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Royal Cornwall Hospitals NHS Trust

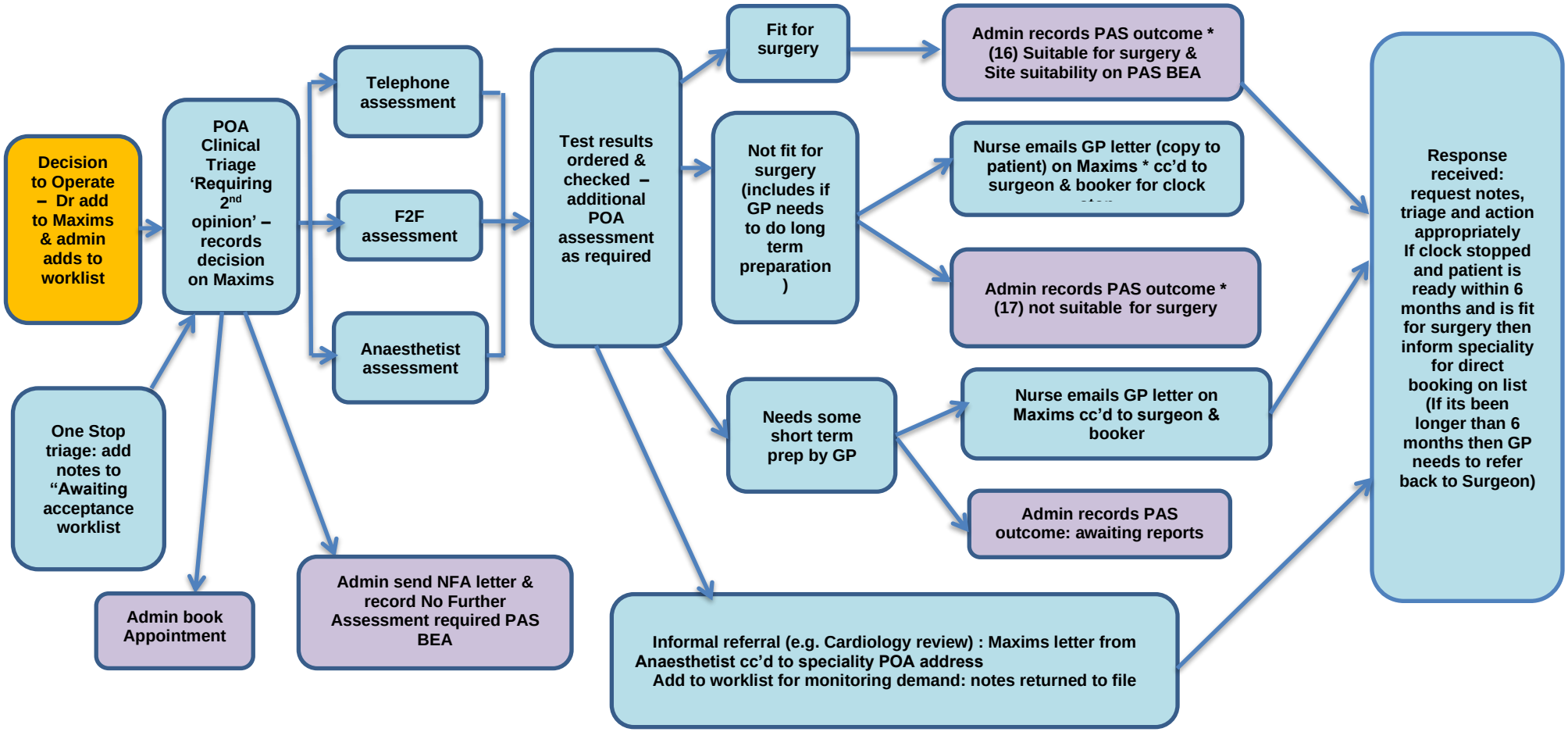
# Pre Assessment Clinical Guidelines

# V7.0

# January 2022

## Summary

Pre-Operative Assessment Pathway



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# 1. Aim/Purpose of this Guideline

1.1. The service offers pre-operative assessment and preparation for adults requiring regional or general anaesthesia for elective surgery and endoscopic procedures across the trust.

The POA clinics run every day at RCH and SMH sites. A consultant anaesthetist is in clinic every afternoon at RCH and on Tuesdays (variable) and Fridays at SMH (see Table 1). In addition CPET clinics occur throughout the week at RCH.

The purpose of the service is to prepare patients for their planned procedure in a timely efficient manner that utilises available resources appropriately. The process from decision to operate to POA outcome is outlined in the summary.

1.2. **This document is divided into sections:**

- An overview of the pre-assessment 'Which Role performs task and How'.

- Sections giving Clinical Guidance for specific topics.

- Guidance Top-Up assessments and Telephone assessments.

- Anaesthetist Absence in the RCH POA clinic Protocol.

1.3. This version supersedes any previous versions of this document.

**Data Protection Act 2018 (General Data Protection Regulation – GDPR) Legislation**

The Trust has a duty under the Data Protection Act 2018 and General Data Protection Regulations 2016/679 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed, and documented. We cannot rely on opt out, it must be opt in.

Data Protection Act 2018 and General Data Protection Regulations 2016/679 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the Data Protection Act 2018 and General Data Protection Regulations 2016/679 please see the *Information Use Framework Policy* or contact the Information Governance Team rch-tr.infogov@nhs.net

## 2. The Guidance

2.1. All patients listed for surgical procedures that require pre-operative assessment should be listed via the Maxims Add to Waiting List system. This system is the only point of referral to the Pre Assessment Service. Referrals will not be accepted from other routes.

2.2. An MRSA swab must be taken in the surgical outpatients according to RCHT infection control guidance.

**RCHT Patient Access Policy**
http://intranet.cornwall.nhs.uk/DocumentsLibrary/RoyalCornwallHospitalsTrust/Finance/FinancialAndContractManagement/PatientAccessPolicy.pdf

Pre-Operative Assessment (POA)

20.5...1. POA ensures that the patient is fit for surgery and anaesthesia and establishes that the patient is fully informed and wishes to proceed with surgery. POA can be:

- Telephone assessment by nursing staff
- Face-to-face nurse led
- Face-to-face consultant led

20.5...2. POA should be booked at least three weeks prior to the admission date (TCI).

2.05…2.1 POA should not be booked for Priority P3 (3 months) and P4(over 3 months) patients unless a TCI is confirmed.

20.5...3. Where a patient requires urgent surgery, POA will be arranged as soon as practicable for both patient and service.

2.3. **Access to medical information from Duchy Hospital**

If you ever need any medical records from the Duchy, please can you email Duchy Medical Records Team Leader angela.ellis11@nhs.net or phone 01872 226100 ext 6355 between 0800-1800hrs to make your request

## 3. Triage Criteria for level of pre-operative assessment

3.1. **No specific pre assessment**

Minor/Intermediate procedure, no functional limitation, no allergies or only food/dressings, BMI <35, age <65 and no comorbidity or regular medications.

**Send** 'No further POA required' **letter to patient.**

3.2. **Telephone assessment**

- Multiple, well controlled co-morbidity without functional limitation

- More complex/inpatient surgery
- Medication/Anaesthetic/Latex or Multiple allergies
- Patient is on antiplatelet/anticoagulant

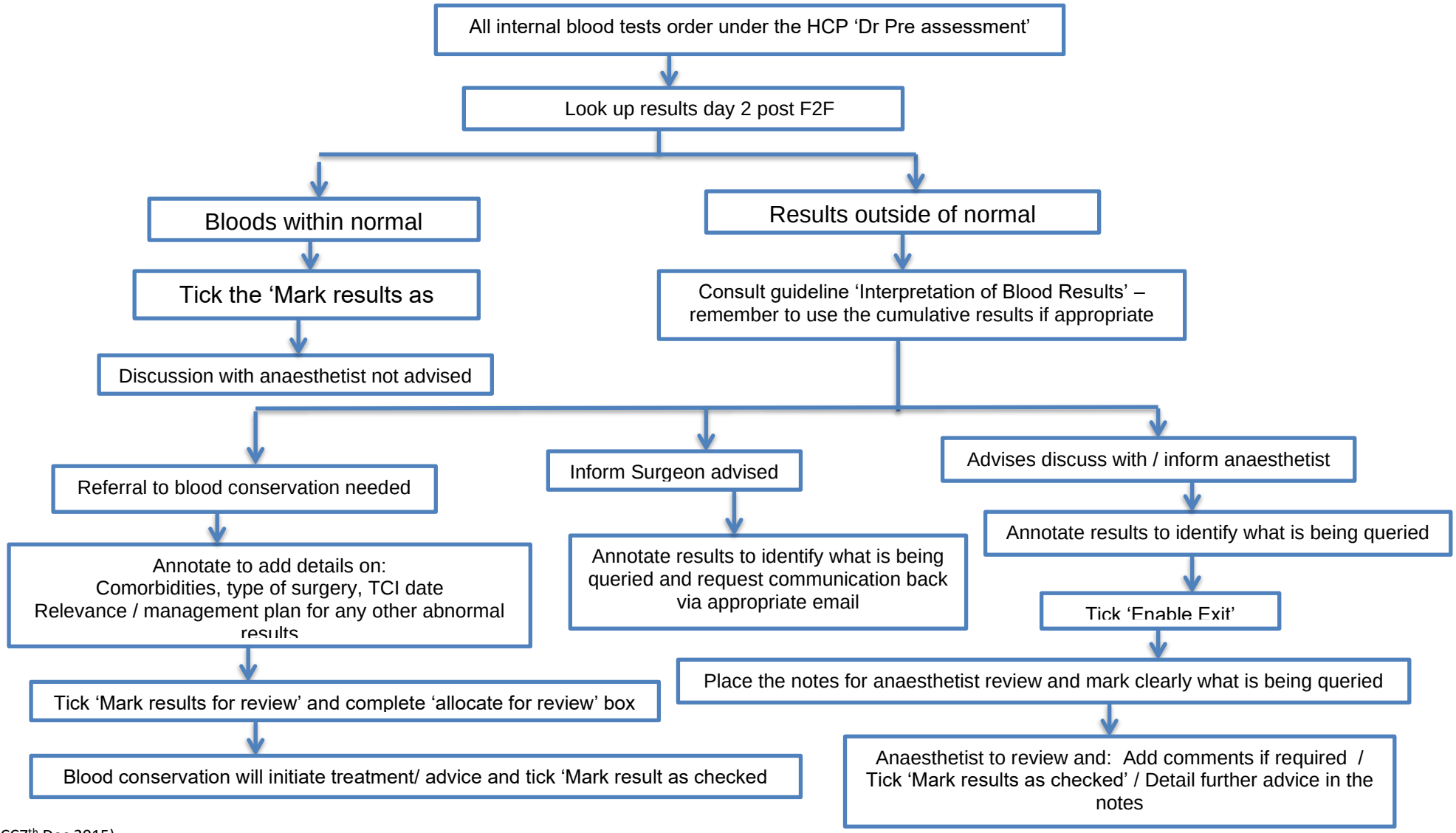
# 4. Ordering and follow-up of investigations

4.1. **Basic observations**
All patients must have their height, weight and blood pressure recorded, these values should be taken from those made in primary care (available on the RMS letter). Where this is not available they should be measured in clinic or obtained from the GP practice.

4.2. Oxygen saturations on air should be measured for all patients. Peak expiratory flow is only required for patients with asthma or obstructive lung disease.

4.3. Pre-operative tests should be ordered according to the clinical guidance set out in Pre-operative Tests. Table 2 below gives the process for ordering and sign-off of these. Interpretation of blood result sets out guidance for when blood results sit outside normal levels.

**Table 2. Pre-Operative Assessment: Blood Sign Off Process**




(CC7th Dec 2015)

4.4. **Echocardiograms (For clinical details on echocardiography; see Echocardiograms )**

- Echocardiograms can be requested via the POA echocardiogram clinic (through the POA booker) or though the cardiology department using the Maxims (internal referral/Add to WL) request form.

- The request must detail **indications for the test and what specifically you want to know from the test**. If the POA nurse is being asked to place the request, these details must be recorded clearly in the POA notes.

- All POA echocardiogram requests that are placed on Maxims should be placed under requesting HCP 'Dr Pre Assessment' and the results should be fed back to the appropriate POA clinic. If interpretation of the result is required it should be placed with notes for the clinic anaesthetist.

4.5. **Myocardial perfusion scans**
Request via Maxims 'Place Order'. Place under HCP 'Dr Pre Assessment'. Give clear commentary on indications. The requesting doctor must ensure that they follow up the examination themselves or leave clear instructions for this in the POA documentation – this must include the indication for the test and suggested courses of action. An ECG must accompany the Myocardial Perfusion Scan Request

4.6. **X-Rays**
Requests should be made on Maxims by the requesting anaesthetist. The requesting doctor must ensure that they follow up the examination themselves or leave clear instructions for this in the POA documentation – this must include the indication for the test and suggested courses of action.

4.7. **CIEDs (Loop recorders, pacemakers and internal defibrillators) See CIEDS for clinical details**
Request for device deactivation before surgery and reactivation after surgery will need to be made for the day of surgery. This should be done using the request form on Maxims for cardiac devices. Note Device Activation is not required for some peripheral surgeries. Contact Cardiac Technicians for most up to date advice.

# 5. Management of medical problems identified in POA

- When to refer patients back to the GP

- When to make an internal referral

- How to clarify communication with GPs and other specialists.

Consideration of risks and benefits associated with delays to surgery vs. investigation and treatment need to be made on a case by case basis.

As a general rule of thumb; untreated or sub-optimal chronic conditions managed or normally managed by the GP should be referred back to primary care.

Problems requiring further investigation or secondary care review, as part of the surgical pathway the patient is on, should be referred internally.

5.1. **Refer back to GP**

Patient has a previously diagnosed chronic condition found to be sub-optimally managed from the POA.
E.g. Asthma, DM, HTN, Thyroid, IHD, CCF, arrhythmia, OSA

POA identifies evidence for a probable diagnosis of a new condition, which requires further investigation or treatment prior to surgery.
E.g. Asthma, DM, HTN, Thyroid, IHD, CCF, arrhythmia, OSA, anaemia

If the condition or its anticipated management is envisaged to be complex, then it is appropriate for Direct Internal Referral via Maxims Add To Waiting List (Outpatient) for the appropriate Speciality, if the patient is P2, or P3 (national priority codes)

5.2. **Internal referrals**

A specific investigation/treatment is needed as part of the patient's surgical pathway (items the anaesthetist feels are appropriate for the patient because they are having GA/surgery)
E.g. Echocardiograms, anaemia treatment (for blood conservation), 24 hr tape, MIBI scan, -etc

- Patients on an urgent cancer pathway who have previously diagnosed chronic condition found to be sub-optimally managed from the POA and likely to need review by secondary care even if the patient were referred back to GP.

- Patients on an urgent cancer pathway who have a probable diagnosis of a new condition, likely to need further investigation/management from secondary care.

5.3. **Clarifying communication**

Please form a Maxims letter detailing the issues in the following circumstances:

- all F2F assessments

- all referrals back to primary care

- all referrals to secondary care – in addition to the Maxims AWL

- cases that are likely to incur a delay to their passage thorough POA, beyond that from standard assessments/investigations

- where changes in medication are required (standardised letters for anti-platelets / coagulants and DM meds)

Correspondence will routinely be copied to GP, surgeon and patient unless alternative instructions are given.

The primary method of dictation is Dragon Dictation Voice Recognition Software Tapes for the Dictaphone are available at RCH clinic. These are for use only in exceptional circumstances

The POA typist is on ext. 8074.

Please give patient name, CR number and DOB. Indicate who letter is addressed to and others for the CC. list.

At the end of the clinic please state "end of tape", apply a post-it note with clinic date and place tape in the 'in tray' on the POA typist's desk., with a list of all patients on the tape.

5.4. **To GP**

Dictate/write a letter to the GP, which will go into the Maxims record. Detail: What is being asked of them,

- The clinical indications for this
- What the timeframe is:
  - if the problem is likely to be resolved within 6 months, the patient should remain on the waiting list (clock stop situation for RTT). Communications should be requested back to POA clinic using the specialty specific email address (the typist will place this on the letter).
  - if the problem is likely to take >6 months. The patient should come off the waiting list and will require a new referral to the surgical specialist

5.5. **To other specialists**

Dictate/write a letter (which will go on Maxims) to the appropriate specialist highlighting the appropriate details. Please ask for return correspondence to go back to the appropriate pre-assessment email (this will be included on the top of the letter by typist)

| Specialty specific POA emails: |
| --- |
| rch-tr.poaheadandneck@nhs.net - MaxFax, ENT, Dental |
| rch-tr.poaortho@nhs.net – all orthopaedics |
| rch-tr.poasurgical@nhs.uk – general surgery, urology, breast |
| (RCH cases) |
| rch-tr.poagynae@nhs.net – all gynaecology |
| rch-tr.poasmh@nhs.net – all cases assessed at SMH POA |

NB. Contacting Cardiologists Update 2021

**Non-urgent** – via Add to Waiting List Maxims. In text identify most recent Cardiologist involved in care if there was one. In text state 'Request for Advice and Guidance' or ' Request for Outpatient Appointment'

**Urgent** – telephone call to responsible cardiologist for that patient. If unable to obtain help in this way the COW could be used as last resort.

5.6. **Between POA nurses and POA anaesthetists - notes review**

Nursing requests for notes review must:

Be written clearly on page 11 of F2F booklet. For the telephone assessments; under clear subheading *Anaesthetist to review.*

- The page should be bookmarked to make it easy to find
- Give specific instructions on which aspects of the nursing assessment they wish the anaesthetist to consider. They should expect only these points to be considered by the anaesthetist.
- Multiple issues should be clarified by using separate bullet points

Any investigation results for attention or previous specific documentation should be bookmarked wherever possible.

The reviewing anaesthetist must document their findings/advice clearly in the notes with indication of date and clarification of their name. Addressing bullet pointed issues with bullet pointed responses aids clarity.

Any requests for further investigations must clearly detail indication and if possible, advice on how results may influence further management. Investigation results should be followed up by the POA nurses. Results requiring anaesthetist interpretation should be placed for notes review.

Electronic letters should be formed for all referrals to primary care/other specialists or if significant delays are likely.

## 6. POA outcome

The outcome of the assessment should be recorded electronically by POA nurses (the current system for this is BEA in PAS).

One of the following options:

**Suitable to proceed:**

- Suitable for all surgical sites
- Suitable for RCH only – in these cases a code indicating the reason for this should be added:
- WCH
- WCH Spinal Anaesthesia Day Case Only (Requires Maxims AWL)
- SMH Standard
- SMH Higher Level Care (requires Maxims AWL)
- ORTHO MDT (requires Maxims AWL)
- RCHT WARD
- RCHT EPOC IDEAL
- RCHT EPOC MINIMUM
- RCHT HDU IDEAL
- RCHT HDU MINIMUM

**FC –** Functional Capacity

**C-** Cardiovascular

**R-** Respiratory

**BMI –** weight

**Renal**

**DM –** Diabetes

**CNS –** neurological reasons

**S –** surgical*****

**MRSA –** MRSA or other infection control reason

**B –** booker already booked case for RCH BUT suitable for other site from medical + surgical points of view.

***S –** should be used when the *operation type or specialty dictates* that it must be RCH. No other code is required in these cases.

**E.g. ENT, major operations, etc.**

**Unsuitable – requiring further optimisation**
(RTT clock stopped), expected to be completed within 6 months. Optimisation results to flow back to POA, where a further decision will be made (see Table 3).
**Unsuitable – unlikely to be suitable to proceed in the next 6 months.**
Patient will require re-referral to specialist via GP.

**Table 3. RCHT Patient Access Policy – unfit for surgery.**

**RCHT Patient Access Policy**

**http://intranet.cornwall.nhs.uk/DocumentsLibrary/RoyalCornwallHospitalsTrust/Finance/FinancialAndContractManagement/PatientAccessPolicy.pdf**Pre-Operative Assessment (POA)

20.5...5. If the patient is medically unfit and a decision made not to proceed with surgery following POA, they will be removed from the waiting list.

20.5...6. The patient and their GP must be informed of this decision and the reasons. The RTT clock will be stopped. In some circumstances, the patient may be relisted when the Trust receives confirmation that the patient is fit and ready.

20.5...7. It will then be at the discretion of the clinician as to whether the patient is directly listed or asked to attend a further POA appointment.

20.5...8. Patients who are determined fit for surgery after a six-month period should be referred back to outpatient department by their GP.

20.5...9. This is to ensure their Consultant agrees to continue with the previously agreed treatment plan. A new RTT clock will start on receipt of the referral.

6.1. **Validity of Pre-assessment – top-up assessments**
For cases where the TCI date for surgery is >3 months after the pre-assessment please see guideline on page 60.

- **Telephone Assessment SOP**
  For guidelines on Telephone Assessments in Central (RCH) and SMH Pre Assessment Departments please see page 62.

- **Absence of POA clinic Anaesthetist**
  On occasion the POA anaesthetist may be absent from clinic. This may occur predictably, where Governance half day falls in the afternoon, or unpredictably due to sickness or staff shortage. Please see A PROCESS FOR COPING WITH THE IMPACT OF POA CLINIC ANAESTHETIST ABSENCE guidance on page 64.

6.2. **Provision of written information and leaflets**

- See Table 4 for the provision of written information and leaflets.

| **Information leaflet** | **Give to** | **Written by** | **Where to order / get** | **Cost** |
|---|---|---|---|---|
| You and your anaesthetic | All patients who haven't accessed online (link included in appointment letter) | Royal College of Anaesthetists | See link on shared drive under Leaflets | Free – but please print double sided to save paper |
| Following GA/Sedation | Day cases only | RCHT 036 | EROS | £7.50 per 100 |
| Getting Ready to Leave Hospital | All in patients and day cases at your discretion | RCHT 1006 | EROS | £2.56 per 100 |
| Pressure Ulcers | In patients | RCHT 153 | Vanessa Bird Publications | |
| Reducing the risk of VTE | In patients | RCHT 1277 | EROS | £6.06 per 100 |
| MRSA | If required | RCHT 044 | EROS | £11.50 per 100 |
| ESBL inc AmpC and K1 advice | If required | RCHT 1002 | Vanessa Bird Publications | |
| CPE | If required | RCHT 1469 | EROS | £4.63 per 100 |
| What to pack for hospital | If required | POA | Shared drive | free |

The Accessible Information Standard (AIS) requires health and social care staff to ask patients and their carers if they require information in another format and if so provide it that way. For example the patient may have poor sight and request large print or audio format. You can find out more about AIS here. If you need advice on producing accessible information please contact RCHT's Human Rights, Equality & Inclusion Lead.

# 7. Clinical Guidance

## 7.1. Anti-platelet agents

(Aspirin, Clopidogrel, Dipyridamole, Prasugrel, Ticlopidine and Ticagrelor). These drugs inhibit platelet function. Whilst ideally best avoided in the 7 days prior to surgery, however, usually these drugs are for a medical indication e.g. significant vascular ischaemia. The need for continuing therapy may need to be considered with their clinician or cardiologist in more complex cases. If the drug is continued this should be at a minimum dose/schedule with close attention given to any undue surgical haemorrhage. General guidance is as follows in Table 5:

**Table 5. Anti-platelet Agent & Clinical Indication**

| Antiplatelet agent & Clinical Indication | Action |
|---|---|
| Aspirin **alone**. Any indication.<br><br>75mg daily<br><br>>75mg daily | <br><br>Continue usual dose<br><br>Reduce dose to 75mg 7 days pre-op<br><br>(cases on >150mg daily should be d/w anaesthetist) |
| Clopidogrel or Dipyridamole **alone** for TIA/CVA – that occurred >9 months ago.<br><br>(If CVA/TIA <6/12 ago – d/w anaesthetist) | Stop 7 days pre-op<br><br>Bridge with Aspirin 75mg daily if tolerated<br><br>Send 'Clopidogrel bridged with Aspirin' letter to patient +GP |
| **Dual** Clopidogrel and Aspirin for Cardiovascular indication:<br><br>Higher thrombosis risk factors* present<br><br>No higher thrombosis risk factors | <br><br>Discuss with cardiologist who performed most recent procedure<br><br>Stop Clopidogrel 7 days pre-op, continue Aspirin at 75mg daily. Send 'Clopidogrel+Aspirin – Aspirin continued' letter to patient |
| Prasugrel/Ticagrelor for Cardiovascular indication | Discuss with cardiologist who performed most recent procedure. |
| Clopidogrel for vascular surgical indication | Discuss with relevant vascular surgeon |

*Higher cardiovascular thrombosis risk factors:

- < 6/52 since MI, PCI, bare metal stent placement
- < 12/12 since drug eluting stent placement
- High risk stent (Long or narrow lumen, bifurcation or ostial stenting, overlapping or multiple stents, sub-optimal stent result, low ejection fraction, renal failure, DM, high risk ACS as indication for stent, previous stent thrombosis)

## 7.2. Anti-coagulants

- **Vitamin K Antagonists (VKA)**

  E.g. Warfarin
  The thrombotic risk is dependent on the underlying indication for anticoagulation and the patient's general health. Surgery increases the risk for venous thrombosis, but not arterial thrombosis. Generally procedures require discontinuation of anticoagulants.

