

Nil By Mouth (NBM) and Peri Operative Medicines Use

Key Document code:	WAHT-TP- 054	
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Approved by:	Paediatric Quality Improvement meeting	
Date of Approval:	22 nd March 2019	
Date of review:	23 rd March 2021	

Date	Amendment	Approved by

Introduction

The term 'Nil By Mouth' is often used inappropriately and therefore can be misleading. Patients may be labelled 'Nil By Mouth' for several reasons and this may put the patient at risk of dehydration, malnutrition and the omission of essential regular medicines. Some patients are kept nil by mouth repeatedly for various investigations. As hospital in patients are often either malnourished or at risk of malnutrition even before admission it is essential that interference with nutritional intake be kept to a minimum. Careful consideration must be given to the use of the term. Examples of why patients may be nil by mouth:

- Pre or post surgery
- When the bowel is non-functional e.g. gastric outlet obstruction
- The patient is unable to swallow safely e.g. after a stroke, head injury, myasthenia gravis or reduced level of consciousness.
- Nausea or vomiting may also inhibit the intake of fluids, nutrition and oral medicines.

No patient should be without fluid input (either enteral or intravenous) for more than 10 hours. Certain groups of patients are particularly vulnerable and should not be left for long periods without hydration, correcting serum electrolytes as necessary:

- Elderly patients
- Patients who have undergone bowel preparation
- Acutely ill patients
- Breast feeding mothers
- Infants and children

If patients need to be kept NBM for longer (days) consider other methods of feeding such as nasogastric, naso-jejunal, PEG or parenteral feeding. This needs to involve multi-disciplinary team (medical and nursing staff, dieticians, pharmacists and speech and language therapists) including patients and relatives. Patients should be re-assessed at least daily to determine when regular feeding can be re-instated. Specific guidance on enteral and parenteral feeding can be found on the Trust intranet.

The National Confidential Enquiry into Peri-Operative Deaths (NCEPOD) report for 2001-02 ⁽¹⁾ found that many patients were not being given essential regular medicines before operations. The report entitled 'Functioning as a team' says 'Of concern is the information on antianginal, bronchodilator and steroid treatment. These drugs should be given throughout the operative period and when the patient cannot take their oral drugs, there are simple topical, inhaled or parenteral replacement preparations readily available'. This recommendation is supported by an observational study by Kennedy et al ⁽²⁾ of over 1000 admissions for general and vascular surgery that found that a high number of patients scheduled for inpatient surgery took medicines unrelated to surgery, the majority of which (53%) were for cardiovascular problems. There was a higher incidence of peri-operative complications among patients who took such medicines and there was a significant association between abstinence from their regular medication and adverse outcomes. This guideline, produced as a result of a recommendation by

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The Royal College of Anaesthetists helps define which medicines should be administered pre and post-operatively and which should be discontinued. ⁽³⁾

- It is not appropriate to simply omit an oral medicine without first clarifying the instruction with the relevant team. It may be appropriate to give the oral medicine or to change to an alternative product using an alternative route. Failure to continue a patient's usual medication can potentially cause an exacerbation of their chronic condition or adverse effects from abrupt drug withdrawal to occur.
- When changing the route of administration of a drug care should be taken to ensure that the appropriate dose and frequency is prescribed, as these may not be the same as for the oral route. Please check with the ward pharmacist, anaesthetist Medicines Information (extension 30235) or the on-call pharmacist (available via switchboard).
- Patients are at risk of aspirating their stomach contents during general anaesthesia. Therefore minimum fasting periods for scheduled surgery are:
 - 6 Hours for solid food, infant formula or milk
 - 4 Hours for breast milk
 - 2 Hours for water, dilute squash or tea/coffee with a small amount of milkSee appendices for patient information
- As water leaves the stomach within 2 hours of ingestion, medicines can be given up to two hours before surgery with water.
- Chewing gum should not be chewed within 2 hours before anaesthesia. However, patients who have chewed gum pre-operatively should not have their surgery/procedure cancelled for this reason
- There are a few significant interactions between drugs used during surgery and routine medications that require the drugs not to be administered concurrently. The anaesthetist will usually manage this, by their choice of anaesthetic technique but the advice given in this document will help limit potential problems
- This guideline is intended to provide advice on therapy that should be continued or discontinued for patients who are 'nil by mouth' It is NOT intended to provide advice regarding the alteration to the preparation, formulation or alternative medicine for specific therapies. For this information, please contact your ward pharmacist or Medicines Information (Mon-Friday 9am to 5pm) on extension 30235.

Adjustment to routine medication during the peri-operative period

Routine medicines should wherever possible, be reviewed *prior* to surgery for:

1. Medicines that should be continued throughout the peri-operative period to prevent relapse of the treated condition or to avoid the effects of drug withdrawal.
2. Medicines that should be withheld before surgery to reduce the risks that they may impose upon the procedure.

Pre-operative assessment registered nursing staff may use this guideline to advise patients on medicines use but must refer specific cases to the surgeon and or anaesthetist for advice if they are not confident about the correct course of action. Written instruction should be given to the patient and the registered nursing staff should ensure understanding of the instructions given.

