Pre-Anaesthetic Assessment

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Pre-Anaesthetic Assessment

• What tests should we be doing?
• What do we need to worry about?
• What exactly are we trying to achieve?
The Pre-Anaesthetic 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
The Pre-Aナesthesic Assessment

It’s all about Planning

- Should surgery go ahead?
- Is the patient as well as they can be?
- Can we do anything to improve their state pre-op?
- How can we manage the risks?

Communication around each of these steps
Selected topics

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

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

- Facilitate Day of Surgery Admission
  - DoH benchmark: 90% DOSA

- Reduce cancellations on Day of Surgery
  - DoH benchmark: 2%

- Facilitate Discharge process
  - DoH benchmark: 80% Day Only or 23-hour
Pre-procedure Preparation

- NSW Health Pre-procedure Preparation Toolkit
  NSW Health website: Policies 2007_018

- All patients need some degree of assessment

- How much can be done remotely vs in person?

- Selection for attendance at Preadmission Clinic
Form of Preadmission Clinic

- Phone Clinics
- Nurse-based Clinics
- Multidisciplinary medical clinic
- Selection for attendance at Preadmission Clinic
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 wherever 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
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
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
  – 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
ACC/AHA Guidelines on Perioperative Cardiovascular Evaluation and Care for Non-Cardiac Surgery

_Circulation_ 2007;116: e418-500

[www.circ.ahajournals.org](http://www.circ.ahajournals.org)
“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
Low Risk (<1%)

- 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 > 200umol/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
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
  and
  3 or more Clinical risk factors
  and
  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

- Provides little information on ischaemia other than serving as a baseline.

- Useful information on conduction system, rhythm, some metabolic issues
Resting Echocardiogram

• No role in excluding ischaemia

• 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
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

- Anticoagulants may be continued 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. Consider commencing prophylactic aspirin if not on it already.
- Continue aspirin if at all possible.
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
Warfarin

- Whether to stop depends on surgical bleeding risk, and proposed anaesthetic technique.
- Whether to bridge with heparin depends on risk of clotting while off warfarin.
# 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><strong>AF</strong></td>
<td><strong>AF Plus</strong></td>
<td><strong>AF Plus</strong></td>
</tr>
<tr>
<td></td>
<td>Valvular disease other than rheumatic mitral stenosis</td>
<td>History of stroke or systemic thromboembolism</td>
</tr>
<tr>
<td></td>
<td>1 of the following: Age &gt; 75 CCF HT Diabetes</td>
<td>Rheumatic mitral stenosis AVR bi-leaflet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 or more of: Age &gt; 75 CCF HT or Diabetes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tissue heart valves</td>
<td>Prosthetic heart valves, less than 3 months old, without AF</td>
<td>Mechanical heart valves with or without AF</td>
</tr>
<tr>
<td>Past Venous TE</td>
<td>Recent Venous or any Arterial TE Recent (&lt;2-3 months) or recurrent VTE</td>
<td>Acute Venous or arterial Thromboembolism (≤ 1 month)</td>
</tr>
<tr>
<td>Mural thrombus</td>
<td></td>
<td>Mural thrombus Recent (&lt;6 months)</td>
</tr>
<tr>
<td>Others</td>
<td>Vascular prosthetic grafts Vascular stents &gt; 30 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cerebrovascular disease with intracranial stenosis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carotid stenosis ± asymptomatic stenosis or bruit ± previous TIA</td>
<td></td>
</tr>
</tbody>
</table>
### Follow Perioperative Warfarin Management protocol

<table>
<thead>
<tr>
<th>THROMBO-EMBOLIC (TE) RISK</th>
<th>PRE-OP</th>
<th>POST-OP</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW</td>
<td>Warfarin</td>
<td>LMWH/UFH</td>
</tr>
<tr>
<td></td>
<td>Omit 4 doses pre-op#</td>
<td>Nil</td>
</tr>
<tr>
<td>MODERATE</td>
<td>Omit 4 doses pre-op#</td>
<td>Optional Prophylactic anticoagulation</td>
</tr>
<tr>
<td>HIGH</td>
<td>Omit 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.
Selected topics

- Pre-admission clinics
- Cardiac assessment
- Anticoagulation
- Routine tests: Bloods, chest x-rays and ECGs
- Obstructive sleep apnoea
- Notes on Herbal medications
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
- 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/sign_in/guidelines](http://www.cas.ca/members/sign_in/guidelines)

- Ottawa Hospital Guidelines
  “Best evidence suggests that investigations done without indication are of no clinical value” [http://www.anesthesia.org](http://www.anesthesia.org)
Compelling evidence


- 20,000 patients for cataract surgery under LA

- Randomised to testing or no testing

- No difference in any outcome measure.
Further evidence of no harm


Elimination of Preoperative Testing in Ambulatory Surgery

Frances Chung, FRCPC
Hongbo Yuan, PhD
Ling Yin, MSc
Santhira Vairavanathan, MBBS
David T. Wong, MD

BACKGROUND: Preoperative testing has been criticized as having little impact on perioperative outcomes. We conducted a randomized, single-blind, prospective, controlled pilot study to determine whether indicated preoperative testing can be eliminated without increasing the perioperative incidence of adverse events in selected patients undergoing ambulatory surgery.

