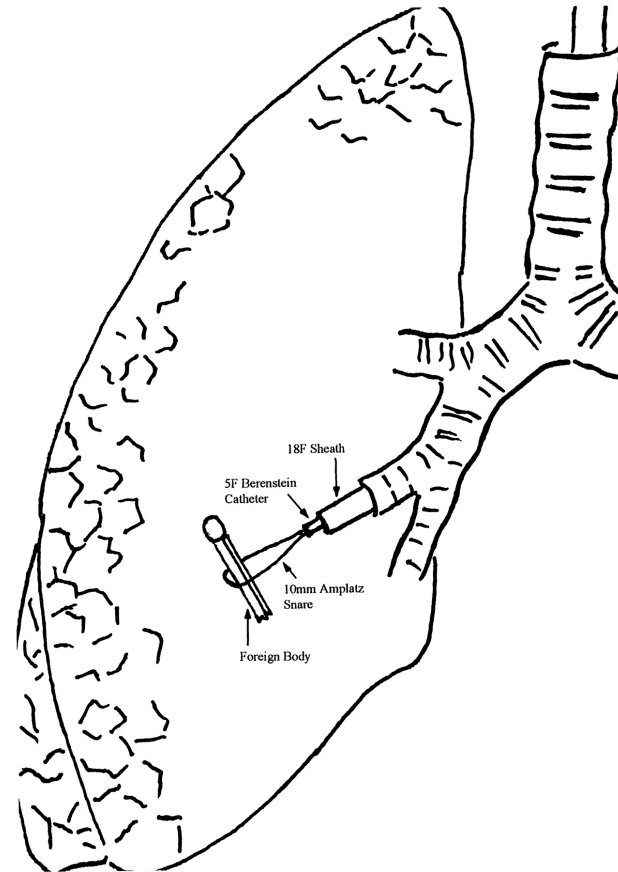
# Biopsy

- Biting forceps
- Grasping forceps
- Shielded brushes
- Unshielded brushes
- Sheathed needles
- Sampling catheters

