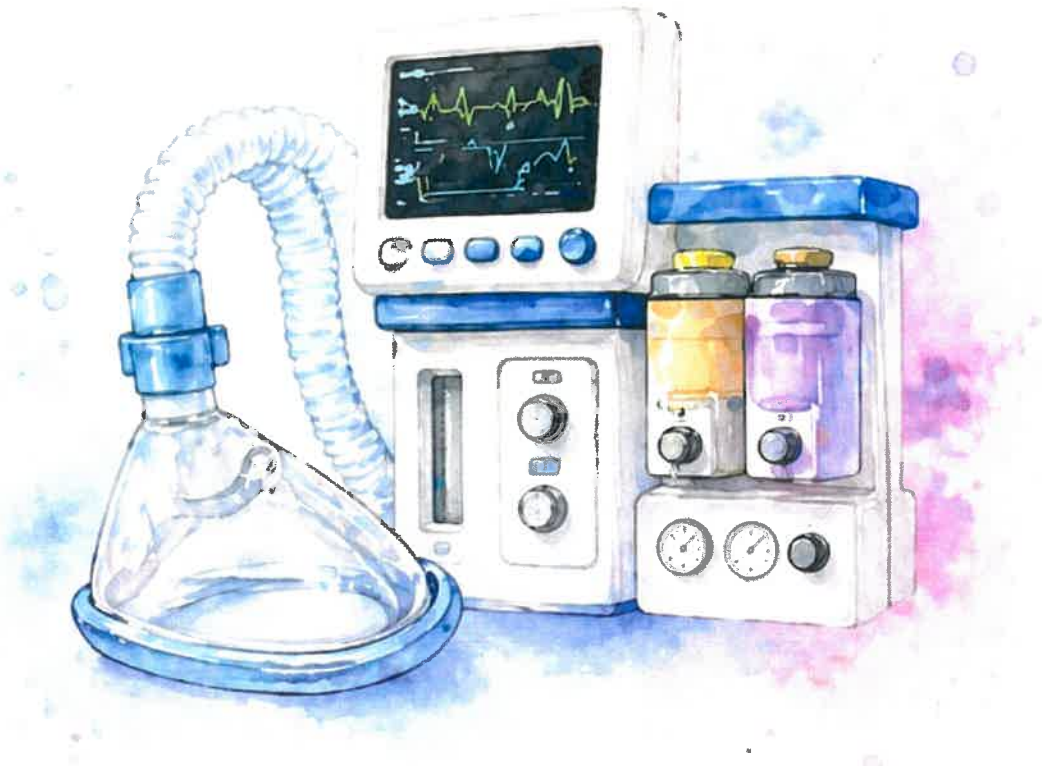
NEET SS ANESTHESIA

Updated Notes 2026



GENERAL ANAESTHESIA PART-2

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POST-ANAESTHESIA CARE UNIT : PART I

Post anaesthesia care

00:00:30

Post anaesthesia care unit :

Importance of post anaesthesia care :

- Monitoring patients after surgery.
- Surgery and anaesthesia involve unphysiological interventions.
- The body requires time to restore normal physiology.
- Transition phase from intensive operating room (OR) monitoring to minimal ward monitoring.
- Most complications occur in the postoperative period.

Location of PACU :

- Close to the OR for rapid intervention if complications arise.
- Trained anaesthetists nearby to manage postoperative issues.
- Bridges the gap between OR and general ward.

Objectives of PACU :

- Provide hemodynamic stability for critically ill patients.
- Maintain a tranquil environment for recovering patients.

Complications in PACU :

Studies on PACU complications :

- Heinz Baras et al. (Prospective study on 18,000 patients) :
  - 24% of complications occur in the postop period.
  - m/c complication : Nausea & vomiting (9.8%).
  - 6.8% require airway support.
  - 3.7% experience hypotension.
- Malpractice claims in the USA :
  - Out of 1175 claims, 7.1% occurred in PACU.
- Australian Incident Monitoring System (2003) :
  - 43% complications : Airway/ respiratory problems.
  - 24% complications : Cardiovascular problems.

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Guidelines

00:06:15

American society of anaesthesiologists (ASA) practice guidelines for post anaesthesia care unit (PACU) :

Understanding guidelines :

- Guidelines are not rigid rules but a minimum standard of care.
- Hospitals can go beyond the guidelines but must not fall below them.
- Failure to meet guidelines can result in legal issues.

How ASA guidelines are formed :

- Developed by a team of anaesthesiologists, private practitioners, academicians and epidemiologists.
- Based on collected data and the best practices.
- Courts often reference failure to provide standard care rather than individual mistakes.

Key ASA guidelines for postoperative care :

Who requires postoperative care :

- All patients who received :
  - General anaesthesia.
  - Regional anaesthesia.
  - Monitored anaesthesia care (MAC).
- must receive appropriate postoperative care management.

Patient handover from OR to PACU :

- Accompanied by a qualified person :
  - Trained anaesthetist/ resident who knows the case must accompany the patient.
  - Not just any staff member.
- Continuous monitoring during transfer is essential.
- Hemodynamic fluctuations can occur during movement.