If adjustments to therapy cannot be made e.g. for emergency admissions, ensure the surgeon and anaesthetist are aware of the patients medication history

PERI-OPERATIVE MEDICINES USE GUIDANCE

Medication	Advice	Comments
ACE Inhibitors E.g. captopril, enalapril, fosinopril, lisinopril, ramipril,trandolapril.	See comments	For patient's on ACE Inhibitors who are to have an epidural anaesthetic, there may be a higher risk of hypotension during anesthesia. This is due to blocking of angiotensin II formation secondary to compensatory renin release and is more likely to occur if the patient is volume depleted. Continue therapy and inform the anaesthetist who may request that the pre-operative dose be omitted.
Allopurinol	Continue	Must ensure patient is able to take with sufficient water to prevent oesophageal lodging.
Alpha blockers e.g. doxazosin, tamsulosin	Decision to continue on clinical grounds	Consider indication e.g. if for hypertension, continue for blood pressure control; if for urinary retention and patient catheterized, may be withheld if patient at risk of hypotension. Alpha blockers should be discontinued post TURP if prescribed for urinary retention.
Aminosalicylates e.g. Mesalazine (Asacol, Pentasa)	Continue unless bowel surgery then omit on day of procedure	Preparations for alternative routes of administration are available if indicated. Review need to continue therapy according to surgical procedure.
Analgesia - Opioid	See comments	Patients should not be left without analgesia. Pre-operatively, the patient's usual analgesia should be continued and the anaesthetist informed of the regimen. Post-operatively, alternative routes of administration may be used if the patient is unable to take oral medicines. Please seek advice from the anaesthetist/pharmacist/Acute Pain Control Guidelines as appropriate.

Angiotensin II antagonists e.g. losartan, candesartan	See comments	For hypertensive patient's likely to have an epidural anaesthetic, withhold on the morning of surgery. These patients on ACE Inhibitors may have a higher risk of hypotension during anesthesia, due to blocking of angiotensin II formation secondary to compensatory renin release. Hypotension is more likely to occur if the patient is volume depleted. For congestive heart failure and/or history of myocardial infarction patients, continue therapy and inform the anaesthetist.
Anti-androgens e.g. bicalutamide, cyproterone, finasteride	Continue	
Anti-anginal therapy e.g. isosorbide mononitrate, nicorandil	Continue	Alternative routes of administration are available if the patient is nil by mouth post-operatively, please seek advice from pharmacy.
Anti-arrhythmics E.g. amiodarone, digoxin, disopyramide, flecainide, verapamil.	Continue	Anti-arrhythmic drugs should generally be continued to prevent relapse of the arrhythmia. However, amiodarone can safely be omitted for a few days as it has a very long half-life. Digoxin, amiodarone and verapamil can be given by injection if the patient is unable to take orally. Consult the pharmacist for dosage advice. Omit therapy if the patient is bradycardic (<50 beats per minute)

Anticoagulants (Oral)	Warfarin, <u>phenindione</u>	See comments	Refer to Trust guideline WAHT-HAE-002. Oral anticoagulants increase the risk of bleeding complications and should, ideally, be stopped 5 days before surgery to allow the INR to fall below 1.5. Continuing anticoagulation with LMWH or unfractionated heparin can be given in the interim as appropriate, either at prophylactic or full treatment dose, according to the clinical indication. If it is not possible to stop oral anticoagulation, the effects can be reversed within 12 hours with oral vitamin K, 6-8 hours with IV vitamin K or immediately with <u>Beriplex</u> (on specialist advice). Epidural analgesia will require an INR \leq 1.5 Patients who attend hospital and may need theatre should be given iv vitamin K as soon as possible as this may prevent the need for PCC if they require an operation later in their hospital stay
	<u>Dabigatran etexilate - Pradaxa®</u>	See comments	Refer to Trust guideline WAHT-HAE-002. Patients on dabigatran should have their PT and APTT measured prior to a surgical procedure. The manufacturer does not recommend concomitant use with post-op indwelling epidural/spinal catheters. Other forms of central <u>neuraxial</u> blockade or regional anaesthesia for surgery are not contraindicated. If an epidural catheter is placed, withhold the re-introduction of dabigatran until 24 hours after epidural removal. The risk of epidural or spinal haematoma may be higher with the concomitant use of other medicines affecting haemostasis. Prior to <u>neuraxial</u> intervention consideration should be given to the potential benefit versus the risk in anticoagulated patients or in patients to be anticoagulated for <u>thromboprophylaxis</u> . The first dose of dabigatran may be given 2-4 hours after cessation of surgery if haemostasis satisfactory. If there is a concern over bleeding, the re-introduction of dabigatran should be delayed but consider the use of prophylactic LMWH if the delay is $>$ 24 hours. Dabigatran is contraindicated in patients with severe renal impairment (creatinine clearance $<$ 30 ml/min) These patients should therefore receive reduced dose low molecular weight heparin or unfractionated heparin as detailed in the Guidelines for <u>Thromboprophylaxis for Adult Inpatients Undergoing Surgery (WAHT-SUR-007)</u> Please refer to the Summary of Product Characteristics for more detailed information on dosing in mild renal impairment and in patients aged $>$ 75 years.

