Contents

Contents

Glossary:

Term	Meaning
AF, atrial fibrillation	Irregular heart rhythm leading to an increased risk of cardioembolic stroke because of clot development in the left atrium of the heart
Bridging	A broad description of peri-operative anticoagulation management – it may involve replacing the usual anticoagulation with full or low dose anticoagulation (or none)
CHA2DS2VASc	A risk assessment tool for atrial fibrillation, giving an annualised stroke risk
CrCl/Creatinine clearance	A measure of renal function; relevant here because of drug elimination and its effects on some of the anticoagulants
DOAC/Direct oral anticoagulants	A class of oral drugs which act directly to inhibit either factor IIa or Xa
LMWH/Low molecular weight heparin	A form of heparin, used as an anticoagulant in the setting of peri-operative care and bridging
Major bleed	Bleeding into a vital organ/critical site; or leading to a 20g/l drop in Hb; or requiring 2units+ of red cell transfusions
Thrombotic risk	Risk of developing a clot; either venous e.g. deep vein thrombosis or arterial e.g. Ischaemic stroke
VKA/vitamin K antagonist	Anticoagulants which act by reducing the levels of clotting factors II, VII, IX and X (via vitamin K)
Warfarin	The most commonly used VKA

Document changes:

- Highlighted the way to make a referral for anticoagulation bridging for specific cases (VTE within 3 months, HIT, high INR targets), or if the operating team still cannot make a plan after reading this document.
- Highlighting the responsibility of the operating teams to supply prescriptions as clinically necessary
- Re-organize the sequence of the contents to prioritize the Practical guide. This is to save clinical teams some time when they use the document on day to day basis.

1. Practical guide: how to use the document:

You will need the following information (as a minimum):

- Procedure and its bleeding risk, (+date, time, operator where known)
- Patient weight, renal function
- Name of anticoagulant
- Indication for anticoagulant, and medical history to inform assessment of thrombotic risk

For minimal bleeding risk procedures that do not require significant interruption of anticoagulation, use APPENDIX 9.

For warfarin use APPENDIX 1 for "bridging template" choice. For DOACs use APPENDIX 2.

Follow the algorithm – this will lead to an appendix which is the template plan that should be used for this patient.

Print and complete this appendix with patient and operation details (*use caution not to print the entire document!*)

Ensure a copy goes to 1. The patient 2. The notes and 3. The patient's GP

***If additional medications are required (e.g. LMWH), the supply required for bridging up to 14 days' worth of medication should be supplied by the operating team; and education on its use is the responsibility of the operating team.**

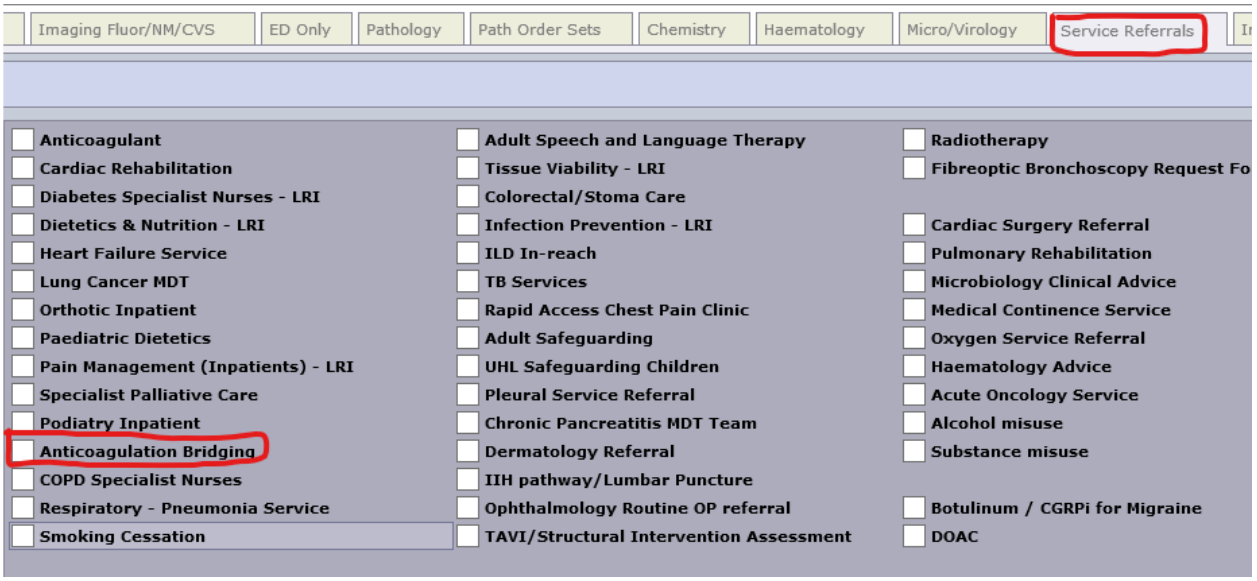
IMPORTANT NOTE re: CANCELLATIONS: In the event that a procedure is postponed or cancelled, an *active decision* should be made about *anticoagulation* (and other medicines), to ensure safe medicines management during the time from cancellation to the rebooked procedure. This clearly needs to be individualised but should involve a risk assessment and decision about whether to continue with "usual" anticoagulant or stop or bridge. IT IS VERY IMPORTANT TO COMMUNICATE THIS PLAN CLEARLY TO THE PATIENT (AND WIDER MDT AS APPROPRIATE).
If patient is already on LMWH then use APPENDIX 8.

