INDIAN SOCIETY OF ANAESTHESIOLOGISTS (ISA)
MECHANICAL VENTILATION MODULE (BASIC)

Orientation Course for Clinical Specialists &
Refresher Course for Anaesthesiologists

Supportive Therapy for Patients on Mechanical Ventilation

Introduction

- **Critically ill patients on Mechanical Ventilation receive**
  - Treatment of Primary condition &
  - Supportive therapy for Other organ systems

- **The supportive measures include**
  - Sedatives, analgesics, neuromuscular blockers…..
  - Cardiovascular, renal, neurologic, nutritional support, etc.

- For easy recollection, these are remembered by the Mnemonic **FAST HUG** is used

FAST HUG

F = **F**eeding

A = assessment of **A**nalgesia

S = assessment of **S**edation

T = **T**hromboembolic prophylaxis

H = **H**ead of bed elevation

U = stress **U**lcer prophylaxis

G = **G**lycaemic control

(BID)

F (Feeding or Nutritional Support)

- Patients on mechanical ventilation are intensely catabolic
- Nutritional support
  - Offsets catabolic losses
  - Modulates the metabolic response to stress
  - Mitigate oxidative cellular injury
  - Promotes beneficial immune responses
- **Enteral feeding preferred over parenteral**

F (Feeding or Nutritional Support)

- Generally 5.6 Kcal/Kg per day is acceptable, but those with sepsis may require twice or thrice this value
- Overfeeding should be avoided to prevent excessive CO2 production
- When patients are fed, they are kept **semi-recumbent with their heads in the upright position** to decrease the risk of ventilator-associated pneumonia (VAP)

Fluid and electrolyte management

- Conservative fluid management - buffered or non-buffered crystalloids suggested
- Energy, electrolyte, renal, arterial blood gas values influence fluid management
- Goal directed fluids with sepsis, high fever, GI losses

A (Analgesia)

- Pain is one of the most unpleasant memories patients retain from their ICU stay
- **Causes of Pain -** suctioning, turning, mobilization, catheter insertion & wound care
- Opioids (Fentanyl as infusion) form the first line of choice followed by acetaminophen and NSAIDS
- Nonpharmacologic methods include relaxation techniques and music therapy

S (Sedation)

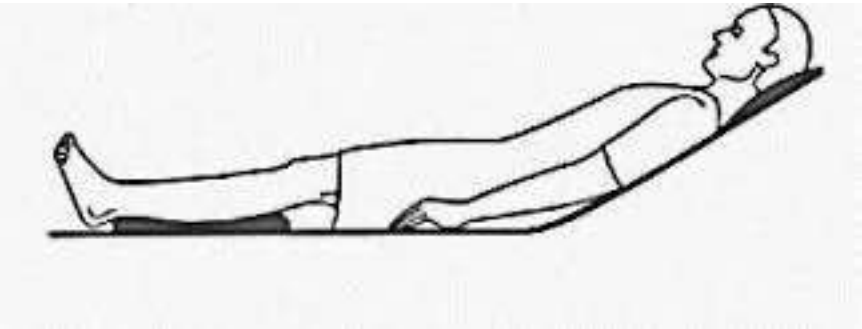
- Pain, restlessness, anxiety & delirium common
- ✓ **Sedatives** (Benzodiazepines, Propofol, Dexmedetomidine) frequently used
- Intermittent dosing preferred over continuous infusion
- **Optimise:** Sedation protocols & daily wakeup trial- associated with reduced duration of MV
- Prolonged & deep sedation- poor outcomes

T (DVT prophylaxis)

- Routine venous thromboembolism (VTE) prophylaxis
- **Common:** Enoxaparin 40 mg SC once or twice daily

  - Check for contraindications (Bleeding & Thrombocytopenia)
- Unfractionated heparin 7500 units 8th hourly, mechanical compression devices can also be used
- **Fondaparinux:** appropriate in heparin-induced thrombocytopenia

(H) Head of the bed Elevation



- - decreases incidence of gastroesophageal reflux

  - reduces incidence of nosocomial pneumonia

- Recommended inclination is 30^0-45^0

- Patients under sedation may slide down, hence important to keep the thorax also upright

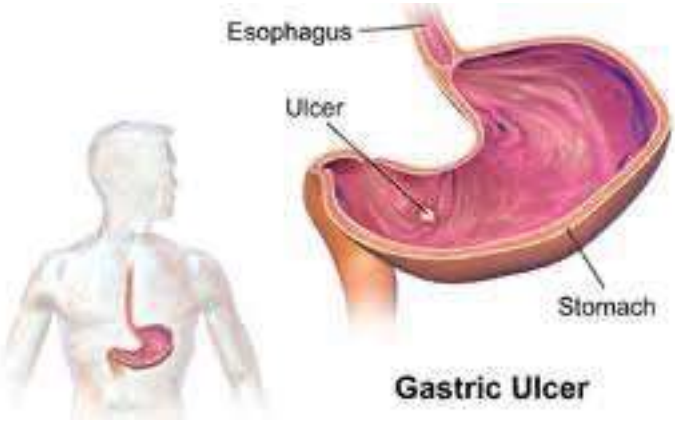
Stress (U)ulcer prophylaxis

- Prolonged mechanical ventilation - increased risk of GI bleeding
- Esp. with history of gastroduodenal ulcer, steroid therapy, coagulation abnormalities
- **Options:**

  antacids, sucralfate

  H_2-antagonists

  proton pump inhibitors



G (Glucose)