			For patients requiring surgery whilst taking Dabigatran, therapy should be stopped as detailed in the table below.																						
			<table border="1"> <thead> <tr> <th rowspan="2">Renal function (CrCL in ml/min)</th> <th rowspan="2">Estimated half-life (hours)</th> <th colspan="2">Stop dabigatran before elective surgery</th> </tr> <tr> <th>Standard risk</th> <th>High risk of bleeding or major surgery</th> </tr> </thead> <tbody> <tr> <td>\geq 80</td> <td>~ 13</td> <td>24 hours before</td> <td>2 days before</td> </tr> <tr> <td>\geq 50-$<$ 80</td> <td>~ 15</td> <td>2 days before</td> <td>3 days before</td> </tr> <tr> <td>\geq 30-$<$ 50</td> <td>~ 18</td> <td>3 days before</td> <td>4 days before ($>$ 48 hours)</td> </tr> <tr> <td>$<$30</td> <td>~27</td> <td>5 days before</td> <td>5 days before</td> </tr> </tbody> </table> <p>Emergency Surgery If it is not possible to stop therapy as described above, the blood bank should be informed to allow time for cross matching of blood, platelets and the thawing of FFP if there is excessive bleeding during surgery. Where life-threatening bleeding is present the use of prothrombin complex concentrate and/or recombinant factor <u>VIIa (NovoSeven)</u> should be considered. Epidural or spinal <u>anaesthesia</u> should be avoided. Consideration should be given to the use of tranexamic acid (contra-indicated in urinary tract bleeding). There is no indication for the routine use of FFP or platelets without major <u>haemorrhage</u> as these will not reverse the effects of the drug</p>	Renal function (CrCL in ml/min)	Estimated half-life (hours)	Stop dabigatran before elective surgery		Standard risk	High risk of bleeding or major surgery	\geq 80	~ 13	24 hours before	2 days before	\geq 50- $<$ 80	~ 15	2 days before	3 days before	\geq 30- $<$ 50	~ 18	3 days before	4 days before ($>$ 48 hours)	$<$ 30	~27	5 days before	5 days before
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Anticoagulants (Oral)	<u>Rivaroxaban - Xarelto®</u>	See comments	Refer to Trust guideline WAHT-HAE-002 Patients on rivaroxaban should have their PT and APTT measured prior to a surgical procedure. The manufacturer advises the risk of epidural or spinal haematoma may be increased by the post-operative use of indwelling epidural catheters or the concomitant use of medicinal																						

		<p>products affecting haemostasis. Prior to <u>neuraxial</u> intervention the physician should consider the potential benefit versus the risk in anticoagulated patients or in patients to be anticoagulated for <u>thromboprophylaxis</u>.</p> <p>For epidural catheter removal, ensure at least 18hours between the last dose of Rivaroxaban and epidural catheter removal. Rivaroxaban may be restarted after at least 6 hours post removal of epidural catheter.</p> <p>Give the first dose 6-10 hours <u>post surgery</u> provided haemostasis satisfactory unless traumatic epidural or spinal in which case give first dose 24 hours post procedure.</p> <p>In patients with severe renal impairment (creatinine clearance < 30 ml/min) rivaroxaban plasma levels may be significantly increased which may lead to an increased bleeding risk. These patients should therefore receive reduced dose low molecular weight heparin or unfractionated heparin as detailed in the Guidelines for <u>Thromboprophylaxis</u> for Adult <u>inpatients</u> Undergoing Surgery (WAHT-SUR-007)</p> <p>For patients undergoing surgery, rivaroxaban, should be stopped as advised below:</p> <table border="1" data-bbox="646 712 1497 1016"> <thead> <tr> <th rowspan="2">Renal function (CrCl in ml/min)</th> <th colspan="2">Timing of last dose before elective surgery</th> </tr> <tr> <th>Standard risk</th> <th>High risk of bleeding or major surgery</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>24 hours before</td> <td>2 days before</td> </tr> <tr> <td>≥ 50-< 80</td> <td>2 days before</td> <td>3 days before</td> </tr> <tr> <td>≥ 30-< 50</td> <td>3 days before</td> <td>4 days before</td> </tr> <tr> <td><30</td> <td>5 days before</td> <td>5 days before</td> </tr> </tbody> </table> <p>Emergency Surgery If it is not possible to stop therapy as described above, the blood bank should be informed to allow time for cross matching of blood, platelets and the thawing of FFP if there is excessive</p>	Renal function (CrCl in ml/min)	Timing of last dose before elective surgery		Standard risk	High risk of bleeding or major surgery	≥ 80	24 hours before	2 days before	≥ 50-< 80	2 days before	3 days before	≥ 30-< 50	3 days before	4 days before	<30	5 days before	5 days before
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		<p>complex concentrate and/or recombinant factor <u>VIIa (NovoSeven)</u> should be considered. Epidural or spinal anaesthesia should be avoided. Consideration should be given to the use of tranexamic acid (contra-indicated in urinary tract bleeding). There is no indication for the routine use of FFP or platelets without major haemorrhage as these will not reverse the effects of the drug</p>																	
	<p><u>Apixaban Eliquis®</u></p>	<p>See comments</p> <p>Refer to Trust guideline WAHT-HAE-002</p> <p>Elective surgery <u>Apixaban</u> has a half-life of 10-15 hours but is only partially <u>renally</u> excreted (~30%). For procedures with a high risk of bleeding the drug should be discontinued for 48 hours, procedures with a lower risk of bleeding should be discontinued for 24 hours. A normal PT and APTT <u>suggests</u> that the anticoagulant effect of the drug has worn off. <u>Apixaban</u> can be restarted when haemostasis is secure and there is no further risk of bleeding, if there is a delay of >24 hours in restarting the <u>apixaban</u> the patient should be assessed to receive <u>thromboprophylaxis</u> with low molecular weight heparin. <u>Apixaban</u> should not be given until epidural catheters have been removed for 5 hours.</p> <p>Emergency surgery If patient requires emergency surgery ideally it should be delayed as long as clinically possible to allow maximal reversal of the <u>apixaban</u>. Consideration should be given to activated charcoal if there is no contra-indication. Prior to surgery the blood bank should be informed to allow time for cross matching of blood, platelets and the thawing of FFP if there is excessive bleeding during surgery. When surgery does take place, if there is bleeding, then there should be early use of blood, platelets and FFP. Where life-threatening bleeding is present the use of prothrombin complex concentrate and/or recombinant factor <u>VIIa (NovoSeven)</u> should be considered. Epidural or spinal anaesthesia should be avoided. Consideration should be given to the use of tranexamic acid (contra-indicated in urinary tract bleeding). There is no indication for the routine use of FFP or platelets without major haemorrhage as these will not reverse the effects of the drug.</p> <p>Dental procedures <u>Apixaban</u> at standard dose is approximately equitant to an INR of 2.5. Therefore dental procedures that previously would have been safely performed while on warfarin can be performed without interruption of <u>apixaban</u>. It is reasonable to schedule the surgery as long after the <u>apixaban</u> as possible to achieve lowest drug levels during the time of operation and to avoid having the next dose for 4 hours after the procedure.</p>																	

