Pre-Anticoagulation

Routine tests: Bloods, chest x-rays and ECGs

Obstructive sleep apnoea

Notes on Herbal medications

The Pre-Anticoagulation Assessment

The usual drivel....

Pertinent history and examination
Investigations or consultations
Discussion and Informed Consent
Medication and fasting instructions
Other specific preparation
Etc
Etc

The Pre-Anticoagulation Assessment

It's all about Planning

Pre-op preparation
Anaesthetic technique
Intra-operative monitoring
Intra- and post-op analgesia
Post-op monitoring and nursing support
Discharge planning

Communication around each of these steps

Pre-Admission Clinics

Facilitate Day of Surgery Admission
DoH benchmark: 90% DOSA

Reduce cancellations on Day of Surgery
DoH benchmark: 5% \(\rightarrow\) 2%

Facilitate Discharge process
DoH benchmark: 80% Day Only or 23-hour
Pre-anaesthetic or Pre-admission Clinics?

- Anaesthetic assessment
- Review of surgical issues
- Chronic and incidental medical issues
- Administrative and Logistic
- Admission and Discharge planning

Pertinent Surgical issues

- Clarification of procedure and consent
- Organise additional surgical investigations
- Bowel preparation
- Other specific preparation: Appliances, TEDS
- Special theatre equipment
- Discharge planning

Administrative & Logistics

- Demographic details
- Financial status
- Parking and Transport
- Physical layout of hospital
- Interpreter service
- Equipment and other special needs
- Discharge planning

Surgery in non-metropolitan centres

- Smaller circle of colleagues
- Potential for closer collaboration
- Potential for better communications and simple systems
- Anaesthetist who also has the broader perspective of a GP
- Potentially better preparation for elective surgery

Surgery in non-metropolitan centres

- Limitations apply where-ever we work
- Appreciating limitations of yourself, and your hospital or day surgery
- Communication and networking deficiencies are as real a problem in the city as the country
Selected topics

- Pre-admission clinics
- **Cardiac assessment**
- Anticoagulation
- Routine tests: Bloods, chest x-rays and ECGs
- Obstructive sleep apnoea
- Notes on Herbal medications

Cardiac assessment will incorporate consideration of ....

- Urgency of surgical condition
- Patient’s risk factors
- Surgery-specific considerations
- Pre-op testing should ideally be limited to aspects that might actually affect patient outcome

Defining Perioperative Cardiac Complications

- Typically includes perioperative
  - Myocardial infarction
  - Death
- Frequently includes
  - Pulmonary oedema
  - Significant arrhythmia
- Diagnostic criteria differ from one centre to another

Aims of Cardiac Evaluation

- Assessment for
  - Presence of disease
  - Extent of disease
  - Stability of disease
- With a view to
  - Stratification of risk
  - Modification of risk
  - Management of risk

ACC/AHA Guidelines on Perioperative Cardiovascular Evaluation and Care for Non-Cardiac Surgery

*Circulation* 2007;116: 0000 October 23

www.circ.ahajournals.org 27 Sept 2007

Cardiac Assessment

- Involves consideration and decisions according to
  - Urgency
  - Active cardiac conditions
  - Surgery-specific risk
  - Functional capacity
  - Clinical risk factors
- Prior coronary evaluation and treatment
“Active cardiac conditions"
A major predictor of risk
- Unstable coronary syndromes
  - Recent myocardial infarct (within 30 days)
  - Unstable or severe angina
- Decompensated LV impairment
- Significant arrhythmias
- Severe valvular disease

Recent myocardial infarction
- There is a trend away from focusing on time since AMI, alone, as the major prognostic determinant
- If recent stress test does not indicate residual threatened myocardium, risk of perioperative re-infarction is low
- In such case, 4-6 weeks post-AMI is probably sufficient delay before non-cardiac surgery

Surgery-specific Risk
High Risk (>5%)
- Major emergency surgery
- Aortic and other major vascular
- Peripheral vascular surgery
- Procedures anticipated to be prolonged with large fluid shifts and/or blood loss

Surgery-specific Risk
Intermediate Risk (1-5%)
- Carotid endarterectomy
- Head and neck surgery
- Intra-thoracic
- Intra-peritoneal
- Orthopaedic
- Prostate

