

**Quick reference guide for the administration of
 anticoagulants and antiplatelet medication in the
 perioperative period**

CONTROLLED DOCUMENT

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Introduction

As the number of anticoagulant medications is ever increasing, the guidance pertaining to their use in the perioperative period has become increasingly complicated. This is a brief guide designed primarily for the use of the anaesthetic department. It seeks to cover the appropriate management of oral anticoagulation and antiplatelet medication throughout the perioperative period, including whom to contact for further advice and the referral process for the anticoagulation bridging clinic. It also provides a brief overview of the agreements with the surgical subspecialties regarding when to stop medication perioperatively.

Rationale

Optimum perioperative management of anticoagulants and antiplatelet medication must balance the risk of thrombosis associated with stopping the drug with the risk of bleeding associated with the procedure. Whilst each case must be evaluated on its own merits, and expert consensus sought where there is any doubt, this guideline provides some basic principles to which anaesthetists can adhere.

Anaesthetists are frequently concerned with the safety of performing central neuraxial blockade in patients who are anticoagulated. Increasingly the importance of making the correct decision regarding withholding of medication perioperatively falls under our remit and responsibilities.

This guideline does not cover patients undergoing emergency surgery: the urgent nature of the situation and the inability to instigate appropriate bridging therapy necessitate a discussion with the team who instigated the anticoagulant or antiplatelet medication and also the haematology registrar or consultant on call. It also does not cover patients being admitted to Birmingham Women's Hospital although the principles underpinning the management may be similar.

Indications for instigating anticoagulants or antiplatelet medication

Patients are started on these medications for a relatively small number of reasons:

1. Venous thromboembolic (VTE) treatment or prophylaxis
2. Atrial fibrillation
3. Metallic heart valve
4. Following stroke or transient ischaemic attack (TIA)
5. Post-insertion of cardiac stents
6. Following myocardial infarction (MI), coronary artery bypass graft (CABG) or other cardiac procedure.

Weighing up the risks

When considering the perioperative management of patients taking anticoagulants or antiplatelet medication the risk of incurring a thrombosis must be weighed up against the risk of bleeding during the procedure. In addition to surgical risk, the appropriateness of regional anaesthetic techniques should also be evaluated.

Risk of thrombosis^{1,2,3,4}

Low risk	Intermediate risk
Six months after CABG or MI without complications Twelve months after stroke without complications Primary prevention of stroke or MI	Six months after CABG or MI with complications Greater than one year after drug-eluting stent insertion Greater than four weeks after bare metal stent insertion Diabetes mellitus Malignancy Low ejection fraction (<40%) Greater than three months following DVT/PE

High risk	
Six weeks after MI or CABG Two weeks after stroke AF with previous stroke Thrombophilias: antiphospholipid syndrome, antithrombin III deficiency Patients with LVAD Non-AF source of cardiac thrombus within the last month Mitral or aortic metallic valve Carotid stenosis Within three months of diagnosis of DVT/PE	Within one year of drug-eluting stent insertion Within four weeks of bare metal stent insertion High risk stents: <ul style="list-style-type: none"> • History of stent thrombosis • More than one stent • Long stent • Stent placed at bifurcation • Stent in left main artery or within small arteries

NB: Estimated mortality following stent thrombosis is 50%.

Risk of bleeding in non-cardiac surgery based on procedure^{5,6}

Low risk	Intermediate risk	High risk
Dental Dermatological biopsies Minor orthopaedic eg joint injections and soft tissue aspirations Anterior chamber ophthalmic Endoscopy	Visceral Cardiovascular Major orthopaedic ENT Urology	Spinal or neurosurgery Posterior chamber ophthalmic Hip arthroplasty Transurethral prostatectomy

Central neuraxial blockade should be considered as major bleeding risk requiring complete haemostasis⁷.

Guidance for stopping anticoagulants and antiplatelet medication preoperatively

A comprehensive account of when medications should be stopped is found here: <http://uhbpolicies/assets/OralAnticoagulantAntiplateletGuideline.pdf>

Further information on direct oral anticoagulant drugs (DOACs) can be found here: <http://uhbpolicies/assets/DoacsInitiationMonitoring.pdf>

For patients undergoing procedures at low risk of bleeding, anticoagulants and antiplatelet medication can be continued throughout the perioperative period.