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Anticoagulants (parenteral)	Low molecular weight heparin e.g. enoxaparin	See comments	If the patient is to have an epidural catheter, ensure at least 12 hours between enoxaparin administration and the insertion of the epidural catheter. This is to reduce the risk of epidural <u>haematoma</u> . For epidural catheter removal, ensure this is at least 12 hours after enoxaparin administration. Once the epidural catheter has been removed, allow at least 4-6 hours before administering the next dose.
	<u>Fondaparinux</u>	See comments	If the patient is to have an epidural catheter, <u>fondaparinux</u> may be given 6 to 12 hours postoperatively. For epidural catheter removal, ensure at least 36 hours between the last dose of <u>fondaparinux</u> and removal of the epidural catheter. <u>Fondaparinux</u> may then be restarted 12 hours post removal of the epidural catheter.
Antidiabetic medicines	<u>Sulphonylureas</u> e.g. <u>gliclazide</u> , <u>glipizide</u>	See comments	Omit on the morning of procedure and follow Trust guideline WAHT-END-005 Guideline for the Management of diabetes for patients undergoing IV contrast & <u>anaesthesia</u> . NB <u>glibenclamide</u> has <u>renally</u> excreted active metabolites which may result in a prolonged duration of action
	Metformin	See comments	For Surgical patients undergoing a short starvation period (no more than one missed meal) metformin should be continued as normal. For patients with longer starvation periods, stop metformin when the preoperative fast begins and restart postoperatively once the patient is eating again. Use with caution in patients at risk of renal impairment e.g. in dehydration or the co-prescribing of potentially nephrotoxic agents. See WAHT-ANA-019 For patients undergoing IV contrast with normal renal function (creatinine clearance >50ml/minute), there is no need to omit metformin. For patients with renal impairment, stop metformin for 48 hours following the procedure. Restart metformin when renal function is satisfactory.

	<u>Glitazones</u> e.g. <u>pioglitazone</u>	Continue	
	<u>Acarbose</u>	See comments	Continue unless patient starved (omit if NBM as tablets must be taken with food)
	GLP-1 agonist e.g. <u>exenatide</u>	See comments	Omit on the day of surgery and follow Trust guideline WAHT-END-005 Guideline for the Management of diabetes for patients undergoing IV contrast & <u>anaesthesia</u> .
	DPP-4 inhibitors e.g. <u>sitagliptin</u>	See comments	Omit on the day of surgery and follow Trust guideline WAHT-END-005 Guideline for the Management of diabetes for patients undergoing IV contrast & <u>anaesthesia</u> .
Anti-epileptics E.g. phenytoin, carbamazepine, sodium valproate.		Continue	Anti-epileptics should be continued since abrupt withdrawal may precipitate seizures. Patients may have reduced requirements for general anaesthesia. Alternative routes of administration are available if the patient is nil by mouth post-operatively.
Anti-muscarinic drugs <u>Orphenadine</u> , <u>Procyclidine</u> , <u>Trihexyphenidyl</u>		Continue	Withhold if patient is presenting with intestinal obstruction or <u>post operative</u> ileus or urinary retention post catheter removal
Anti-Parkinsonian Drugs e.g. <u>cabergoline</u> , <u>madopar</u> , <u>sinemet</u>		Continue	These drugs should be continued wherever possible as per the patient's usual regimen (at the times determined by the patient/ <u>carer</u>) as uncontrolled symptoms reduce mobility and impede recovery. Alternative medication is available to relieve rigidity and tremor if the patient is (truly) unable to take oral medication after surgery. Avoid pethidine and tramadol with <u>selegiline</u> . Do NOT prescribe metoclopramide or <u>prochlorperazine</u> in Parkinson's Disease (<u>domperidone</u> may be given in patients without cardiovascular risk factors)

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Anti-platelet Drugs	Aspirin	See comments	For patients with coronary artery stents, each case must be considered with liaison between the surgeon, anaesthetist and cardiologist. See flow diagram for management at the end of this document
	Cilostazol	See comments	In general, aspirin/clopidogrel/prasugrel/ticagrelor should be stopped when the risks of postoperative bleeding are high or where the consequences of even minor bleeding are significant e.g. retinal. This must be balanced against the risk of precipitating thromboembolic complications if these are stopped, particularly in those with unstable angina. If low dose aspirin, clopidogrel , prasugrel or ticagrelor are to be stopped, this is generally done 7 days (14 days for ticlopidine) before surgery to allow recovery of adequate platelet function. Restart antiplatelet therapy as soon after surgery as possible (ensuring that any epidural catheter has been removed first). See appendix 4 regarding timing advice relating to spinal/epidural anaesthesia
	Clopidogrel	See comments	
	Prasugrel	See comments	Cilostazol has a platelet aggregation inhibitory effect leading to a possible increased bleeding risk. For patients at risk of peri-operative bleeding, cilostazol should be stopped 5 days before surgery.
	Ticagrelor	See comments	
	Ticlopidine	See comments	
	Dipyridamole	See comments	It is not usually necessary to stop dipyridamole prior to surgery, but if complete absence of anti-platelet effect is desired then it should be stopped 24 hours before surgery.
	Platelet glycoprotein IIb/IIIa receptor antagonists	See comments	Time to normal platelet aggregation once discontinued is approximately 8 hours for eptifibatid and tirofiban and 24 to 48 hours for abciximab