Surgery-specific Risk
Low Risk (<1%)<br/>- Superficial procedures
- Endoscopic procedures
- Breast surgery
- Cataract surgery

Functional Capacity < 4 METs
One MET is defined as basal energy expenditure at rest

- 1-4 METS
  - eating, dressing, walking around the house

- 4-10 METS
  - climbing a flight of stairs, walking @6km/h, golf

- >10 METS
  - swimming, running, tennis

Risk is increased in patients unable to perform 4 METS
Clinical risk factors
Intermediate predictors
- History of heart disease
- Compensated or prior LV impairment
- History of cerebrovascular disease
- Diabetes
- Renal impairment Creatinine > 200μmol/l

Stepwise Approach
1. Assess urgency
   - Proceed if urgent
2. Assess for Active cardiac conditions
   - Defer if present
3. Assess nature of surgery
   - Proceed if low risk surgery
4. Assess Functional capacity
   - Proceed if 4 METs or more
5. Assess clinical risk factors

Poor Functional Capacity and intermediate or high risk surgery
- Assess Clinical risk factors
  - Proceed if no risk factors
  - Consider further investigation if several Clinical risk factors present, and if those investigations may influence management, especially if high-risk surgery.

Whom to defer and investigate further?
- Active cardiac conditions present
  - usually defer elective surgery pending optimisation of condition, or further investigation
  - medical treatment
  - angiography if candidate for revascularisation

Whom to defer and investigate further?
- No Active cardiac conditions, but
  - Poor exercise tolerance
  - 3 or more Clinical risk factors
  - High-risk surgery
Consider deferring and investigating if management may change

- No active cardiac conditions but
  - Poor functional capacity
  - and
  - 1-2 Clinical risk factors
  - and
  - Intermediate or high-risk surgery

Recent coronary revascularisation?

- If the patient has had CABG or other coronary intervention in the last 5 yrs, and no new symptoms
  - > no further testing needed

Recent cardiac evaluation?

- If this has been done in the last 2 years and symptoms have been stable
  - > no further testing needed

Perioperative Cardiac Investigations

- Non-invasive
  - ECG
  - Echocardiography
  - Scintigraphy (thallium or sestamibi)
  - SPECT
  - PET scanning

- Invasive
  - Angiography

*Stress* denotes pharmacological or exercise

Resting ECG

- Resting ECG provides little information on ischaemia other than serving as a baseline.

- Does provide useful information on conduction system, rhythm, some metabolic issues

Resting Echocardiogram

- Resting echocardiogram suggestive of ischaemia only if segmental wall motility abnormalities present

- Does provide baseline LV and RV function, assessment of LVH and diastolic impairment, and valvular function
Sensitive Non-invasive Tests
- Similar predictive value from
  - Stress Mibi
  - Stress Echocardiogram
  - 24 Ambulatory ECG (Holter monitoring)
  - in determining which patients are at risk of adverse perioperative cardiac events
- Limited availability for these tests
- Inferior predictive value from Exercise ECG

Coronary Angiography
- Adds little additional information about risk
- Generally reserved for clarifying anatomy when revascularisation is contemplated
- May be indicated for risk assessment if non-invasive testing is uninterpretable

Outcomes following Cardiac Evaluation
- Reconsider need for surgery
- Delay surgery pending optimisation of cardiac condition
- Modify intraoperative monitoring
- Modify anaesthetic technique
- Modify postoperative monitoring
- (Preoperative coronary revascularisation)

Preoperative coronary revascularisation
- Growing body of evidence and opinion that pre-operative revascularisation does not alter the short-term risk of perioperative cardiac events.
- This applies to both CABG and stenting.
- Indeed the risk may increase with stenting if not properly anticoagulated.