2. Introduction

This guideline covers the management of adult patients (age 16 years or more) taking anticoagulant medication who are due to undergo an elective invasive or surgical procedure. It provides guidance on:

- Which procedures or operations require stoppage of the patient's usual anticoagulation
- How to estimate the risk of thromboembolic complications associated with stopping anticoagulation
- How to safely organise and communicate the plans for anticoagulation at this higher risk time

There remains a limited service within the haemostasis unit for providing high risk peri-operative management plans. These plans may be requested via the ICE system if this guideline does not cover the clinical scenario. This can be found under Service Referrals, Anticoagulation Bridging. Please note that this will only cover cases of VTE within the last 3 months, patients needing high INR targets, or patients with history of Heparin Induced Thrombocytopenia. If you think that your patient is not falling within these categories and you still cannot make a perioperative plan after reading this document, please discuss with the Haematology SpR.



3. Scope

The guidelines pertain to patients > 16years old who require elective surgery and invasive procedures AND who are taking anticoagulant medications. This includes anticoagulants (e.g. warfarin, DOACs, heparins) but does not cover anti-platelet therapy.

4. Recommendations, Standards and Procedural Statements

- Anticoagulants generally need to be interrupted prior to major surgical procedures to minimise peri-operative bleeding risk . However, many minor procedures can be safely performed without interruption of anticoagulation.
- Interruption of anticoagulation increases peri-operative thrombotic risk (arterial, venous or cardioembolic) and hence an evaluation of both bleeding and thrombotic risk is needed. Some facts need to be borne in mind:
- Approximately 20% of arterial thromboembolic events are fatal and 40% result in serious permanent disability. In contrast, only about 3% of major post-operative bleeding events are fatal, with most making full and uneventful recovery after haemorrhagic complications [5]
- Approximately 6% of recurrent venous thromboembolic events are fatal and there is a 3 - 30% risk of longer term post-thrombotic complications (e.g. post thrombotic syndrome, chronic thromboembolic pulmonary hypertension)

Anticoagulant bridging involves substituting a rapid acting, short half-life anticoagulant for the long acting usual anticoagulant (typically warfarin) and it was developed because of the long half-life of warfarin. There are a number of different interpretations of bridging, ranging from the use of unfractionated heparin and very short interruption of therapeutic anticoagulation, to the use of therapeutic dose LMWH, to prophylactic dose LMWH. These approaches can be taken for variable time periods pre and post operatively. This guideline aims to provide a standard approach to risk assessment and bridging management based on available data regarding thrombotic risks and outcomes of bridging and peri-operative management of anticoagulation.

With the advent of the rapid-acting and short half-life DOACs and the publication of high quality evidence with bridging outcomes, it is anticipated that "bridging" will be required much less frequently. The most important aspects are to identify the individuals at highest risk of bleeding and thrombosis and to improve their safety; and also to communicate the peri-procedural management plan for an anticoagulant, even if it is a straightforward stop and restart of the anticoagulant.