- **Direct Oral Anticoagulants (DOACs)** These agents are direct inhibitors of coagulation. Apixaban and Rivaroxaban inhibit activated factor X (anti-Xa), with maximum concentrations appearing 2 - 4 hours after tablet intake and *in the presence of adequate stable* renal function, mean half-lives of about 7-14 hours. Dabigatran inhibits activated factor II (anti-IIa), with the peak plasma concentration and anticoagulant effect achieved within 2-3 hours of oral administration and a mean half-life between 12-17 hours.

  Check the eGFR, if <90 use the serum creatinine level to calculate the creatinine clearance as follows (G-C Creatinine Cl):

  $$\text{Creatinine Cl} = \frac{(140-\text{age}) \times \text{weight* (Kg)}}{\text{Creatinine (micromoles/L)}} \times 1.23(\text{if male}) \text{ or } 1.04(\text{if female})$$

  A convenient calculator can be found at:
  https://www.mdcalc.com/creatinine-clearance-cockcroft-gault-equation

  NB. Entering both height and weight into this calculator removes the need for Maximal body weight tables.

- **"Bridging" anticoagulation** describes the administration of a short-acting anticoagulant, consisting of subcutaneous (SC) low-molecular-weight heparin (LMWH) or IV unfractionated heparin (UFH), over the pre and post-operative periods during interruption of VKA therapy when the international normalized ratio (INR) is below the therapeutic range. With LMWH for surgeries at high risk of haemorrhage post-operatively a preventative dose may be appropriate.

  In patients with chronic AF routine bridging is not required unless patients are at high risk for arterial embolism (CHADS VASC score >5) have a mitral mechanical heart valve, or have had embolic stroke/ systemic embolism/TIA within the previous 12 weeks.

## 7.3. CHADS VASC link

https://www.mdcalc.com/cha2ds2-vasc-score-atrial-fibrillation-stroke-risk

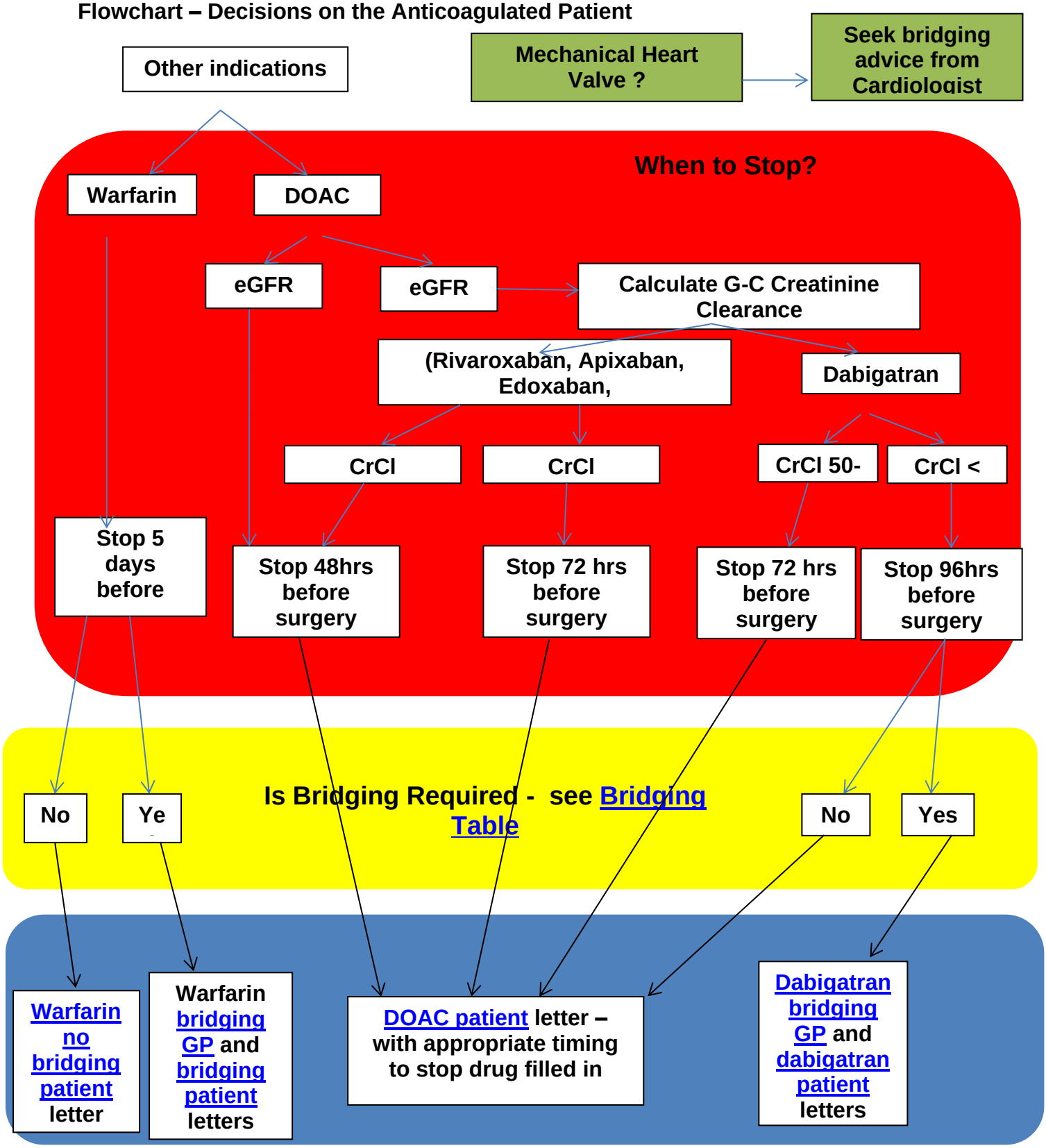
The following flow chart 'Decisions on the Anticoagulated Patient' can be used to identify:

- **When to stop the anticoagulant before surgery**
- **Whether bridging anticoagulation is required**
- **Which preformed letters to send to the patient +/-GP to communicate this action**

7.4. **High Risk Factors (venous thrombosis):**
Previous venous thrombosis whilst on therapeutic anticoagulation
Target INR >3.
Advice can be sought via; rch.tr-ThrombosisNurses@nhs.net

^Therapeutic bridging increases the risk of major bleeding. This should be considered when deciding to prescribe **bridging – see Table 6. Bridging Table below.**

**Flowchart – Decisions on the Anticoagulated Patient**




**Letters required**

## Table 6. Bridging Table

| Indication | Therapeutic LMWH bridging indicated |
|---|---|
| Acute Venous Thrombosis <3 months ago | Yes |
| Venous Thrombosis >3 months ago, continuous warfarin:<br><br>High risk factors[$] absent | No |
| Venous Thrombosis >3 months ago, continuous warfarin:<br><br>High risk factors[$] present | Yes |
| Acute Arterial Thrombosis <1 month ago | Yes |
| Arterial Thrombosis >1 month ago | No |
| Atrial fibrillation:<br><br>CHADS VASC<5 | No |
| Atrial fibrillation and:<br><br>Embolic stroke/TIA or systemic embolization in last 12 weeks | Yes |
| Atrial fibrillation:<br><br>CHADS VASC 5 or more | Yes^ |
| Mitral stenosis without previous thrombosis (TIA/CVA/systemic embolization) | No |
| Mechanical Heart Valve | Yes<br><br>Consult Patient's Cardiologist |

See: CLINICAL GUIDELINE FOR THROMBOSIS PREVENTION INVESTIGATION AND MANAGEMENT OF ANTICOAGULATION – Classification of bleeding risk associated with procedure.
http://intra.cornwall.nhs.uk/DocumentsLibrary/RoyalCornwallHospitalsTrust/Clinical/AnticoagulationAndThrombosis/ThrombosisPreventionInvestigationAndManagementOfAnticoagulati.pdf

7.5. **Therapeutic LMWH bridging**
Where indicated instruction should follow: CLINICAL GUIDELINE FOR THROMBOSIS PREVENTION INVESTIGATION AND MANAGEMENT OF ANTICOAGULATION - LMW heparin bridging anticoagulation during interruption of vitamin K antagonists

http://intra.cornwall.nhs.uk/DocumentsLibrary/RoyalCornwallHospitalsTrust/Clinical/AnticoagulationAndThrombosis/ThrombosisPreventionInvestigationAndManagementOfAnticoagulati.pdf

For Mechanical Heart Valve Bridging The POA Nurse must attempt to identify the target INR that the patient / GP uses to manage their warfarin therapy. This may be used by Anaesthetist to liaise with Cardiology to make bridgeing plan. Cardiology services continue to wish to own this element of bridgeing and approve plans.

References.

^Perioperative Bridging Anticoagulation in Patients with Atrial Fibrillation. N Engl J Med 2015; 373:823-833
http://www.nejm.org/doi/full/10.1056/NEJMoa1501035

# 8. Assessment of Cardiac Disease

**Ischaemic heart disease**
Patients with stable coronary artery disease on appropriate medication having intermediate or minor surgery have similar outcomes to the general population.

Those with unstable symptoms and/or associated heart failure are at significantly increased risk especially if major surgery is planned.
Pre-operative assessment must include key considerations when assessing patients for Ischaemic Heart Disease (IHD):

8.1. There are five important questions to answer when assessing patients for IHD. See following Table 7.

## Table 7. Assessing patients with Ischaemic Heart Disease

<table>
<tr><td>1. Is the Diagnosis of IHD likely?</td><td colspan="2">A diagnosis of IHD is more likely in patients with:</td></tr>
<tr><td></td><td colspan="2">Abnormal ECG (left ventricular hypertrophy, left bundle-branch block, ST-T abnormalities)<br>Rhythm other than sinus (e.g., atrial fibrillation)<br>Type II diabetes mellitus<br>Poorly controlled systemic hypertension<br>History of stroke<br>Smoker<br>Hypercholesterolemia<br>Renal insufficiency (serum creatinine ≥ 180µmol/l)<br>Advanced age (≥ 75 years)</td></tr>
<tr><td>2. Is the IHD stable?</td><td colspan="2">What is their functional capacity (METS)?<br><br>What is the frequency and severity of symptoms (chest pain/tightness, shortness of breath, orthopnoea?<br><br>How have these symptoms varied over the past 6-12 months, i.e. Are they stable?<br><br>Unstable patients should be discussed with the anaesthetist on duty and their cardiology team</td></tr>
<tr><td colspan="2">MARKERS OF STABLE CORONARY ARTERY DISEASE</td><td>MARKERS OF UNSTABLE CORONARY ARTERY DISEASE</td></tr>
<tr><td colspan="2">• mild stable angina pectoris (CCS class 1 or 2)<br>• previous MI by history or ECG without current symptoms<br>• six months after CABG, Percutaneous Coronary Intervention (PCI), or bare metal stent (BMS) with good symptom control</td><td>• < 6 weeks after MI, PCI, BMS, CABG<br>• < 6 months after MI, PCI, BMS, CABG<br>• if complications or current symptoms<br>• < 12 months after a drug eluting stent (DES) or > 12 months if high risk DES<br>• Unstable or severe angina (CCS class III or IV)<br>• Symptoms of decompensated heart failure (NYHA class III or IV)<br>• Clinical ischaemia and/or symptomatic arrhythmias (ventricular or supraventricular)</td></tr>
</table>

| | |
|---|---|
| **3. Are patients on correct medication?**<br><br>**Are they compliant?** | Patients with IHD should usually be on a combination of drugs for secondary prevention.<br><br>These will usually include a cholesterol lowering drug (Statin) and anti-platelet drugs (either aspirin, clopidogrel, or combined aspirin and clopidogrel).<br><br>B Blockers, ACE inhibitors, nitrates, diuretics and other antihypertensives are common place.<br><br>**Patients with suspected coronary artery disease who are not on drugs for secondary prevention (principally aspirin, statin) or are non-compliant with medication should be discussed.**<br>**See separate guidelines for management of patients on anti-27. platelet drugs.**<br><br>In general all cardiac medications should be continued up to and including the day of surgery. **If in doubt please consult the anaesthetic clinic.** |
| **4. Have all appropriate investigations been undertaken?** | Recent ECG is required in most situations – see preoperative testing guide for details.<br><br>See pre-operative testing guide for details on required blood tests.<br><br>Patients with unstable disease need discussion as previously outlined. |
| **5. Is there evidence of cardiac failure / poor exercise tolerance?** | Patients with poorly controlled or undiagnosed heart failure are at significantly increased risk. Patients with poor exercise tolerance should be considered to have heart failure until proven otherwise.<br><br>**Please discuss all of these patients with the consultant anaesthetist clinic especially if major surgery is planned.** |

# 9. Timing of surgery after cardiac event/intervention

9.1. **After PCI**
AHA/ACC guidelines suggest the following delays for elective non cardiac surgery in patients who have undergone specific coronary vascular interventions:

| | |
|---|---|
| Balloon angioplasty alone | 14 days |
| Bare metal stenting | 30 days |
| Drug-eluting stent | 365 days |
| Drug-eluting stenting (where surgery is more urgent) | 180 days |

9.2. **After MI** Rates of postoperative MI following non-cardiac surgery within so many days of a previous MI:

| Days after MI | Postoperative MI rate |
|---|---|
| 0-30 | 14% |
| 31-60 | 11% |
| 61-90 | 10% |
| 91-180 | 9.9% |

Livhits, M. Anaesthesiology 2011. 253; p 857-64

**Also note:**
MI within previous 6 months is an independent risk factor for post-operative CVA.
MI within previous 6 months increases post-operative death rate x8.

| |
|---|
| The risks of post-operative events after a preceding MI are also linked to other vascular risk factors that the patient may have, e.g. older age, frailty, low physical activity, DM, smoking, HTN, etc. |

9.3. **Estimating cardiac risk**
Overall incidence of post-operative death/MACE/CVA is around 3%.

- The severity of surgery alone will influence this; major 5%, intermediate 1-5% and minor<1%.

9.4. **Lee's Revised Cardiac Risk Index**

Devised and validated over 17 years ago – there is evidence that some risk factors are perhaps less important in modern practice.
https://www.mdcalc.com/revised-cardiac-risk-index-pre-operative-risk

| |
|---|
| History of IHD |
| History of CVD |
| History of CCF |
| High Risk Surgery (intraperitoneal/suprainguinal vascular) |
| Pre-operative insulin treatment |
| Creatinine >176mcg/L |

| Score and % risk of MACE |
|---|
| 0 = 0.4% |
| 1 = 1% |
| 2 = 2.4% |
| 3 or more 5.4% |

## 9.5. GRADING OF ANGINA PECTORIS BY THE CANADIAN CARDIOVASCULAR SOCIETY CLASSIFICATION SYSTEM

**Class I**

Ordinary physical activity does not cause angina, such as walking, climbing stairs. Angina (occurs) with strenuous, rapid or prolonged exertion at work or recreation.

**Class II**

Slight limitation of ordinary activity. Angina occurs on walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals, or in cold, or in wind, or under emotional stress, or:

- only during the few hours after awakening. Angina occurs on walking more than 2 blocks on the level and climbing more than one
- flight of ordinary stairs at a normal pace and in normal condition.

**Class III**

Marked limitations of ordinary physical activity. Angina occurs on walking one to two blocks on the level and climbing one flight of stairs in normal conditions and at a normal pace.

**Class IV**

Inability to carry on any physical activity without discomfort—anginal symptoms may be present at rest.

## 9.6. NEW YORK HEART ASSOCIATION (NYHA) CLASSIFICATION OF HEART FAILURE

**Class I**

**Cardiac disease but without resulting limitation of physical activity** Ordinary physical activity does not cause undue fatigue, palpitation, dyspnoea or anginal pain.

**Class II**

**Cardiac disease resulting in slight limitation of physical activity** Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnoea or anginal pain.

**Class III**

**Cardiac disease resulting in marked limitation of physical activity** Comfortable at rest. Less than ordinary physical activity results in fatigue, palpitation, dyspnoea or anginal pain.

**Class IV**

**Cardiac disease resulting in inability to carry on any physical activity without discomfort** Symptoms of cardiac insufficiency or of anginal syndrome may be present even at rest. If any physical activity is undertaken discomfort is increased.

# 10. Cardiac Implantable Electronic Devices (CIEDs)

**PRE OP**

10.1. **Implantable loop recorders (ILRs) and insertable cardiac monitors (ICMs)** are used for monitoring cardiac arrhythmias. There is no additional risk to the patient during surgery. **Contact the cardiac physiologists to obtain an up-to-date report from the device**.

10.2. **Pacemakers (PPM)**

Look-up device check records on Maxims or paper notes. **Contact Cardiac Physiologists if:**

- the re-check frequency is less than 6 months, or
- previous problems were noted on the last check, or
- the record is not available, or
- next check is overdue.

Otherwise pre-operative checks are *not required*.

10.3. **Implantable Cardiac Defibillators (ICDs) and ICDs for treatment of heart failure using ventricular resynchronisation (CRT-P and CRT-D respectively)**

Look-up device check records on Maxims or paper notes. **Contact Cardiac technicians if:**

- the re-check frequency is less than 6 months, or
- previous problems were noted on the last check, or
- the record is not available, or
- next check is overdue.

Otherwise pre-operative checks are not required.

| | **Pacemaker** | **ICD** |
|---|---|---|
| Surgery site: lower abdomen, lower limbs or upper arms distal to the elbow | Monitor during surgery to ensure no inhibition of pacemaker. No reprogramming of the device likely to be required. No post op device checks required unless programming has been altered or an adverse event has occurred | Deactivation of ICD during surgery and reactivation post operatively |
| If surgery in head, neck, upper abdomen or upper limb proximal to the elbow | Monitor to ensure no inhibition of pacemaker. Consider pacemaker | Deactivation of ICD during surgery and reactivation post operatively |

| | | |
|---|---|---|
| | reprogramming only if pacing dependant and prolonged diathermy close to device. No post op device checks required unless programming has been altered or an adverse event has occurred | |

British heart rhythm society guidelines for the management of patients with cardiac implantable electronic devices (CIEDs) around the time of surgery (2019).

10.4. **A request for device deactivation before surgery and reactivation after surgery will need to be made for the day of surgery. This should be done using the request form on Maxims for cardiac devices**.

NB. Endoscopy or dental procedures – deactivation is only required if argon beam or prolonged diathermy is anticipated; clarify with the surgeon.
Occasionally minor peripheral procedures do not require deactivation. Clarify with Cardiac Technicians.

10.5. **POST OP – for all devices:**

No post op device checks required unless programming has been altered or an adverse event has occurred.
NB. Patients with PPM who have undergone lithotripsy or ECT should have the device interrogated within 1 month of the procedure.

10.6. **Site Suitability**

The presence of ILR, ICM or PPM is not a contraindication to surgery at peripheral sites.
NOTE:
Pacemaker dependant (no underlying rhythm – see most recent device check report) *are not* suitable for peripheral sites.

**ICDs – RCH only**.

**Cardiac Physiologist**
Available 0900-1700 Monday to Friday.
Ext 2432.
Royal Cornwall Hospital – Treliske only

**Reference:**
British heart rhythm society guidelines for the management of patients with cardiac implantable electronic devices (CIEDs) around the time of surgery (2019).

https://bhrs.com/wp-content/uploads/2019/05/Revised-guideline-CIED-and-surgery-Feb-19.pdf

# 11. Consultant Anaesthetist Review

***Anaesthetist F2F assessment -*** following should be considered for this

- Age and operation
- Bowel resections > 75yrs or any age with multiple co-morbidities
- Major gynae oncology >75yrs or any age with multiple co-morbidities
- AAA and major lower limb reconstructions
- Hip Revision >80yrs or any age with functional impairment
- Major joint >85yrs or any age with functional impairment

- SORT score >5% (30 day post-operative mortality risk *estimate*/category http://www.sortsurgery.com/index.php)
- SORT score 3-5% anaesthetist notes review minimum
- Other cases with major/complex comorbidities and or high risk/major surgery.
- Major surgical cases with high frailty score and or new/accelerated cognitive decline.
- All patients requested by surgeon on AWL for ITU bed. Anaesthetist may re-outcome to HDU or EPOC bed. Surgeon must be informed by letter.

## 11.1. Notes review - *following should be considered for at least this*

- **History of anaesthetic difficulties/complications**

  E.g. Difficult intubation/anticipated difficult intubation, family/personal history of malignant hyperthermia, atypical cholinesterase (scoline apnoea), porphyria, previous awareness, history of anaphylaxis. Unplanned admission to ICU after previous surgery.

**Cardiovascular disease**

**Unstable heart disease – new/more frequent/more severe angina, shortness of breath on exertion, palpitations, syncope.**

- Heart Failure - Moderate/severe (Ejection fraction less than 50%)
- Significant IHD; e.g. Unstable angina, multiple MIs or coronary procedures
- Recent coronary stenting; <12 months after drug eluting and <6/52 after bare metal stents or angioplasty.
- Significant heart valve disease; especially aortic or mitral stenosis, mechanical prosthetic valves, functional limitation

- Heart murmur – new or unevaluated heart murmur
- Arrythmias – new arrhythmia, poorly controlled rate (<50 or >100), syncope, complete heart block, Mobitz type 2 heart block, Trifascicular block
- Hypertension - see guideline Section 18 on page 40.
- Pulmonary hypertension from any cause
- Implantable cardiac defibrillators

## Respiratory Disease

**Incapacitating or severely limiting respiratory disease**
**Unstable respiratory symptoms – new/worsening cough, shortness of breath, wheeze**

- OSA – see Section 20 guideline on page 45
- Home oxygen
- Pulmonary hypertension

## Cerebrovascular and neurological disease

- Stroke < 9 months ago. TIA < 3 months ago
- Epilepsy – unstable or severe
- Myaesthenia gravis
- Muscular dystrophies
- Spinal cord disorders and known autonomic hyper-reflexia

## Diabetes and Endocrine

- Diabetes – poorly controlled DM (HbA1c > 69, frequent hypo's), end organ damage (nephropathy, retinopathy, IHD, severe ulcers, neuropathy)
- Thyroid disease – abnormal thyroid function results (as per blood results interpretation guideline), new or poorly controlled symptoms.
- Other major endocrine disorders, e.g. Adrenal disease
- Patients taking high doses of steroids.

## Renal

- Any patient with end stage renal failure
- All patients with new or accelerated deterioration (25% or more or 15ml/min/1.73m2).

- Patients scheduled for major surgery with low serum albumin/proteinuria or CKD III or worse.

**Haematology disease**

- Anaemia – see Section 17 on Pre-operative Haemoglobin Optimisation on page 38
- Haemoglobinopathy
- Suspected or known bleeding disorder
- Jehovah's witness and planned major surgery

**Rheumatological disease**

- Severe rheumatoid arthritis
- Any condition limiting neck/jaw movement
- Patients on disease modifying drugs that may require additional perioperative advise from specialists

**Functional Limitation**

- Patients with significant limitation of physical activity or those who are mostly sedentary and scheduled for major surgery.
- **Cognitive impairment** (see Section 15 on page 34) and
- **Frailty** (see Section 16 on page 35)

**Patients scheduled for MAJOR surgery who have:**

- Moderate to severely frailty (frailty score >5)
- Cognitive impairment (patients scoring <3 on Mini-Cog), with a clinical history of decline

**Obesity**

- Metabolic syndrome (obesity, hypertension, DM, dyslipidaemia)
- Known or suspected OSA – see OSA guideline on page 45
- Severe functional limitation/mostly sedentary

### 11.2. Abnormalities on routine investigations

- Blood results interpretation guidelines and guidelines for blood conservation referral.

- Minor abnormalities on ECGs in patients under 60 without risk factors for cardiac disease, have good exercise capacity and no symptoms are unlikely to prompt outcome changing actions.

### 11.3. Uncertainty on site suitability – WCH and SMH

There are cases clearly suitable for a peripheral site and those who are clearly unsuitable. There are a significant group in between, where the decision is more difficult to make. It is important that we make the best use of these sites, so that the maximum number of patients can receive their surgery in a timely fashion. Where there is uncertainty place the notes for anaesthetist review.

- **Nursing requests for notes review must give specific instructions on which aspects of the nursing assessment they wish the anaesthetist to consider. They should expect only these points to be considered by the anaesthetist. Multiple issues should be clarified by using separate bullet points.**
- **Any investigation results for attention or previous specific documentation should be bookmarked wherever possible.**
- **The reviewing anaesthetist must document their findings/advice clearly in the notes with indication of date and clarification of their name. Addressing bullet pointed issues with bullet pointed responses aids clarity.**
- **Any requests for further investigations must clearly detail indication and if possible, advice on how results may influence further management.**
- **Electronic letters should be formed for all referrals to primary care/other specialists or if significant delays are likely – see 'clarifying communication'**
- **There are separate Trust Guidelines for Fitness for Surgery at SMH (Standard and Enhanced Higher Level Care) and for Fitness for Surgery at WCH. These are deliberately separate documents, as the context and pace of change is more dynamic in these Remote Site Locations.**

## 12. Cerebrovascular Disease

Brain infarct from haemorrhage or ischemia within 30 days of surgery is a perioperative stroke. It is not common, incidence is 1/1000 (but more common in vascular surgery; e.g. 6/1000 in major infra-diaphragmatic vascular surgery).