Where patients are at intermediate or high risk of bleeding, consideration needs to be given as to the risk of thrombosis. Those at low risk of thrombosis are likely able to be managed by discontinuing their usual medication preoperatively and it being replaced with a low molecular weight heparin (LMWH) such as tinzaparin in the postoperative period if their VTE assessment requires it before recommencing their usual medicines.

Patients at intermediate and high risk of thrombosis in who it is felt necessary to stop anticoagulant and antiplatelet medication are those that need to be considered for perioperative bridging therapy. A referral to bridging clinic should be completed if stopping oral or parenteral anticoagulants. The process of how to achieve this is listed in Appendix 3. **Therapeutic anticoagulation is not recommended within 72 hours following major surgery associated with a bleeding risk or with an epidural catheter in situ due to the risk of bleeding and epidural haematoma formation:** if this is felt necessary then each case must be evaluated on its merits and discussed with the relevant specialties involved in the patient's care.

Please note in patients considered to be at very high risk of thromboembolism the Trust guidance recommends stopping clopidogrel for five days instead of the usual

seven and aspirin stopped for three days or not at all. These cases are best discussed with the relevant specialties with knowledge of the indication for commencing antiplatelet treatment and the risks of pausing it before any medication is stopped.

Regional anaesthesia

Of paramount concern to anaesthetists is the safety of performing central neuraxial blockade. As before, the risk of thrombosis and the overall appropriateness of performing a regional technique must be balanced. Where a central neuraxial blockade is to be performed, it is imperative the correct medications are stopped pre-operatively and in many cases not resumed until after an epidural catheter has been removed where one has been sited. The table in appendix 1 lists the necessary time lines and when the medication can be safely reinstated postoperatively.⁷

Where it is desirable to resume therapeutic anticoagulation (therapeutic dose LMWH or unfractionated heparin (UFH)) within 72 hours following surgery then epidural analgesia is likely best avoided.

Epidural care, and pertinently their removal, is covered in the Trust guideline “Expanded Practice Protocol for the Care of a Continuous Epidural Infusion for the Management of Acute Pain”.

<http://uhbpolicies/assets/EppCareContinuousEpiduralInfusionAcutePain.pdf>

In summary, epidurals must be removed within 5 days of insertion. There should be at least 12 hours from the last dose of prophylactic LMWH before an epidural is removed. INR should be <1.5.

Emergency advice – Contact haematology registrar or consultant via switchboard. There is a haematology registrar on for referrals between 9am and 5pm each day, with consultant support, thereafter there is an on call registrar and a consultant who covers general haematological problems.

Appendix 1: Safe administration time intervals for perioperative anticoagulant and antiplatelet medicines⁸

Drug	Acceptable time after administration to perform block	Administration of drug whilst spinal or epidural catheter in place	Acceptable time after block/catheter removal before drug can be given
Heparins			
UFH subcutaneously (sc) prophylaxis	4 hours or normal APTTR	Caution ¹	1 hour
UFH intravenous (iv) treatment	4 hours or normal APTTR	Caution ¹	4 hours ²
LMWH sc prophylaxis	12 hours	Caution ¹	4 hours ²
LMWH sc treatment	24 hours	Not recommended	4 hours ²
Heparin alternatives			
Danaparoid	Avoid (consider anti-Xa levels)	Not recommended	6 hours
Bivalirudin	Avoid ³	Not recommended	6 hours
Argatroban	Avoid ³	Not recommended	6 hours
Fondaparinux prophylaxis	96 hours (consider anti-Xa levels)	Not recommended	6-12 hours
Fondaparinux treatment	Avoid (consider anti-Xa levels)	Not recommended	12 hours
Antiplatelet medication			
NSAIDs	No additional precautions	Continue	Continue
Aspirin	No additional precautions	Continue	Continue
Clopidogrel	7 days	Not recommended	6 hours
Prasugrel	7 days	Not recommended	6 hours
Ticagrelor	7 days	Not recommended	6 hours
Tirofiban	8 hours	Not recommended	6 hours
Eptifibatide	8 hours	Not recommended	6 hours
Abciximab	48 hours	Not recommended	6 hours
Dipyridamole	No additional precautions	Continue	6 hours

Oral anticoagulants			
Warfarin	5 days or INR <1.5	Not recommended	After removal
Rivaroxaban	60 hours ⁴	Not recommended	6 hours
CrCl >30ml/min			
Dabigatran			
CrCl >80ml/min	60 hours ⁴	Not recommended	6 hours
CrCl 50-80ml/min	72 hours	Not recommended	6 hours
CrCl 30-50ml/min	96 hours	Not recommended	6 hours
Apixaban	60 hours ⁴	Not recommended	6 hours
Thrombolytic drugs			
Alteplase, anistreplase, reteplase, streptokinase	2 days ⁵	Not recommended	10 days

