Objectives:
- At the end of this talk JMOs will be able to:
  - Identify patients who need preoperative referral to Anaesthesia for review by performing appropriate history, examination and investigations
  - Manage preoperative medications and fasting
  - Identify common postoperative problems and commence initial management
Preoperative Assessment

- Current problem and indications for surgery
- Medical history
- Medication history and allergies
- System review
- Anaesthesia specific: airway, previous anaesthetic history and family history
- Physical examination
- Investigation review
- ASA status, anaesthesia plan and informed consent of patient

Preoperative Assessment

- Current problem and indications for surgery:
  - Elective vs Emergency
  - Acute physiological derangement
  - Fasting status
  - Burden of disease and risks of surgery
  - Timing of optimisation

Preoperative Assessment

Medical History and System Review:

- Cardiac
- Respiratory
- Renal
- GIT
- Neurological
- Endocrine
- Musculoskeletal

Preoperative Assessment

- IHD
- Heart failure
- Valvular disease
- Arrhythmias and diseases of conduction
- Cardiomyopathy
- Systemic and pulmonary hypertension
Cardiac

ACC/AHA Clinical Practice Guideline

2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery: Executive Summary
A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American College of Surgeons, American Society of Anesthesiologists, American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Vascular Medicine

Step One: Clinical Risk Factors

CAD: age, sex, HT, smoking, FHx, obesity, lipids, DM etc

Other cardiac risk factors:

- Heart failure
- Valvular disease
- Cardiomyopathy
- Pulmonary hypertension
- Arrhythmias and diseases of conduction
- Adult congenital heart disease
Step Two: Treat unstable disease

- Patient scheduled for surgery with known or risk factors for CAD (Step 1)
- Emergency: Yes
  - Clinical risk stratification and proceed to surgery
- No
  - ACS (Step 2)
  - Yes
    - Evaluate and treat according to GDMT
  - No

Step Three: Surgical and Clinical Risk

- Risk of MACE:
- **Clinical:**
  - Factors as above
  - Plus insulin dependent DM, Hx of CVA, presence of sepsis, renal impairment etc

- **Surgical:**
  - High risk: Intrathoracic, intraabdominal and suprainguinal vascular; major orthopaedic, major head and neck
  - Low Risk: peripheral/superficial, endoscopic, breast, cataracts,
Clinical Risk Calculators

- P-POSSUM: http://www.riskprediction.org.uk
- NSQUIP: https://riskcalculator.facs.org

Step Four: Proceed to Surgery

- Manage perioperative medications
- Fasting
- Appropriate investigations
Step Five: Assess functional capacity

1. METS Eating, getting dressed, working at a desk
2. METS Showering, walking down eight steps
3. METS Walking on a flat surface for one or two blocks
4. METS Raking leaves, weeding or pushing a power mower
5. METS Walking 4 miles per hour, social dancing, washing car
6. METS Nine holes of golf carrying clubs, heavy carpentry, using push mower
7. METS Digging, spading soil, singles tennis, carrying 60 lb
8. METS Moving heavy furniture, jogging slowly, rapidly climbing stairs, carrying 20 lb upstairs
9. METS Bicycling at a moderate pace, sawing wood, slow jumping rope
10. METS Brisk swimming, bicycling uphill, walking briskly uphill, jogging at 6 MPH
11. METS Cross-country skiing, full court basketball
12. METS Running continuously at 8 MPH

Adapted with permission from Brigham and Women's Hospital Preoperative Assessment form.

Cardiac Preoperative Management

Practical aspects for ward JMO:
- Thorough history and examination
- Assess functional status
- ECG
- Chase Cardiology letters and previous investigations
- Chase PPM/AICD card and documentation of last testing

Cardiac Preoperative Management

- Continue beta blockers, statins and CCB
- Omit ACEi and ARB on day of surgery
- Consider diuretics in context of fluid balance
- Antiplatelet therapies according to clinical and surgical risk
Anticoagulation

- No cessation of anticoagulation:
  - Dental work; ophthalmology eg cataracts; endoscopy; superficial surgery eg drainage of abscess
- Low risk of bleeding:
  - Endoscopy and biopsy; bladder biopsy; PPM insertion
- High risk of bleeding:
  - Intracranial, intrathoracic and intraabdominal surgery; spinal surgery
Respiratory

History:
- Exercise tolerance
- Hospital visits, admissions and intubations
- Smoking
- Medications and compliance

OSA - STOPBANG

- Snoring
- Tiredness (daytime somnolence)
- Observed apnoeas
- Pressure (hypertension)
- BMI
- Age (>50)
- Neck circumference
- Gender (male)
Respiratory

- **Examination:**
  - Respiratory system
  - SpO2 on RA, RR
  - Cardiovascular system

- **Investigations:**
  - PFT
  - ABG
  - ECG
  - CXR?