It's occurrence increases length of stay, mortality, risk of post-operative MACE (major adverse cardiac event) and very often diminishes post-operative quality of life.

| **Principle risk factors** |
|---|
| Advanced age |
| Previous CVA/TIA |
| Renal Failure |

| **Additional Risk Factors** | |
|---|---|
| Atrial fibrillation | Diabetes |
| Hypertension | Ischaemic heart disease |
| COPD | Smoking |
| Valvular heart disease. | |

## 12.1. Anti-platelets

Most patients with previous CVA/TIA will be taking secondary prevention anti-platelet drugs. If such medications are stopped in a non-operative setting, these patients suffer an increased incidence of stroke within the next 2 months. Stroke severity and mortality is also greater in those who discontinue medication. There are conflicting data on whether anti-platelets continued at the time of surgery have a beneficial effect on stroke rates that outweighs any increased risk of bleeding.

- **Generally Aspirin 75mg daily should be continued at time of surgery.** See: Anti-platelets for further details on management of anti-platelets.

## 12.2. Beta Blockers

**Routinely administered beta blockers should be continued throughout the perioperative period**. There is some evidence that Metoprolol increases the risks of perioperative stroke, even in routine administration. This may need to be considered in patients who also have high risk factors for perioperative stroke; discussion with a stroke specialist may be required.

## 12.3. Statins

**Routinely administered statins should be continued in the perioperative period.**

## 12.4. Timing of surgery after stroke

**Patients who have suffered a stroke have impaired cerebral auto- and chemo-regulation for months afterwards.**

- Patients who have recently had an acute stroke should have had investigations (e.g. Carotid artery/heart imaging) to help identify potential causes.

- As always a risk benefit decision is required to decide on when to operate after previous stroke; the urgency of the surgery and patient risk factors should be considered.

- The following table (see Table 8) is taken from a Danish observational study published in 2014. It gives risks of 30d-post-operative MACE and death for those undergoing surgery at different time intervals after a stroke, compared to those who have not had a stroke.


From: **Time Elapsed After Ischemic Stroke and Risk of Adverse Cardiovascular Events and Mortality Following Elective Noncardiac Surgery**

JAMA. 2014;312(3):269-277. doi:10.1001/jama.2014.8165

Table 2. Unadjusted Outcomes in Patients With and Without Stroke

| Outcomes | Stroke <3 mo Prior (n=862) | Stroke 3 to <6 mo Prior (n=469) | Stroke 6 to <12 mo Prior (n=898) | Stroke ≥12 mo Prior (n=4908) | All Strokes (n=7137) | No Prior Stroke (n=474 046) |
|---|---|---|---|---|---|---|
| Crude events, No. (%) | | | | | | |
| 30-d MACE | 153 (17.7) | 34 (7.2) | 37 (4.1) | 165 (3.4) | 389 (5.5) | 1923 (0.4) |
| Acute myocardial infarction | 7 (0.8) | 5 (1.1) | 2 (0.2) | 20 (0.4) | 34 (0.5) | 449 (0.1) |
| Ischemic stroke | 103 (11.9) | 21 (4.5) | 16 (1.8) | 70 (1.4) | 210 (2.9) | 368 (0.1) |
| Cardiovascular death | 43 (5.0) | 8 (1.7) | 19 (2.1) | 75 (1.5) | 145 (2.0) | 1106 (0.2) |
| 30-d all-cause mortality | 66 (7.7) | 21 (4.5) | 29 (3.2) | 138 (2.8) | 254 (3.6) | 2914 (0.6) |
| Incidence rate per 1000 patients (95% CI) | | | | | | |
| 30-d MACE | 177.5 (149.4-205.6) | 72.5 (48.1-96.9) | 41.2 (27.9-54.5) | 33.6 (28.5-38.7) | 54.4 (49.1-59.9) | 4.1 (3.9-4.2) |
| Acute myocardial infarction | 8.1 (2.1-14.1) | 10.7 (1.3-20.0) | 2.2 (0.0-5.3) | 4.1 (2.3-5.9) | 4.8 (3.2-6.4) | 0.9 (0.9-1.0) |
| Ischemic stroke | 119.5 (96.4-142.6) | 44.8 (25.6-63.9) | 17.8 (9.1-26.5) | 14.3 (10.9-17.6) | 29.4 (25.4-33.4) | 0.8 (0.7-0.9) |
| Cardiovascular death | 49.9 (35.0-64.8) | 17.1 (5.2-28.9) | 21.2 (11.6-30.7) | 15.3 (11.8-18.7) | 20.3 (17.0-23.6) | 2.3 (2.2-2.5) |
| 30-d all-cause mortality | 76.6 (58.1-95.0) | 44.8 (25.6-63.9) | 32.3 (20.5-44.0) | 28.1 (23.4-32.8) | 35.6 (31.2-40.0) | 6.1 (5.9-6.4) |
| Unadjusted odds ratio (95% CI) | | | | | | |
| 30-d MACE | 53.0 (44.3-63.5) | 19.2 (13.5-27.3) | 10.6 (7.6-14.7) | 8.5 (7.3-10.0) | 14.2 (12.7-15.8) | 1 [Reference] |
| Acute myocardial infarction | 8.3 (4.1-18.3) | 11.4 (4.7-27.6) | 2.4 (0.6-9.5) | 4.3 (2.8-6.8) | 5.0 (3.6-7.2) | 1 [Reference] |
| Ischemic stroke | 174 7 (138.8-219.8) | 60.3 (38.5-94.6) | 23.4 (14.1-38.7) | 18.6 (14.4-24.1) | 39.0 (32.9-46.3) | 1 [Reference] |
| Cardiovascular death | 22.5 (16.4-30.7) | 7.4 (3.7-15.0) | 9.2 (5.8-14.6) | 6.6 (5.2-8.4) | 8.9 (7.4-10.6) | 1 [Reference] |
| 30-d all-cause mortality | 13.4 (10.4-17.3) | 7.6 (4.9-11.8) | 5.4 (3.7-7.8) | 4.7 (3.9-5.6) | 6.0 (5.2-6.8) | 1 [Reference] |

Abbreviation: MACE, major adverse cardiovascular events (ischemic stroke, acute myocardial infarction, or cardiovascular death).



**Generally, purely elective surgery should be postponed for 6-9 months after an acute stroke.**

## References

Perioperative Stroke; a question of timing. BJA. 2015 p1-3.

Perioperative Care of Patients at High Risk for Stroke during or after Non-Cardiac, Non-Neurologic Surgery: Consensus Statement from the Society for Neuroscience in Anaesthesiology and Critical Care. J Neurosurgical Anaesthesiology 2014.

Time elapsed after ischaemic stroke and risk of adverse cardiovascular events and mortality following elective non-cardiac surgery. JAMA 2014 p. 269-77 https://jamanetwork.com/journals/jama/fullarticle/1887763

# 13. Diabetes Mellitus

The following guideline is for the management of adult patients with Diabetes Mellitus during surgery / elective procedures but is also relevant to emergency care.

**During surgery** / fasting diabetes is managed by the anaesthetist.

- Patients with Diabetes should ideally be placed as first on the morning list to reduce the fasting period prior to surgery.

**Pre – Operatively**

- Where possible, blood glucose levels should be optimally controlled in the pre-operative period. This may necessitate admission to hospital prior to surgery
- **Check U&E's, venous blood glucose and HbA1C prior to surgery**
- The recommended general targets for surgery are –
- Fasting glucose of 6 – 10 mmol/L HbA1C < 69 mmol/mol (8.5%)
- If HbA1C > 69 mmol/mol (8.5%) refer to GP for diabetes review
- If HbA1C HbA1C > 86 mmol/mol (10%) and Type 1 Diabetes refer to locality DSN
- Where it is considered by consultant anaesthetist that the complexity of diabetic management (irrespective of HBA1C) and necessary modification of diabetic medications is such that primary care would not provide a sufficiently expeditious optimisation, then referral may be made by Maxims Add To Waiting List to Diabetic Outpatient Clinic. 2021 Audit of Diabetic Surgical Pathway Clock Pauses identifies that this is no more than one referral per week from POA.

**On Admission**
Ensure that hypo / hyper treatment is routinely prescribed on admission but not for discharge prescription.

## 13.1. Specific Guidance for Bariatric Surgery

- For patients undergoing Bariatric surgery refer to the Bariatric guidelines and the Bariatric Specialist Nurse
- For Patients undergoing Enhanced Recovery receiving Preoperative Nutritional Supplements, omit the pre-operative high carbohydrate drink in people with insulin treated diabetes if a sliding scale insulin infusion is not required.

### 13.1.1. Specific Guidance for Colorectal Surgery

For patients undergoing surgery / elective procedures requiring bowel preparation please refer to:

## Clinical Guidelines for the Care of Adults with Diabetes who Require Bowel Preparation

13.2. **The Diabetes Medication Plan should be used to provide clear, written instructions to patients on perioperative management of DM medications**

- Please refer to the relevant section of the guideline for the patient's current diabetes treatment.
- If the patient is receiving multiple treatments i.e. insulin and OHA's etc. guidance for each therapy needs to be followed.

**For additional advice please refer to the:**

**Diabetes In-Patient Specialist Nurse Team via Maxims or bleep 2205**

**Or**

**The Endocrine Team via Maxims or the consultant of the week via switchboard**

13.3. The following guidelines are for the management of Adults with Diabetes Mellitus whose diabetes is managed with:

- **A Diet alone**
- **B Oral Hypoglycaemics (see Table 9)**
- **C Insulins (see Table 10)**
- **D GLP Analogue**

### *A. Patients managed by diet alone*

**Pre Op General Advice**
If possible arrange for an AM Operation list

**Admission Advice**

1. Pre op fasting as per anaesthetist advice.

2. Monitor blood glucose at least 1 hourly pre op from 6 am, 1 hourly during surgery and recovery. (See Clinical guideline for use of Nova Stat Strip blood glucose meter))

3. If blood glucose is <4 mmol/l see guidelines for the management of hypoglycaemia and inform surgical / anaesthetic team

4. If the blood glucose is > 12 mmol/L on 2 separate occasions seek advice from the diabetes team to consider the need for intravenous insulin and fluids and inform surgical / anaesthetic team

5. Recommence diet and fluids post operatively as soon as condition allows

### *B. Patients managed with oral hypoglycaemics*

**Pre – Operative General Advice**
If possible arrange for an AM Operation list

Metformin

If contrast medium is to be used and eGFR < 60 ml/min metformin should be omitted on the day of the procedure and for the following 48 hours

If eGFR < 30 ml/min stop metformin and review

**Admission Advice**

- If glucose control is suboptimal i.e. < 4 mmol/L or > 12 mmol/L (on 2 separate occasions) gain review of medication and consider referral to the diabetes specialist nurse
- If required Pre op fasting as per anaesthetist advice.
- Monitor blood glucose at least 1 hourly pre op from 6 am, during surgery and recovery (See Clinical guideline for use of Nova Stat Strip blood glucose meter)
- If blood glucose is < 4 mmol/l see guidelines for the management of hypoglycaemia and inform surgical / anaesthetic team
- If the blood glucose is > 12 mmol/l on 2 separate occasions inform surgical / anaesthetic team and consider the need for intravenous insulin and fluids
- Recommence diet and fluids as soon as condition allows

**Table.9. Oral hypoglycaemics**

| **Tablet** | **Day Prior to Admission** | **Day of Surgery** | | |
|---|---|---|---|---|
| | | **a.m. surgery** | **p.m. surgery** | **If using sliding scale inulin infusion** |
| **Acarbose** | Take as normal | Omit morning dose if nil by mouth | Give morning dose if eating | - Stop once infusion commenced<br>- Restart once eating and drinking normally |
| **Meglitinide** *(repaglinide or natedlinide)* | Take as normal | Omit morning dose if nil by mouth | Give morning dose if eating | - Stop once infusion commenced<br>- Restart once eating and drinking normally |
| **Metformin** (see above) | Take as normal | If taken once or twice a day<br>- take as normal<br>If taken three times a day:<br>- omit lunchtime dose | If taken once or twice a day<br>- take as normal<br>If taken three times a day:<br>- omit lunchtime dose | - Stop once infusion commenced<br>- Restart once eating and drinking normally |

| | | | | |
|---|---|---|---|---|
| **Sulphonylurea's**<br>Glibenclamide,<br>Gliclazide<br>Glimepiride<br>Glipizide<br>Tolbutamide | Take as normal | If taken once daily am:<br>- omit the dose<br>If taken twice daily:<br>- omit the morning dose | If taken once daily am:<br>- omit the dose<br>If taken twice daily:<br>omit both doses | - Stop once infusion commenced<br>- Restart once eating and drinking normally |
| **Pioglitazone** | Take as normal | Take as normal | Take as normal | - Stop once infusion commenced<br>- Restart once eating and drinking normally |
| **DPP IV Inhibitor**<br>Alogliptin<br>Linagliptin<br>Saxagliptin<br>Sitagliptin<br>Vildagliptin | Take as normal | Take as normal | Take as normal | - Stop once infusion commenced<br>- Restart once eating and drinking normally |
| **SGLT-2 inhibitors**<br>Canagliflozin<br>Dapagliflozin<br>Empagliflozin | Take as normal | Omit on the day or surgery | Omit on the day of surgery | Omit on the day of surgery |

### *C. Patients managed with insulin*

**Pre – Operative General Advice**
If possible arrange for an AM Operation list

**Admission Advice**

- If glucose control is suboptimal i.e. < 4 mmol/L or > 12 mmol/L (on 2 separate occasions) gain review of insulin and consider referral to the diabetes specialist nurse
- If required Pre op fasting as per anaesthetist advice.
- Monitor blood glucose at least 1 hourly pre op from 6 am, during surgery and recovery (See Clinical guideline for use of Nova Stat Strip blood glucose meter)
- If blood glucose is < 4 mmol/l see guidelines for the management of hypoglycaemia and inform surgical / anaesthetic team
- If the blood glucose is > 12 mmol/l on 2 separate occasions inform surgical / anaesthetic team and consider the need for intravenous insulin and fluids
- Recommence diet and fluids as soon as condition allows

**Advice**
**If possible arrange for an AM operation list**

**Table 10. Insulins**

| Insulin | Day Prior to Admission | Day of Surgery | | |
|---|---|---|---|---|
| | | **a.m. surgery** | **p.m. surgery** | **If using sliding scale inulin infusion** |
| **Once daily evening dose** | Reduce dose by 20% | Check blood glucose on admission | Check blood glucose on admission | Continue at 80% of usual dose |
| **Once daily Morning dose** | Reduce dose by 20% | Reduce dose by 20% | Reduce dose by 20% | Continue at 80% of usual dose |
| **Twice Daily Insulin** | Take Normal Dose | - ½ the morning dose<br><br>- Usual evening dose | - ½ the morning dose<br><br>- Usual evening dose | - Stop once infusion commenced until eating and drinking normally<br>- Restart at a meal time once eating and drinking normally (see IV sliding scale chart for advice) |
| **Three times daily mixed insulin** | Take Normal dose | - ½ the morning dose<br><br>- omit the lunchtime dose | - take the usual morning dose<br><br>- omit the lunchtime dose | - Stop once infusion commenced until eating and drinking normally<br>- Restart at a meal time once eating and drinking normally (see IV sliding scale chart for advice) |
| **Basal Bolus Insulin** (e.g. 3 x rapid acting meal time insulin and background insulin) | Take Normal dose | - - background insulin if taken am reduce dose by 20% If taken pm usual dose - Omit the morning and lunchtime rapid acting insulin | - background insulin unchanged - am rapid insulin take the usual dose - lunchtime rapid acting insulin omit | - - background insulin Continue at 80% of usual dose - omit all rapid acting insulin doses once sliding scale commenced - Restart rapid acting insulin at a meal time once eating and drinking normally (see IV sliding scale chart for advice) |
| **Insulin Pump (Refer to DSN)** | Normal doses | Normal Doses unless IV insulin | Normal doses unless IV insulin | Restart once eating and drinking normally 30 mins after first meal time bolus |

### *D. Patients managed with GLP Analogue Injections*

**Pre – Operative General Advice**

If possible arrange for an AM Operation list

**Admission Advice**

- If glucose control is suboptimal i.e. < 4 mmol/L or > 12 mmol/L (on 2 separate occasions) gain review of insulin and consider referral to the diabetes specialist nurse
- If required Pre op fasting as per anaesthetist advice.
- Monitor blood glucose at least 1 hourly pre op from 6 am, during surgery and recovery (See Clinical guideline for use of Nova Stat Strip blood glucose meter)
- If blood glucose is < 4 mmol/l see guidelines for the management of hypoglycaemia and inform surgical / anaesthetic team
- If the blood glucose is > 12 mmol/l on 2 separate occasions inform surgical / anaesthetic team and consider the need for intravenous insulin and fluids
- Recommence diet and fluids as soon as condition allows

Examples: Exenatide, Liraglutide, Lixisenatide

| **Frequency** | **Day Prior to Admission** | **Day of Surgery** | | |
|---|---|---|---|---|
| | | **a.m. surgery** | **p.m. surgery** | **If using sliding scale inulin infusion** |
| **GLP analogue once daily or twice daily** | Take as normal | - If having bowel surgery omit<br><br>- If not having bowel surgery take as normal | - If having bowel surgery omit<br><br>- If not having bowel surgery take as normal | - If having bowel surgery omit<br><br>- If not having bowel surgery take as normal<br><br>- restart once eating and drinking |
| **GLP -1 once weekly** | Take as normal | - If having bowel surgery omit<br><br>- If not having bowel surgery take as normal | - If not having bowel surgery take as normal<br><br>- If having bowel surgery omit | - If having bowel surgery omit<br><br>- If not having bowel surgery take as normal<br><br>- restart once eating and drinking |

Full RCHT guideline:

http://doclibrary-rcht-intranet.cornwall.nhs.uk/DocumentsLibrary/RoyalCornwallHospitalsTrust/Clinical/EndocrineAndDiabetes/ManagementOfAdultPatientsWithDiabetesMellitusDuringSurgeryOrElectiveProceduresClinicalGuideline.pdf

# 14. Echocardiography

Resting echocardiography is a non-invasive test that can assess heart valve anatomy/function, ventricular function and regional wall motion abnormalities. It can also be helpful in evaluating pulmonary hypertension.

An ejection fraction <50% is diagnostic of heart failure; a major risk factor for adverse outcome.
A significant proportion of heart failure patients have normal systolic LV function but abnormal diastolic function. Diastolic dysfunction defined by an E/e'>15 predicts a higher risk of major adverse cardiac events after surgery.

Aortic stenosis; AVA>0.8 and mean gradient <45-50mmHg, preserved LVF and no symptoms are not high risk.

It is important to note that a resting echocardiogram only assesses the heart at rest and not under stress. Resting echocardiogram findings may not always correlate well with functional capacity or predict outcome.

Consideration should always be given to the benefits of the test (how it may alter management/inform risk) vs. the risk that could be caused by the delay in obtaining it.

NB. A normal echocardiogram in a breathless patient does not exclude potentially important respiratory causes of dyspnoea.

## 14.1. Indications for pre-operative echocardiogram

- **Suspected valvular pathology**
  - Presence of a new murmur ***and*** cardiac symptoms (breathlessness, poor functional capacity, pre-syncope, syncope, chest pain) ***and/or*** abnormal ECG (esp. LVH, ST changes, LBBB).
  - Known mitral stenosis, aortic stenosis or cardiomyopathy who have not been evaluated in the last 1-2 years *or* who have developed new/worsening symptoms.

## 14.2. Evaluation of heart failure

Worsening breathlessness/functional capacity in a patient with known or suspected* heart failure.

*NICE guidelines suggest first measuring BNP if a new diagnosis of heart failure is suspected.

## 14.3. Evaluation of pulmonary hypertension

Known or suspected pulmonary hypertension or severe thromboembolic disease.

The following do not routinely require pre-operative echocardiography:

- Ischaemic heart disease

- Congenital disease or previous cardiac surgery – review of cardiology notes and/or discussion with cardiology team may be more useful.

- History of murmur in childhood/pregnancy in a patient with no other cardiac history or symptoms, who has not required on-going cardiology review.

- Bundle branch block - without angina, shortness of breath/poor functional capacity.

### 14.4. Process

**Echocardiograms can be requested via the POA echocardiogram clinic (through the POA booker) or though the cardiology department using the Maxims (internal referral/add to WL) request form.**

**The request must detail indications for the test and what specifically you want to know from the test. If the POA nurse is being asked to place the request, these details must be recorded clearly in the POA notes.**

**All POA echocardiogram requests that are placed on Maxims should be placed under requesting HCP 'Dr Pre Assessment' and the results should be fed back to the appropriate POA clinic.**

**References:**

Bundle Branch Block as a risk factor in non-cardiac surgery. Dormann T et Al. Arch Intern Med 2000 160(8) 1149-1152.

www.nice.org.uk/guidance/full-guidance-pdf-87258149468

2014 ESC/ESA Guidelines on non-cardiac surgery: cardiovascular assessment and management. European Heart Journal 2014 35 2383-2431

Presence of preoperative diastolic dysfunction predicts postoperative pulmonary oedema and cardiovascular complications in patients undergoing non-cardiac surgery. Cho D-H Echocardiography 2014 31 42-49.

Guidelines for the per-operative use of echocardiography 2017. Pre-operative association.

## 15. Elderly patients Cognitive Impairment

Pre-existing cognitive impairment or dementia are the strongest predictors of post-operative delirium. Post-operative delirium is associated with worse post-surgical outcomes; increased length of stay, increased mortality and reduced post-operative functional status.

The risks of a patient not returning to their own home/becoming more dependent after surgery can be significantly increased. NB. This may be of far greater concern to many patients than the development of transient cardiovascular complications after surgery.

**Patients >80yrs scheduled for intermediate/major surgery should be screened for cognitive impairment.** This should be done early in their assessment; evidence of impairment raises further concern about the subsequent history and medications compliance. **The Mini Cog tool (see below) should be used.** Further history should always be sought from family or carers to ascertain evolution of cognitive impairment or functional decline.

## COGNITIVE ASSESSMENT: MINI-COG

### Mini-Cog: 3 Item Recall and Clock Draw[19]

1. GET THE PATIENT'S ATTENTION, THEN SAY:

"*I am going to say three words that I want you to remember now and later. The words are* **Banana** **Sunrise** **Chair**

*Please say them for me now.*"

Give the patient 3 tries to repeat the words. If unable after 3 tries, go to next item.

2. SAY ALL THE FOLLOWING PHRASES IN THE ORDER INDICATED:

"*Please draw a clock in the space below. Start by drawing a large circle. Put all the numbers in the circle and set the hands to show 11:10 (10 past 11).*"

If subject has not finished clock drawing in 3 minutes, discontinue and ask for recall items.

3. SAY: "*What were the three words I asked you to remember?*"

### Interpretation of the Mini-Cog

SCORING:

| | |
|---|---|
| 3 item recall (0-3 points): | 1 point for each correct word |
| Clock draw (0 or 2 points): | 0 points for abnormal clock<br>2 points for normal clock |

A NORMAL CLOCK HAS ALL OF THE FOLLOWING ELEMENTS:

All numbers 1–12, each only once, are present in the correct order and direction (clockwise) inside the circle.

Two hands are present, one pointing to 11 and one pointing to 2.

ANY CLOCK MISSING ANY OF THESE ELEMENTS IS SCORED ABNORMAL. REFUSAL TO DRAW A CLOCK IS SCORED ABNORMAL.

**Total Score of 0, 1, or 2 suggests possible impairment.**

**Total Score of 3, 4, or 5 suggests no impairment.**

If the patient has evidence of cognitive impairment on the Mini-Cog, consider a referral to a primary care physician, geriatrician, or mental health specialist.[20,21]

Patients scoring <3, with a clinical history of decline who are scheduled for major surgery should be reviewed (at least notes) by the consultant anaesthetist. Consideration should be given to postponing non-urgent surgery and referring the patient for further assessment via the GP. Consultant F2F appointment may be required for a full risk discussion with some patients.

Decision making capacity should also be assessed in the elderly. This is particularly important if deficits have been elicited on cognitive testing.

**References:**

NSQIP Optimal pre-operative assessment of the geriatric surgical patient. https://www.facs.org/~/media/files/quality%20programs/nsqip/acsnsqipagsgeriatric2012guidelines.ashx

Preoperative Assessment in Older Adults: A Comprehensive Approach. American Academy of Family Physicians 2018

https://www.aafp.org/afp/2018/0815/afp20180815p214.pdf

## 16. Frailty

Defined as decreased physiological reserve, based on a composite of physiological and functional characteristics. Frailty is an independent predictor of adverse health outcomes. The prevalence in the surgical population is 25-50%. Fifty percent of patients over 80 will be frail.

- After surgery, it is associated with increased rates of complications, increased hospital length of stay, increased mortality and increased rates of institutionalisation.

Some studies have shown odds ratios for post-operative institutionalisation of 20 for frail patients compared to non-frail.

There are two accepted models of frailty:

1. Phenotype – presence of 3 or more of:
    - Unintentional weight loss
    - self-reported exhaustion
    - weakness low grip strength
    - low walking speed
    - low physical activity.

2. Index – a deficit accumulation model containing 70 items including ADLs and physical conditions.

    Two other syndromes may also be markers of frailty:

    - Sarcopenia – progressive loss of muscle mass and strength, leading to poor quality of life or even death
    - Cachexia – a complex metabolic syndrome associated with an underlying illness.

    It has also been demonstrated that experienced clinical judgement can reasonably accurately identify frailty.