Selected topics
- Pre-admission clinics
- Cardiac assessment
- Anticoagulation
  - Routine tests: Bloods, chest x-rays and ECGs
  - Obstructive sleep apnoea
  - Notes on Herbal medications
Perioperative Anticoagulants
- Aspirin
- NSAIDS and COX-2 Inhibitors
- Warfarin
- Clopidogrel

Cessation of Anticoagulants
- Cessation of anticoagulants is not necessary for many procedures, including most skin surgery, cataract, and dental extraction
- Cessation unnecessarily exposes patient to risk of thrombo-embolic event
- As much a surgical matter as an issue for anaesthetists

Cessation of Anticoagulants
Who makes the call?
- Other than following protocols, it is not appropriate for clerical or nursing staff to advise patients as to what to do with anticoagulants
- Need surgeon and anaesthetist to come to agreement about cessation of these drugs

Continuation of aspirin
- Widely agreed as acceptable for all regional blocks, and for most minor surgery
- Clinically significant increase in blood loss for:
  - joint replacement
  - TURP
- Unacceptable bleeding risk for intra-cranial and spinal surgery

Clopidogrel
- More complex
- Increasingly prescribed
- Clear risk of stent thrombosis for new stents, and some risk of late stent thrombosis in established stents.
- Very high risk in bare metal stents in first month, and in drug eluting stents less than 12 months old

Clopidogrel and Coronary Stents
- If possible, defer elective surgery in high restenosis-risk patients
- Otherwise, generally cease for 10 days. Continue aspirin if at all possible.
- Consider discussing with cardiologist, and consider commencing prophylactic aspirin if not on it already.
Warfarin

- Increasing agreement that there is no need to cease for minor procedures, including skin surgery, cataract and other ophthalmic surgery, and dental extraction.
- Reported adverse thromboembolic events during cessation period, including successful litigation

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**Follow Perioperative Warfarin Management protocol**

<table>
<thead>
<tr>
<th>THROMBO-EMBOLIC RISK</th>
<th>PRE-OP</th>
<th>POST-OP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warfarin</td>
<td>LMWH/UFH</td>
<td>Warfarin</td>
</tr>
<tr>
<td>LOW</td>
<td>Off 2 doses pre-op</td>
<td>nil</td>
</tr>
<tr>
<td>MODERATE</td>
<td>Off 4 doses pre-op</td>
<td>Optional</td>
</tr>
<tr>
<td>HIGH</td>
<td>Off 4 doses pre-op</td>
<td>Full anticoagulation*</td>
</tr>
</tbody>
</table>

* Warfarin to cease 4 days pre-op if INR within therapeutic range of 2-3. Longer interval needed if INR > 3.0.

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**Stratify thrombo-embolic risk**

<table>
<thead>
<tr>
<th>Low thrombo-embolic risk</th>
<th>Moderate Thrombo-embolic risk</th>
<th>High thrombo-embolic risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF Plus</td>
<td>History of stroke or systemic thromboembolism</td>
<td>History of stroke or systemic thromboembolism</td>
</tr>
<tr>
<td>Vascular disease other than rheumatic valve disease</td>
<td>Anticoagulation</td>
<td>Anticoagulation</td>
</tr>
<tr>
<td>1 of the following: Age &gt; 75</td>
<td>Type of LVAD or RVAD</td>
<td>Type of LVAD or RVAD</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Type of LVAD or RVAD</td>
<td>Type of LVAD or RVAD</td>
</tr>
</tbody>
</table>

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**Selected topics**

- Pre-admission clinics
- Cardiac assessment
- Anticoagulation
- **Routine tests: Bloods, chest x-rays and ECGs**
- Obstructive sleep apnoea
- Notes on Herbal medications

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**Routine investigations**

- What are we trying to achieve by screening?
- Where does our responsibility for whole-patient care start and finish?
- What happens to results of investigations?
  - Whose responsibility to follow up?
  - How are they followed up?
  - Risk and consequence of not following up
UK National Institute for Clinical Excellence (NICE)

- Guidelines for perioperative testing – 2003
- Extensive consultation process
- Summary document runs to 30 pages.
- Full script 108 pages; appendix 237 pages
- Frustratingly inconclusive: “consider testing…”

More-practical guidelines

- Canadian Anesthesiologists’ Society Guidelines
  - “Investigations should not be ordered on a routine basis”
    - http://www.cas.ca/members/ainv/guidelines
- Ottawa Hospital Guidelines
  - “Best evidence suggests that investigations done without indication are of no clinical value”
    - http://www.ottawahospital.on.ca/clinicalPolicy/policy1.htm

Pre-op Chest X-rays

- Becoming less contentious
- Tending away from routine pre-op CXR
- Little yield in asymptomatic patients
- Predominantly used as baseline for major surgery in high-risk patients
- A matter of local consensus

Routine Pre-op Chest X-rays at Concord Hospital

Aged 60 years or over, having
- Thoracic surgery
- Open intra-peritoneal surgery
- Vascular surgery except varicose veins
- Joint replacements
- Craniotomy
- Nephrectomy and nephrolithotomy
- Cystectomy, radical prostatectomy and TURP
- Free flaps and neck dissections (plastics or ENT)
- All patients who will likely need ICU or HDU.