CXR?

- Severe or poorly controlled COPD
- Active pulmonary disease or symptoms
- Abnormal lung sounds on physical exam
- Recent pneumonia
- Strongly consider in patients undergoing thoracic, upper abdominal, or AAA surgery

Respiratory Preoperative Management

- **Practical tips for ward JMO:**
  - Usual respiratory medications and inhalers
  - Consider extra dose of salbutamol immediately preoperatively
  - CPAP machine in hospital and use perioperatively in OSA

Endocrine

- Diabetes
- Thyroid disease
- Adrenal disease
- Pituitary disease
Diabetes Perioperative Management

- **History and examination**
  - Including presence of systemic complications

- **Investigations**:
  - Tailored to surgery and patient
  - EUC, FBC, HbA1C

Anaesthetic Specific

- Airway
- Post operative nausea and vomiting (PONV)
- Malignant hyperthermia
- Suxamethonium apnoea

Airway Assessment

- Mallampati Score
- Thyromental distance
- Mouth opening
- Jaw protrusion
- Neck movement
- Dentition

- Body habitus and facial features
- Facial hair
- Neck circumference
- History of difficult intubation
Airway Assessment

- Mallampati Score:
  - Class I: Good
  - Class II: Fair
  - Class III: Poor
  - Class IV: Obstruction

Airway Assessment

- Thyromental distance: > 5 fingerbreadths/6 cm
- Mouth opening: > 3 fingerbreadths
- Jaw protrusion

Malignant Hyperthermia

- Autosomal dominant
- Chr 19, abnormality of ryanodine receptor in SR
- Abnormal release of Ca in response to triggers: volatiles and suxamethonium
- Hypermetabolic state
- Mortality 75% without treatment, 5% with
- Treatment: dantrolene, active cooling and supportive

Suxamethonium Apnoea

- Suxamethonium and mivacurium metabolised by plasma cholinesterases
- Autosomal inheritance: heterozygotes slightly prolonged action, homozygotes severely prolonged action
- Rarely used in current practice
- Recognition and treatment leads to no long term complications
Refer to Anaesthesia:

- Major surgery
- Unstable or severe cardiac and respiratory disease
- Pulmonary hypertension (moderate and severe)
- Moderate to severe valvular disease (especially AS and MS)
- Poor exercise tolerance
- Previous anaesthetic problems or anticipated difficulty with airway
- Multiple comorbidities
- If any concerns from patient or team about anaesthesia

ASA Score

<table>
<thead>
<tr>
<th>ASA Score</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA I</td>
<td>A normal healthy patient</td>
<td>Healthy, non-smoking, no or minimal alcohol use</td>
</tr>
<tr>
<td>ASA II</td>
<td>A patient with mild systemic disease</td>
<td>Mild diseases only without substantive functional limitations. Exceptions include those with limited to current smoker, social alcohol drinker, pregnant, obesity (BMI &gt; 40), well-controlled DM/Htn, etc.</td>
</tr>
<tr>
<td>ASA III</td>
<td>A patient with severe systemic disease</td>
<td>Substantive functional limitations; cause more impairment; system limited to minor organ system with diminished reserve: DM or HTN, COPD, renal failure (GFR &lt; 30), atrial fibrillation, alcohol dependence or abuse, implanted pacemaker, moderate reduction of left ventricular function, DM/Htn with proteinuria or metabolic acidosis or renal failure (GFR &lt; 30), CHT, TIA or CAD/CHF</td>
</tr>
<tr>
<td>ASA IV</td>
<td>A patient with severe systemic disease that is a constant threat to life</td>
<td>Examples include those with limiting condition that recent &lt; 30 mmHg or DM, CHT, TIA, or CAD/Htn by ongoing venous insufficiency or severe valvular disease, severe reduction of left ventricular function, severe diastolic hypertension requiring medication, etc.</td>
</tr>
<tr>
<td>ASA V</td>
<td>A moribund patient who is not expected to survive without the operation</td>
<td>Examples include those with limited to uncorrectable abnormally high oxygen tensions, massive brain, respiratory, or cardiovascular impairment with cause off, severe organ failure, major burns, etc.</td>
</tr>
<tr>
<td>ASA VI</td>
<td>A declared brain dead patient whose organs are being removed for donor purposes</td>
<td>Example includes those with limited to uncorrectable severe organ dysfunction or multiple organ system failure</td>
</tr>
</tbody>
</table>