    **All patients presenting for intermediate / major surgery over the age of 65, or in whom it is clinically suspected should be assessed for frailty.** The

standard Rockwood frailty screening tool should be used. Further assessment can be made using the Edmonton Frailty Scale: https://www.nscphealth.co.uk/edmontonscale-pdf (see also Table 11 below)

Moderate-severely frail patients scheduled for major surgery, also need serum albumin measurement.

Moderate to severely frail patients scheduled for major surgery require consultant anaesthetist F2F review to allow risk discussion and consideration of referral for interventions / exercise/strengthening programs, comprehensive geriatric assessment, nutritional referral, input from physiotherapy / occupational therapy.

**Table 11. The Edmonton Frail Scale**

**NAME:**

**D.O.B.:** **DATE:**

| Frailty domain | item | 0 point | 1 point | 2 points |
|---|---|---|---|---|
| Cognition | Please imagine that this pre-drawn circle is a clock. I would like you to place the numbers in the correct positions then place the hands to indicate a time of 'ten after eleven' | No errors | Minor spacing errors | Other errors |
| General health status | In the past year, how many times have you been admitted to a hospital? | 0 | 1-2 | ≥2 |
| | In general, how would you describe ', your health? | 'Excellent', 'Very good', 'Good' | 'Fair' | 'Poor' |
| Functional independence | With how many of the following activities do you require help? (meal preparation, shopping, transportation, telephone, housekeeping, laundry, managing money, taking medications) | 0-1 | 2-4 | 5-8 |
| Social support | When you need help, can you count on someone who is willing and able to meet your needs? | Always | Someti mes | Never |
| Medication use | Do you use five or more different prescription medications on a regular basis? | No | Yes | |
| | At times, do you forget to take your prescription medications? | No | Yes | |
| Nutrition | Have you recently lost weight such that your clothing has become looser? | No | Yes | |
| Mood | Do you often feel sad or depressed? | No | Yes | |
| Continence | Do you have a problem with losing control or urine when you don't want to? | No | Yes | |
| Functional performance | I would like you to sit in this chair with your back and arms resting. Then, when I say 'GO', please stand up and walk at a safe and comfortable pace to the mark on the floor (approximately 3 m away), return to the chair and sit down' | 0-10 s | 11-20 s | One of: >20s, or patient unwilling or requires assistance |
| Totals | Final score is the sum of column totals | | | |

**Scoring:**

**0-5 = Not Frail** **TOTAL**

**6-7 = Vulnerable**
**8-9 = Mild Frailty**
**10-11 = Moderate Frailty**
**12-17 = Severe Frailty** **Administered by: ……** **/17**

NSQIP Optimal pre-operative assessment of the geriatric surgical patient. https://www.facs.org/~/media/files/quality%20programs/nsqip/acsnsqipagsgeriatric2012guidelines.ashx

Frailty and Anaesthesia, what we need to know. https://academic.oup.com/bjaed/article/14/6/273/247717/Frailty-and-anaesthesia-what-we-need-to-know

Perioperative care of the elderly 2014. http://www.aagbi.org/sites/default/files/perioperative_care_of_the_elderly_2014.pdf

## 17. Pre-operative Haemoglobin Optimisation

Approximately 30% of the surgical population are anaemic. Prevalence is greater in higher risk; in patients with higher cardiac risk (RCRI>2), it may be as high as 60%. Moderate to severe anaemia ([Hb] <110g/L) results in worse outcome after surgery than milder anaemia. Allogeneic blood transfusion increases post-operative morbidity and mortality. Pre-operative treatment of anaemia reduces the need for transfusion.

The diagnosis and treatment of anaemia/iron deficiency should be made and commenced as **early on in the surgical pathway** as possible; ideally at the point of GP referral for surgery.

Anaemia is defined as a [Hb] of less than 130g/L for men and 120g/L for women.
Any patients undergoing major surgery or with anticipated blood loss of >500mls should be referred to the Patient blood management service (PBM) for optimisation if Hb <130g/L. All patients with severe anaemia ([Hb] of less than 90g/L) should also be referred.

Patients scheduled for non-major surgery (not on list* below) where: 90< Hb<130, should be informed of the result and advised to arrange follow up with their GP. A copy of the anaemia letter should be sent to GP.

**Elective major surgical procedures (or where >500ml blood loss is anticipated)***

**ORTHO**
Primary/Revision Knee Arthroplasty
Primary/Revision Hip Arthroplasty
Shoulder replacement surgery

**GYNAE**
Major gynae oncology
Hysterectomy

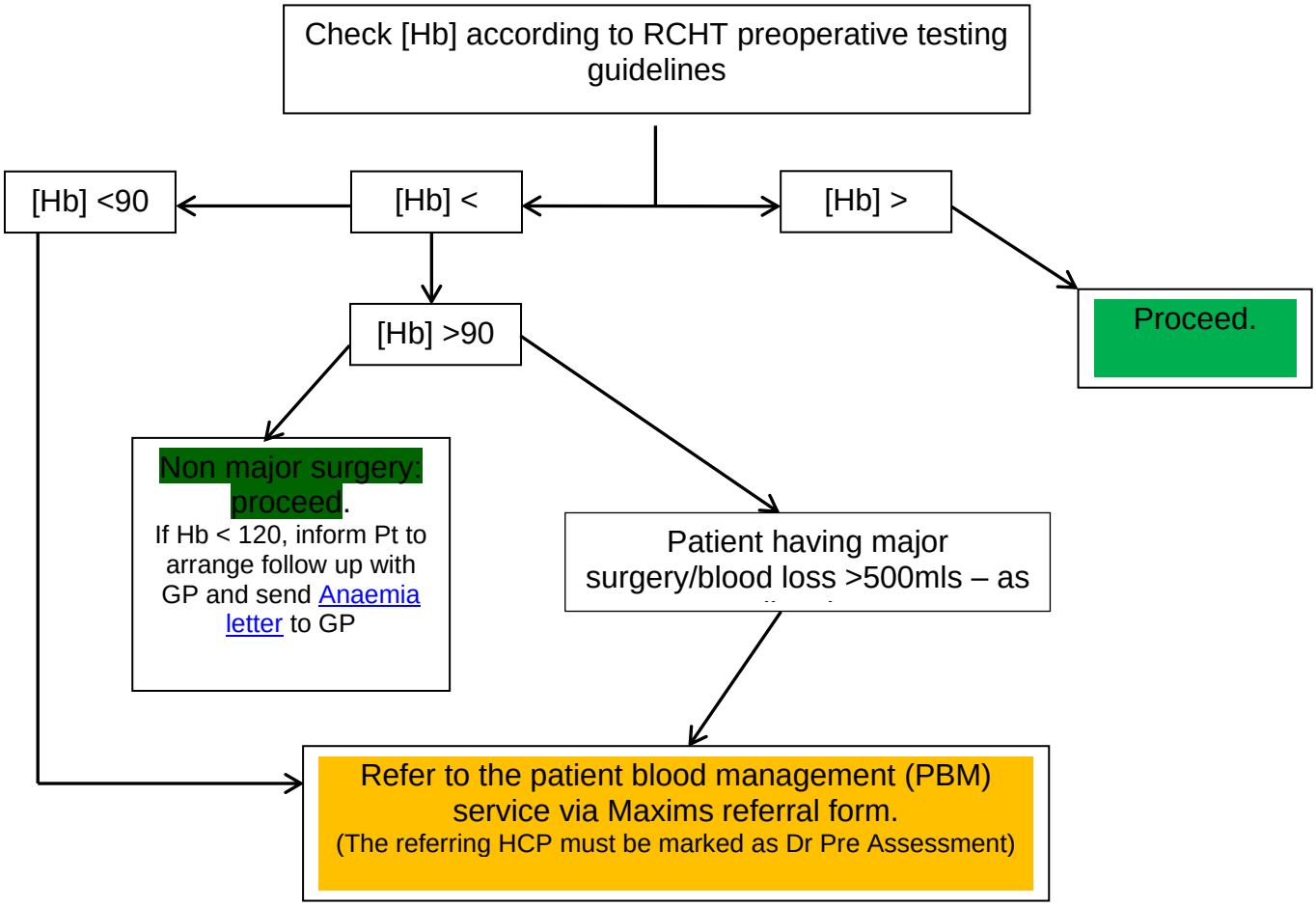
**ENT/OMFS**
Laryngectomy
Radial neck dissection
Bimaxilliary osteotomy

**GENERAL**
Colorectal resections

**UROLOGY**
Nephrectomy
Adrenalectomy

**VASCULAR**
AAA repair (open or endovascular)
Arterial bypass surgery
Limb amputation
Endarterectomy (Carotid or Femoral)

**Preoperative clinic *process***




PBM will classify anaemia and arrange appropriate treatment, aiming to achieve a target [Hb] >130g/L.

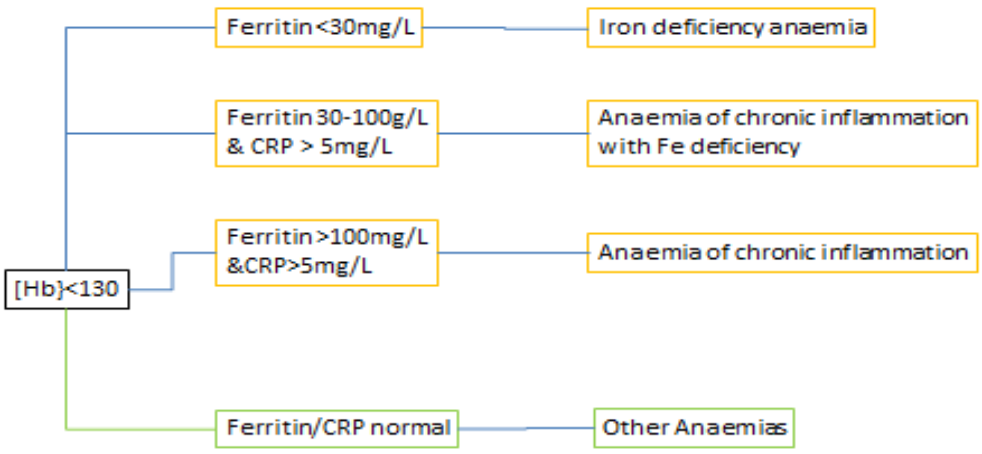
| | Urgent Surgery | Non Urgent Surgery |
|---|---|---|
| Iron deficiency Anaemia | Total dose Iv iron | Oral iron<br>2nd line iv iron |
| Anaemia of chronic inflammation with Fe deficiency | Total dose Iv iron | Oral iron<br>2nd line iv iron |
| Anaemia of chronic inflammation | Individualised PBM management<br>May include EPO | |
| Other anaemias | Refer to PBM for further management | |

All surgical patients diagnosed with anaemia or haematinic deficiency will have their GP notified of the diagnosis and any proposed treatment via a letter from the PBMS.

*Full details for the PBM treatment protocols and processes are available from the Anaesthesia PeriOperative Blood Management Lead. Accessible via the Anaesthesia Department*

*Anaemia of Chronic Disease may be considered as Functional Iron Deficiency. Some of these patients may benefit from Intravenous Iron Therapy.*

**Classification of Anaemia**




References:

International consensus statement on the perioperative management of anaemia and iron deficiency. Anaesthesia 2017; 72: 233-247.

Effects of allogeneic red blood cell transfusions on clinical outcomes in patients undergoing colorectal cancer surgery - systematic review and meta-analysis. Annals of Surgery 2012; 256: 235–44.

# 18. Hypertension

Approximately 15% of patients are hypertensive, with both systolic and hypertension being important. NICE defines hypertension as a diastolic BP > 90mmHg or a systolic BP > 160mmHg. But the overall risk to the patient is determined by the average out-of-hospital blood pressure. A blood pressure record from the GP is more useful than a single pressure taken in the clinic.

- Patients who have high blood pressure may get exaggerated intra-operative swings in BP that can result in myocardial ischaemia.

- However, making surgery safer for these patients is not just a question of bringing their BP down. Treatment started in a hurry can make them even more prone to swings (mainly low BP) during surgery. Their overall risk can only be brought down by months or years of stable lower blood pressure.

- Studies suggest that the risk of a significant peri-operative event (MI, cardiac death, CVA or renal failure) does not rise until the systolic BP > 180 and/or diastolic BP >110 (grade III and IV HTN).

## 18.1. **Taking a history:**

- Duration: the longer the hypertension has been present, the more likely there is to be damage to blood vessels in the heart, kidney or brain.

- Number of tablets currently taken to control BP: Gives an indication of severity.

- Other risks: IHD, CVD, CCF, DM, FHx., smoking, PVD, renal failure, age – in the presence of hypertension increase the risks of adverse events compared to isolated hypertension.

- Control: How well controlled is the BP with current medication? Ask about readings taken in the GP surgery. Is the patient compliant with medications?

## 18.2. **In Clinic**

Primary care blood pressure readings (from RMS letter) should be considered:

- Readings from the last 12 months are **<160/100; no further blood pressure measurement in POA is required.**

- No primary care BP readings are available - measure BP in POA clinic; 3 readings, accept lowest:

- **>180SBP and/or >110DBP**; call GP practice to obtain measurements from within the last 3 months (ideally 3 results). See table 12 below for further advice :

- **Ensure Bilateral BP for vascular patients who often have discrepancy right and left**. The higher reading is the accurate reading.

- **'White coat hypertension' is not normal**. Health Professionals should not support the concept that 'white coat hypertension' is normal. It is a marker of cardiovascular risk.

18.3. **Anaesthetist review should consider**:

1. Type and nature of surgery
2. Underlying risk factors: favouring treatment

   E.g. IHD, CVD, Renal failure, Family history, DM, age
3. Underlying factors which may preclude tight BP treatment:

   E.g. CCF, PVD, frailty.

**Table 12. Guidance for BP levels**

If it is decided to progress a patient to surgery who may have undiagnosed or poorly treated hypertension, the patient should be informed of this. They may wish to seek further follow up with their GP. **In such cases it may help to send BP letter 1 to GP.**

| | **Surgery has urgency e.g. all cancer surgery** | **Surgery not urgent e.g. hernia repair, joint replacement** |
|---|---|---|
| **No BP results available from GP within last 3 months** | Notes for anaesthetist review, with POA BP readings, blood results and ECG. | Obtain community ambulatory measurements.<br>Issue ambulatory BP monitor, or<br>Send *BP 2* letter to GP |
| **Systolic >180**<br>**Diastolic > 110** | Notes for anaesthetist review, with blood results and ECG. | Defer case<br>Send – *Medical problems in POA* letter to GP and cc. surgeon<br>Problems = severe HTN<br>Request – investigate and treat<br>Desired endpoint - <grade II HTN<br>Timeframe – remove from WL |
| **Systolic <180**<br>**Diastolic <110** | Accept | Accept |

References:

The measurement of adult blood pressure and management of hypertension before elective surgery. Joint Guidelines from the Association of Anaesthetists of Great Britain and Ireland and the British Hypertension Society. Anaesthesia. March2016. P326-337.

# 19. Modifiable Lifestyle Risks

All patients should be screened for modifiable risks. Pre assessment is not just about gathering information. It is also about giving patients the best chances of a good outcome from their surgery.

Many of these risks are 'lifestyle' choices that patients make but they can have a serious detrimental effect on their chances of obtaining a good outcome from surgery. Sometime this can leave patients in a worse state after their procedure than they were in before they had it done. Emphasis should always be placed on helping patients to obtain the best outcome from surgery. By the time patients present to POA a decision to operate has been made and our interventions can often be perceived as obstructive. This can frustrate patients and impair undermine their motivation to make positive lifestyle changes. A positive stance is important.

## 19.1. Smoking

**Smoking is the leading modifiable risk associated with poor health disability.**

Smoking increases risk of post-operative complications. Smokers are more likely to have significant cardiovascular and respiratory disease, which may also increase perioperative risks.

Studies have demonstrated that patients who are due to have surgery have higher levels of motivation to stop smoking than their general population counterparts.

**All smokers should be advised to stop smoking before surgery and offered access to smoking cessation support services.** .

A program of smoking support development pathways is in development, increased use of Nicotine Replacement Therapy, Nicotine Vape Substitution, and Buproprion and Varenicline [within NICE recommendations) (Recent Phizer Withdrawal (2021) acknowledged)

6–8 weeks of cessation from smoking has a beneficial effect on complications such as wound healing.

**Patients who are not willing to engage with smoking cessation, should be advised to abstain from smoking in the 24 hours immediately prior to surgery.** This is sufficient to get rid of carbon monoxide, improve ciliary function and return nicotine levels to normal.

## 19.2. Obesity

25% of the population are obese (BMI>30kg/$m^2$).

The majority of obese patients are relatively healthy and in the absence of comorbidity their perioperative risks are similar to that of non-obese patients.

Higher perioperative risks occur in those with:

Metabolic syndrome (3 of: HTN, DM, central obesity, raised

triglycerides/HDL-cholesterol)

Sleep disordered breathing (OSA or obesity hypoventilation syndrome)

Those at higher risk of VTE

19.3. **Respiratory:**
Wheeze, significant exertional dyspnoea, FVC<3L, FEV1<1.5, SaO2<95%, PaCO2>6: are all indicators of probable respiratory compromise.

**OSA** 10-20% of patients BMI>35 have OSA

**Screen all Obese patients (BMI>35) with the STOP BANG tool.** Scores >5 for females and >4 for men suggest possible OSA. Marked exertional dyspnoea, morning headaches and ECG evidence of right atrial hypertrophy may indicate OSA.

19.4. **Metabolic syndrome:**
Central obesity can be defined as waist circumference >88cm for females and >102cm in males, or a waist:height ratio >0.55. **All patients with metabolic syndrome scheduled for intermediate/ major surgery should be discussed with the consultant anaesthetist.**

19.5. **Orthopaedic surgery** Patients with obesity alone are at higher risks of peri-prosthetic joint infections and worse outcome following joint replacement surgery.

Obesity Surgery Mortality Risk Stratification score (OS-MRS) – has been validated in gastric bypass surgery:

| | |
|---|---|
| BMI > 50 kg.m$^{-2}$ | 1 |
| Male | 1 |
| Age > 45 years | 1 |
| Hypertension | 1 |
| Risk factors for pulmonary embolism:<br>Previous venous thromboembolism<br>Vena caval filter<br>Hypoventilation (sleep-disordered breathing)<br>Pulmonary hypertension | 1 |

Scores >3 indicate higher requirements for post-operative monitoring

19.6. **Day Surgery:**
Patients with BMI<40, no comorbidity and STOP BANG<5 are suitable for day surgery.

Patients with BMI>40 being considered for day surgery, should have notes review by anaesthetist. If Airway Concerns are not re-assured by Anaesthetist Notes review, then F2F/video should arranged. This is also an opportunity to 'Make Every Contact Count'

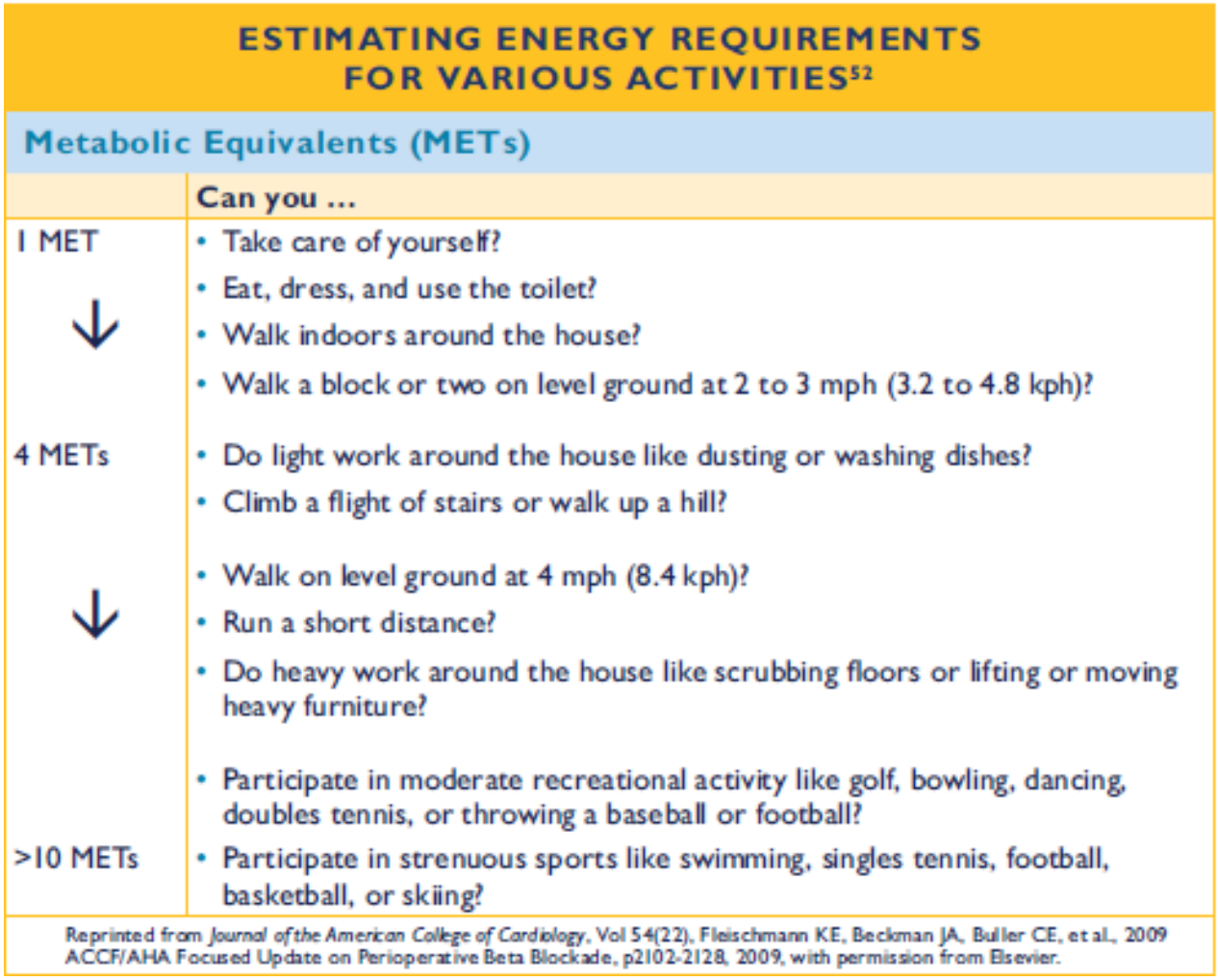
References:
Peri-operative management of the obese surgical patient 2015. Anaesthesia 859-876

## 19.7. Physical Activity

The development of human technology is associated with a concurrent decline in physical activity. Now up to 40% of long-term conditions are caused by low physical activity. It is thought to cause 1 in 6 deaths. Low levels of physical activity may be caused by poorly controlled or severe cardiopulmonary conditions; representing significant perioperative risk. Whether caused by musculoskeletal conditions or sedentary lifestyle, low physical activity will be associated with poor cardiorespiratory fitness and as such represents an independent risk factor for poor outcomes after major surgery. The most sedentary patients can gain the greatest reductions in mortality risk from quite small increases in their overall levels of activity. Improvements in physical activity can significantly improve many chronic conditions, especially hypertension and type II diabetes.

**All patients should have their functional status assessed.** It is important to obtain an accurate/honest history from the patient, carers or family. Details on limiting symptoms; severity, frequency and stability is vital for all.

Patients who have new or worsening functional limitation, who are scheduled for intermediate/major surgery should be discussed (minimal notes review) with the anaesthetist. All patients scheduled for major surgery who have severe functional limitation (unable to achieve 4 METS) require a F2F anaesthetist review. Consideration should be given to further functional testing including CPET.



**ESTIMATING ENERGY REQUIREMENTS FOR VARIOUS ACTIVITIES[52]**

**Metabolic Equivalents (METs)**

| | Can you … |
|---|---|
| 1 MET | • Take care of yourself?<br>• Eat, dress, and use the toilet?<br>• Walk indoors around the house?<br>• Walk a block or two on level ground at 2 to 3 mph (3.2 to 4.8 kph)? |
| 4 METs | • Do light work around the house like dusting or washing dishes?<br>• Climb a flight of stairs or walk up a hill?<br>• Walk on level ground at 4 mph (8.4 kph)?<br>• Run a short distance?<br>• Do heavy work around the house like scrubbing floors or lifting or moving heavy furniture? |
| >10 METs | • Participate in moderate recreational activity like golf, bowling, dancing, doubles tennis, or throwing a baseball or football?<br>• Participate in strenuous sports like swimming, singles tennis, football, basketball, or skiing? |

Reprinted from *Journal of the American College of Cardiology*, Vol 54(22), Fleischmann KE, Beckman JA, Buller CE, et al., 2009 ACCF/AHA Focused Update on Perioperative Beta Blockade, p2102-2128, 2009, with permission from Elsevier.

### 19.8. Excess Alcohol intake, misuse of other substances/drugs

Pre-operative alcohol dependence or abuse, are associated with complications (pneumonia, sepsis, wound infection) and increased length of stay. Post-operative withdrawal syndromes are likely.

**All patients should be screened using the trust alcohol screening tool.** A history of other substance or drug abuse should also be sought. Multidisciplinary team input can help perioperative planning and may include drug and alcohol liaison services. Higher risk cases should be discussed (notes review) with the anaesthetist.