Anti-psychotics & Anxiolytics E.g. diazepam, chlorpromazine, sulpiride . (Not clozapine)	Continue	Generally continued to avoid relapse of the condition. Antipsychotics may reduce anaesthetic requirements and potentiate arrhythmias.
Anti- TNF e.g. etanercept	See comments	Discuss use with primary prescriber. The British Society for Rheumatology Guidelines state: In RA patients on anti-TNF, the potential benefit of preventing post-operative infections by stopping treatment should be balanced against the risk of a perioperative flare in RA activity. If anti-TNF is to be stopped prior to surgery, Consideration should be given to stopping at a time 3–5 times the half-life for the relevant drug before surgery (for etanercept this is approximately 2 weeks, for others discuss with Medicines Information ext 20235) Anti-TNF should not be restarted after surgery until there is good wound healing and no evidence of infection.
Aromatase inhibitors Anastrozole , Exemestane , Letrozole	Continue	Prescribe VTE prophylaxis and compression stockings
Asthma medication e.g. Inhaled bronchodilators	Continue	It is important that the patient is as stable as possible before surgery. The usual inhaled treatment is given before surgery and an extra dose of bronchodilator may be given with the pre-medication. Nebulised therapy may be used as an alternative.
Azathioprine	Continue	Review need to continue therapy according to surgical procedure and indication
Baclofen	Continue	Abrupt withdrawal may lead to hallucinations, psychotic reactions, convulsions and tachycardia.
Benzodiazepines e.g. diazepam, temazepam	Continue	Abrupt withdrawal may lead to withdrawal symptoms

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Beta-blockers e.g. atenolol , bisoprolol , metoprolol , sotalol		Continue	In patients with hypertension, anesthesia and surgery may provoke tachycardia and increase blood pressure. Beta-blockers may help to suppress these effects and reduce cardiovascular complications e.g. myocardial infarction and are therefore usually continued peri-operatively.
Bisphosphonates e.g. alendronate , risedronate		Continue	Must be able to take with a full glass of water whilst standing or sitting upright for 30 minutes. If unable to do so, omit dose.
Calcium channel blockers e.g. amlodipine , felodipine		Continue	Should be given to prevent hypertension and angina.
Clozapine		See comments	<p>Clozapine should be stopped 24 hours before surgery. Therefore, if the patient is on the morning list – do not give on the day before surgery as well as the day of surgery itself. There are no withdrawal problems from doing this. If patient is unable to take clozapine for more than 2 days due to being 'nil by mouth' the drug must be gradually re-titrated up from the starting dose (25mg 1-2 times a day) – contact Pharmacy for advice.</p> <p>Please ensure the patient brings a suitable supply into hospital. Clozapine is no longer stocked at WAHT but a supply may be obtained from Lloyds Pharmacy if the patient does not have their own (this may result in a delay in therapy).</p>
Contraceptives	Combined (COC)	See comments	<p>Oestrogen containing oral contraceptives should be discontinued 4-6 weeks before major elective surgery and all surgery to the legs to reduce the risk of thromboembolism. Alternative contraception e.g. progestogen only pill, should be discussed with the patient but due to the risk of pregnancy, document all decisions and exclude pregnancy prior to surgery. COC should not be restarted until the first menses that occur at least two weeks after the patient is fully mobile following surgery. Alternatively, ensure adequate thromboprophylaxis with compression stockings and LMWH.</p>
	Progesterone only	Continue	Ensure thromboprophylaxis prescribed.
Corticosteroids e.g. prednisolone .		Continue	<p>Continue usual steroid dose on morning of surgery. Risk of HPA axis suppression if patients have been on steroids for 1-2 weeks before surgery or have been on steroids within the last 6 months. Dose and duration of steroids will determine the risk, as will the type of surgery. Stress due to surgery is associated with an increased cortisol production. Therefore, these patients will require IV hydrocortisone cover. Usual dose in major surgery is 50mg of hydrocortisone given pre-operatively, intra-operatively if necessary and every 6-8 hours for 2-3 days after surgery. Normal pre-operative steroid cover should be re-started 2 days after surgery (no gradual dose reduction is needed from post-operative cover).</p> <p>20mg iv hydrocortisone is equivalent to 5mg oral prednisolone but consider dose increase in major surgery to allow for normal stress response.</p>
Ciclosporin		Continue	<p>If patient NBM: Non-transplant patient = omit dose Transplant patient = obtain specialist advice</p>
Cilostazol		See Comments	<p>Due to cilostazol's platelet aggregation inhibitory effect, there is a possible increased bleeding risk. For patient's at risk of peri-operative bleeding, cilostazol should be stopped 5 days before surgery.</p>
Clonidine		Continue	<p>Abrupt withdrawal may precipitate hypertensive crisis. Alternative route may be used if patient is NBM</p>
Dementia medication e.g. donepezil , galantamine , rivastigmine		See comments	<p>Donepezil, galantamine and rivastigmine as cholinesterase inhibitors, are likely to exaggerate succinylcholine-type muscle relaxation during anaesthesia. Decision to stop or continue to be made on clinical grounds</p>
Digoxin		Continue	<p>IV route may be used if the patient is unable to take oral therapy. Seek advice from Pharmacy regarding dose adjustment</p>