This guideline is divided into warfarin/VKA and DOAC sections for the convenience of the user.

5. Warfarin:

Stopping warfarin:

Based on the known half-life of [the anticoagulant effects of] warfarin (36-42 hours), it will require at least 5 days for most of the anticoagulant effect to be eliminated after stopping warfarin. A longer period (at least 6 days) may be required for elderly patients, patients with congestive cardiac failure, patients on certain medications and patients on a higher intensity anticoagulation regimen (e.g. target INR range 3.0-4.0).

Patients on acenocoumarol (Sinthrome), (half-life 8-11 hours), require only about 3-4 days interruption for elimination of anticoagulant effect.

Warfarin bridging with Low Molecular Weight Heparin (LMWH) and patients on long-term LMWH with adequate renal function (estimated Creatinine Clearance [CrCl] ≥ 30ml/min):

- LMWH should generally be started 36-48 hours (approx. 2 days) after last dose of warfarin. For the purpose of full bridging, a therapeutic dose is required. Prophylactic doses are used when the risk of stopping an anticoagulant is low from the cardio-embolic point of view but where there is a risk of venous thromboembolism (VTE).
- Therapeutic dose Enoxaparin (i.e.1mg/kg BD): twice daily dosing is preferred for bridging. Administer half dose (1mg/kg OD) on day before procedure and ensure at least 24 hour interval between last dose and time of procedure. Full anticoagulation may need to be withheld for up to 48-72 hours with high bleed risk procedures; in these circumstances, prophylactic doses may be administered safely in the interim.
- Prophylactic dose Enoxaparin: some clinical situations do not require bridging with LMWH; warfarin is simply stopped 5-6 days pre-operatively and recommenced, usually at previous maintenance dose, and dose- titrated over time to achieve the desired therapeutic INR. Prophylactic dose LMWH may be restarted from 6 hours post-procedure (provided haemostasis is secure) and continued from the first post-op day, and administered concurrently with warfarin until the INR is in the desired therapeutic range before withdrawing LMWH.
- Warfarin bridging for patients with impaired renal function (estimated CrCl < 30 ml/min):Prophylactic Enoxaparin (see weight base dosing table on UHL Connect) can usually be administered safely without need for drug (anti-Xa/heparin level) monitoring and without risk of accumulation, however, where CrCl is <15ml/min monitor heparin assay on day 4 and every 4 days to ensure there is no accumulation. Aim for peak levels <0.3iu/ml.
- **Special categories of patients**: The following categories of patients should be referred to the consultant overseeing the patient to make decisions regarding peri-procedural anticoagulation, unless a specific local guideline is in place for the scenario in question. A referral to the Haemostasis & Thrombosis clinic would be reasonable in such cases:.
    - *pregnant women with mechanical heart valves,*
    - *patients with history of heparin induced thrombocytopenia who require bridging*
    - *bariatric patients (weight > 150 kg) or underweight adults (< 40kg),*
    - *patients with known bleeding disorders or an abnormal bleeding history*
    - *patients with CrCl < 15ml/min* (see dosing table)

A note on ***patients with mechanical prosthetic heart valves undergoing high bleeding risk procedures:***

- The overall risk of valve thrombosis and/or cardio-embolisation in non-surgical patients after suspension of anticoagulation is very low (< 0.2% over a 7 day period) [11]. Mechanical valves in the mitral position carry the highest thrombosis risk without anticoagulation, whereas modern prosthetic aortic valves (e.g. On-X) have a lower risk. In the peri-operative setting, a retrospective analysis of 180 non-cardiac operations in 159 patients with valve prostheses in whom anticoagulation was withheld for an average total period of 6.6 days, the post-operative thromboembolic rate was 0% [2]. Consequently, in patients undergoing high bleeding risk procedures, full therapeutic anticoagulation can be safely be withheld for up to 72 hours.

6. Direct Oral Anticoagulants (DOACs):

This document also provides guidance for the management of peri- procedural anticoagulation for adult patients taking the direct oral anticoagulants (DOACs) Apixaban, Dabigatran, Edoxaban and Rivaroxaban, and who require elective surgery or invasive procedures.

