

## **Performance Guideline for Bronchoscopy, Bronchoalveolar Lavage, Protected Specimen Brushing**

### **Pre-procedure evaluation:**

**During performance of any bronchoscopic procedure, several steps must be taken to minimize risk of complications which include:**

- **Accessibility to maintain oxygenation and ventilation during and after procedure –**
  - **Peep > 14**
  - **Inability to tolerate decreased minute ventilation**
  - **High FIO<sub>2</sub> requirements prior to initiating procedure**
- **Elevated ICP. Acute change in minute ventilation and airway pressures will acutely elevate ICP**
- **Presence of coagulopathy**
  - **INR >1.5**
  - **Plt < 20,000**
- **ET tube size < 7.5 mm diameter tube**

**Each of these suggests increased risk and should be discussed with attending.**

### **Monitoring:**

**Patients must be monitored to ensure adequate hemodynamics, minute ventilation, and Oxygen saturations are maintained throughout procedure with standardized documentation:**

- **Continuous pulse-oximetry**
- **Continuous ECG monitoring**
- **Continuous or q5 minute blood pressure monitoring**
- **Completion of documentation for Sedation/paralysis surrounding procedure. (Must be signed by MD)**

### **Equipment preparation:**

**Bronchoscopy cart should be brought to bedside and all equipment examined and verified to be in working order. All flushes and equipment needed should be prepared before beginning procedure.**

- **Bronchoscope and light source**
- **Wall suction**
- **Saline for irrigating suction port and clearing/cleaning suction port on scope**
- **Saline flushes**
  - IF performing BAL, flushes**
    - **Must be non-bacteriostatic saline**
    - **Non-leurlock 20 cc syringes**
    - **5 total aliquots**
- **sterile field to front of patient to prevent contaminating respiratory tract with new, resistant pathogens**

- Clean non-sterile gloves to prevent contamination
- Sputum trap

#### **Ventilator adjustments:**

To ensure continued minute ventilation and adequate oxygenation, the ventilator must be adjusted accordingly. Contact respiratory therapist (or appropriate faculty/fellow) to make changes:

- 100% FIO<sub>2</sub>
- Mode with mandatory minute ventilation – usually volume control /AC
- To allow continued minute ventilation despite relative airway obstruction
  - High RR
  - Small TV
  - Decreased flow-rates (can be achieved by lengthening “T” time
  - Adjust “high-pressure” limits and alarms
- Settings should be adjusted to maintain at least the pre-procedure minute ventilation that was being delivered to patient before changing the ventilator or medicating patient

Patients may require frequent interruption of procedure to maintain ventilation and oxygenation.

#### **Medication for procedure:**

Patients must be adequately sedated for procedure to ensure tolerance and comfort. Patients in whom procedure is being performed through an endotracheal tube must receive paralytics as well to prevent damaging the scope. Patients with tracheostomies may also require paralysis and adequacy of the procedure is markedly enhanced by their use.

- Sedation/analgesia with some combination of narcotic/benzodiazapine/propofol
- Supplemental sedation for increased BP and heart rate
- Paralytic agent (vecuronium or cisatracurium if hepatic or renal insufficiency suspected)

#### **Performance of Bronchoscopic alveolar lavage:**

Standardized procedure must be followed to ensure adequacy of data and prevent false negative results. Thick secretions with high mucous content are typically from the larger airways and cannot be quantitatively cultured adequately (increased false negative results). Additionally, small volume irrigation does not necessarily reach the peripheral alveolar spaces and again decrease the sensitivity.

- Clear large airways of secretions as needed
- Advance bronchoscope to the terminal bronchi of the area of concern on CXR and wedge
- Irrigate with 20 cc aliquot and discard to reduce upper airway flora and contamination in specimen
- Irrigate with sequential 20 cc aliquots X 4 while remaining in wedge position in the identified bronchus. Return of volumes may require a slight “in and out” motion of the bronchoscope.

- Collect the 4 - 20 cc aliquots in a single sterile sputum trap
- Send for quantitative bacterial cultures by typing in BRP, selecting bronchoscopic lavage and typing in “ quantitative culture from X lobe”

**Performance of Protected Specimen Brush Sampling:**

Protected brushing may be preferable to BAL in patients with more severe pulmonary dysfunction. BAL is probably preferable when no visible mucopurulent material is visible at the ostia of terminal bronchi.

- Advance bronchoscope to the orifice of the area of concern
- Advance the PSB catheter 3 cm from the scope
- Eject the distal carbon wax plug
- Advance brush into sub-segment and rotate brush within secretions
- Retract brush into catheter sleeve and remove entire catheter from bronchoscope
- Wipe distal portion of catheter with 70% alcohol, then advance brush portion and cut brush with sterile scissors and place in 1 ml of non-bacteriostatic saline
- Send for quantitative bacterial cultures by typing in BRP, selecting bronchoscopic lavage and typing in “ quantitative culture from X lobe”

**Post-bronchoscopy procedures:**

- Post-bronch Chest Xray
- Clean the suction port by suctioning 250 cc of Wex-cide solution
- Wipe the outside with Wex-cide solution
- Place in bronchoscope in container and return to front desk- ICU side in plastic tub