Notes:

- 1.) Caution is advised in the use of UFH due to the variability in response and difficulty controlling levels. Whilst caution is advised when considering prophylactic LMWH with an epidural in situ this is standard practice presuming there are no specific concerns that would contraindicate its use;
- 2.) UFH and LMWH should be avoided for 6 hours following traumatic spinal or epidural insertion;
- 3.) Association of Anaesthetists of Great Britain and Ireland (AAGBI) suggests that central neuraxial blockade can be performed following bivalirudin and argatroban after 10 and 4 hours respectively with a normal APTTR, however epidural insertion is not generally recommended given the likely necessity to resume these medications following surgery;
- 4.) Guidance varies from AAGBI regarding the DOACs and how long they should safely be stopped for preoperatively. For consistency 60 hours is recommended from last dose to safe insertion of central neuraxial blockade. 48 hours is acceptable for most types of surgery where no central neuraxial blockade is anticipated;
- 5.) If normal fibrinogen. All thrombolytic agents have a short half-life. The guidance from the AAGBI document suggests central neuraxial blockade is contraindicated for 10 days following administration of thrombolytics but we are unable to find evidence to support this. However thrombolysis is contraindicated for 10 days following central neuraxial blockade.

Appendix 2: Sub-specialty agreed arrangements

Breast, burns and plastics, maxillofacial, colorectal, upper gastrointestinal and general surgery

No specific advice beyond guidance above. Stop aspirin on day of surgery.

Liver

Liver biopsy, TIPSS, ERCP:

Drug	Action
Aspirin, dipyridamole, NSAIDs	Stop 7 days preprocedure
Clopidogrel	Stop 10 days preprocedure ¹
Warfarin	Stop 5 days preprocedure and start LMWH if necessary; INR <2 for transjugular biopsy, <1.3 for percutaneous biopsy.

1.) This is an amendment to the Trust liver biopsy guideline which will be altered in line with this guideline.

Neurosurgery

The below is a summary of the guidance agreed between the neurosurgeons and anaesthetists.

For neuroradiology procedures discuss with the responsible neuroradiologist before stopping or commencing any anticoagulant or antiplatelet medication.

Drug	Action
Aspirin	Stop 7 days preoperatively. If high risk discuss with anaesthetist.
Dipyridamole	Stop 24 hours preoperatively.
Clopidogrel	Stop 7 days preoperatively.
NSAIDs	Stop 5 days preoperatively. Exception is microdiscectomy – discuss with surgeon.
Warfarin	Stop preoperatively with referral to bridging clinic if required (see appendix 3). INR must be normal for operation.
DOACs	Stop At least 48 hours preoperatively unless eGFR <30ml/min/1.73m ² , in which case stop for 72 hours. Dabigatran may need to be stopped for longer (as per table on page 7).

Ophthalmology

Cataract surgery

Two large studies have shown no increased risk of complications following cataract surgery in patients taking anticoagulants. As such patients should continue their usual anticoagulant regimen, within the therapeutic range, checked on the day of surgery. It may be preferable to perform a blunt needle technique such as a subtenon rather than peribulbar block.⁹

Orbital and lid surgery

These are more prone to bleeding and blood tracking into the orbit can cause compartment syndrome and acute visual loss. As such patients may need to stop or take a reduced anticoagulation regimen.

Retinal and glaucoma surgery

These have an increased risk of intra-ocular haemorrhage and will need to be assessed on a case-by-case basis by the consultant surgeon.

Pain management

Low risk	Intermediate risk	High risk
Peripheral nerve blocks Peripheral joints and musculoskeletal injections Trigger point injections Sacroiliac joint injections	Interlaminar ESI Transforaminal ESI Facets /MBBI Radiofrequency ablations Intradiscal procedures Paravertebral blocks Sympathetic Blocks (stellate ganglion , thoracic, splanchnic, coeliac, lumbar hypogastric, ganglion impar) Peripheral nerve stimulations trials or implants IPG placement/ ITP replacement Sacroiliac join injections	Spinal Cord Stimulator trial and implant Intrathecal catheter and pump implant Vertebral augmentation (vertebroplasty and kyphoplasty) Epiduroscopy and epidural decompression

For low risk procedures all medicines can be continued perioperatively. For intermediate and high risk procedures stop medications as per guidance on pages 6-7 unless listed below.