**References:**

Physical Activity: Applying all our health.
https://www.gov.uk/government/publications/physical-activity-applying-all-our-health/physical-activity-applying-all-our-health

NSQIP Optimal pre-operative assessment of the geriatric surgical patient.
https://www.facs.org/~/media/files/quality%20programs/nsqip/acsnsqipagsgeriatric2012guidelines.ashx

Exercise and physical activity: Clinical outcomes and applications.
https://www.facs.org/~/media/files/quality%20programs/nsqip/acsnsqipagsgeriatric2012guidelines.ashx

Patients' inability to perform a preoperative cardiopulmonary exercise test or demonstrate an anaerobic threshold is associated with inferior outcomes after major colorectal surgery.
https://academic.oup.com/bja/article/111/4/607/240277/Patients-inability-to-perform-a-preoperative

# 20. Obstructive Sleep Apnoea

**Epidemiology**
Males and older patients more at risk
Obesity; every 10% increase in body fat, increases OSA risk by x6

20.1. **Symptoms- screen for possible OSA in respiratory component of POA; looking to the three S:**

- **S**top breathing when asleep **–**
- **S**noring –
- **S**leepy when awake (NB *sleepy* NOT just tired)

20.2. **STOP BANG score**

**Measure if history of any of these.**
https://www.mdcalc.com/stop-bang-score-obstructive-sleep-apnea

**If STOP BANG >5 obtain**:

**Epworth Sleepiness score**
http://www.britishsnoring.co.uk/sleep_apnoea/epworth_sleepiness_scale.php

20.3. **Patients with diagnosed OSA – obtain sleep study report from Maxims/notes.** Note down the AHI and ODI if available (see below).

20.4. **Screening**

STOP BANG score – has good sensitivity (higher scoring patients are likely to have OSA when tested) but lower specificity (lower scoring patients may still actually have OSA).
One reason for low specificity is that equal weighting is applied to all factors. The combination of Male + BMI >35 confers a disproportion risk to other combinations.

20.5. **Diagnosis**

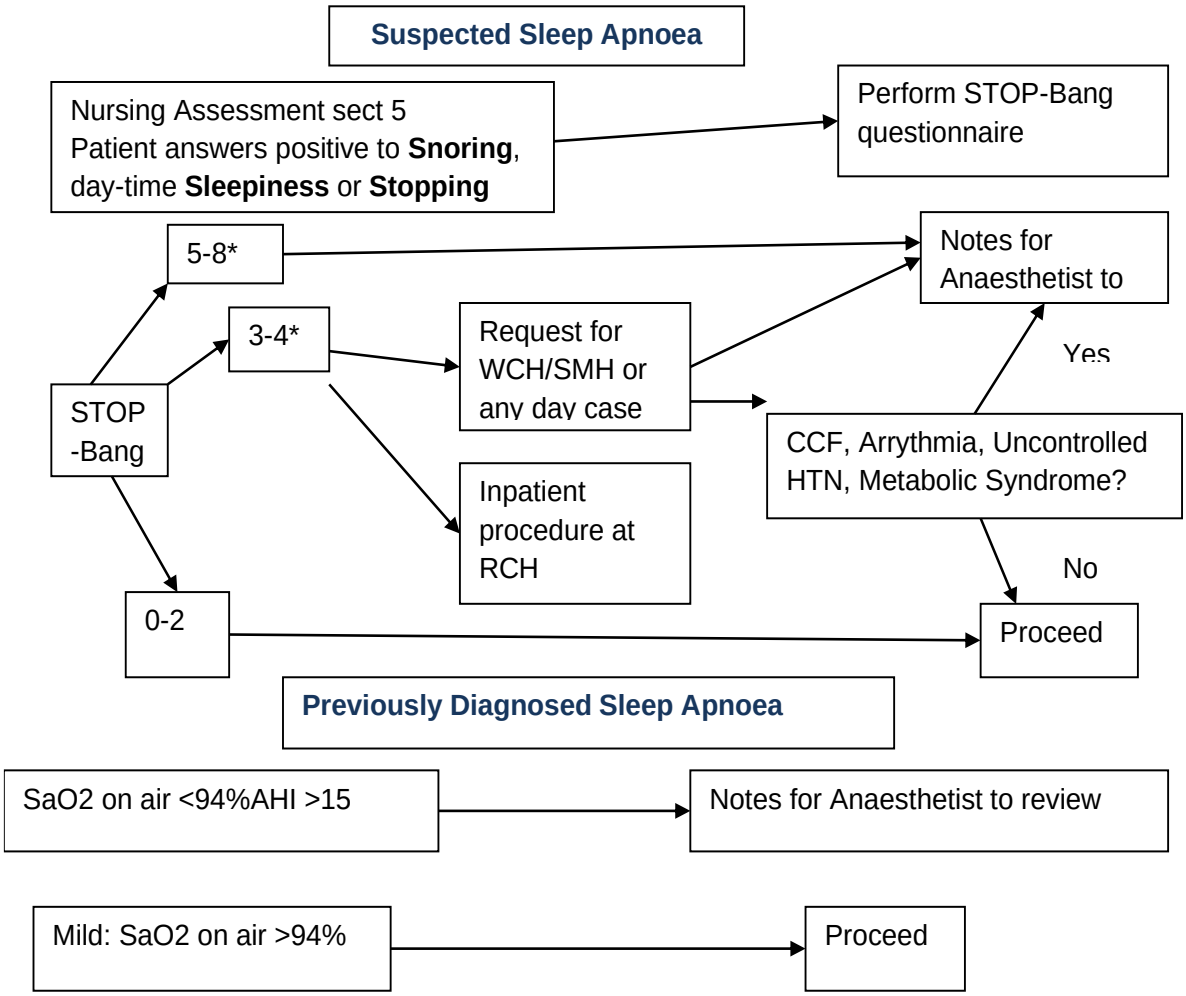
Sleep study: AHI: (Apnoea Hypopnoea Index)
Apnoea (no airflow) Hypopnoea (>50% reduction in airflow)
AHI>30 is severe 15-30 is moderate <15 is mild

20.6. **Perioperative Risks**

- Opiates and sedatives (GA) have propensity to exacerbate OSA.

- Patients with OSA can be very sensitive to respiratory side effects of opiates.
- Patients with OSA are at increased risk of uncommon but potentially serious complications.
- Poorly controlled comorbidities can increase risks.

## 20.7. Diagram of Suggested Action Plan for POA Nurses




## 20.8. Advice for Anaesthetists

**Urgency of operation?**
Proceed with modification of perioperative care to mitigate risks. **Vs.** Delay for investigation and possible treatment (suggested 8-12 weeks on established treatment, compliance >4hrs/night)

## 20.9. Comorbidities?

Other medical conditions; severity and stability
More risk associated with; CCF, Arrhythmia, Uncontrolled HTN, Metabolic syndrome

20.10. **Perioperative risk assessment** can be estimated from the ASA Taskforce scoring system below in Table 13:

**Table. 13. ASA Taskforce scoring system**

| **A Severity of OSA?** | **Points** |
|---|---|
| Mild | 1 |
| Moderate | 2 |
| Severe | 3 |
| **B Surgery and Anaesthesia** | |
| Superficial under LA or block, no sedation | 0 |
| Superfical with moderate sedn. Or GA | 1 |
| Peripheral under spinal/epidural moderate sedation | 1 |
| Peripheral surgery with GA | 2 |
| Airway surgery with moderate sedation | 2 |
| Major surgery with GA | 3 |
| Airway surgery with GA | 3 |
| **C Post-operative opiates** | |
| None | 0 |
| Low dose oral | 1 |
| High dose oral, parenteral, neuraxial | 3 |
| 4= increased risk | **>4 significantly increased risk** |

20.11. **Sleep Study Referral**

The patient is **suitable to proceed to surgery** but you feel that they should have further follow up – ask nurse to send the OSA patient and OSA GP letters to both patient and GP. POA nurse will advise patient to seek follow up with GP.

- **Non urgent surgery**, the patient has significant risk factors, they are **not suitable to proceed** to surgery – write a letter/use medical problems in POA letter and send to the GP (Cc. Surgeon) detailing the clinical issues.

- **Urgent surgery; a sleep study is needed** to inform perioperative decision making/care – write a referral to Dr Pickering (Respiratory Physician and Sleep Specialist at RCHT), Cc Surgeon.

NB. Patients without significant daytime sleepiness tend to not use their CPAP adequately.

20.12. **Published evidence summarising primary risk elevations:**
(from Pre-op Association guidelines, see Tables 14 and 15 below

**Table 14. Postoperative risk of complications in patients with OSA compared to non-OSA patients**

| | Orthopaedic surgery | | | Prostrate surgery | | | Abdominal surgery | | |
|---|---|---|---|---|---|---|---|---|---|
| | No OSA (%) | OSA (%) | RR increase with OSA (p-value) | No OSA (%) | OSA (%) | RR increase with OSA (p-value) | No OSA (%) | OSA (%) | RR increase with OSA (p-value) |
| **Post-operative complication** | | | | | | | | | |
| Emergent intubation | 0.3 | 3.9 | 13 (<.01) | 0.3 | 3.5 | 11.7(<.01) | 3.3 | 6.6 | 2 (<.01) |
| Emergent CPAP/NIV | 0.1 | 3.5 | 35 (<.01) | 0 | 2.9 | 2.9(<.01) | 0.4 | 4 | 10 (<.01) |
| Respiratory failure | 0.5 | 1.5 | 3 (<.01) | 0.5 | 1.2 | 2.4(<.01) | 4.2 | 5.1 | 1.2(<.03) |
| Atrial fibrillation | 4.9 | 6.7 | 1.4 (<.01) | 2.9 | 5.8 | 2 (<.01) | 8.3 | 9.2 | 1.1 |

Risks of pneumonia and tracheostomy were not increased in OSA vs. no OSA group

**Table 15. Unadjusted incident rates and adjusted odds ratios (OR) of postoperative cardiopulmonary complications for treated and untreated obstructive sleep apnoea patients (Treatment = CPAP)**

| Outcome | No OSA | OSA Untreated | OSA Treated | Adjusted OR |
|---|---|---|---|---|
| Any cardiopulmonary complication | 4.9% | 6.4% | 4.2% | 1.8 |
| Postoperative myocardial infarct | 0.6% | 1.4% | 0.6% | 2.6 |
| Unplanned reintubation | 1.8% | 2.7% | 1.4% | 2.5 |
| Postoperative arrhythmia | 1.5% | 1.6% | 1.4% | 1.4 |
| Postoperative cardiac arrest | 0.6% | 0.9% | 0.4% | 2.5 |

Adjusted OR compares patients with OSA who are treated and untreated.

# 21. Parkinson's Disease

Parkinson's disease affects about 1% of >65yrs.

The disease is due to a loss of Dopamine in the central nervous system, classically resulting in rigidity, tremor and bradykinesia. Patients may also develop dementia, depression, restrictive lung abnormalities, fixed flexion deformities of neck, othostatic hypotension and OSA. The rigidity and bradykinesia means that patient often have very low levels of physical activity.

All Parkinson's patients require the following **observations/assessments**:

- Lying+standing blood pressure (Fall in SBP >20mmHg on standing is significant)
- Spirometry
- Mini cog
- STOP Bang

It is particularly important to obtain a clear history on **physical activity** and **medications.**

**Medication history** needs to include:

- Names of drugs, doses and timing
- Consequences of missed doses and levels of compliance
- Any recent changes

It is also useful to obtain the names of PD physician and or specialist nurse.

Patients with severe disease and or those on complex drug regimens require **Anaesthetist F2F assessment.** Pre operative input from Parkinson's disease specialists may well be required. Some of these patients will require post operative critical care.

Patients with early/mild disease who are on simple drug regimens (ie. Single agent therapy) will require **Anaesthetist notes review.**

PD patients should be prioritised to **first on the operating list**

Patients with severe disease or having major surgery should have a note for the booker to notify the PD inpatient team (including their contact details – as below) of the TCI date.

A clear plan needs to be issued to the patient on the management of medications the day before and on the day of surgery. There is a PD medication sheet which should be used for this.

A plan for the management of medications during surgery should be advised by the anaesthetist reviewing the case. The following flow chart may assist with this:

## Flow chart for management of Parkinson's Disease patients

All patients with PD should have their notes reviewed by an anaesthetist preoperatively.

If the patients is on a complex drug regime, they are severely physically impaired or having major surgery, they should be seen in a preoperative assessment clinic by an anaesthetist.

**A**

Patient is able to have surgery with regional anaesthesia and will be able to take usual oral dose of PD medication.

**B**

Surgery requires GA, with duration likely to be longer than usual PD medication dosing interval. GI tract likely to remain functional for PD medication absorption.

**C**

Surgery requires GA, with duration likely longer than PD medication dosing interval. GI tract unlikely to remain functional for PD medication

Continue usual PD medications

Continue all usual medications pre-operatively , calculate equivalent NG doses for administration via NG tube during surgery

Continue all usual medications pre-operatively, calculate equivalent doses for transcutaneous Rotigotine patch

All patients with PD patients should be prioritised to first on the operating list.
The regular eldercare or neurology PD physician should be notified of TCI date for patients

**Aids to the calculation of equivalent doses of medication where either the NG route or transdermal route need to be used.**

## 21.1. Dose calculator

A comprehensive dose conversion calculator can be found here:

OPTIMAL Calculator

The following tables may also help:

1. Levodopa dose to equivalent Madopar dispersible dose. [1,2]

| Normal Prescription | Equivalent Madopar dispersible form |
|---|---|
| Madopar (co-beneldopa) | Equivalent dose Madopar dispersible |
| Madopar CR | Equivalent dose Madopar dispersible with a 30% dose reduction |
| Sinemet (co-careldopa) 62.5mg | Madopar dispersible 62.5mg |
| Sinemet 110mg | Madopar dispersible 125mg |
| Sinemet 125mg | Madopar dispersible 125mg |
| Sinemet 275mg | 2 * Madopar dispersible 125 mg |
| Sinemet CR | Equivalent dose Madopar dispersible with a 30% dose reduction |
| Stalevo (combination of co-beneldopa / entacapone) 50/12.5/200mg | Madopar dispersible 62.5mg |
| Stalevo 100/25/200mg | Madopar dispersible 125mg |
| Stalevo 150/37.5/200mg | Madopar dispersible 62.5mg + 125mg |
| Stalevo 200/50/200 | 2 * Madopar dispersible 125mg |

2. Conversion of Dopamine agonist to Rotigotine patch. [1,2]

| Pramipexole | Pramipexole PR | Ropinorole | Ropinorole XL | Rotigotine patch |
|---|---|---|---|---|
| 88mcg TDS | 260mcg OD | 750mcg TDS | 2mg OD | 2mg |
| 180 mcg TDS | 520 mcg OD | 1mg TDS | 4mg OD | 4mg |
| 350mcg TDS | 1.05mg OD | 2mgTDS | 6 mg OD | 6mg |
| 530 mcg TDS | 1.57mg OD | 3mg TDS | 8mg OD | 8mg |
| 700 mcg TDs | 2.1mg OD | 4mg TDS | 12mg | 10-12mg |
| 880 mcg TDS | 2.62 mg OD | 6mg TDS | 16mg | 14mg |
| | | 8mg TDS | 24 | 16 |

3. Conversion of Levodopa to Rotigotine patch.[1]

| Levodopa dose | Rotigotine patch equivalent |
|---|---|
| Madopar or Sinemet 62.5mg BD | 2mg/24 hours |
| Madopar or Sinemet 62.5mg TDS | 4mg/24 hours |
| Madopar or Sinemet 62.5mg QDS | 6mg/24 hours |
| Madopar or Sinemet 125mg TDS | 8mg/24 hours |
| Madopar or Sinemet 125mg QDS | 10mg/24 hours |
| Madopar or Sinemet 187.5mg TDS | 12mg/24 hours |
| Madopar or Sinemet 187.5mg QDS | 16mg/24 hours |
| Madopar or Sinemet 250mg TDS | 16 mg/24 hours |
| Madopar or Sinemet 250g QDS | 16mg/24 hours |
| Stalevo 50/12.5/200 TDS | 6mg/24 hours |
| Stalevo 100/25/200 TDS | 10mg/24 hours |
| Stalevo 100/25/200 QDS | 14mg/24 hours |
| Stalevo 150/37.5/200 TDS | 16mg/24 hours |
| Stalevo 200/50/200 TDS | 16mg/24 hours |

**Note:** Maximum licensed Rotigotine patch is 16mg/24 hours. If higher dose required discuss with PD team.

Rotigotine patches should not be cut. More than one patch can be used.
Any PD patients with Deep brain stimulator of continuous dopamine infusion should be discussed with PD team

**Contacts:**

| | |
|---|---|
| Eldercare physicians secretaries | Ext. 2084/2447 |
| Stephen Chan, Pharmacist | Ext. 2588 |

References:

1. Handbook of Peri-Operative medicines 2nd edition.

2. Royal Cornwall Hospital. Clinical Guidelines for the management of Inpatients with Parkinson's Disease.

# 22. Renal Impairment

Post-operative acute kidney injury (AKI) is associated with prolonged length of stay, longer term morbidity and mortality. Even relatively trivial post- operative AKI can have long term sequelae.

- AKI can be defined using the RIFLE or KIDGO criteria.

Various predictive risk scoring systems have been developed. These include the MEHTA, Cleveland clinic and Any Stage AKI scores. They are *all developed from cardiac surgical populations,* which make their use in more general settings difficult.

**Risk factors for post-operative AKI**:

Age, PVD DM
COPD IHD
HTN
Left ventricular dysfunction (EF <55%)
CVA Major surgery
CKD

**Modifiable risks**

Smoking
BMI >35
Anaemia

## 22.1. Proteinuria and Serum Albumin

Proteinuria is an independent risk factor for post-operative AKI.

As is low serum Albumin <40g/L. This is the case even in those with normal pre-operative renal function.

## 22.2. Notes on eGFR

- A *new* low eGFR (<60) should be re-checked in 2 weeks to exclude AKI
- A sustained reduction in eGFR of 25% or more or 15ml/min/1.73m$^2$ indicates *accelerated progression* of CKD
- Patients receiving nephrotoxic drugs (e.g. ciclosporin, tacrolimus. Lithium, NSIADs, ACE-I, A2RB and mesalazine) are recommended to have their eGFR checked every 12 months. Look up historical GP requested bloods.

**Renal function should be checked in accordance with pre-operative blood testing guidelines.**

**Patients scheduled for major surgery who have a low eGFR (<90) also require a serum albumin measurement and urine dipstick for proteinuria.**

**[Hb] level must be considered and anaemia corrected according to guidelines.**

**Offer smoking cessation and weight loss support if relevant.**

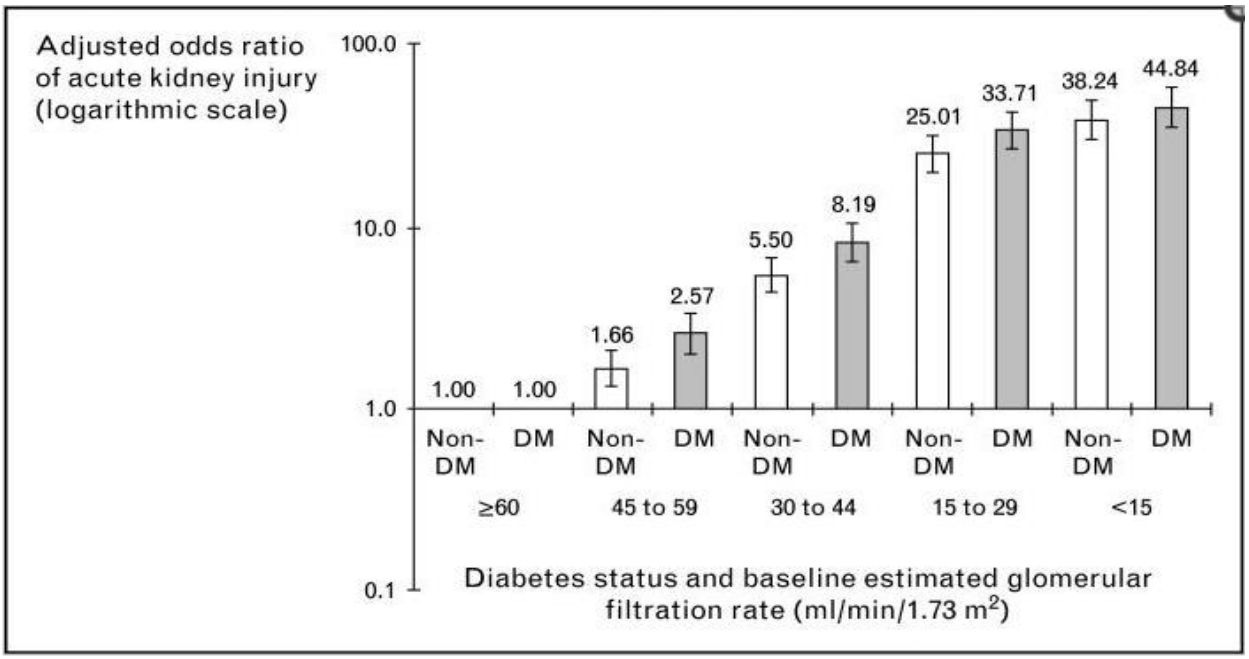
**The following require anaesthetist review:**

- **All patients with new or accelerated deterioration in eGFR**

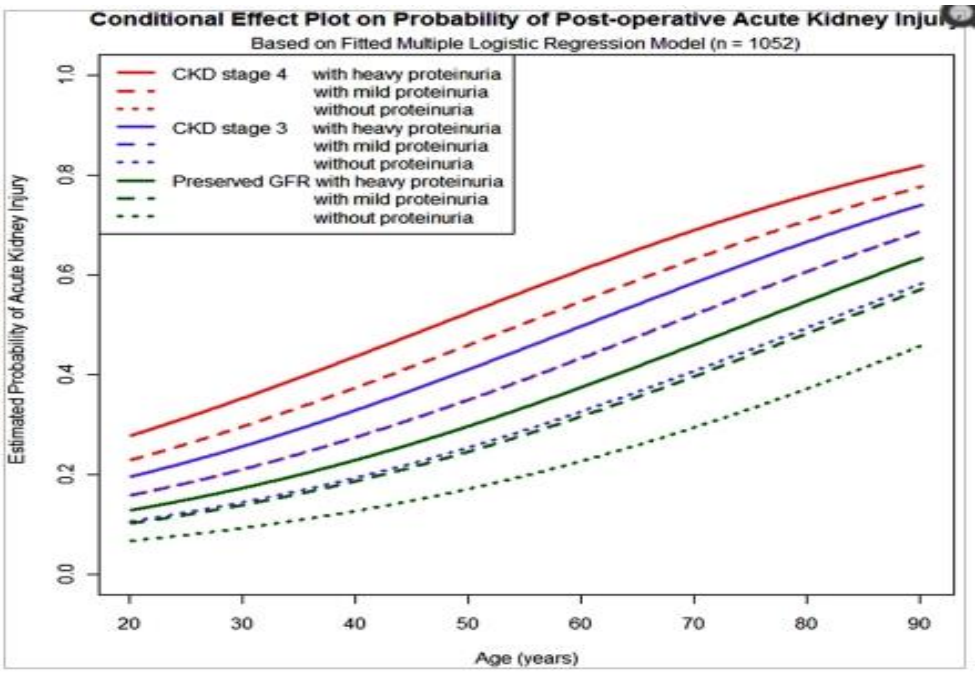
- **Patients scheduled for major surgery with low serum albumin/proteinuria or CKD III or worse.**

- **Patients who proceed to major surgery with significantly elevated risks of post-operative AKI should have this risk highlighted in the outcome summary from POA.**

The following has been produced from **cardiac surgery** populations but may help to frame an individual's risks of post-operative AKI, informing risk discussion, decision to operate and site suitability for some orthopaedic cases:




Hsu CY, et al. The risk of acute renal failure in patients with chronic kidney disease. Kidney Int. 2008; 74:101–107




J Am Soc Nephrol 2011. 22 p 156-163. Protienuria: Mild = trace/+1, heavy = +2 or more

# 23. Respiratory Disease

**Risks associated with chronic respiratory disease and surgery depend on:**

Underlying respiratory disease, its severity and stability

- The type of surgery being undertaken:

  **Higher risk:** Open abdominal surgery, prolonged procedures under GA (esp. laparoscopic procedures), prone positioning and procedures requiring significant post-operative opiates.

  **Lower risk** – short duration (<30 minutes), peripheral surgery and anything that can be done entirely under regional anaesthesia.

- The patient's co-morbidities.

23.1. **A full respiratory history, tailored to the individual, should be obtained for all patients assessed in POA.** Functional capacity and details of respiratory symptoms (stability / severity) and medication use/compliance are vital.

Patients who are not as well as they usually can be should have their surgery deferred unless it is urgent.
The following patients should be placed for anaesthetist review:

- Home oxygen
- Hospitalised for pneumonia in the last 4 months
- Recurrent respiratory tract infections requiring antibiotics >3/year
- Previous ICU admission because of respiratory failure associated with chronic lung condition
- Cystic fibrosis, severe bronchiectasis, known pulmonary hypertension
- Patients with functionally limiting respiratory disease for higher risk procedures
- Previously recorded FEV1<1.0

Other patients with significant/severe respiratory issues, e.g. lung transplant, pulmonary fibrosis, etc.

23.2. **Respiratory investigations:**

- PEFR is not routinely required.