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Diuretics	Thiazides e.g. <u>bendroflumethiazide</u> .	Continue	Thiazide and loop diuretics need not be omitted. Any electrolyte imbalance should be corrected before surgery.
	Loop diuretics e.g. <u>furosemide</u> .		Withhold if patient dehydrated but seek advice if patient has cardiac failure.
	Potassium sparing diuretics e.g. <u>amiloride</u> , <u>spironolactone</u>	See comments	Omit potassium-sparing diuretics on the morning of surgery as reduced kidney perfusion in the immediate post-operative period may predispose to <u>hyperkalaemia</u> .
Drugs of dependence e.g. methadone		See comments	Should be given to prevent symptoms of withdrawal. Suggest that the usual dose is continued after surgery and the patient's pain managed separately. Seek advice from the <u>anaesthetist</u>
Erythropoietin e.g. <u>darbepoetin</u>		Continue	Possible increased risk of thrombosis, ensure appropriate <u>thromboprophylaxis</u>
Gabapentin		Continue	
Glucosamine		See comments	Glucosamine may affect blood glucose control. Glucosamine and chondroitin may have an anticoagulant effect and should therefore be discontinued two weeks prior to surgery.



Herbal Medicines This list is not exhaustive, please contact medicines information on 30235 for further information	Ephedra	Discontinue	Risk of MI and stroke from tachycardia and hypertension. Potential to interact with MAOI's. Discontinue at least 24 hours before surgery.
	Echinacea	Discontinue	Discontinue as far in advance as possible before surgery. Possible increased risk of infection and poor wound healing.
	Garlic	Discontinue	Possible increased risk of bleeding especially in combination with other anti-platelet drugs. Discontinue at least 7 days before surgery.
	Ginkgo	Discontinue	Possible increased risk of bleeding especially in combination with other anti-platelet drugs. Discontinue at least 7 days before surgery.
	Ginseng	Discontinue	Possible increase risk of bleeding. Discontinue at least 7 days before surgery.
	Kava	Discontinue	Possible increased sedation with <u>anaesthetics</u> . Discontinue at least 24 hours before surgery.
	St John's Wort	Discontinue	Interaction with a number of drugs including warfarin and steroids. Refer to BNF for other interactions. Discontinue at least 5 days before surgery.
	Valerian	Discontinue	Possible increased sedation with anaesthetics. Reduce dose slowly over several weeks before surgery. If this is not possible continue until day of surgery. Withdrawal symptoms may develop during post-operative period.

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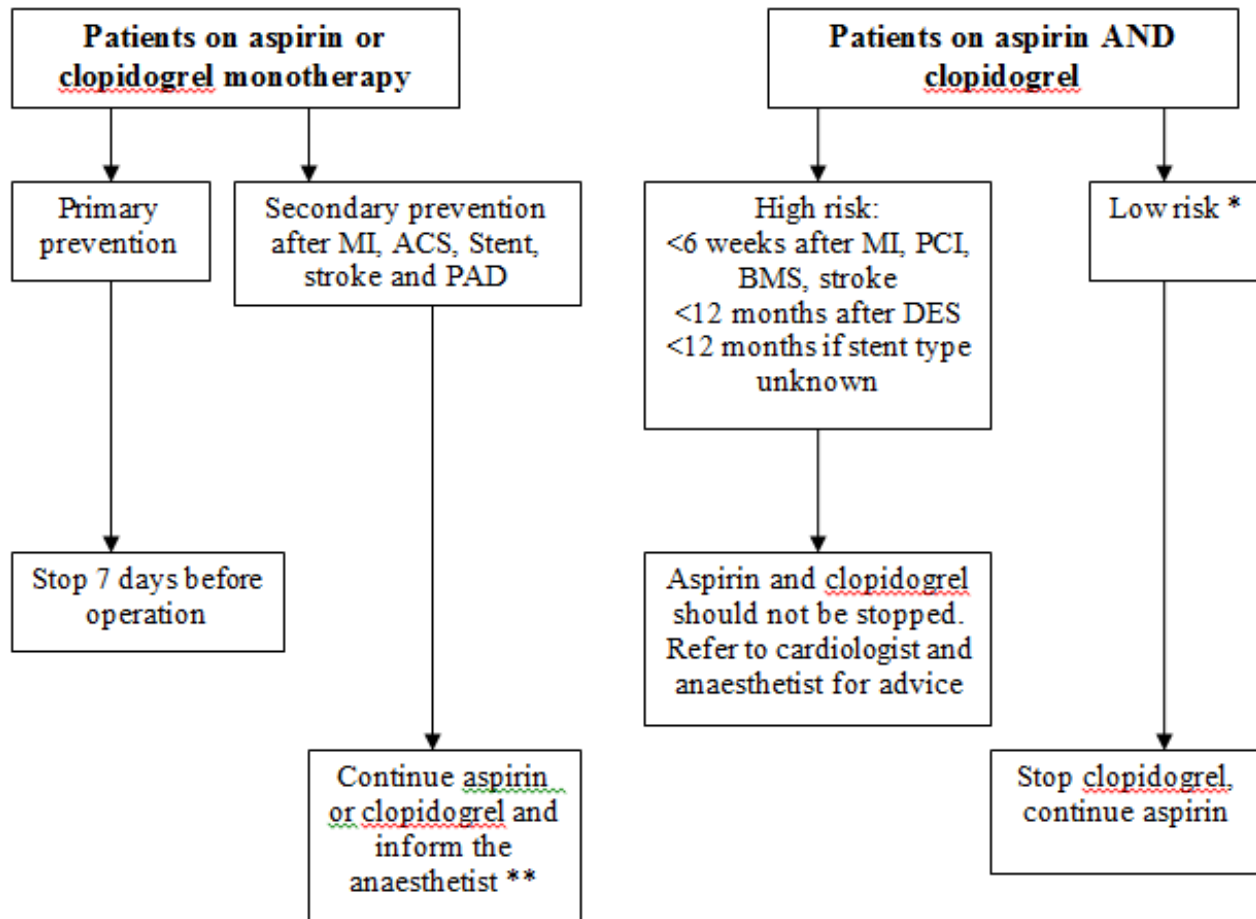
Hormone Replacement Therapy (HRT)	See comments	Preferably discontinue 4 weeks prior to <i>major</i> surgery or where there is a high risk of a thromboembolic event. If not, HRT may be continued <u>peri-operatively</u> but <u>thromboprophylaxis</u> is recommended.
Hydroxychloroquine	Continue	Hydroxychloroquine may exert an antiplatelet effect as described by some studies on its use for <u>thromboprophylaxis</u> . However, due to its long elimination half-life it is not practical to stop this pre-operatively
Insulin	See comments	See appendix 3. Variable Rate Intravenous Insulin Infusion (VRIII) is usually not necessary for patients with a planned short starvation period (no more than one meal will be missed) If VRIII is required, this should stop when the patient is able to eat and drink normally
Iron supplements	See comments	Continue unless bowel <u>surgery then discontinue</u> 7 days pre-operatively.
Levothyroxine, <u>liothyronine</u>	Continue	
Lithium	See comments	Ideally, stop lithium 24 hours before <i>major</i> surgery (but it may be continued in minor surgery) due to risk of toxicity in the <u>peri-operative</u> period due to changing lithium blood levels. If it is not possible to stop, ensure adequate fluid intake during and after surgery. Monitor U+Es regularly. Measure lithium blood levels if necessary. Lithium may be restarted soon after the operation.
Methotrexate	See comments	Withhold dose if due within 48 hours of major surgery. Continue weekly dose if possible to prevent condition flare. If active infection present withhold dose. NB authority to prescribe rests with senior clinician (consultant or SpR)

