Alaa hussein aljoubori (practical anesthesia) forth stage

Anesthesia for thoracic surgery

Thoracic anesthesia is a field requiring mastery of pulmonary anatomy and physiology, as well as technical skills in the stabilization of an adequate airway through various modalities.

One-lung anesthesia:

In thoracic anesthesia, one-lung ventilation is used, so only a single (non operative) lung is ventilated.

Principal indications for one-lung anesthesia:

1) Isolation of the lungs.
2) Ventilation of one lung alone.
3) Bronchopulmonary alveolar lavage.
4) Collapse of one lung to allow surgical access to other structures

Ventilation of one lung alone requires either a double-lumen tracheal tube or a bronchial blocker.

Traditionally, in one-lung ventilation, the same minute volume used in two-lung ventilation is applied to the single lung. However, a smaller tidal volume or pressure controlled ventilation may reduce stretch-related lung injury.

MANAGEMENT OF HYPOXAEMIA DURING ONE-LUNG VENTILATION

- Increase inspired oxygen to 100%.
- Check position of tube with fibre-optic bronchoscope.
- Suctioning of secretions may be required.
- Ensure adequate blood pressure and cardiac output.
- PEEP 5–10 cmH2O to the dependent lung to decrease atelectasis and increase FRC. Excessive PEEP increases pulmonary vascular resistance and may increase shunt.
- CPAP 5–10 cmH2O with 100% oxygen to the non-ventilated lung to facilitate oxygen uptake in this lung whilst not adversely affecting the surgical conditions.
- Abandon one-lung ventilation and intermittently ventilate the collapsed lung after warning the surgeon.
- Early clamping of the appropriate pulmonary artery will stop the shunt

Thoracotomy:

Median sternotomy in supine position is used for access to the thymus, retrosternal goiters and anterior mediastinum; lateral thoracotomy is used for most-other thoracic operations.

Postoperative considerations:

1) Postoperative hypoxemia: Patients who have undergone a thoracotomy will require oxygen in the immediate postoperative period for 24 hours and chest physiotherapy, factor may contribute postoperative hypoxemia are:

a) Pneumothorax: which it should be excluded by routinely postoperative chest radiograph.

b) Atelectasis. c) Sputum retention. d) Poor pain relief. e) Fluid overload.

2) Cardiac arrhythmia: The most common one after thoracotomy is atrial fibrillation.
3) Torsion of remaining lobe: It is may occur after lobectomy. The presentation may be up to 2 weeks postoperatively. Chest radiology
shows engorgement and increased density of the affected lobe. Resection of the affected lobe is usual.

4) Herniation of the heart: Removal of pericardium together with lung resection, may allow the heart to be displaced from the mediastinum. Cardiovascular collapse is usually profound. Emergency re-exploration is required.

Implications for anesthesia:

1) Increased sensitivity to non-depolarizing muscle relaxants.

2) Resistance to depolarizing muscle relaxants.

3) Increased sensitivity to the neuromuscular effects of volatile agents.

4) Risk of aspiration due to bulbar weakness (a weakness due to impairment of function of the lower cranial nerves).

5) Risk of postoperative respiratory failure with respiratory muscle weakness.

6) Risk of cholinergic crisis with excessive doses of anticholinesterases.

7) Effects of immunosuppressant therapy Maintenance of anesthesia with propofol has the advantages of avoiding the neuromuscular effects of volatile agents.

Rigid bronchoscopy

It is performed most often to obtain tissue diagnosis and determine if a lesion may be resected. Other indications include removal of foreign bodies and secretions, and control of hemorrhage.

The principles of anesthesia for rigid bronchoscopy are:

1) To maintain oxygenation and carbon dioxide removal during the procedure.
2) Hypnosis and reduction of autonomic response.
3) Muscle relaxation to allow passage of the scope and to facilitate the conduct of endotracheal and endobronchial manipulation.

Fiber-optic bronchoscopy

Commonly, fiber-optic bronchoscopy is performed under topical anesthesia and sedation with midazolam or diazepam. Opioids may be used in addition, but apnea must be avoided. A flexible fiber-optic scope may be passed via an endotracheal tube or laryngeal mask airway under general anesthesia