Drug	Action
Dipyridamole	Stop 2 days pre-procedure.
Acenocoumarol	Stop 3 days pre-procedure. Normal INR.

Renal

Major procedures:

Drug	Action
Aspirin	Stop 24 hours preoperatively unless differing instruction from consultant.
Dipyridamole	Stop 24 hours preoperatively.
Clopidogrel	Stop 7 days preoperatively.
Warfarin	Stop 5 days preoperatively +/- LMWH cover. Withhold LMWH the night before procedure.

Renal biopsy:

Drug	Action
Aspirin	Stop 7 days preprocedure unless differing instruction from consultant.
Dipyridamole	Stop 24 hours preprocedure unless differing instruction from consultant.
Clopidogrel	Stop 7 days preprocedure.
Warfarin	Stop 5 days pre-procedure +/- LMWH cover. INR must be <1.4. Last dose of LMWH must be at least 24 hours prior to biopsy.

Urology

Stop aspirin/clopidogrel for 7 days before all major procedures and prostate biopsies.

List of major procedures: artificial urinary sphincter insertion, bladder biopsy, bladder neck incision, cystoscopy and biopsy, any cystectomy procedure, reimplantation of ureter, neobladder formation, nephrectomy, Nesbitt's procedure, orchidectomy, parastomal hernia repair, percutaneous nephrolithotomy (PCNL), pyeloplasty, prostatectomy, renal ablation, renal stone fragmentation, retroperitoneal lymph node dissection, transurethral resection of bladder tumour (TURBT), transurethral resection of prostate (TURP), ureteric stone removal, uretogram, uretoscopy, urethrectomy, urethroplasty, urinary diversion, vesicovaginal fistula repair.

Trauma and orthopaedics

There is specific guidance available pertaining to fractured neck of femur in patients depending on the proposed operative method of fixation.

Vascular

If in any doubt preoperative clinic will speak to the consultant surgeon directly.

Drug-eluting cardiac stent within the last 12 months or bare metal stent within the last three months: do not stop aspirin or clopidogrel. Speak to consultant surgeon who liaise with relevant specialities.

Otherwise, the following guidance is accepted:

Drug	Action
Aspirin	Do not stop.
Clopidogrel	In general, do not stop. If sole agent before open abdominal aortic aneurysm(AAA) switch to aspirin 7 days pre-operatively (not endovascular aneurysm repair (EVAR)).
Dual antiplatelet therapy	Do not stop either for carotid endarterectomy. If for open AAA continue aspirin only and stop clopidogrel for 7 days.
Dipyridamole	If sole agent, stop on day of surgery only.
Warfarin	Stop for 5 days and consider referral to bridging clinic if appropriate (discuss with surgeon if in doubt – see appendix 3).

Appendix 3: Referral to anticoagulation bridging clinic.

All referrals to bridging clinic within UHB are performed via PICS. A minimum of one week is required between referral and surgery in order to accommodate patient admission if necessary. Where less than one week is available, please phone extension 2481 or 2479 to speak to the anticoagulation nurses whom may be able to provide further advice and arrange bridging therapy.

By following these step-by-step guidelines you should successfully submit a referral:

1. Log onto PICS
2. Click on "**Pat Srch**"
3. Enter patient hospital number
4. Click on "**Open patient record without creating any form of admission**"
5. Click on "**Pat Admin**"
6. Click on "**Allergies**"
7. Edit details then confirm
8. Click on "**Observations**"
9. Click on "**Height/Weight**"
10. Click on "**Now**" (right hand side of screen) and enter height and weight
11. Click on "**Requests**"
12. Click on "**Nurse Specialists**" then "**New**"
13. Select "**Anticoagulant Team**"
14. Select "**Anticoagulant Bridging Therapy Referral**"
15. Complete request. Include if a central neuraxial blockade is intended ;
16. The screen page should indicate the referral has been submitted.

The anticoagulant team will then scan their response/action plan onto Clinical Portal once confirmed. It can be found under "Correspondence".

References:

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 - 9.) The Royal College of Ophthalmologists. Cataract Surgery Guidelines September 2010.
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- References 1-4 as per Mohr TS Brouse SD Perioperative management of antiplatelets agents. *Orthopedics* 2012; 35 (8): pages 687-691.