Monoamine Oxidase Inhibitors (MAOIs) e.g. <u>phenelzine</u>	Discontinue	MAOIs may result in hypertensive crisis with the concurrent use of interacting drugs e.g. pethidine, <u>pentazocine</u> . They are usually withdrawn 2 weeks before surgery. If necessary, they can be substituted with a short acting MAOI such as <u>moclobemide</u> (which can be withheld on the morning of surgery). If withdrawal is not possible, avoid pethidine and <u>pentazocine</u> . <u>Phentolamine</u> can be used to lower the blood pressure in the event of a hypertensive crisis. Inform the <u>anaesthetist</u> of any patients taking an MAOI.
<u>Moclobemide</u>	See comments	Omit on the morning of surgery but continue post-op. Ensure <u>anaesthetist</u> aware patient taking <u>moclobemide</u>
NSAIDs	<u>Conventional</u> e.g. <u>ibuprofen, diclofenac</u>	See comments
	<u>COX-2 inhibitors</u> e.g. <u>celecoxib</u>	Continue
<u>Pentosan polysulfate</u>	See comments	<u>Pentosan</u> has anticoagulant and antiplatelet effects so the risk of bleeding must be considered. Elimination half-life of <u>pentosan</u> of up to 27 hours has been measured. Ensure the <u>anaesthetist</u> is aware that the patient is taking <u>pentosan</u> .
Selective Serotonin Re-uptake Inhibitors (SSRI) E.g. <u>fluoxetine, paroxetine</u>	Continue	Abrupt withdrawal may lead to withdrawal symptoms such as headache, dizziness, <u>paraesthesia</u> , anxiety and nausea. There is a risk of serotonin syndrome with the concurrent administration of pethidine. NB. Be aware of drug interactions with SSRIs.

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Statins e.g. simvastatin, atorvastatin	See comments	May be continued if patient has good renal and hepatic function. NB risk of myopathy and rhabdomyolysis. Omit if LFTs are deranged, creatinine kinase is raised or interacting medicines prescribed.
Tamoxifen	See comments	<p>For patients with <i>breast cancer</i> undergoing major surgery, tamoxifen therapy should be stopped 4 weeks pre-operatively. Ensure adequate <u>thromboprophylaxis</u> with LMWH and compression stockings (especially if tamoxifen has been continued) as there is an increased risk of thromboembolism post-operatively. Tamoxifen should be restarted two weeks postoperatively if the patient is fully mobile.</p> <p>For patients being treated for <i>infertility</i>, tamoxifen should be discontinued 6 weeks pre-operatively and restarted only when the patient is fully mobile.</p>
Theophylline, aminophylline	Continue	Alternative preparations are available, consult pharmacist. Check plasma theophylline concentration for patients at risk of arrhythmias.
Tricyclic Antidepressants E.g. amitriptyline, dosulepin, lofepramine	Continue	Abrupt withdrawal may lead to withdrawal symptoms such as headache, dizziness, paraesthesia, anxiety and nausea. TCAs may increase the risk of ventricular arrhythmias and hypertension during surgery. For patients with a high cardiovascular risk planned for major surgery, TCAs may be withdrawn slowly 2 weeks before surgery to reduce this risk. This may not be possible in severely depressed patients. If therapy continued, ensure the <u>anaesthetist</u> is aware and monitor patients for withdrawal symptoms if doses missed in the post-operative period.
Ulcer-healing medicines e.g. ranitidine, omeprazole, lansoprazole	Continue	
Vitamin and mineral supplements	Continue	
Warfarin	See oral anticoagulants	

Peri-operative antiplatelet therapy



Appendix 1 – Ward notices

Fasting / Nil by mouth policy for patients before anaesthesia or sedation where consciousness will be impaired.