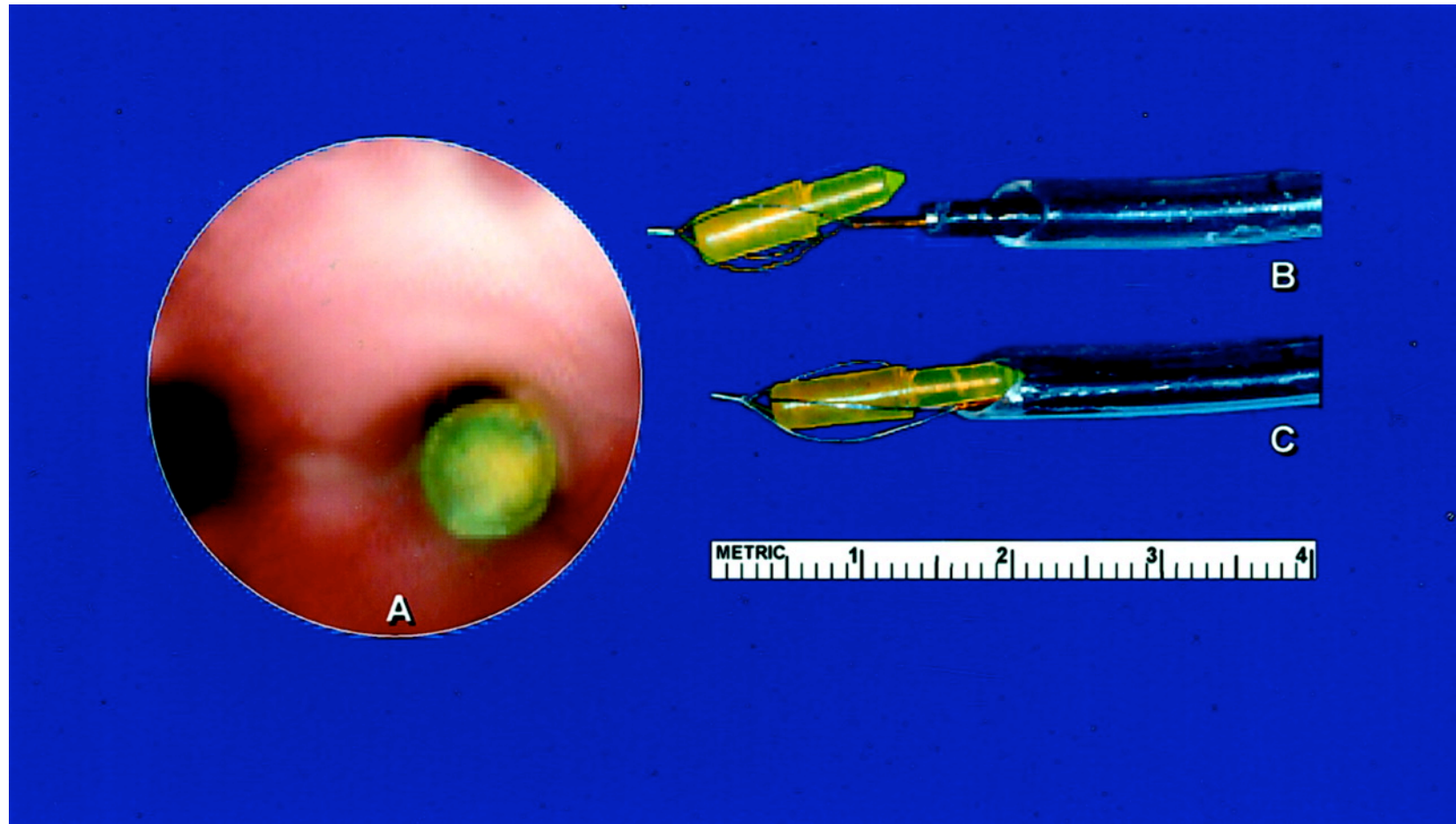


# Foreign Body Retrieval

- Grasping forceps
- Snares



**Flexible bronchoscopic view of a large foreign body (a Lite-Brite peg) lodged in the right main bronchus of a 7-year-old boy (left, A)**



Swanson K. L. et.al. Chest 2002;121:1695-1700

# BAL

- Tip of the scope is wedged into the bronchus
- Aliquots of sterile saline are instilled in to flood the alveoli
- A little more than half of the lavage is suctioned back to into a collection chamber
- Fluid contains cellular debris, microorganisms used for diagnosis

# Interventional Bronchoscopy

- Laser Therapy
  - Thermal tissue damage to destroy obstructing lesions
  - Saline lavage to clean debris
- Cryotherapy
  - Tissue destruction via intracellular freezing
  - Bronchogenic carcinomas
- Stents
  - Tracheobronchial prostheses
  - May require opening the airway with other techniques prior to placement

# Fluoroscopic Guidance

- Real time moving images of internal structures
- Allows precision in locating areas of interest
- Use with caution for both patient and health care providers

# Role of the RCP

- Know the type of procedure being performed
- Preparing the patient
- Explain your role
- “Prep” the upper airway
- Prepare the equipment and workspace
- Establish monitoring
- Procedural sedation
- Observe safety protocols



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# Patient Preparation

- Explain the procedure to the patient. Allay any fears and allow the patient to verbalize any concerns.
- Obtain informed consent for this procedure.
- Keep the patient on nothing by mouth (NPO) status for 4 to 8 hours before the test to reduce the risk of aspiration.
- Instruct the patient to perform good mouth care to minimize the risk of introducing bacteria into the lungs during the procedure.
- Remove and safely store the patient's dentures, glasses, or contact lenses before administering the preprocedural medications.
- Administer the preprocedural medications as ordered. Atropine may be used to prevent vagal-induced bradycardia and to minimize secretions. Meperidine may be used to sedate the patient and relieve anxiety.
- Reassure the patient that he or she will be able to breathe during this procedure.
- Instruct the patient not to swallow the local anesthetic sprayed into the throat. Provide a basin for expectoration of the lidocaine.



# Procedure

- The patient's nasopharynx and oropharynx are anesthetized topically with lidocaine spray before the insertion of the bronchoscope. A bite block may be used.
- The patient is placed in the sitting or supine position, and the scope is inserted through the nose or mouth and into the pharynx.
- After the scope passes into the larynx and through the glottis, more lidocaine is sprayed into the trachea to prevent the cough reflex.
- The scope is passed farther, well into the trachea, bronchi, and the first- and second-generation bronchioles, for systematic examination of the bronchial tree.
- Biopsy specimens and washings are taken if a pathologic condition is suspected.
- If bronchoscopy is performed for pulmonary toilet (removal of mucus), each bronchus is aspirated until clear.
- Monitor the patient's oxygen saturation to be sure that the patient is well oxygenated. These patients often have pulmonary diseases that already compromise their oxygenation. When a scope is placed, breathing may be further impaired.

# Post Procedure

- Instruct the patient not to eat or drink anything until the tracheobronchial anesthesia has worn off and the gag reflex has returned, usually in approximately 2 hours.
- Observe the patient's sputum for hemorrhage if biopsy specimens were removed. A small amount of blood streaking may be expected and is normal for several hours. Large amounts of bleeding can cause a chemical pneumonitis.
- Observe the patient closely for evidence of impaired respiration or laryngospasm. The vocal cords may go into spasms after intubation. Emergency resuscitation equipment should be readily available.
- Inform the patient that postbronchoscopy fever often develops within the first 24 hours.
- If a tumor is suspected, collect a postbronchoscopy sputum sample for a cytologic determination.
- Inform the patient that warm saline gargles and lozenges may be helpful if a sore throat develops.
- Note that a chest x-ray film may be ordered to identify a pneumothorax if a deep biopsy was obtained.

# Potential Complications

- Fever
- Bronchospasm
- Hemorrhage (after biopsy)
- Hypoxemia
- Pneumothorax
- Infection
- Laryngospasm
- Aspiration
- Cardiac arrest – arrhythmias
- Respiratory depression
- hypotension

## Age-Related Concerns

- Children have a smaller bronchus. The bronchoscope can significantly decrease the available space for them to breathe. They are at higher risk of hypoxemia than adults.

