Episode 9 - Obesity and Critical Care

Frailty

Obese patients have an increased likelihood of mechanical ventilation, prolonged length of stay and mortality. Obesity can be thought of as a form of anatomical and physiological frailty, in that patients have a poor baseline functional reserve, may be malnourished and suffer from other comorbidities related to their obesity. They can be susceptible to serious consequences of otherwise relatively minor insults (e.g. rib fractures, chest infections).

Mechanical Ventilation

A neck circumference of greater than 42 cm (16 inches) is associated with difficult mask ventilation and laryngoscopy (heavy head, soft tissues contributing to pharyngeal collapse when unconscious). There is a reduced sensitivity to carbon dioxide in the context of obstructive sleep apnoea or the use of opioid analgesia. Increased ventilation pressures are required due to abdominal contents splinting diaphragm and soft tissues weighing down and compressing the thorax. Nurse at a 45 degree head-up tilt.

Oxygen supply and demand

Lower FRC, weaker respiratory muscles (fat deposition in diaphragm and intercostal muscles), increased work of breathing (abdominal and thoracic bulk). Greater lean body mass, higher cardiac output and oxygen demand, sedentary lifestyle (deconditioning), comorbidities affecting cardiovascular function (diabetes, hypertension, coronary artery disease). Imbalance between oxygen supply and demand.

Tracheostomy

Percutaneous tracheostomy is difficult - a surgical tracheostomy is recommended. Adjustable tracheostomy tubes; preformed tubes may not be long enough.

Intravenous access

Extravasation from femoral central lines (proximal lumens sitting outside the vessel, displacement due to movement). Ultrasound needed for peripheral lines and arterial lines.

Monitoring

NIBP sizing - The width must be 40% of the arm circumference and the length (internal bladder length) must be 80% of the arm circumference.

Medication

Therapeutic drug monitoring for all relevant medications. Drugs dosed according to adjusted body weight, e.g. anticoagulants, aminoglycosides, vasoactive agents. Consultation with a critical care pharmacist. Infusions of sedative drugs based on adjusted body weight.

Nutrition

Relatively insensitive to insulin and therefore high circulating insulin levels. Insulin suppresses lipid mobilisation from adipose tissue, i.e. unable to utilise energy stores with consumption of carbohydrate and protein instead of fat. Loss of lean body mass.

Commence enteral or parenteral nutrition as soon as possible, within 24 hours of admission. Hypocaloric enteral feeding regime - energy input of 70% of requirements (15 kcal/kg/day) with normal or high protein intake (2 g/kg/day). Based on an adjusted body weight. Dietician consultation.

Immobility - VTE and soft tissue care

Obese patients are at a higher risk of venous thromboembolism. Low molecular weight heparin should be dosed on adjusted body weight and can be monitored using anti-Xa levels.

They are at higher risk of skin and soft tissue breakdown and infection, i.e. pressure sore and fungal infections. Wounds consume energy and infections can lead to mortality.