Critical Care Monitoring

Pulmonary Endoscopy

Bronchoscopy

- Direct visualization of TB tree
- Developed in 1890’s to remove foreign bodies - rigid metal tube
- Advances added light system, Sx
- Flexible fiberoptic scopes introduced in early 1960’s

Rigid Bronchoscope

- Used by
- Performed in OR under anesthesia
- Cannot penetrate as far into TB tree as flexible fiberoptic scope
- Optics are better than flexible scope (better resolution)
Endoscopy

Indications for Bronchoscopy
Diagnostic

- Observation
  - Mobility of vocal cords
  - Patency & mobility of TB tree
  - State of the mucosa
  - Presence of tumors & foreign bodies
  - Presence of secretions
  - Origin of bleeding

Indications for Bronchoscopy
Diagnostic

- Aspiration of secretions for
- Brushing of mucosa: cytology, bacteriology
- Biopsy of
- Lobar sampling of
- Bronchoalveolar lavage (BAL)

Indications for Bronchoscopy
Therapeutic

- Placement of
Indications for Bronchoscopy
Therapeutic

• Remove

Management of severe hemoptysis
– Therapy directed at protecting remaining lung
– Find site, remove blood, clots
– Instill epinephrine, if mild
– Balloon catheters to compress bleeding site
– If massive, may need combination of flexible & rigid scope

Indications for Bronchoscopy
Therapeutic

• Endobronchial relief of
Endoscopy

Indications for Bronchoscopy
Therapeutic

• Endobronchial radiotherapy
  – Iridium-192 catheter

Contraindications for Bronchoscopy

• Absence of
• Absence of experienced
• Lack of emergency facilities for:

Contraindications for Bronchoscopy

• Inability to adequately
• Inability to
• Cardiac instability
• Uncontrolled
• Coagulation abnormalities
• Uremia
• Patient
Equipment for Bronchoscopy

- Light source
- Attachments for teaching
- Instruments for:
  - Scope - multiple lumens
    - Fiberoptic glass fibers
    - Wires for controlling scope tip
    - Lens
    - Suction
    - Lumen for passing instruments

Flexible Fiberoptic Bronchoscope
Endoscopy

Equipment for Bronchoscopy

• Scope - different size for adults, kids
• Head of scope
  – Viewing lens
  – Field of vision 75-120°
  – Focus attachment
  – Fingertip control for suction

Equipment for Bronchoscopy

• Head of scope
  – Motion lever for tip
    • Flex 100-130° down
    • 160-180° up
  – Diaphragm valve to allow instrument passage

Procedure

• Safety
  – Universal Precautions
  – HIV, TB, Hepatitis
    • Properly
    • HEPA masks
    • Patient in isolation with HEPA mask
    • Proper handling of sharps, body fluids
Endoscopy

Procedure

- Informed consent

- Patient usually sedated, NPO x 6°
  - Valium
  - Versed + Atropine
  - Morphine

Procedure

- Local anesthetic to upper airway
  - Lidocaine

- Oxygen

Procedure

- Scope passed through:
  - To above vocal cords
  - Into trachea
## Procedure

- While in, can do lots o’ stuff -
  - Direct vision with forceps
  - for cytology
  - Transbronchial biopsy by passing forceps towards edge of lung (fluoroscopy) to Bx alveolar tissue
  - with needle
  - Bronchoalveolar lavage (BAL)

## Procedure

- Monitor

## Post-Procedure

- NPO x
- CXR (if transbronchial biopsy done)
- Clean scope (cold sterilize)
- Inspect scope for damage
Endoscopy

Handling of Specimens

• Brushings
  – Smeared on slide
  – Spray fixer
  – End of brush clipped, put in saline or fixer
  – Sent to lab

Handling of Specimens

• Needle aspiration
  – Flush needle with saline onto slide
  – Spray with fixer
  – Some to jar for cytology
  – If large tissue core
    • Flushed into fixer jar
  – Sent to lab

Handling of Specimens

• Transbronchial biopsy
  – Sample placed on glass slide with saline
  – Into formalin if frozen section to be done
  – Sent to lab
Handling of Specimens

• BAL

Complications

• Side-effects of medications
  • 
  •
  • Laryngospasm

Complications

• Increased airway resistance
  •
  • Cardiac dysrhythmias
  • Laryngeal edema (if no ETT used)
Indications for Mediastinoscopy

• Assessment of patients with
  – For pre-op assessment
  – Information obtained needed for accurate
    selection of treatment

• Establish Dx of other intrathoracic
  conditions, esp.

Equipment for Mediastinoscopy

• Cautery with forceps
• Small right-angle retractors
• Mediastinoscope
• Biopsy forceps
• Suction
• Aspiration needle with syringe
• Gauze

Procedure

• General anesthesia
• Cuffed ETT
• Bronchoscopy done immediately prior
• Ventilate patient by ETT/anesthesia
  machine
Endoscopy

**Procedure**

- 4 cm. Transverse incision made above suprasternal notch
- Trachea exposed
- Aortic notch, innominate artery palpated
- Blunt dissection to open channel to right & left of trachea
- Scope inserted

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**Procedure**

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**Procedure**

- Inspection of

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- Can do lymph node biopsies
Endoscopy

Procedure

• Incision closed with sutures

• If tumor in LUL - another incision made 2nd intercostal space lateral to sternum (left anterior mediastinal area is blocked by great vessels during center approach)

Endoscopy

Complications

• Vascular injury

• Bleeding, hemorrhage

Endoscopy

Complications

• Infection

• Pneumothorax

• Left recurrent laryngeal nerve damage
Laryngoscopy

- Fiberoptic laryngoscope
  - Shorter version of bronchoscope
  - No suction or operating channel
- Uses
  - Confirm
  - Insert ETT in patients with