BRONCHOPLEURAL FISTULA

Introduction

- Defined as a communication between the bronchial tree and pleural space. Clinically seen as a persistent air leak 24 hours after pneumothorax
- How to identify
  - Failure to reinflate lung despite chest tube drainage or continued air leak after evacuation fo the PTX in the setting of chest trauma
  - Complication of diagnositc or therapeutic procedure eg thoracic surgery
  - Complication of mechanical ventilation eg for ARDS
- Problems with a large BPF
  - Failure of lung re-expansion
  - Loss of delivered tidal volume
  - Inability to apply PEEP
  - Inappropriate cycling of ventilator
  - Inability to maintain alveolar ventilation with resultant hypoxia, hypercapnia
  - Problems of weaning
  - Attributable mortality

Management of BPF

General

1. Conservative
   - Large size chest tube (multiple if necessary)
   - Use drainage system with adequate capabilities
   - Mechanical ventilation that can minimize air leaks
     - Adjust conventional ventilator settings *(see below)*
     - HFV
     - Independent lung ventilation
   - Fibreoptic bronchoscopy and direct application of sealant (cyanoacrylate, fibrin agents, absorbable gelatin sponges eg Gelfoam)
2. Invasive
   - Mobilization of intercostal or pectoralis muscle
   - Thoracoplasty
   - Bronchial stump stapling
   - Pleural abrasion and decortication

Mechanical ventilation in BPF - principles

- BPF provides an area of low resistance to flow; conduit for escape of a variable % of delivered tidal volume

- Fistula flow theoretically delay healing of fistulous site
- **Goal** is to maintain adequate ventilation and oxygenation while reducing the fistula flow and allow the repair to occur
- Lowest effective VT
- Fewest mechanical breaths per minute
- Lowest level of PEEP – reduce airway pressure
- Shortest inspiratory time
- Use greatest number of spontaneous breaths per minute
- Intermittent mandatory ventilation better than control ventilation
- Permissive hypercapnia and accept a lower arterial oxygenation

High Frequency ventilation

- No experience in this ICU
- Remains controversial in terms of benefit
- However, better at controlling pO_2 and pCO_2 than conventional ventilation

Independent Lung Ventilation

- Limited experience in this ICU
- For unilateral BPF
- Patient intubated with **double lumen tube**
- Need 2 ventilators (synchronous or asynchronous)
- Conventional ventilation of unaffected lung, affected lung either ventilated with lower pressures and volumes or with CPAP alone
- Guided by volume of air leak, haemodynamic and gas exchange stability
- Short term solution**,** bridge to surgical intervention