Fasting

- Solids: 6 hours
- Breast milk: 4 hours
- Clear fluids: 2 hours
- NBM < 2 hours (sips H2O with medication is OK)

IV Fluids in fasting

- Resuscitation
- Replacement
- Regular maintenance:
  - H2O 25ml/kg/day
  - K 1 mmol/kg/day
  - Na 1 mmol/kg/day
  - Glucose 50g/day
**IV Fluids in Fasting**

- Hartmanns:
  - Na 131 K 5 Ca 2 Cl 112 lactate 29 osm 254
- Plasmalyte:
  - Na 140 K 5 Mg 1.5 Cl 98 acetate 27 gluconate 23 osm 271
- 0.9% NaCl: “normal saline”
  - Na 150 Cl 150 osm 300
- 4% dextrose 0.18% NaCl:
  - Na 30 Cl 30 dextrose 222 osm 282

**IV Fluids in Fasting**

- Consider salt load
- Consider comorbidities
- Maximise oral fluids if possible
- Alternate fluids if prolonged fasting and monitor electrolytes regularly

**Post Operative Problems**

- Pain
- Hypoxia
- Oliguria
- Hypotension
Pain
• Review Anaesthetic chart, medication chart and file notes
• Pain history
• Examine patient
• Multimodal analgesia
• PCA efficacy?
• APS

Hypoxia
• Decreased minute ventilation
• Decreased respiratory drive
• Increased VQ mismatch and shunt
• Decreased ciliary action
• Decreased HPV

Hypoxia
• ABC, give appropriate O2
• Examine patient - RR, TV, respiratory muscle use, auscultate
• Pre-existing conditions
• Review medications and procedure
• Exclude other causes: bronchospasm, fluid overload, PE, aspiration, pneumothorax
• ? ABG, ? CXR
• Chest physiotherapy, incentive spirometry and early mobilisation

Oliguria
• Surgical stress response: tissue trauma, pain and catecholamine surge releases neuroendocrine response mediated by cytokines releasing cortisol, activating RAS and ADH.
• Catabolism, insulin resistance, increased metabolic rate and salt and water retention.
• Examine patient
• Review fluid charts including Anaesthetic charts
• Fluid challenge in context of patient state and comorbidities
• Don’t chase a number in otherwise well patient
• Discuss diuretics with more senior colleagues
### Hypotension

- A,B,C
- Examine patient
- \( BP = CO \times SVR \)
- \( CO = SV \times HR \)
- SV affected by preload, contractility and afterload
- Exclude serious causes: hypovolaemia/anaemia; cardiac; PE; sepsis;
- Replace losses, fluid bolus
- Consider effects of anaesthesia, hypothermia, surgical stress response and medications

### Case Study

- John, a 65 year old male admitted to hospital after a fall off a ladder.
- Fractured his left femur, needs IM nail.
- Past history of hypertension, smokes 25 cigarettes a day.
- BMI 36. Snores loudly - the patient in the next bed complains.
- Medications: metoprolol, irbesartan and pantoprazole.
- Previous hernia repair and colonoscopy without problems.

### Post-operative management.

- ASA?
- Anaesthetic referral?
- Preoperative investigations?
- Fasting?
- Medications?
Postoperatively...

- Two hours post op. Comfortable and drowsy.
- 6 hours post op. He’s in pain: fentanyl PCA 20mcg bolus q5 minutes. Pressing it every 3 minutes. States 9/10 pain.

Later that evening...

- John now comfortable again. SpO2 is 92% on 2L NP, snoring loudly.
- Concerns? Instructions to nursing staff?

Questions?