Spirometry has value in the diagnosis and long-term assessment of some lung diseases but has not been shown to translate into effective risk prediction for individual patients. There is no good evidence suggesting cut-off values that make surgical risk unacceptable. A detailed clinical history, functional status and type of surgery are often more important considerations. Spirometry may be useful in higher risk patients and should be ordered after discussion with the anaesthetist.

23.3. **Smoking:** **(see section in modifiable risks)**

- **All smokers should be advised to stop smoking before surgery and offered access to smoking cessation support services.**
- 6–8 weeks of cessation from smoking has a beneficial effect on complications such as wound healing.
- **Patients who are not willing to engage with smoking cessation, should be advised to abstain from smoking in the 24 hours immediately prior to surgery.**
- This is sufficient to get rid of carbon monoxide, improve ciliary function and return nicotine levels to normal.

# 24. Risk Assessment

Evidence suggests that clinical judgement of anaesthetists alone is not a consistently good measure of risk – NCEPOD 2011; Knowing the Risk.

80% of deaths occur in just 12.5% of the surgical population.
Patients who are incorrectly identified as low risk and scheduled for immediate ward care, who later require HDU/ICU suffer higher mortality rates than those correctly identified and who go straight to critical care or enhanced peri-operative care EPOC after surgery.
Early post-operative morbidity of any kind is the strongest determinant of longer-term survival; reducing median survival by 69%.

Guidance from the Royal College of surgeons suggests that patients should have their risk of death calculated and documented. Good practice would suggest that risks of post-operative morbidity, especially those that may lead decision making about surgery.

Whilst the risks of elective surgery are considerably lower than emergency surgery, because elective surgery is much more common, it accounts for the greater number of deaths. The same can be said if considering intermediate vs. major procedures.

24.1. **Risk prediction tools**

**Risk scores** – add weighting to risk factors (according to the strength of the regression coefficient) and calculate a total score for the patient. The patient can be placed on a scale and compared to other patients. It does not provide an individual risk. E.g. ASA, Charlson, RCRI, Surgical risk scale.

**Risk Prediction models** – can provide a more individualised risk by entering patient information into the model. E.g. P-POSSUM, NSQIP, SORT.

**Limitations of risk prediction tools**
All tools are limited to some extent; precision and calibration decline if a tool is made more generalizable. Morbidity is more common than mortality but less accurately predicted. Disability-free survival is probably of greater relevance to most patients. *Any figure quoted is only an estimate of average risk* for a patient with those specific parameters.

24.2. **Guidance for practice**
National guidelines recommend the use of evidence based risk prediction tools to calculate risk of mortality. These should be used alongside clinical judgement and a good understanding of local procedures/environment to help identify high risk patients.

**The SORT score should be calculated for all patients.**
**http://sortsurgery.com/**

**Those with estimated mortality risk of >3% should be reviewed (at least notes) by the POA anaesthetist.**

**Following Risk Analysis and Shared Decision Making patients will be assigned to:**

**RCHT WARD**

**SMH STANDARD**

**SMH HIGHER LEVEL CARE**

**WCH WARD**

**RCHT EPOC IDEAL**

**RCHT EPOC MINIMUM**

**RCHT HDU IDEAL**

**RCHT HDU MINIMUM**

24.3. **Very High Risk Complex Patients. It is Professional Courtesy and MDT appropriate to discuss these rare cases with Critical Care.**

**References:**
Knowing the Risk. NCEPOD 2011.
The higher Risk Surgical Patient. RCS 2010.
Determinants of long term survival after surgery and the adverse effects of post-operative complications. Khuri et Al. Ann Surg 2005. 242 p 326-43.

# 25. Pre-Operative tests and investigations

25.1. ***Investigations grid*** (based on NICE NG45, April 2016) See below page 54.

25.2. **Group and Screen**
**Maximum Surgical Blood Order Schedule (MBOS)** should be referred to for guidance on which patients require:

- Group and screen test as part of their pre assessment.
- A repeat sample taking on admission

It also guides on how to manage patients in whom abnormal antibodies are found; some of these will require a repeat sample in the days prior to surgery.

# 26. Blood Test Interpretation Guide

**See below page 76.**

# Investigations Grid (based on NICE NG45, April 2016)

| | Normal healthy patient | Mild systemic disease<br>No functional limitation | Severe systemic disease<br>Functional limitation | |
|---|---|---|---|---|
| **Test** | **ASA 1** | **ASA 2** | **ASA 3 or ASA 4** | |
| **Minor Surgery** (Eg: excising skin lesion, cateracts, breast abscess / biopsy, cystoscopy, circumcision, hysteroscopy, diagnostic laparoscopy, grommets, dental extractions, carpel tunnel, simple metalwork extraction, hip injection) | | | | |
| Full Blood count | | | A | A - [Hb] required for hysteroscopy/cystoscopy/malignancy if no results for >6/52 |
| Haemostasis | | | | B - U+E required if CCF/DM/liver disease/over 65yrs if no results for >6/12 |
| Kidney Function | | | B | C - ECG required if CVS/Resp/Renal/DM/Obesity comorbidity |
| ECG | | | C | D - Coag required in liver disease or strong bleeding history |
| Lung function / arterial blood gas | | | | E - perform vitalograph if ASA3 or 4 due to respiratory disease |
| **Intermediate surgery** (Eg: primary repair of hernia, haemorrhoids, Lap chole, lesser gynae laparoscopic surgery, cystodiathermy, scrotal surgery, ureteroscopy, adenotonsillectomy, breast WLE, knee arthroscopy, hand/wrist and forefoot surgery) | | | | F - ECG required from last 12 months if aged >65yrs |
| Full Blood count | | A | | G - required in Frail/malnorished or eGFR<90 |
| Haemostasis | | | D | |
| Kidney Function | | B | | |
| ECG | | C | | |
| Lung function / arterial blood gas | | | E | |
| **Major or complex surgery** (Egs; any open intrabdominal surgery, hysterectomy, major endometriosis surgery, vaginal repair, TURP, TURBT, mastectomy, breast reconstruction, thyroidectomy, neck dissection, facial bones surgery, total joint replacement, bowel resections, nephrectomy, vascular surgery) | | | | |
| Full Blood count | | | | |
| Haemostasis | | | D | |
| Kidney Function | | | | |
| ECG | F | | | |
| Lung function / arterial blood gas | | | E | |
| Serum Albumin | | | G | |

# Blood Test Interpretation Guide

| Parameter | General information | Above normal range | Low limit |
|---|---|---|---|
| Hb | Hb carries oxygen in red cells<br>low = anaemia<br>high = polycythaemia with possible increased risk of vascular event. | Look at haematocrit (Hct). Report to anaesthetist if Hct is >0.55 or above. This is the threshold for intervention to bring the Hct down. | Accept Hb above 130.<br>Otherwise follow Hb optimisation for elective surgery guideline. |
| WCC | White cells fight infection. Total WCC is made up by adding together all the sub-types of white cell listed below. If total count is raised, one of the subtypes will be raised to account for the high WCC | If total WCC above 11 consider cause. If cause is clear (e.g. known UTI, bad chest etc.) then accept for surgery if the infection does not contra-indicate proceeding. (e.g UTI and THR = do not proceed, but UTI with bladder stones is probably OK to proceed if patient not too unwell). | Total WCC below 2.0 please discuss with anaesthetist. Others accept. |
| Neutrophils | Neutrophils rise in most common infections (UTI or chest infection). | Consider where the infection is<br>NB: high dose steroids cause a neutrophil rise (maybe as high as 30!) | Neutrophils below 2.0 please discuss with anaesthetist |
| Lymphocytes | Lymphocytes are less commonly raised in infection – e.g. atypical infections such as TB | Unusual. If lymphocytes are >11 please discuss with anaesthetist. | Ignore low count |
| Other WBC<br>'Differential' | Other kinds of WBC (eosinophils, basophils and monocytes) are rarely raised in isolation – there is a range of unusual diagnoses causing them to be raised. | Very high counts of these cells will be trigger a blood film and haematology comment – follow instructions in the comment. | Ignore low count |
| Platelets | Blood cells which allow normal clotting | Notes review for anaesthetist if >800. Goes up in many illnesses – probably no action needed.<br>Risk of thrombotic event remains low until count >1500 at which point we would consider aspirin | Below 100 : A blood film should have been done automatically for all counts <100. If film shows count is normal – ignore low count .<br>If film confirms count is low discuss all counts below 100 with anaesthetist (notes review). |
| Other figures on FBC | These are MCV, Hct, RBC, MCH, MCHC:<br>Ignore all other results if Hb is normal. They are all to do with diagnosing cause of anaemia if present. | | |

| | General information | Above normal range | Low limit |
|---|---|---|---|
| INR | A ratio of patient clotting time to a normal control clotting time. | Accept 1.3 or less<br>Report if more than 1.3 (this includes 1.31) | Ignore <1.0 |
| INR for patients on warfarin | A ratio of patient clotting time to a normal control clotting time. | If >5 report to GP or patient directly on the same day (phone or fax) | |
| APTR | A different kind of clotting measure. Used to monitor heparin but is also raised in haemophilia when INR may be normal. | If there is no bleeding history, (e.g. nosebleeds, menorrhagia, bleeding after minor surgery) accept 1.3 (and up to 1.39)<br>If there is a bleeding history and level is 1.3 or more, report to anaesthetist.<br>Report to anaesthetist if > or = 1.4 | Ignore <1.0 |
| Antibody screen | Machine looks for antibodies and identifies them | Blood bank will advise suitable management if antibodies are found. | |
| Sodium | Salt in blood. Level rises and falls according to dehydration but also to renal function and many disease states. Also falls in patients on diuretics. | Discuss all Na > 147 with anaesthetist. | Look for previous results. If chronic, accept if >129.<br>If new or not previously noted discuss with anaesthetist. If patient is on diuretics which are not essential we will probably stop them.<br>If lower than 129 please discuss with anaesthetist. |
| Potassium | Salt in blood. Rises in renal failure or due to some drugs | Discuss all K > 5.5 with anaesthetist.<br>If Cr is also raised discuss all K >5.0 | If <3.0, discuss notes with anaesthetist.<br>Use Medical Problems in POA letter to request supplement treatment via GP. A drug review may be needed also. |

# Blood Test Interpretation Guide

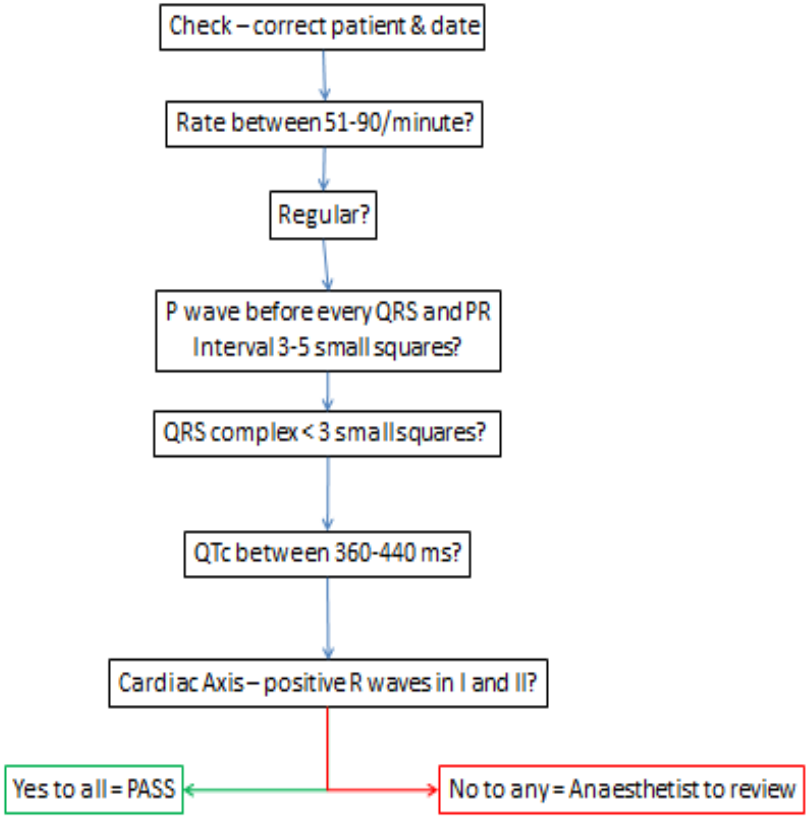
| Parameter | General information | Above normal range | Low limit |
|---|---|---|---|
| Urea | Waste product which rises in renal failure. Also rises with dehydration relatively more than the creatinine. So a patient in renal failure who has a “higher” urea (e.g. Urea 25, Cr 140) , may also be dehydrated | If not known to be in renal failure discuss notes with anaesthetist if urea >12. | Ignore low urea result |
| | | | |
| | | | |
| Creatinine | Waste product which rises in renal failure. | Patients under 70yrs: If above 140 please report if new.<br>Patients over 70yrs: If above 100 please look at e GFR and report to anaesthetist if e GFR<50 and this is a new finding. | Ignore low creatinine |
| epi GFR | This is a much more sensitive indicator for renal failure that is adjusted for age. Normal is around 120 and it is expected to drop with age. | Not quoted if above normal (>90) | CKD I-II is 90-60, CKD III is 30-59, CKD IV is 15-29.<br>Check the trend. If new or significant deterioration – please report to anaesthetist. Remember to check the K also.<br>Major surgery and eGFR <90, check also albumin + urine for proteinuria.<br>All CKD IV require at least notes review by anaesthetist. |

| | | | |
|---|---|---|---|
| LFT | Several liver function tests exist with different implications. E.g:-<br>Bilirubin and Gamma GT rise in obstructive jaundice<br>AST and ALT rise in hepatic failure.<br>Bilirubin, AST or ALT can also rise as a side effect of certain drugs | Report raised results if >20% raised.<br>Patients having cholecystectomy or breast surgery; inform the surgeon and not the anaesthetist. | Ignore low results |
| FT4 | This is thyroxine level. If on thyroxine treatment, this shows if they are on correct amount. If not it shows natural thyroid hormone levels. | If raised more than 10% please report to anaesthetist. | If below normal range inform anaesthetist.<br>The GP will also need notifying via Medical problems in POA letter. |
| TSH | Thyroid stimulating hormone. This is produced by the pituitary gland and acts on the thyroid to increase thyroxine production. It is high in hypothyroidism and low if over treated or thyrotoxic. . | If fT4 is normal – ignore.<br>If fT4 not normal – follow actions above. | If fT4 is normal – ignore.<br>If fT4 not normal – follow actions above. |
| CRP and ESR | A non-specific marker for inflammation – may be raised with any kind of infection or inflammation anywhere. Used to inform cut off values for Ferritin in cases of anaemia or Fe-deficiency. | For joint replacement surgery if >10; please inform the surgeon and include details- symptoms/signs of any infection.<br>No need to inform anaesthetist. | Ignore low results |
| HbA1C | Provides a reflection of longer-term BSL control in Diabetes | Inform the anaesthetist if >69 | Ignore low results |
| Ca | May be raised in parathyroid disease. Can be raised if metastatic cancer. | For ENT or breast; if above 2.55 inform surgeon<br>> 2.8 inform anaesthetist. | <2 inform anaesthetist. |

# 27. ECGs – interpretation advice for POA nurses.

27.1. Don't get caught up with worrying about making specific diagnosis from the ECG. Consider your role that of triaging ECGs – does it need anaesthetist review or not?

27.2. Do not assess the ECG without knowing something about the patient
Is there any history to indicate heart disease – previous events, hypertension, heart failure, irregular heart beat etc
What kind of state is the patient in - are they well? What is their exercise capacity? What symptoms do they get?
Have you any previous ECGs to compare your recording with?




**Conditions we are looking for in POA**

- Pathological bradycardia or tachycardia
- Irregularity, therefore atrial fibrillation
- Ischaemia – ST and T-wave abnormalities
- LBBB/RBBB
- Left ventricular hypertrophy
- Old myocardial infarction – Q waves
- Wolf-Parkinson-White
- Long QT interval

# 28. Top up Assessments in Central (RCH) and SMH Pre Assessment Departments

28.1. The purpose is to provide guidance for the management of patients who are referred via MAXIMS for a top up assessment at Central Pre Assessment and St Michaels Hospital Pre Assessment Clinic.

28.2. The following responsibilities apply:

- It is the responsibility of the in-patient booker to make a top up referral at or after 3 months following the original pre assessment
- It is the responsibility of the Pre Assessment Nurses to ensure that all top up referrals made to the department, are triaged.
- It is the responsibility of the Pre Assessment bookers to act on the triage advice.
- It is the responsibility of all staff to adhere to this policy and the relevant protocols.

28.3. **Background Information**

Pre Assessments at Royal Cornwall Hospital have traditionally remained valid for 3 months and if the patient had not yet had their surgery at 3 months they would be re-referred to Pre Assessment for a 'top up' assessment. Following an audit of original and top up assessments and comparison of local to national practice, it had become evident that this might not always be necessary and agreement has been reached to extend the validity of a pre assessment for up to nine months. However in the peri-pandemic era, we have seen rapid deconditioning. Therefore 3 months is the baseline at which top is required. Surgical Patients since end 2021 follow Priority codes for prioritization. Electively: P2 surgery within 1 month; P3 surgery within 3 months; P4 surgery required can wait over 3 months. Surgical patients in P3 and P4 categories must not have a POA booked unless they have a confirmed TCI date.

28.4. **MRSA screening**

MRSA used to be a barrier to extending the validity of a pre assessment but there is now agreement from the Prevention of Infection and Control Department that the original MRSA screen taken at the time of decision to add to waiting list will remain valid until day of surgery as long as it is checked at pre assessment (during the top up review) that the patient has not been admitted to hospital in the meantime, in which case it would require repeating.

28.5. **Operational Plan**

The in-patient booker will consider whether the pre assessment is or will be over 3 months old when giving a TCI (to come in date) to the patient for surgery. If over 3 months a top up referral will be made on MAXIMS.

28.6. **Top Up Triage**

The nurse will establish by a telephone call to the patient the following:

- Have there been any changes to medication since the original Pre Assessment?
- Have there been any changes to overall health since the original Pre Assessment?
- Have there been any visits to hospital for treatment since the original Pre Assessment?
- Is the patient having major surgery?
- Is the patient likely to be ASA 3 or above? It might be appropriate to use electronic tools (GURU, MAXIMS, patient questionnaires and GP referral letters) to establish this.
- Was the original pre assessment more than 9 months ago?

If all the answers to the above questions are 'no' then the pre assessment can be extended for a further 3 months without recalling the patient to another assessment appointment. There is no need to repeat the MRSA screen. This can be completed and recorded on MAXIMS by the nurse who is triaging.

If the answer to any of these questions is 'yes' a top up assessment will be required and the usual triage guidelines apply. The nurse needs to 'accept and add note' to the patient on MAXIMS and the pre assessment booker will book as directed by the nurse.

The nurse should attempt to call the patient for up to 3 days in a row and if unable to contact the patient should arrange a top up assessment as a default. This can be completed and recorded on MAXIMS by the nurse who is triaging.

28.7. **Repeat Bloods**

The following points need considering when deciding whether repeat bloods are required:

- Were blood tests indicated in the first instance?
- Does patient have cancer/condition causing on-going bleeding (e.g. the hysteroscopy/bladder cancer etc.?) If yes, check FBC.
- Where all other tests were normal there is only a need to re-check after 6 months.
- Any bloods with significant abnormalities
- The blood results interpretation guide may help define significant abnormalities, i.e. action required then recheck see Blood test Interpretation Guide on page 55.

28.8. Group and Save specimens taken in Pre Assessment are to identify antibodies only and after consultation with the transfusion department it has been established that unless the patient has had a blood transfusion or had a baby since the original G & S, there is no need to repeat it.

28.9. **Telephone or Face to Face (F2F) Top up assessment**
The pre op investigations grid (on page 54) supports the need for any investigations, which can support the triage nurse in her decision about whether a face to face appointment is appropriate.

Time from F2F appointment to pre assessment outcome is faster than telephone assessment to Pre assessment outcome if investigations will be required.

Consideration should be given to distance to travel to F2F appointment given that the patient has already had an assessment and this is a top up assessment i.e. Isles of Scilly residents.
Consideration should be given to the patient's ability to hear on the telephone.

Consideration should be given to accessibility issues e.g. wheelchair user, need for hospital transport, learning difficulties that might be traumatic for the patient to attend, communication difficulties.

# 29. Telephone Assessments in Central (RCH) and SMH Pre Assessment Departments

29.1. The purpose of this is to define the management of flow of all patients who require an elective surgical procedure and are assessed as suitable for a telephone Pre-operative Assessment (POA) at Central Pre Assessment and St Michaels Hospital Pre Assessment Clinic.

It excludes those patients who are assessed at POA triage who require a face-to-face assessment or deemed POA not required and able to proceed safely to surgical admission.

This guidance also excludes MRSA screening.

29.2. **Responsibilities**
The following responsibilities apply:

- It is the responsibility of the POA Registered Nurses to ensure that all referrals made to the department, are triaged within 24 hours of entry to the maxims electronic database.

- It is the responsibility of the POA appointment bookers to act correctly on the triage decision.

- It is the responsibility of POA registered nurses and ward clerks to ensure that assessments are conducted and communicated to in-patient bookers.

- It is the responsibility of patients to act upon instructions and advice given by letter or telephone to comply with arrangements made for assessment and act as advised with regard to any investigations required.

- It is the responsibility of all staff to adhere to this policy and the relevant protocols.

29.3. **Background Information**

Current NICE guidelines for Pre-Operative Investigations (2016) have been used to support the decision making grid for nurses to assess which pre op investigations are likely to be required. (See Investigations Grid on page 54). POA should consider relevant and recent investigations already performed in GP practices. If at triage, it is thought that investigations are not going to be required but the patient has a co-morbidity that requires further assessment a telephone assessment is the most suitable option we can provide. Telephone assessments are avoided for patients who need further investigations as in-house audit has demonstrated that requesting investigations from general practice teams can delay the POA pathway and the overall surgical pathway. Telephone pre assessment may also be the default assessment when there has not been enough patient information available at triage to support the decision of 'Pre Assessment not required'.

29.4. **Definition of "Triage"**

The purpose of triage is to allocate elective surgical patients the appropriate pre- operative pathway. Registered Nurses will use the referral information combined with electronic records (MAXIMS, BEA, GURU, GP referral and Patient Questionnaires ) in conjunction with estimated ASA and NICE Pre Op Investigations guidance to determine whether the patient should have a Pre Assessment appointment at all or if there should be telephone or face to face appointment (with investigations included).

29.5. **Operational Plan**

29.5.1. **Pre Telephone Assessment**

A patient receiving a decision for treatment at outpatients is added to the waiting list for surgery and added to MAXIMS by the consultant in-patient booker.

POA Registered Nurse accesses maxims daily and triages (as per the process above) using NICE guidance for testing and consideration of co-morbidities and planned surgery. Use of electronic records i.e. GURU, MAXIMS, patient questionnaires and GP referral letters should be used whenever available to support decisions. If a decision cannot be made the default pathway is to a face to face POA.

All POA triage decisions are recorded in maxims

Appointments are allocated by Pre Assessment booker on MAXIMS and PAS within 48 hours to allocate an appointment and appointment should be either within 2 weeks of referral or not later than 14 weeks on the 18 week pathway and appointment letter is sent to the patient by post.

29.5.2. **Telephone Assessment**

At the time designated on the appointment letter the patient is expected to telephone the POA Nurse as per the appointment letter instructions.

The POA Nurse will then confirm the patient contact number and immediately telephone the patient back.

The telephone assessment is completed to include, demographic details/medical/social & drug history/general procedure, pre post-operative instructions and MRSA screening results.

The POA Nurse determines if the patient has a valid MRSA screen result available by looking at results on MAXIMS combined with assessment of any hospital admissions in the meantime. If there is no result and the patient has not been screened arrangements are made for a self- screening kit to be posted to the patient.
The POA Nurse will advise the patient on what to do on receipt of the kit.

The results of telephone assessment are documented in telephone assessment/short procedure POA document and in the appropriate sections of the nursing profile. If the telephone assessment indicates that the patient requires further investigation or more in depth face to face assessment the telephone assessment nurse informs the POA booker and an appointment is negotiated to attend clinic for face to face assessment at that time while the patient is on the 'phone.

Patients who require further investigations at their GP surgery are informed at assessment and a copy of the request to the GP may be sent to the patient. Patients should be advised to get any investigation required completed within 2 weeks. The assessment nurse then contacts the surgery by email using the relevant template.

29.5.3. **After Telephone Assessment**

Case notes for patients who are assessed as suitable to proceed to surgery are sent to POA clerical staff within each POA unit to record the POA outcome within the PAS system – this makes the decision clearly visible to the surgical bookers and indicates the patient is ready to be allocated a date for surgery.

Case notes for patient awaiting any results are stored in the POA department and a weekly check will be made to follow-up those results.

29.5.4. **Communication Pathway for lack of results**

- If at the 2 week review following POA date there are no results available, the POA Nurse will contact the patient, clarify instructions and check understanding and action.

- If at the 3 week review following POA date there are no results available, the POA Nurse will contact the patient and reiterate above and contact the patients named GP Practice to request information and clarify if the patient has attempted to make an appointment.

- If at the 4 week review following POA date there are no results available, the POA Nurse will contact the patient, GP Practice, Surgeon and in-patient booker for advice on action to take.

- All the above actions should be documented by the POA Nurse in the patient record.