Selected topics

- Pre-admission clinics
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- Routine tests: Bloods, chest x-rays and ECGs
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OSA Assessment

- Patient may have known OSA, or anaesthetist may suspect OSA from history
- The triad of snoring, arousals, and daytime somnolence are highly suggestive.

Prevalence

- 2-4% of adult population have at least mild OSA and daytime sleepiness
- Male 2:1
- 80% or more are undiagnosed
- The majority of patients with OSA are obese, perhaps 80-90%, but remember that some patients with OSA are not obese

Obstructive and hypoxic risks are therefore further increased in:

- Painful surgery or when post-op analgesia requirements are high
- Co-morbidities which depress respiration, and/or make obstruction more likely
  - eg obesity, neuromuscular disease
- Surgery which depresses respiration, and/or makes obstruction more likely
  - eg airway surgery, upper abdominal surgery

Postoperative respiratory consequences of OSA

- Final common pathway of postoperative hypoxia and hypoventilation brought about by:
  - Upper airway obstruction
  - Reduced margin of safety from non-obstructive respiratory embarrassment
  - Impaired arousal

Risk factors when considering Postoperative Care

- Severity of Sleep Apnoea
- Co-morbidities
- Nature of procedure and expected analgesic requirements
High Risk group

- Severe OSA
- Significant co-morbidities
- High risk, painful procedure

CPAP

- CPAP overcomes most of the problems of airway patency
- Post-operative CPAP should be available for all patients with diagnosed or suspected OSA
- Patient’s own CPAP unit should be available for use in recovery
- The CPAP system should be able to accept supplemental oxygen

Summary of Concord Guidelines

- Adequate Pre-operative assessment, consultation and planning
- Untreated OSA may justify postponement in high-risk patients
- Patients own CPAP to be available in recovery
- Supplemental oxygen is a must
- Post-op care according to risk level

Planning for Post-op Care

- Highest risk group: HDU
- Lowest risk group: General ward or home
- Intermediate risk groups:
  - Mandatory 2 hours in recovery as minimum
  - Severe OSA and one other major risk factor. consider for overnight Respiratory Observation Unit
  - General ward if stable and managing own CPAP
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Patient use of Herbs

- Several studies of surgical populations suggest 25-30% of patients report regularly using herbal medicines
- 70% of these patients do not volunteer such information

Eight herbs make up 50% of the single-herb preparations sold in USA

- Echinacea
- Ephedra
- Garlic
- Ginkgo
- Ginseng
- Kava
- StJohn’s Wort
- Valerian

Adverse effects

- Direct pharmacologic effects
- Pharmacodynamic interactions
- Pharmacokinetic interactions
- Intrinsic to Herb
- Related to specific preparation
Contamination, adulteration or substitution
- Inclusion of undeclared substances or toxins in 83 of 260 preparations tested
- Heavy metals
  - lead, mercury, arsenic
- Undeclared drugs
  - Testosterone
  - Ephedrine
  - Phenacetin
  - Chlorpheniramine
  
  (Ko, 1998)

Other adulterants or substitutions
- Other Drugs
  - Oral hypoglycaemic agents
  - Corticosteroids
  - NSAIDS
  - Paracetamol and aspirin
  - Pesticides and residues
  - Substitution of cheaper plants and ingredients

Bleeding tendency
- Garlic
- Gingko
- Ginger
- Ginseng - also associated with hypoglycaemia

CNS depressants - benzodiazepine analogues
- Kava
- Valerian

CNS excitation
- St John’s wort – Serotonin/noradrenaline reuptake inhibition
- Ephedra (Ma Huang) - sympathomimetic

Pre-anaesthetic assessment and planning
- Specifically enquire about herbal use, as patients often do not volunteer such information
- Patient may be self-medicating, and therefore have undiagnosed or untreated disorders
- Generally, advise cessation of herbal meds for one week
Pre-anaesthetic assessment

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