Proper verbal handover in PACU :

- Physician must verbally communicate patient's status to the PACU nurse.
- Information should include :
  - Patient's consciousness level.
  - Amount of fluid loss.
  - Any complications during surgery.
  - Monitoring requirements.

Monitoring in PACU :

- Vital parameters must be continuously monitored, including :
  - Oxygenation.
  - Ventilation.
  - Blood pressure.
  - Arrhythmias.
  - Temperature.
  - Level of consciousness.

Duration of monitoring :

- Minimum of 15 minutes for stable patients.
- more frequent (every 5 minutes or continuous) for critical cases.

Discharge from PACU to general ward :

- A responsible physician must approve patient discharge from PACU.
- Ensures patient stability before moving to the general ward.

Postoperative care :

- Importance of skilled personnel in PACU :
  - Anaesthetist's responsibility to ensure trained doctors & nurses are available.
  - Staff must recognize complications and act swiftly to manage them.

Post-op complications 00:13:00

Classification of postoperative complications :

- Respiratory complications (m/c).
- Cardiovascular complications.
- Central nervous system complications.
- Renal complications.
- General complications.

Respiratory complications :

Loss of pharyngeal muscle tone :

- Pharynx = muscular tube (Nasopharynx, oropharynx, laryngopharynx).
- During consciousness : muscle tone maintained.
- During unconsciousness : muscle tone lost → Airway collapse.
- Tongue falls back, leading to dynamic airway obstruction.

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Causes :

- IV anaesthetics.
- Opioid.
- Muscle relaxants.

Signs of airway obstruction :

- Paradoxical chest movements.
- Reduced chest wall rise.
- Snoring sounds.
- Decreased ventilation (Not just oxygen saturation).

High risk groups :

- Elderly.
- Obese patients.
- Preterm babies.
- Children.

Management :

- Slightly propped up position.
- Neck extension.
- Supplemental oxygen.
- Physical stimulation to wake the patient.

Residual neuromuscular blockade :

- Common complication due to improper monitoring of neuromuscular blockers.
- Many practitioners rely only on clinical signs instead of objective neuromuscular monitoring.
- Proven data : Postop Train-of-Four (TOF) ratio is often 0.4 to 0.5, indicating muscle weakness.

Clinical assessment of recovery :

- Best test : Sustained head lift >5 sec (TOF ~0.6).

Other tests (Less reliable) :

- Grip strength.
- Eye opening.
- Tongue protrusion (TOF ~0.4 to 0.5).
- Ideal TOF ratio : ≥0.9 to confirm full neuromuscular recovery.

Factors leading to prolonged blockade :

- Old age and associated comorbid conditions.
- Impaired metabolism (Liver/ renal dysfunction).
- Electrolyte imbalances.
- Long surgeries.
- Hypothermia.
- Concomitant drugs (E.g., lithium, magnesium).

Common mistakes :

- Many residents administer reversal agents too early, before spontaneous breathing efforts.
- Ideal timing for reversal : When spontaneous breathing attempts begin.
- Competitive blockade mechanism : Safer to reverse when neuromuscular recovery is evident.

Introduction of Sugammadex (2023) :

- Reverses steroidal non depolarizing neuromuscular blockers (NDMRs).
- Steroidal NDMRs : Vecuronium, rocuronium.
- Benzylisoquinolinium NDMRs (Not reversed by Sugammadex) : Atracurium, cisatracurium, mivacurium.
- Mechanism : Binds covalently to rocuronium/ vecuronium → Rapid renal excretion.
- Train-of-Four (TOF) ratio of 0.9 achieved quickly → Prevents residual neuromuscular blockade.
- Risk : Anaphylaxis (Caution required, limited studies in Indian population).

Laryngospasm :

- m/c post extubation complication.
- Occurs d/t forceful contraction of upper airway muscles → Airway obstruction.

Causes :

- Secretions pooling around the endotracheal tube (ETT) or laryngeal mask airway (LMA).
- Inadequate suctioning before extubation.
- Presence of blood/ saliva in the airway.
- Stage 2 of anaesthesia (Excitatory phase) → Increased airway reflexes.
- more common during LMA extubation d/t secretion accumulation on cuff.

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High risk situations :

- Inhalational induction (Especially in paediatrics).
- Extubation in light planes of anaesthesia.
- Inadequate airway suctioning.

Signs and symptoms :

- Sudden cessation of breathing after extubation.
- Paradoxical chest movements.
- Stridor.
- Rapid desaturation.

Preventive measures :

- Ensure deep anaesthesia before LMA insertion.
- Avoid airway manipulation in stage 2 of anaesthesia.
- Adequate suctioning before extubation.