29.5.5. **Telephone Assessments Patients who DNA**

- The patient does not telephone at the allocated appointment time.
- The POA Nurse will allow 5 minutes.
- The POA Nurse after this time will telephone the patient on the number contained in the medical record and PAS system.
- If an individual answers the Nurse will ask them to confirm their name and date of birth and once satisfied that they are speaking to the patient, continue with the assessment, but explain to the patient your time frame for the assessment.

# 30. CLINIC ANAESTHETIST ABSENCE A PROCESS FOR COPING WITH THE IMPACT OF NO POA ANAESTHETIST

On occasion the POA anaesthetist may be absent from clinic. This may occur predictably, where Governance half day falls in the afternoon, or unpredictably due to sickness or staff shortage.

30.1. **For predictable absence:**
Anaesthetists F2F bookings for the next day should be limited to two appointments (three could be taken at a push following discussion with the scheduled anaesthetist). This is to allow the greater volume of notes for review to be safely managed.

30.2. **For unpredictable absence:**
Patients booked for just anaesthetist F2F appointments should be contacted to apologise for the cancellation and re-booked another anaesthetist F2F slot. The surgeon's secretary should be informed of this by email.

Patients booked for Nurse+Anaesthetist F2F should be seen by the nurse as scheduled. Apologies should be made for the absence of the anaesthetist. The notes should be placed for anaesthetist review, pointing out the missed F2F. The surgeon's secretary should be informed of this by email.

Management of notes review workload for subsequent day's clinic Anaesthetist:

Urgent: Cancer surgery, TCI <2wks
Less urgent: All others

Notes for review should be divided into two clear piles:

- Urgent – for initial attention of anaesthetist
- Less urgent- to be attended to after the urgent notes.

NB. If all notes in the less urgent pile cannot be attended to by the anaesthetist in clinic the day after an absence due to a lack of time, they should be rolled over for attention the next day and the day after if required.

Revert to the usual system for the second day following an absence. The less urgent pile should be attended to once all of that day's notes have been reviewed.

Where notes from the Less Urgent pile are reviewed 2 or more days after an absence please indicate the reason for the delay with your note (e.g. Delay to anaesthetist notes review due to absence of clinic anaesthetist on previous day).

Once the Less Urgent pile is cleared the usual system can be resumed.

# 31. Medicines Guidance on which should be continued or omitted prior to surgery. An alphabetical list follows on page 67.

31.1. **Disclaimer:**

*This guideline is believed to be an accurate reflection of the most current evidenced based literature available at time of composition. This is not an exhaustive list; it is intended to be used as a guide only. Users are advised to always consult medical literature and take into account any new developments. Always relate the information provided to the individual clinical situation.*

31.2. **Introduction:**

It is important that a patient continues all their regular medication for as long as feasibly possible to ensure a patient is as stable as possible on admission to theatre. This is particularly important for immunosuppressants, *B*-blockers, and other drugs used to treat angina, heart failure, bronchospasm, epilepsy and Parkinson's disease.

**Medication can still be taken by a Nil By Mouth (NBM) patient: Plain water will be emptied from the stomach within two hours**; therefore medication can be swallowed with a glass of water up to two hours prior to surgery.

Certain medications do need to be withheld prior to surgery; e.g. Anti-platelets, anticoagulants and diabetes medications. Standardised letters exist for clarifying cessation of these medications and should be used where appropriate.

Below is a list of commonly prescribed medications and whether they can be continued prior to surgery or from when they should be omitted.

31.3. **Important points:**

This list should be used as a guide only.

- When in doubt, consult the anaesthetist and / or surgeon conducting the procedure.

- If necessary, discuss individual cases with associated speciality teams.
- *Drugs in italics* require action (e.g. omit, alert anaesthetist etc.)
- Herbal medication and their potential peri-op complications are listed in a separate guide.
- We also have copies of The Perioperative Medicines Handbook –an additional useful resource.

**Table 16. Medicines to be continued or omitted prior to surgery**
**A**

| | |
|---|---|
| Abiraterone | Continue |
| Acamprosate | Continue |
| *Acarbose* | *Follow Diabetes and surgery guideline.* |
| *Acenocoumarol* | *Treat as for Warfarin. See Anticoagulants* |
| Acetubolol | Continue |
| *Adalimumab* | *Omit if due week prior to surgery. Do not re-start until wound clean* |
| Alendronate | Continue, *but may be safely omitted if due day of procedure* |
| *Alfuzosin* | Continue*, but could be withheld if catheterised.*<br><br>*Cateract surgery – ask Opthalmic surgeon; may require omission for 2/52.* |
| Alimemazine | Continue |
| Aliskerin | Continue |
| *Allopurinol* | Continue – *Take with plenty of water so tablet does not lodge in oesophagus* |
| Alogliptin | *Follow Diabetes and surgery guideline.* |
| Alverine | Continue |
| Amantadine | Continue |

| | |
|---|---|
| Ambrisentan | Continue |
| Amifampridine | Continue – *Alert anaesthetist ( for myasthenic syndromes)* |
| Amiloride | Continue |
| Amiodarone | Continue |
| Amisulpride | Continue |
| *Amitriptyline* | Continue – *but caution with pethidine use. Also increased risk of arrhythmia's and hypotension* |
| Amlodipine | Continue |
| *Anagrelide* | *Seek haematologist advice* |
| Anastrozole | Continue |
| *Apixaban* | *See anticoagulants* |
| Apomorphine | Continue |
| Aripiprazole | Continue |
| Asenapine | Continue |
| *Aspirin* | *Continue ( 75mg dose) unless otherwise specified. Reduce higher doses to 75mg. See also Antiplatelets* |
| Atenolol | Continue |
| Atorvastatin | Continue |
| Auranofin | Continue |
| Azathioprine | Discuss with prescribing specialist+surgeon. |
| Azilsartan | Continue |

**B**

| | |
|---|---|
| Baclofen | Continue |

| | |
|---|---|
| *Balsalazide* | Continue – *but may not be indicated post-op if procedure is to remove diseased bowel.* |
| Barbiturates | Continue |
| Bendroflumethiazide | Continue |
| Benzhexol | Continue |
| Benperidol | Continue |
| Betahistine | Continue |
| *Betamethasone (steroid*) | Continue *But consider dose increase if long duration or high dose; see Trust Guideline* |
| Bezafibrate | Continue |
| Bicalutamide | Continue |
| Bilastine | Continue |
| *Bisacodyl* | Continue – *May omit if laxative action undesirable* |
| Bisoprolol | Continue |
| Bosentan | Continue |
| Bromocriptine | Continue |
| *Budesonide MR capsules* | Continue – *but may not be indicated post-op if procedure is to remove diseased bowel.* |
| Bumetanide | Continue |
| *Buprenorphine* | Continue – *but alert anaesthetist* |
| *Buprenorphine patch* | Continue – *but alert anaesthetist it's in situ* |
| *Bupropion* | Continue – *but avoid pethidine and alert anaesthetist (increases seizure risk)* |
| Burinex A | Continue |
| Buspirone | Continue |

**C**

| | |
|---|---|
| Cabergoline | Continue |
| Calcitonin | Continue |
| Calcium salts | Continue |
| Canagliflozin | *Follow Diabetes and surgery guideline.* |
| Candesartan | Continue |
| Captopril | Continue |
| Carbamazepine | Continue |
| Carbimazole | Continue |
| Carbocisteine | Continue |
| Carvedilol | Continue |
| Celecoxib | Continue |
| Celiprolol | Continue |
| Cetirizine | Continue |
| Chloroquine | Continue |
| Chlorpheniramine | Continue |
| Chlorpromazine | Continue |
| *Chlorpropamide* | *Follow Diabetes and surgery guideline.* |
| Ciclosporin | Continue |
| Cilazapril | Continue |
| Cilostazol | Continue |
| Cimetidine | Continue |

| | |
|---|---|
| Cinacalcet | Continue |
| Cinnarizine | Continue |
| Ciprofibrate | Continue |
| *Citalopram* | Continue – *but caution with pethidine use* |
| *Clodronate* | Continue - *but may be safely omitted if due day of procedure* |
| Clomethiazole | Continue |
| Clomifene | Continue |
| *Clomipramine* | Continue – *but caution with pethidine use. Also increased risk of arrhythmia's and hypotension* |
| Clonazepam | Continue |
| Clonidine | Continue |
| *Clopidogrel* | *See Anti-Platelet Guideline.* |
| *Clozapine* | *Withhold 12 hours pre-op.*<br><br>*Alert anaesthetist. Alert Pharmacy that pt is in hospital. Dose will need re-titrating if withheld for more than 48hrs.* |
| Co-amilofruse | Continue |
| Co-amilozide | Continue |
| Co-beneldopa | Continue |
| Co-careldopa | Continue |
| *Co-danthramer* | Continue – *May omit if laxative action undesirable* |
| Codeine phosphate | Continue |
| Colchicine | Continue |

| | |
|---|---|
| Colesevelam | Continue |
| Colestyramine | Continue |
| *Contraceptives* | *See oral contraceptives* |
| Co-phenotrope (lomitil) | Continue |
| *Cortisone (steroid*) | *Continue. But consider dose increase if long duration or high dose; see Trust Guideline* |
| Cyanocobalamin | Continue |
| Cyproterone | Continue |

**D**

| | |
|---|---|
| *Dabigatran* | *See AntiCoagulation Guideline* |
| *Dapaglifozin* | *Follow Diabetes and surgery guideline*. |
| *Deflazacort (steroid)* | *Continue. But consider dose increase if long duration or high dose; see Trust Guideline* |
| *Desferrioxamine* | *Seek haematologist advice* |
| Desloratidine | Continue |
| *Dexamethasone (steroid)* | Continue. *But consider dose increase if long duration or high dose; see Trust Guideline* |
| *Dexamfetamine* | Continue – *but alert anaesthetist* |
| Diazepam | Continue |
| Diclofenac | Continue |
| Dicycloverine | Continue |
| Digoxin | Continue |
| Diltiazem | Continue |
| *Dipyridamole* | *See Anti-platelets* |

| | |
|---|---|
| Disopyramide | Continue |
| *Disulfiram* | Continue – *but alert anaesthetist* |
| *Docusate sodium* | Continue – *May omit if laxative action undesirable* |
| Domperidone | Continue |
| *Donepezil* | Continue. *But alert anaesthetist – may potentiate muscle relaxation during anaesthesia* |
| *Dosulepin* | Continue – *but caution with pethidine use. Also increased risk of arrhythmia's and hypotension* |
| *Doxazosin* | Continue if for BP control<br><br>*If for urinary symptoms, could be withheld if pt catheterised* |
| *Doxepin* | Continue – *but caution with pethidine use. Also increased risk of arrhythmia's and hypotension* |
| Dronedarone | Continue |
| Dutasteride | Continue |
| *Duloxetine* | Continue – *but caution with pethidine use* |

**E**

| | |
|---|---|
| Enalapril | Continue |
| Entacapone | Continue |
| *Ephedrine* | *Seek anaesthetist advice* |
| Eplerenone | Continue |
| Eprosartan | Continue |
| *Escitalopram* | Continue – *but caution with pethidine use* |
| Eslicarbazepine | Continue |

| | |
|---|---|
| Esomeprazole | Continue |
| *Etanercept* | *Omit if due week prior to surgery. Do not re-start until wound clean* |
| *Ethinylestradiol* | *Discuss with endocrine team. High doses may need to be stopped or continued at a lower dose.* |
| Ethosuximide | Continue |
| *Etidronate* | *Omit on day of procedure* |
| Etodolac | Continue |
| Etoricoxib | Continue |
| Exemestane | Continue |
| *Exenatide* | *Follow Diabetes and surgery guideline.* |
| Ezetimbe | Continue |

**F**

| | |
|---|---|
| Famotidine | Continue |
| Fampridine | Continue – *but alert anaesthetist (use for MS)* |
| Feboxustat | Continue |
| Felodipine | Continue |
| Fenofibrate | Continue |
| *Fentanyl patch* | Continue – *but alert anaesthetist it's in situ* |
| Ferrous fumarate | Continue |
| Ferrous gluconate | Continue |
| Ferrous sulphate | Continue |
| Fexofenadine | Continue |

| | |
|---|---|
| Finasteride | Continue |
| *Flavoxate* | Continue. *May be omitted if pt catheterised* |
| Flecanide | Continue |
| Fluazepam | Continue |
| *Fludrocortisone (steroid)* | *Continue. But consider dose increase if long duration or high dose; see Trust Guideline.* |
| *Fluoxetine* | Continue – *but caution with pethidine use* |
| *Flupentixol* | Continue – *but caution with pethidine use* |
| Flutamide | Continue |
| Fluvastatin | Continue |
| *Fluvoxamine* | Continue – *but caution with pethidine use* |
| Folic acid | Continue |
| Fosinopril | Continue |
| Furosemide | Continue |

**G**

| | |
|---|---|
| Gabapentin | Continue (alert anaesthetist also on many other pain medications) |
| *Galantamine* | Continue. *But alert anaesthetist – may potentate muscle relaxation during anaesthesia* |
| Gaviscon | Continue |
| Gemfibrozil | Continue |
| *Glibenclamide* | *Follow Diabetes and surgery guideline.* |
| *Gliclazide* | *Follow Diabetes and surgery guideline.* |
| *Glimepiride* | *Follow Diabetes and surgery guideline.* |

| | |
|---|---|
| *Glipizide* | *Follow Diabetes and surgery guideline.* |
| *Glucosamine* | *Stop 2 weeks pre-op if mixed with chondroitin* |

**H**

| | |
|---|---|
| Haloperidol | Continue |
| *HRT: Oestrogens only or*<br><br>*combined oestrogens and progesterones* | *Women without additional risk factors for VTE can continue – this should be clarified for DOS-admission staff to ensure appropriate thromboprophylaxis is given.*<br><br>*Those with additional VTE risk factors should be advised to discontinue 4 weeks prior to surgery but warn of possible menopausal like side effects of withdrawal, which may be considerable. Offer leaflet*<br><br>*See handbook of perioperative medicines p58 for further details* |
| Hydromorphone | Continue |
| Hydralazine | Continue |
| *Hydrocortisone (steroid)* | *Continue. But consider dose increase if long duration or high dose; see Trust Guideline* |
| Hydroxychloroquine | Continue |
| Hydroxyzine | Continue |
| Hyoscine butylbromide (Buscopan) | Continue |

**I**

| | |
|---|---|
| Ibandronate | Continue*, but may be safely omitted if due day of procedure* |
| Ibuprofen | Continue |
| Imidapril | Continue |
| *Imipramine* | Continue – *but caution with pethidine use. Also increased risk of arrhythmia's and* |

| | |
|---|---|
| | *hypotension* |
| Indapamide | Continue |
| Indometacin | Continue |
| *Indoramin* | Continue if for BP control.<br><br>*If for urinary symptoms, could be withheld if pt catheterised* |
| *Infliximab* | *Omit if due week prior to surgery. Do not re-start until wound clean* |
| *Insulins* | *Follow Diabetes and surgery guideline. Guidance is procedure and product dependant.* |
| Irbesartan | Continue |
| *Isocarboxazid (MAOI)* | *Seek both anaesthetic and psychiatric input!*<br><br>*If withdrawal necessary; do so slowly, well in advance to allow a 2 week drug free period.* |
| Isosorbide dinitrate | Continue |
| Isosorbide mononitrate | Continue |
| *Ispaghula husk* | Continue – *May omit if laxative action undesirable* |
| Isradipine | Continue |
| Ivabradine | Continue |
| Ivacaftor | Continue |

**K**

| | |
|---|---|
| Ketoprofen | Continue |

**L**

| | |
|---|---|
| Labetalol | Continue |

| | |
|---|---|
| Lacidipine | Continue |
| Lacosamide | Continue |
| *Lactulose* | Continue – *May omit if laxative action undesirable* |
| Lamotrigine | Continue |
| Lansoprazole | Continue |
| Leflunomide | Continue |
| Lenolidomide | Continue – *Increase DVT risk but usually benefits outweigh risks* |
| Lercanidipine | Continue |
| Letrozole | Continue |
| Levetiracetam | Continue |
| Levocetirizine | Continue |
| Levomepromazine | Continue |
| Levothyroxine | Continue |
| Liothyronine | Continue |
| *Linaclotide* | Continue – *May omit if laxative action undesirable* |
| *Linagliptin* | *Follow Diabetes and surgery guideline*. |
| *Liraglutide* | *Follow Diabetes and surgery guideline.* |
| Lisdexamfetamine | Continue – *but alert anaesthetist* |
| Lisinopril | Continue |
| *Lithium* | Continue – *but alert anaesthetist and monitor electrolytes and fluid balance closely* |
| *Lixisenatide* | *Follow Diabetes and surgery guideline.* |

| | |
|---|---|
| *Lofepramine* | Continue – *but caution with pethidine use. Also increased risk of arrhythmia's and hypotension* |
| Loperamide | Continue |
| Loprazolam | Continue |
| Loratidine | Continue |
| Lorazepam | Continue |
| Lormetazepam | Continue |
| Losartan | Continue |

**M**

| | |
|---|---|
| Magnesium triscilicate | Continue |
| Maxepa | Continue |
| Mebeverine | Continue |
| Mefenamic acid | Continue |
| Meloxicam | Continue |
| *Memantine* | *Discuss with anaesthetist – structurally related to ketamine so may be hallucinogenic* |
| Meprobamate | Continue |
| Meptazinol | Continue |
| Mercaptopurine | Continue |
| *Mesalazine* | Continue – *but may not be indicated post-op if procedure is to remove diseased bowel.* |
| *Metformin* | *Follow Diabetes and surgery guideline.* |
| *Methadone* | Continue. *Alert anaesthetist. Avoid buprenorphine.* |
| Methotrexate | Continue |

| | |
|---|---|
| *Methylcellulose* | Continue – *May omit if laxative action undesirable* |
| Methyldopa | Continue |
| Methylphenidate | Continue |
| *Methylprednisolone (steroid)* | *Continue. But consider dose increase if long duration or high dose; see Trust Guideline* |
| Metoclopramide | Continue |
| Metolazone | Continue |
| Metoprolol | Continue |
| *Metyrapone* | *Discuss with anaesthetist* |
| Minoxidil | Continue |
| *Mirabegron* | Continue. *May be omitted if pt catheterised* |
| *Mirtazepine* | Continue – *but caution with pethidine use* |
| Misoprostol | Continue |
| *Moclobemide* | *Omit 12 hours pre-op* |
| Modafinil | Continue |
| Montelukast | Continue |
| Morphine | Continue |
| *Movicol* | Continue – *May omit if laxative action undesirable* |
| Moxonidine | Continue |
| Mycophenolate | Continue |

**N**

| | |
|---|---|
| Nabumetone | Continue |
| Nadolol | Continue |

| | |
|---|---|
| Naftidrofuryl oxalate | Continue |
| Nalmefene | Continue – *but alert anaesthetist* |
| Naproxen | Continue |
| *Nateglinide* | *Follow Diabetes and surgery guideline.* |
| Nebivolol | Continue |
| *Neostigmine* | *Discuss with anaesthetist* |
| Nicardipine | Continue |
| Nicorandil | Continue |
| Nicotinic acid | Continue |
| Nifedipine | Continue |
| Nimodipine | Continue |
| Nitrazepam | Continue |
| Nizatidine | Continue |
| *Nortriptyline* | Continue – *but caution with pethidine use. Also increased risk of arrhythmia's and hypotension* |

**O**

| | |
|---|---|
| Olanzapine | Continue |
| Olmesartan | Continue |
| *Olsalazine* | Continue – *but may not be indicated post-op if procedure is to remove diseased bowel.* |
| Omacor | Continue |
| Omeprazole | Continue |
| *Oral contraceptive: combined oestrogen and* | Oestrogen containing contraceptives (oral and transdermal) should be discontinued at 4 (minimum) to 6 |

| | |
|---|---|
| *progesterones* | weeks prior to major elective surgery, or surgery which involves prolonged immobilisation or immobilisation of a lower limb. The patient must be warned of risk of pregnancy and advised on alternative contraceptive arrangements and documentation of this.<br><br>If continued– *this should be clarified for DOS-admission staff to ensure appropriate thromboprophylaxis is given.*<br><br>*See Handbook of perioperative medicines for further details* |
| Oral contraceptive: progesterone only | Continue |
| *Orlistat* | *Omit once nil by mouth* |
| Oxazepam | Continue |
| Oxcarbazepine | Continue |
| Oxprenolol | Continue |
| Oxybutynin | Continue. *May be omitted if pt catheterised* |
| Oxycodone | Continue |

**P**

| | |
|---|---|
| Pancreatin enzymes (Creon) | Continue |
| Pantoprazole | Continue |
| *Paroxetine* | Continue – *but caution with pethidine use* |
| Penicillamine | Continue |
| Pentoxifyline | Continue |
| Peppermint oil | Continue |
| Peptac | Continue |
| Pergolide | Continue |

| | |
|---|---|
| Perampanel | Continue |
| Perindopril | Continue |
| *Pethidine* | *Omit day of procedure (increases seizure risk)* |
| *Phenelzine (MAOI)* | *Seek both anaesthetic and psychiatric input!*<br><br>*If withdrawal necessary; do so slowly, well in advance to allow a 2 week drug free period.* |
| *Phenindione* | *Treat as for Warfarin*<br><br>*See Anticoagulation guide* |
| Phenobarbital | Continue |
| *Phentolamine* | *Seek anaesthetist advice* |
| Phenytoin | Continue |
| Pindolol | Continue |
| *Pioglitazone* | *Follow Diabetes and surgery guideline.* |
| Piracetam | Continue – *but alert anaesthetist* |
| Pirfenidone | Continue |
| Piroxicam | Continue |
| Pizotifen | Continue |
| Pramipexole | Continue |
| *Prasugrel* | *See Anti-platelets* |
| Pravastatin | Continue |
| *Prazosin* | Continue if for BP control<br><br>*If for urinary symptoms, could be withheld if pt catheterised* |
| *Prednisolone (steroid)* | *Continue. But consider dose increase if long duration or high dose; see Trust Guideline* |

| | |
|---|---|
| Pregabalin | Continue |
| Prestylon | Continue |
| Primidone | Continue |
| Propafenone | Continue |
| Propantheline | Continue. *May be omitted if pt catheterised* |
| Propiverine | Continue. *May be omitted if pt catheterised* |
| Propranolol | Continue |
| Propylthiouracil | Continue |
| *Prucalopride* | Continue – *May omit if laxative action undesirable* |
| *Pyridostigmine* | *Discuss with anaesthetist* |

**Q**

| | |
|---|---|
| Quetiapine | Continue |
| Quinapril | Continue |
| Quinine | Continue |

**R**

| | |
|---|---|
| Rabeprazole | Continue |
| Raloxifene | Continue |
| Ramipril | Continue |
| Ranitidine | Continue |
| *Rasagiline* | Continue – *but avoid pethidine* |
| *Reboxetine* | Continue – *but caution with pethidine use* |
| *Repaglinide* | *Follow Diabetes and surgery guideline.* |

| | |
|---|---|
| Retigabine | Continue |
| Rifaximin | Continue |
| Riluzole | Continue – *but alert anaesthetist* |
| Risedronate | Continue, *but may be safely omitted if due day of procedure* |
| Risperidone | Continue |
| *Rivaroxaban* | *See Anticoagulants* |
| *Rivastigmine* | Continue. *But alert anaesthetist – may potentate muscle relaxation during anaesthesia* |
| Ropinirole | Continue |
| *Rosiglitazone* | *Follow Diabetes and surgery guideline.* |
| Rosuvastatin | Continue |
| Rotigotine | Continue |
| Rufinamide | Continue |
| Rupatadine | Continue |

**S**

| | |
|---|---|
| *Saxagliptin* | *Follow Diabetes and surgery guideline.* |
| *Selegiline* | Continue – *but avoid pethidine* |
| *Senna* | Continue – *May omit if laxative action undesirable* |
| Sertindole | Continue |
| *Sertraline* | Continue – *but caution with pethidine use* |
| *Sevelamer* | *Omit once patient NBM* |
| Sibutramine | Continue |

| | |
|---|---|
| Simvastatin | Continue |
| Sirolimus | Continue |
| *Sitagliptin* | *Follow Diabetes and surgery guideline.* |
| Sodium Valproate | Continue |
| Solifenacin | Continue. *May be omitted if pt catheterised* |
| Sotalol | Continue |
| Spironolactone | Continue |
| Strontium | Continue, *but may be safely omitted if due day of procedure* |
| *Sulfasalazine* | Continue – *but may not be indicated post-op if procedure is to remove diseased bowel.* |
| Sulindac | Continue |
| Sulpiride | Continue |

**T**

| | |
|---|---|
| Tacrolimus | Continue |
| *Tafamidis* | Continue – *but alert anaesthetist* |
| Tamoxifen | Continue |
| Tamsulosin | Continue |
| *Tapentadol* | *Omit day of procedure (increases seizure risk)* |
| Telaprevir | Continue |
| Telmisartan | Continue |
| Temazepam | Continue |
| Tenoxicam | Continue |

| | |
|---|---|
| *Terazosin* | Continue if for BP control.<br><br>*If for urinary symptoms, could be withheld if pt catheterised* |
| *Tetrabenazine* | Continue – *but alert anaesthetist* |
| *Thalidomide* | *Seek haematologist advice* |
| *Theophylline* | Continue – *consider checking level pre-op if pt risk of arrhythmias* |
| Tibolone | Continue |
| *Ticagrelor* | *See Anti-platelets* |
| Tigabine | Continue |
| Timolol | Continue |
| *Tolbutamide* | *Follow Diabetes and surgery guideline*. |
| Tolcapone | Continue |
| Tolterodine | Continue. *May be omitted if pt catheterised* |
| Tolvaptan | Continue |
| Topiramate | Continue |
| Toremifene | Continue |
| *Tramadol* | *Continue where appropriate* |
| *Trancypromine (MAOI)* | *Seek both anaesthetic and psychiatric input!*<br><br>*If withdrawal necessary; do so slowly, well in advance to allow a 2 week drug free period.* |
| *Trandolapril* | Continue |
| Tranexamic acid | Continue |
| *Trazodone* | Continue – *but caution with pethidine use. Also increased risk of arrhythmia's and hypotension* |

| | |
|---|---|
| Triamterene | Continue |
| Trifluoperazine | Continue |
| Trihexyphenidyl | Continue |
| *Trilostane* | *Discuss with anaesthetist* |
| *Trimipramine* | Continue – *but caution with pethidine use. Also increased risk of arrhythmia's and hypotension* |
| Trospium | Continue. *May be omitted if pt catheterised* |

**U**

| | |
|---|---|
| Ulipristal | Continue –*may not be needed post op if removing uterine fibroids* |
| Ursodeoxycholic acid | Continue |

**V**

| | |
|---|---|
| Valproic acid | Continue |
| Valsartan | Continue |
| Varenicline | Continue |
| *Venlafaxine* | Continue – *but avoid pethidine use* |
| Verapamil | Continue |
| Vigabatrin | Continue |
| *Vildagliptin* | *Follow Diabetes and surgery guideline.* |

**W**

| | |
|---|---|
| Warfarin | *See Anticoagulation* |

**Z**

| | |
|---|---|
| Zafirlukast | Continue |

| | |
|---|---|
| Zolendronate | Continue, *but may be safely omitted if due day of procedure* |
| Zolpidem | Continue |
| Zopiclone | Continue |
| Zotepine | Continue |
| Zuclopenthixol | Continue |

# 32. Herbal Medicines with potential peri-operative complications

**Disclaimer:**
*This guideline is believed to be an accurate reflection of the most current evidenced based literature available at time of composition. This is not an exhaustive list; it is intended to be used as a guide only. Users are advised to always consult medical literature and take into account any new developments. Always relate the information provided to the individual clinical situation.*

32.1. **Background:**
The use of natural medicines in the UK is extensive. Many patients do not consider these products to be drugs or medication and often do not disclose their use to health providers. As a result there is a risk that patients may take these products in the perioperative period without healthcare provider's knowledge.