- No food may be taken for 6 hours before the procedure.
(infants may be given breast milk up to 4 hours before anaesthesia or sedation)
- Water or dilute squash should be consumed up until 2 hours before the procedure. Tea and coffee with a small amount of milk is also acceptable
Essential medicines should also be given at this time. Please refer to the 'Nil by Mouth and Peri-operative medicines use guideline' for more information (available on the intranet).
- For 2 hours before the procedure, no food or drinks may be consumed or chewing gum chewed. However, a small amount (30ml) of water to take tablets prescribed as a premed may be permitted.

In practice:

For patients on a **morning list**, they must stop eating at 2am. They may drink water, dilute squash, or tea/coffee with a small amount of milk until 6am. After 6am they should not drink anything unless asked to take a premed by the nursing staff and must not chew gum. If surgery is delayed, patients may be offered a drink up to two hours before the expected time of surgery.

For patients on an **afternoon list**, they must stop eating at 7am. They may drink water, or tea/coffee with a small amount of milk until 11am. After 11am they should not drink anything unless asked to take a premed by the nursing staff and must not chew gum. If surgery is delayed, patients may be offered a drink up to two hours before the expected time of surgery.

Patients listed on an **all day list** should be treated as if they are on a morning list unless the surgeon and anaesthetist decide otherwise. Patients may be offered a drink up to two hours before the expected surgery on the advice of the surgeon/anaesthetist.

Appendix 2

Patient Guidance about starvation / NBM to be inserted into patient invitation letters.

For patient on morning operating lists:

You may be having your procedure under anaesthetic or sedation.

It is very important that you follow these instructions:

We advise you to eat a main meal on the evening before your operation and also have a snack late evening. You are allowed to eat until 2am on the day of your operation.

, tea and coffee with a small amount of milk are allowed until 6am. It is *recommended* for you to have a drink *before* 6am

For patients on afternoon operating lists:

You may be having your procedure under anaesthetic or sedation.

It is very important that you follow these instructions:

You are allowed to eat until 7am on the day of your operation. We advise you to eat a light breakfast e.g. tea and toast before 7am.

recommended for you to have a drink *before* 11am

For patients on all day operating lists:

Use the morning list guidance unless instructed otherwise by anaesthetist and surgeon.

Appendix 3

Guideline for the perioperative management of insulin in Adult diabetic patients undergoing surgery

If only one meal is likely to be missed, give insulin as shown in Table.

Insulin	Day before admission	Day of surgery (am) [Morning list]	Day of surgery (pm) [Afternoon list]
Once daily (evening)	Give usual insulin	Check blood glucose on admission	Check blood glucose on admission
Once daily morning	Give usual insulin	Reduce usual dose of long acting insulin by 1/3 .Check blood glucose on admission	Reduce usual dose of long acting insulin by 1/3. Check blood glucose on admission.
Twice daily fixed mixture	Give usual insulin	Halve usual morning dose. Check blood glucose on admission	Halve usual morning dose. Check blood glucose on admission.
Basal bolus regimen	Give usual insulin	Omit the prandial (short acting insulin) insulin until the patient is able to eat.	Take usual insulin with breakfast. Omit further prandial insulin until the patient is able to eat.
Any other regimen	Consult diabetes team	Consult diabetes team	Consult diabetes team

Check CBG pre-operatively and hourly until the patient is able to eat. If CBG rises to 13mmol/l or more, commence CVRIII and intravenous fluids using CVRIII using the dedicated prescription chart. Once able to eat, recommence usual insulin and discontinue any IV treatment 1 hour after SC insulin injection.

If more than one meal is likely to be missed, commence a VRIII and intravenous fluids.

Appendix 4

Suggested time intervals for antithrombotic administration before and after spinal/epidural or catheter removal

Medicine	Time interval to discontinue before spinal/epidural or catheter removal	Time interval to (re)commence after spinal/epidural or catheter removal
Aspirin and NSAIDs	Nil	Nil
Clopidogrel	7 days	4 hours after catheter removal
Prasugrel	7-10 days	6 hours after catheter removal
Ticagrelor	5 days	6 hours after catheter removal
Cilostazol	42 hours	5 hours after catheter removal
Unfractionated heparin prophylaxis (subcutaneous)	4-6 hours	>1 hour
Unfractionated heparin (iv)	Stop infusion 2-4 hours before (check APTT)	>1 hour
LMWH (prophylactic dose)	12 hours	4 hours
LMWH (treatment dose)	24 hours	4 hours
Fondaparinux (for prophylaxis)	36 hours	6 hours after surgery/CNB 12 hour after catheter removal
Warfarin	INR≤1.5	4 hours after catheter removal
Dabigatran (started postop.)	Use is contraindicated by the manufacturers with postop. Indwelling epidural catheters	6 hours
Rivaroxaban (started postop.)	18 hours	6 hours
Apixaban (started postop.)	20-30 hours	5 hours

Important:

- All patients **must** have a motor and sensory block assessment prior to antithrombotic medication being given
- If the patient has motor or sensory block do not give antithrombotic drugs. Contact the Acute Pain team.
- Clopidogrel should not be given whilst epidural catheter is in place. If this does occur, contact Acute Pain team immediately.

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