- ***Hyperglycaemia is associated with increased mortality, worsens prognosis***
- Has proinflammatory effects
- Strict blood glucose levels between 80-110mg/dl

  - difficult to achieve in routine care

  - aim to keep a blood sugar level less than 150mg/dl

FAST HUG-**BID**

- Addition to MNEUMONIC

- **BID**

  - spontaneous breathing trial & bowel care

  - indwelling catheter removal and

  - de-escalation of antibiotics

Other Considerations

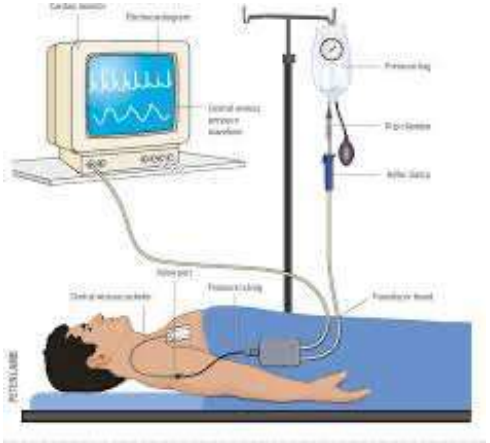
- **Neuromuscular blockade indicated in**
  - Severe ventilator dyssynchrony
  - Unwanted motor movement refractory to ventilator adjustment and sedation
- May improve oxygenation, prevent prolonged neuromuscular weakness
- Conflicting evidence exists for its Use
- *Administer only if a clear benefit is demonstrated*

Haemodynamic Monitoring

- O2 delivery & utilisation depend on good circulatory control also
- **Monitored by Central venous catheter (CVC) & Pulmonary artery catheter (PAC)**

  - CVC guided management- superior

  - PAC based monitoring - 2 fold increase in catheter related complications (arrhythmias)



Early Mobilisation

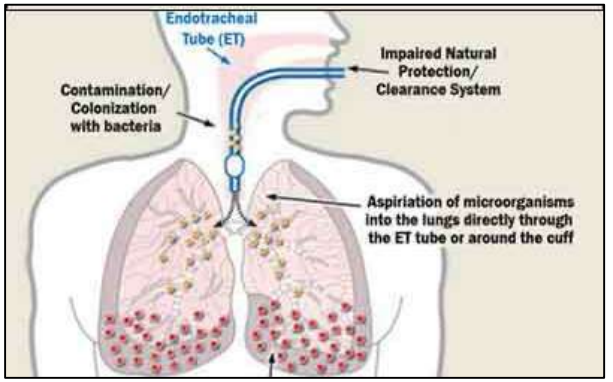
- Prolonged bed rest:
  - Muscular atrophy & remodelling (changes in myosin fibres)
  - Alterations in energy metabolism
  - Resistance to effects of insulin on glucose metabolism
  - Incomplete recovery of NM function

- Early mobilization- safe, improves functional outcomes, reduces occurrence of delirium

Ventilator-associated pneumonia (VAP)

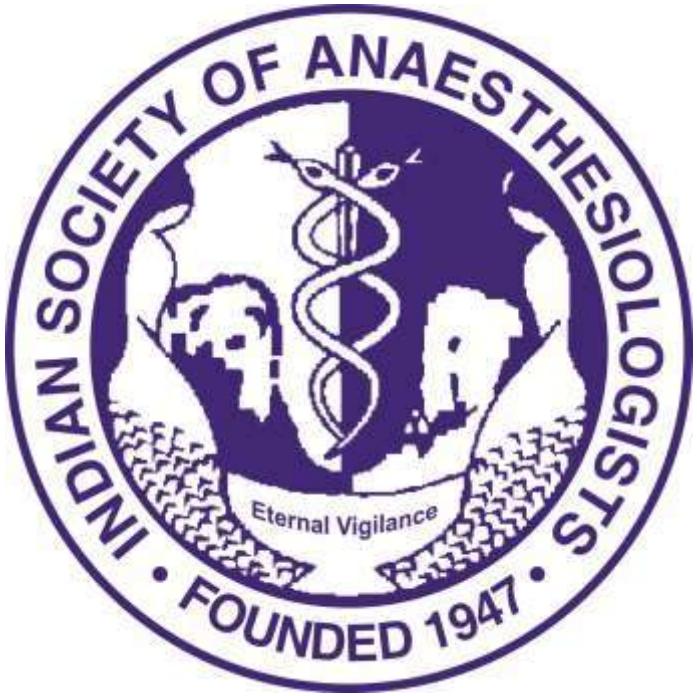
- Develops 48 h after initiation of MV
- High mortality
- Increases duration of MV & hospital stay
- **Prevention & Treatment:**

  - Patient positioning, subglottic drainage,
  - Selective decontamination of digestive tract
  - Chlorhexidine for oral hygiene, probiotics
  - Silver coated endotracheal tubes
  - Glucocorticoids



Other Measures

- **Investigations:** Routine & special investigations to be ordered & analysed (esp. ABGs) for treatment & prognostication
- Suctioning of Endotracheal tube & throat
- **Eye Care, Joint Care**
- Care of Lines & Catheters, Avoidance of Restraints
- Psychological Support of Patients, Involvement of Family
- Record Keeping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