32.2. **Purpose:**
Many natural medicines have pharmacological effects that have the potential to interfere with surgical procedures. Therefore, assessment of natural medicine use is an important aspect of perioperative assessment. Patients should be asked specifically about their use of herbs, vitamins, minerals, or other natural or alternative products.

Advise patients to *discontinue taking all non-essential natural medicines two weeks before an elective surgery procedure.* Some products may not need to be discontinued this far in advance; however, there often is not enough information about which constituents cause a particular pharmacological effect or the half-life of those constituents[1].

Below is a list of herbal medicines known to have pharmacological effects which could adversely affect surgery. Advise patients to stop taking any preparation with these ingredients two weeks prior to surgery[1-4]. If a patient discloses a medication not on this list but wishes to continue taking it, please seek further advice from pharmacy.

| Constituent | Reason why it should be stopped |
|---|---|
| 5-HTP | Has serotinergic properties; treat as an SSRI.<br><br>Caution with pethidine use. |
| Agnus Castus | Pro-oestrogenic; could increase thrombus risk<br><br>Dopamine agonist; Treat as haloperidol clozapine or sulpiride. |
| Agrimony | Clinical evidence of hypotensive effects<br><br>Clinical research suggests hypoglycaemic effects |
| Alfalfa | Immunomodulating properties; Possible increased risk of infection and poor wound healing<br><br>Pro-oestrogenic; could increase thrombus risk<br><br>Clinical research suggests hypoglycaemic effects |
| Aloes/Aloe vera | Clinical research suggests hypoglycaemic effects |
| Alpha-lipoic acid | Clinical research suggests hypoglycaemic effects |
| Andrographis | Preliminary evidence of hypotensive effects |
| Aniseed | Pro-oestrogenic; could increase thrombus risk<br><br>Sympathomimetic; can cause hypertension, tachycardia and arrythmias |
| Arnica | Anticholinesterase action; bradycardia, hypotension, bronchoconstriction. |
| Asafoetida | Clinical evidence of hypotensive effects |
| Avens | Clinical evidence of hypotensive effects |
| Banaba | Clinical research suggests hypoglycaemic effects |
| Bayberry | Mineralocorticoid effect; could increase blood pressure |
| Bilberry | Antiplatelet effect; increases bleeding risk |
| Bitter melon | Clinical research suggests hypoglycaemic effects |
| Bitter orange | Stimulant.<br><br>Structurally related to phenylephrine, it can predispose the patient to stroke, myocardial infarction, arrhythmia from tachycardia and hypertension. May interact with MAOIs. |

| | |
|---|---|
| | Omit a minimum of 24hours pre-op. |
| *Black* Cohosh | Pro-oestrogenic; could increase thrombus risk |
| Black tea<br><br>(concentrated tablets) | Large quantities of caffeine in black tea can have antiplatelet effects; increased bleeding risk |
| *Blue* Cohosh | Theoretical hypertensive effects |
| Boldo | Anticoagulation effect; increased risk of bleeding.<br><br>Can potentiate the effects of warfarin. |
| Boneset | Immunomodulating properties; Possible increased risk of infection and poor wound healing |
| Broom | Hypertensive; potential to raise blood pressure<br><br>Potential cardiac depressant activity |
| Burdock | Clinical research suggests hypoglycaemic effects |
| Butterbur | Clinical evidence of hypotensive effects |
| Calamus | Clinical evidence of hypotensive effects<br><br>Theoretical catecholamine activity<br><br>Potentiates barbiturate sleeping time |
| Calendula | Immunomodulating properties; Possible increased risk of infection and poor wound healing |
| Capsicum | Sympathomimetic; can cause hypertension, tachycardia and arrhythmias |
| Cat's Claw | Antiplatelet effect; increases bleeding risk<br><br>Clinical evidence of hypotensive effects Immunomodulating properties; Possible increased risk of infection and poor wound healing |
| Celery | Clinical research suggests hypoglycaemic effects Sedatives effect |
| Centaury | Sedative effect |
| Chamomile | Immunomodulating properties; Possible increased risk of infection and poor wound healing<br><br>Mild sedative effects; could potentiate anaesthetics |

| | |
|---|---|
| Chondroitin | Anticoagulation effect; increased risk of bleeding.<br><br>Can potentiate the effects of warfarin.<br><br>Chondroitin also affects blood sugar control |
| Clove | Antiplatelet effect; increases bleeding risk |
| Coenzyme Q10 | Clinical research suggesting modest hypotensive effects |
| Cola nut | Stimulant. Increased risk of tachycardia and hypertension. |
| Coltsfoot | Vasopressor activity causes hypertension |
| Corn Silk | Clinical evidence of hypotensive effects<br><br>Clinical research suggests hypoglycaemic effects |
| Couchgrass | Sedative effect |
| Cowslip | Initially causes hypotension, then later hypertension |
| Damiana | Clinical research suggests hypoglycaemic effects |
| Dandelion | Clinical research suggests hypoglycaemic effects |
| Danshen | Anticoagulation effect; increased risk of bleeding.<br><br>Can potentiate the effects of warfarin |
| Devil's Claw | Clinical research suggests hypoglycaemic effects<br><br>Clinical evidence of hypotensive effects |
| Dong quai | Anticoagulation effect; increased risk of bleeding.<br><br>Can potentiate the effects of warfarin |
| Drosera | Immunomodulating properties; Possible increased risk of infection and poor wound healing |
| Echinacea | Possible increased risk of infection and poor wound healing |
| Elecampane | Clinical research suggests hypoglycaemic effects<br><br>Sedative effect<br><br>Clinical evidence of hypotensive effects |
| Ephedra | Stimulant: Is a source of ephedrine, pseudoephedrine, and phenylpropanolamine. Can cause tachycardia and hypertension with spontaneous adverse events including stroke, myocardial infarction, QT interval prolongation and |

| | |
|---|---|
| | arrhythmia.<br><br>Also known to inhibit complement pathway |
| Epimedium | Preliminary evidence of hypotensive effects |
| Eucalyptus | Clinical research suggests hypoglycaemic effects |
| Fenugreek | Anticholinesterase action; bradycardia, hypotension, bronchoconstriction.<br><br>Anticoagulation effect; increased risk of bleeding.<br><br>Can potentiate the effects of warfarin<br><br>Clinical research suggests hypoglycaemic effects |
| Feverfew | Antiplatelet effect; increases bleeding risk |
| Fucus | Anticoagulation effect; increased risk of bleeding.<br><br>Potential hypotensive effects<br><br>Both hyper- and hypo thyroidism reported with continued use |
| Fumitory | Clinical evidence of hypotensive effects |
| Garlic | Antiplatelet effect; increases bleeding risk<br><br>Also has hypotensive properties<br><br>Clinical research suggests hypoglycaemic effects |
| Ginger | Antiplatelet effect; increases bleeding risk<br><br>Clinical research suggests hypoglycaemic effects<br><br>Also has hypotensive properties |
| Ginkgo | Pro-oestrogenic; could increase thrombus risk<br><br>MAOI activity<br><br>Antiplatelet effect; increases bleeding risk |
| Ginseng<br><br>(American, Eleutherococcus and Panax) | Immunomodulating properties; Possible increased risk of infection and poor wound healing<br><br>Has erratic blood glucose control in patients reporting both hyper- and hypo-glycaemic control<br><br>CNS depressant and stimulant |

| | |
|---|---|
| | Pro-oestrogenic; could increase thrombus risk Antiplatelet effects; increases bleeding risk<br><br>Also has erratic blood pressure altering properties, causing both hyper- and hypo-tension in patients.<br><br>MAOI potentiation, suspected phenelzine interaction |
| Glucomannan | Clinical research suggesting hypoglycaemic effects |
| Glucosamine | Anticoagulation effect; increased risk of bleeding.<br><br>Can potentiate the effects of warfarin.<br><br>Glucosamine can also affect blood sugar control. |
| Golden Seal | Potential hypotensive effects<br><br>Heparin antagonist<br><br>Sedative effect |
| Greater Celandine | Immunomodulating properties; Possible increased risk of infection and poor wound healing |
| Green tea<br><br>(concentrated) | Large quantities of caffeine in green tea can have antiplatelet effects; increased bleeding risk.<br><br>It can also be a stimulant in large quantities. |
| Guarana | Antiplatelet effects; increases bleeding risk<br><br>Also a known stimulant; increases risk of tachycardia, hypertension and arrhythmias. |
| Gymnema | Clinical research suggests hypoglycaemic effects |
| Hawthorn | Clinical evidence of hypotensive effects<br><br>CNS depressant; potentiates barbiturate sleeping time |
| Hops | Mild sedative effects( usually used in combination with other sedative products). Could potentiate anaesthetics. |
| Horehound, White | Vasodilator properties; lowers blood pressure |
| Horse chestnut | Active constituents thought to have antiplatelet activity; increases bleeding risk.<br><br>Clinical evidence of hypotensive effects |
| Horseradish | Clinical evidence of hypotensive effects |

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|---|---|
| | Peroxidase stimulates synthesis of arachidonic acid metabolites<br><br>Both hyper- and hypo thyroidism reported with continued use |
| Hydrocotyl | Hyperglycaemic effect<br><br>Sedative effect |
| Jamaica Dogwood | Sedative effect |
| Java Tea | Clinical evidence of hypotensive effects<br><br>Clinical research suggests hypoglycaemic effects |
| Juniper | Clinical evidence of hypotensive effects<br><br>Clinical research suggests hypoglycaemic effects |
| Kava | Additive effects with benzodiazepines increasing sedation; also linked to numerous reports of hepatotoxicity<br><br>Possible dopamine antagonist effects. Treat as haloperidol clozapine or sulpiride. |
| L-arginine | Clinical research suggesting modest hypotensive effects |
| Lavender | Mild sedative effects; additive effects with CNS depressants and anaesthetics. |
| Lemon balm | Clinical research suggesting sedative effects. Could potentiate anaesthetics. |
| Liquorice | Mineralocorticoid effect; could increase blood pressure<br><br>Pro-oestrogenic; could increase thrombus risk<br><br>Antiplatelet effect; increases bleeding risk<br><br>Also has a laxative effect similar to senna. Particularly important to withdraw prior to bowel surgery. |
| L-tryptophan | Clinical research showing sedative effects; documented reports of additive effects with CNS depressants and anaesthetics.<br><br>Also has serotinergic properties; treat as an SSRI.<br><br>Caution with pethidine. |
| Marshmallow | Clinical research suggests hypoglycaemic effects |

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|---|---|
| Maté | Stimulant. Increased risk of tachycardia and hypertension |
| Melatonin | Clinical research suggesting sedative effects; can potentiate anaesthetics. Seek anaesthetic advice if prescribed by a clinician (especially in children). |
| Mistletoe | Clinical evidence of hypotensive effects<br><br>Promotes coagulation<br><br>Immunomodulating properties; Possible increased risk of infection and poor wound healing |
| Motherwort | Oxytocic properties |
| Myrrh | Clinical research suggests hypoglycaemic effects |
| Nettle | Clinical evidence of hypotensive effects<br><br>CNS depression, in vivo<br><br>Clinical research suggests hypoglycaemic effects<br><br>Anticholinesterase action; bradycardia, hypotension, bronchoconstriction. |
| Parsley | Sympathomimetic; can cause hypertension, tachycardia and arrhythmias |
| Passionflower | Mild sedative effects; animal models suggest additive effects with CNS depressants |
| Plantain | Clinical evidence of hypotensive effects |
| Pleurisy Root | Sympathomimetic; can cause hypertension, tachycardia and arrhythmias<br><br>Pro-oestrogenic; could increase thrombus risk |
| Pokeroot | Clinical evidence of hypotensive effects |
| Policosanol | Possible antiplatelet effect (based on anecdotal evidence). May increase bleeding risk |
| Prickly Ash<br><br>(North and South) | Clinical evidence of hypotensive effects |
| Prickly pear cactus | Clinical research suggesting hypoglycaemic effects |
| Red Clover | Pro-oestrogenic; could increase thrombus risk |

| | |
|---|---|
| Resveratrol | Possible antiplatelet effect (based on in vitro data).<br><br>May increase bleeding risk |
| Rosemary | Hyperglycaemic effect |
| Sage | Potential hypotensive effects<br><br>Sedative effect<br><br>Clinical research suggests hypoglycaemic effects |
| SAMe, | Has serotinergic properties; treat as an SSRI.<br><br>Caution with pethidine use. |
| Saw Palmetto | Immunomodulating properties; Possible increased risk of infection and poor wound healing<br><br>Both oestrogenic and anti-androgenic properties<br><br>Possible antiplatelet effect (based on anecdotal evidence). May increase bleeding risk |
| Scullcap | Reputed action |
| Senega | CNS depressant,<br><br>Clinical research suggests hypoglycaemic effects |
| Shepherd's Purse | Potentiates barbiturate sleeping time<br><br>Anticholinesterase action; bradycardia, hypotension, bronchoconstriction. |
| Squill | Clinical evidence of hypotensive effects |
| St. John's wort | Has serotinergic properties; treat as an SSRI.<br><br>Caution with pethidine use.<br><br>Also reduces warfarin effect.<br><br>Clinical evidence of hypotensive effects |
| Tansy | Clinical research suggests hypoglycaemic effects |
| Theanine | Hypotensive effects |
| Thyme | Clinical evidence of hypotensive effects |
| Valerian | Sedative effects. Potentiates anaesthetics. Advise patients to withdraw slowly to avoid withdrawal effects. |

| | |
|---|---|
| Vanadium | Clinical research suggesting hypoglycaemic effects |
| Vervain | Erratic blood pressure altering properties, causing both hyper- and hypo-tension in patients.<br><br>Inhibition of gonadotrophic activity; conflicting results<br><br>Some sympathomimetic activity; causing, tachycardia and arrhythmias |
| Vitamin E | High doses associated with antiplatelet effects; increases bleeding risk |
| Wild Carrot | Clinical evidence of hypotensive effects<br><br>Sedative effect<br><br>Pro-oestrogenic; could increase thrombus risk |
| Wild Lettuce | Sedative effect |
| Yarrow | Clinical evidence of hypotensive effects<br><br>Promotes coagulation |

## 33. Monitoring compliance and effectiveness

| | |
|---|---|
| Element to be monitored | Day of surgery cancellations |
| Lead | Anaesthetic lead for POA with support from ACCT Governance Service Lead |
| Tool | Clinical review of DOS cancellations.<br>Due to varied nature of surgical patients, there is no appropriate tool that can be used, hence a clinician needs to review on a case by case basis |
| Frequency | Quarterly |
| Reporting arrangements | Report feeds into anaesthetic governance meeting biannually |
| Acting on recommendations and Lead(s) | Anaesthetic Governance meetings<br>Anaesthetic and nursing leads for POA |
| Change in practice and lessons to be shared | Anaesthetic governance<br>POA department team briefings |

## 34. Equality and Diversity

34.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Inclusion & Human Rights Policy' or the Equality and Diversity website.

34.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.

# Appendix 1. Governance Information

| | | | |
|---|---|---|---|
| **Document Title** | Pre Assessment Clinical Guidelines V7.0 | | |
| **This document replaces (exact title of previous version):** | Pre Assessment Clinical Guidelines V6.0 | | |
| **Date Issued/Approved:** | December 2021 | | |
| **Date Valid From:** | December 2021 | | |
| **Date Valid To:** | December 2024 | | |
| **Directorate / Department responsible (author/owner):** | Anaesthesia Theatre Critical Care Group ACCT: Pre-Assessment Lead: Gary Matthews | | |
| **Contact details:** | 01872 258195 | | |
| **Brief summary of contents** | Guidelines for pre-operative assessment and preparation for adults requiring regional or general anaesthesia for elective surgery and endoscopic procedures across the trust. | | |
| **Suggested Keywords:** | Pre-Operative assessment | | |
| **Target Audience** | RCHT | CFT | KCCG |
| | ✓ | | |
| **Executive Director responsible for Policy:** | Medical Director | | |
| **Approval route for consultation and ratification:** | ACCT Governance | | |
| **General Manager confirming approval processes** | Doug Riley | | |
| **Name of Governance Lead confirming approval by specialty and care group management meetings** | Anneka Southworth | | |
| **Links to key external standards** | CQC standards: 1; 4; 6; 16 | | |

| | | | | |
|---|---|---|---|---|
| **Related Documents:** | RCHT Guidelines for the Anaesthetic Management of Patients with Latex Allergy<br>Pre-Operative Assessment Guidelines<br>Page 42 of 44<br>RCHT Management of Patients who are Symptomatic or at risk of any transmissible Spongiform Encephalopathy Policy inc: Creutzfeldt – Jakob disease<br>RCHT Guidelines for the Management of Adult Patients with Diabetes Mellitus during Surgery.<br>RCHT Thrombosis Prevention and Anticoagulation Policy<br>RCHT Blood Transfusion Policy<br>RCHT Patient Identification Policy<br>RCHT Policy for the pre-operative fasting of patients<br>RCHT Consent to Treatment/Examination RCHT Standards of Record Keeping RCHT Infection Control Policy<br>NMC (2008) The Code: Standards of conduct, performance and ethics for nurses and midwives<br>NICE: Venous thromboembolism: reducing risk (CG92 Jan 2010)<br>SPC-EU June 2013 Xarelto (rivaroxaban)<br>SPC June 2013 Pradaxa (dagibactran)<br>HPC (2008) Standards of Proficiency | | | |
| **Training Need Identified?** | No | | | |
| **Publication Location (refer to Policy on Policies – Approvals and Ratification):** | Internet & Intranet | ✓ | Intranet Only | |
| **Document Library Folder/Sub Folder** | Clinical / Anaesthetics | | | |

**Version Control Table**

| Date | Version No | Summary of Changes | Changes Made by *(Name and Job* |
|---|---|---|---|
| June 2009 | 01 | Original version | Andy Lee, Consultant Anaesthetist |
| Nov 2010 | 02 | Amendments to pregnancy testing | Andy Lee, Consultant Anaesthetist |
| Nov 2013 | 03 | Update to anticoagulation therapy peri-operatively | Andy Lee, Consultant Anaesthetist |

| | | | |
|---|---|---|---|
| 14 Nov 14 | 04 | Appendices moved to separate documents for publication via mobile guidelines website | Andy Lee, Consultant Anaesthetist |
| 03 May 16 | 04.1 | Appendix added relating to Cardiac Implantable Electronic Devices | Barrie Phypers, Consultant Anaesthetist |
| April 2018 | 5.0 | Re-titled, updated Governance form, updated Equality Impact Assessment form | Barrie Phypers, Consultant Anaesthetist |
| April 2018 | 6.0 | Parkinson's Disease – 4 new pages updated. Pre-operative haemoglobin optimisation replaced/updated. | Barrie Phypers, Consultant Anaesthetist |
| June 2020 | V6.1 | Updated preoperative medication advice in Diabetes Mellitus chapter | Tom Bevir, Consultant Anaesthetist |
| November 2020 | V6.2 | Updated references and insertion of table CIEDS.<br>Updated references including mention of capacity, cognitive impairment – Changes noted locally but not sent for approval. | Lesley Milne, Consultant Anaethetist. Tom Blincoe |
| December 2021 | V7.0 | Ful Version 7.0 revision and incorporated V6.2 amendments. | Gary Matthews, Consultant Anaesthetist POA Lead |

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**This document is only valid on the day of printing**

**Controlled Document**

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# Appendix 2. Equality Impact Assessment

<table>
<tr><th colspan="6">Section 1: Equality Impact Assessment Form</th></tr>
<tr><td colspan="6">Name of the strategy / policy /proposal / service function to be assessed<br>Pre Assessment Clinical Guidelines V7.0</td></tr>
<tr><td colspan="3">Directorate and service area:<br>Anaesthetic and Theatre Division</td><td colspan="3">Is this a new or existing Policy?<br>Existing</td></tr>
<tr><td colspan="3">Name of individual/group completing EIA<br>Gary Matthews, Consultant Anaesthetist</td><td colspan="3">Contact details:<br>01872 253133</td></tr>
<tr><td>1. Policy Aim<br>Who is the strategy / policy / proposal / service function aimed at?</td><td colspan="5">A guide for the pre-operative assessment and preparation of patients undergoing planned surgery.<br><br>Staff involved with the preparation of patients for planned surgery</td></tr>
<tr><td>2. Policy Objectives</td><td colspan="5">Guide efficient and safe pre-operative preparation of patients for planned surgery</td></tr>
<tr><td>3. Policy Intended Outcomes</td><td colspan="5">Efficient assessment and preparation of patients for surgery<br>Minimise day of surgery cancellations<br>Lead to good outcomes from surgery</td></tr>
<tr><td>4. How will you measure the outcome?</td><td colspan="5">Follow up of day of surgery cancellations attributable to inadequate pre-assessment</td></tr>
<tr><td>5. Who is intended to benefit from the policy?</td><td colspan="5">Patients having planned surgery</td></tr>
<tr><td rowspan="3">6a). Who did you consult with?<br><br>b). Please list any groups who have been consulted about this procedure.</td><td>Workforce</td><td>Patients</td><td>Local groups</td><td>External organisations</td><td>Other</td></tr>
<tr><td>X</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Please record specific names of groups:<br>ACCT Governance</td></tr>
<tr><td>c). What was the outcome of the consultation?</td><td colspan="5">Approved</td></tr>
</table>

**7. The Impact**
Please complete the following table. If you are unsure/don't know if there is a negative impact you need to repeat the consultation step.

Are there concerns that the policy **could** have a positive/negative impact on:

| Protected Characteristic | Yes | No | Unsure | Rationale for Assessment / Existing Evidence |
|---|---|---|---|---|
| **Age** | | X | | |
| **Sex** (male, female non-binary, asexual etc.) | | X | | |
| **Gender reassignment** | | X | | |
| **Race/ethnic communities /groups** | | X | | |
| **Disability** (learning disability, physical disability, sensory impairment, mental health problems and some long term health conditions) | | X | | |
| **Religion/ other beliefs** | | X | | |
| **Marriage and civil partnership** | | X | | |
| **Pregnancy and maternity** | | X | | |
| **Sexual orientation** (bisexual, gay, heterosexual, lesbian) | | X | | |

**If all characteristics are ticked 'no', and this is not a major working or service change, you can end the assessment here as long as you have a robust rationale in place.**

I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.

| | |
|---|---|
| **Name of person confirming result of initial impact assessment:** | **Gary Matthews, Consultant Anaesthetist** |

**If you have ticked 'yes' to any characteristic above OR this is a major working or service change, you will need to complete section 2 of the EIA form available here:**
Section 2. Full Equality Analysis

**For guidance please refer to the Equality Impact Assessments Policy (available from the document library) or contact the Human Rights, Equality and Inclusion Lead** india.bundock@nhs.net