METHODS: One thousand sixty-one eligible patients were randomized either to have indicated preoperative testing or no preoperative testing. In the indicated testing group, patients received indicated preoperative testing: a complete blood count, electrolytes, blood glucose, creatinine, electrocardiogram, and chest radiograph according to the Ontario Preoperative Testing Grid as per current practice, whereas in the no testing group, no testing was ordered. The investigators, data collectors, and patient outcome reviewers were blinded to the group assignment. The primary outcome measures were the rate of perioperative adverse events and the rates of adverse events within 7 and 30 days after surgery.

RESULTS: Patients’ age, gender, American Society of Anesthesiologists status, type of surgery, and anesthesia were similar between the two groups. There were no significant differences in the rates of perioperative adverse events and the rates of adverse events within 30 days after surgery between the no testing group and the indicated testing group. Hospital revisits <7 days were higher in the indicated testing group (P < 0.05). None of the adverse events were related to the indicated
Chung et al 2009

- 1000 patients, mostly ASA 1 and 2, for day surgery
- Randomised to testing or no testing, even if fitted to their usual “indicated” testing criteria
- Followed for 30 days post-op
- No difference in any outcome measure
Pre-op Chest X-rays

- Less contentious
- Little yield in asymptomatic patients
- Diagnosis of respiratory symptoms
- Baseline for major surgery in high-risk patients
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
• Cardiac assessment
• Anticoagulation
• Routine tests: Bloods, chest x-rays and ECGs
• Obstructive sleep apnoea
• Notes on Herbal medications
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%
- Thin patients can have OSA
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.
STOP screening tool
Anesthesiology 2008 108(5):812-21

STOP Questionnaire

A Tool to Screen Patients for Obstructive Sleep Apnea


Background: Obstructive sleep apnea (OSA) is a major risk factor for perioperative adverse events. However, no screening tool for OSA has been validated in surgical patients. This study was conducted to develop and validate a concise and easy-to-use questionnaire for OSA screening in surgical patients.

Methods: After hospital ethics approval, preoperative patients aged 18 yr or older and without previously diagnosed OSA were recruited. After a factor analysis, reliability check, and pilot study; four yes/no questions were used to develop this screening tool. The four questions were respectively related to snoring, tiredness during daytime, observed apnea, and high blood pressure (STOP). For validation, the score from the STOP questionnaire was evaluated versus the apnea–hypopnea index from monitored polysomnography.

Results: The STOP questionnaire was given to 2,467 patients, 27.5% classified as being at high risk of OSA. Two hundred eleven patients underwent polysomnography, 34 for the pilot is associated with a high risk for traffic accidents and cardiovascular disease.3,4

The prevalence of OSA in the surgical population is higher than in the general population and varies with different surgical populations. In particular, approximately 7 of every 10 patients undergoing bariatric surgery were found to have OSA,5 presumably because of the high level of obesity in this surgical population. Of even greater concern, despite OSA being present in the majority of patients presenting for bariatric surgery,5,6 most cases were not diagnosed, and careful screening was not implemented before surgery.5 One of the barriers to study the prevalence of OSA in surgical patients is the difficulty with recruiting patients to undergo poly-
STOP screening tool

STOP

- Snoring
- Tiredness
- Observed apnoeas
- Pressure – hypertension
- 65% sensitive for mild OSA (78% PPV)
- 80% sensitive for severe OSA (30% PPV)
STOP-BANG

Add BANG

• BMI > 35
• Age > 50
• Neck > 40 cm
• Gender male

• → Sensit 84 % for mild OSA (PPV 81%)
• → Sensit 100% for severe OSA (PPV 31%)

Postoperative respiratory consequences of OSA

- Final common pathway of postoperative hypoxia and hypoventilation
  - Upper airway obstruction
  - Reduced margin of safety from non-obstructive respiratory embarrassment
  - Impaired arousal
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
Practice Guidelines for the Perioperative Management of Patients with Obstructive Sleep Apnea

A Report by the American Society of Anesthesiologists Task Force on Perioperative Management of Patients with Obstructive Sleep Apnea

PRACTICE guidelines are systematically developed recommendations that assist the practitioner and patient in making decisions about health care. These recommendations may be adopted, modified, or rejected according to clinical needs and constraints. Practice guidelines are based and by a synthesis of expert opinion, open forum commentary, and clinical feasibility data.

Methodology

A Definition of Obstructive Sleep Apnea

Obstructive sleep apnea (OSA) is a syndrome characterized by periodic, partial, or complete obstruction of the upper airway during sleep. This, in turn, causes repetitive arousal from sleep to restore airway patency, which may result in daytime hypersomnolence or other daytime manifestations of disrupted sleep such as aggres-
ASA Taskforce 2006

• Severity of OSA
  and
• Invasiveness of surgery and anaesthesia
  and
• Opioid requirements
Concord Guidelines 2005

• Severity of Sleep Apnoea
• Co-morbidities
• Nature of procedure
• Expected analgesic requirements
CPAP

• Overcomes most of the problems of airway patency

• Should be available for all patients with diagnosed or suspected OSA

• The CPAP system should be able to accept supplemental oxygen
Concord Post-op Care

- Highest risk: HDU
- Lowest risk: General ward or home
- Intermediate risk group:
  - 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. Supplemental oxygen a must
Summary of Concord Guidelines

• Adequate Pre-operative assessment, consultation and planning
• Untreated OSA may justify postponement only in high-risk patients
• Post-op care according to risk level
Selected topics

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

- Pre-admission clinics
- Cardiac assessment
- Anticoagulation
- Routine tests: Bloods, chest x-rays and ECGs
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