Management steps :

- Larsen's maneuver :
  - Apply firm pressure behind the ramus of the mandible (in front of the mastoid process).
  - Strongest painful stimulus → Opens airway → Breaks laryngospasm.
- 100% oxygen via positive pressure ventilation :
  - Give 100% oxygen with a tight mask to improve oxygenation.
- Low dose propofol (1 to 2 mL) :
  - 10 to 20 mg IV propofol blunts reflexes → Reduces laryngospasm.
- Succinylcholine for severe cases :
  - Quick acting muscle relaxant to break spasm.
  - Prolonged succinylcholine action after neostigmine : Neostigmine inhibits pseudocholinesterase, leading to prolonged succinylcholine action (Normal succinylcholine duration is ~10 minutes).
  - After neostigmine administration : Prolonged to ~20 minutes.
  - Practical tip : Be cautious while using succinylcholine after neostigmine, as paralysis may last longer than expected.
- Laryngospasm is an underestimated complication → Often first encountered during independent practice.
- Proper learning of extubation techniques is crucial to prevent life threatening complications.

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Airway hematoma :

Clinical scenario :

- Post thyroidectomy or parathyroidectomy, patients may develop surgical site bleeding.
- Hematoma formation leads to external airway compression → Rapid airway obstruction.

Management of airway hematoma :

- Immediate decompression is Key.
- Hematoma causes airway obstruction → mask ventilation will fail.
- Only effective treatment : Immediate decompression.
- Surgeon may not always be available → Anaesthetist must act swiftly.

Challenges in decompression :

- Older surgical closures : Simple suture removal was sufficient.
- Staplers are now commonly used, making decompression difficult.

Steps to manage airway hematoma :

- If sutured, use a scalpel to quickly cut the sutures & release the hematoma.
- If stapled, use a stapler remover.
- Once decompressed, assess airway patency and oxygenation.
- If airway obstruction persists, prepare for emergency intubation or surgical airway.

Anticipate difficult intubation :

- Post hematoma airway distortion may cause difficult intubation.
- Tracheal deviation, bleeding and edema worsen visualization.
- If intubation is required, use advanced airway techniques (Video laryngoscopy).

Airway edema :

Causes of airway edema :

- Head and neck surgeries.
- Prolonged prone position surgeries.
- Prolonged Trendelenburg position (Gynaecological & laparoscopic surgeries).
- Excessive surgical manipulation or fluid accumulation → Postop swelling.
- Surgical fibrillation and gas insufflation in laparoscopic surgeries.

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Recognizing airway edema :

Clinical signs :

- Facial & scleral edema (Early indicator).
- Difficulty in breathing or airway obstruction.
- Stridor or increased work of breathing.
- Need for re intubation with a smaller tube.

Leak test for airway edema :

- Purpose : To assess airway patency before extubation.

Methods of leak test :

1. Standard leak test :
   - Suction the airway thoroughly.
   - Deflate the endotracheal tube cuff.
   - Occlude the proximal end of the tube.
   - Ask the patient to breathe.
   - If air movement is present → No significant airway edema.
   - If no leak is present → Possible airway edema.
2. Intrathoracic pressure measurement :
   - measure the pressure required to produce an air leak around the tube.
   - Historically used for croup patients.
   - Higher pressure needed → more likely airway edema.
3. Tidal volume based leak test → When the patient is in controlled mode ventilation :
   - Deflate the cuff.
   - measure the exhaled tidal volume.
   - Minimal difference in tidal volume → Suggests airway edema.

Interpretation of leak test :

- Negative leak test (Good air leak) → No airway edema.
- Positive leak test (No air leak) → Possible airway edema but not always clinically significant.
- Leak test has high sensitivity but low specificity :
  - If test is negative → Airway edema is unlikely.
  - If test is positive → Edema may be present but may not necessarily cause complications.

Management of airway edema :

General management :

- Elevate head position (Enhances venous drainage).
- Continue mechanical ventilation, if high risk.
- Delay extubation until edema resolves.

Medical treatment :

- Steroids → Reduce inflammation.
- Diuretics → Reduce fluid overload.

Obstructive sleep apnoea (OSA) :

Overview :

- Most common in obese patients.
- Dynamic airway obstruction.
- Characterized by upper airway collapse during sleep.
- Cycle of snoring, airway obstruction and desaturation.
- Results in sleep fragmentation and daytime somnolence.

Clinical presentation :

- Snoring intensifies → Complete airway obstruction.
- Oxygen levels drop, carbon dioxide rises.
- Patient wakes up repeatedly to restore breathing.

Symptoms :

- Non refreshing sleep despite 8 hours of sleep.
- Daytime somnolence and fatigue.

Perioperative concerns :

OSA patients are highly sensitive to :

- Benzodiazepines : Exaggerated loss of muscle tone.
- Opioid : Increased risk of airway obstruction.
- Mild to moderate OSA often diagnosed in postop period.
- Severe OSA patients may already be using CPAP at home.

Postoperative management :

Positioning :

- Slightly propped up position.
- Avoid supine position if possible.

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Airway support :

- If severe OSA, use CPAP immediately in postop.
- CPAP at 10 cm H_2O has proven benefits.
- Discuss CPAP use with surgeons (Risk of wound dehiscence in abdominal surgeries).

Fluid & medication adjustments :

- Use low sodium IV fluids (To prevent fluid retention & edema).
- Opioid sparing therapy.
- If morbidly obese : Apply CPAP immediately in postop (10 cm of H_2O).