The DOACs have a rapid onset of action (approx. 1-3 hrs to peak concentration) and a shorter half-life than warfarin. Typically, anticoagulants that require stopping should be stopped for 3-5 half-lives, depending on procedural bleeding risk. Depending on renal function, the DOACs have a half-life range of around 9-18 hrs (typically around 12hrs).

The PAUSE study (JAMA 2019) provided good evidence that the information contained within the summary of product characteristics for the DOACs was a safe approach to invasive procedures with the DOACs, and alongside other publications, provides the templates for peri-operative management of DOACs within this guideline.

7. Low molecular weight heparins (LMWHs):

Some patients may be prescribed low molecular weight heparin for their usual anticoagulant therapy or in anticipation of surgery (e.g. some cancer associated VTE). In this case, bridging is not required but the dosing of heparin is usually split to twice daily therapeutic dosing in advance of a procedure. Therapeutic anticoagulation with LMWH may be restarted after 48-72 hours. Details for this are shown in appendix 8.

8. Risk assessment

Bleeding risks:

For patients on oral anticoagulant therapy requiring invasive procedures, the risk of a thromboembolic event in the peri-operative period when anticoagulation is interrupted must be balanced against the risk of bleeding when these are continued. If the risk of procedure-related bleeding whilst continuing oral anticoagulation is thought to be small, anticoagulation may be continued.

If the risk of procedure-related bleeding is thought to outweigh the risk of thromboembolic events, anticoagulation should be stopped and bridging anticoagulation considered depending on the thrombotic risk. If bridging anticoagulation is instituted, this should be done in a manner whereby both the time without anticoagulation and the bleeding risk are minimised. The peri- procedural management therefore depends both on individual patient characteristics and the type of procedure.

For some invasive procedures, such as minor dental (Douketis et al, 2012; Perry et al, 2007), joint injections (Ahmed & Gertner, 2011), ophthalmic such as cataract (Jamula et al, 2009), dermatological (Douketis et al, 2012) and certain endoscopic procedures (Veitch et al, 2016), anticoagulation may not need to be stopped. Procedures that require anticoagulation to be stopped will vary in their bleeding risk and, importantly, the consequences of bleeding will depend on the site of surgery and local anatomy. Although some have grouped procedures into lower or higher risk (Spyropoulos & Douketis, 2012; Baron et al, 2013) the operating surgeon, dentist, or interventional radiologist may wish to assess the risk of bleeding for the individual patient and discuss both this and the plan for peri-operative anticoagulation with them. The plan must be recorded clearly in the notes, including a plan for when the patient is discharged.

The risk of bleeding is best assessed by the surgeon or operator. Table 1 lists common minimal, low and high risk of bleeding procedures as a guide. We recommend assessment of bleeding risk by operators to help those performing the pre-operative assessment. (Note that this list is not comprehensive and is intended as guidance only.).

Departments may wish to assign a bleeding risk to their procedures based on local evidence and experience, and this should perhaps be encouraged. Once assigned, the templates for anticoagulation management should then be used to help communicate the plan for an individual patient (see appendices).

Table 1: Bleeding risks associated with procedure type

High bleeding risk. (2 day risk of major bleed >=2%)	**Medium/Low bleeding risk. (2 day risk of major bleed <2%)**	**Very low bleeding risk**
Major surgery (extensive tissue injury or duration >45mins)	Arthroscopy	Minor skin surgery
Cancer surgery	Cutaneous lymph node resection	Cataract surgery
Major orthopaedic surgery	Shoulder/foot/hand surgery	Most dental procedures (inc extractions, restorations, prosthetics, endodontics)
Reconstructive plastic surgery	Coronary angiography	Pacemaker or defibrillator implantation
Urology surgery, inc transurethral prostate resection, bladder resection, bladder tumour ablation	Gatrointestinal/Colonic endoscopy +- biopsy (excluding polyp removal)	
Gastrointestinal surgery	Abdominal hysterectomy	
Nephrectomy	Laparoscopic cholecystectomy	
Renal biopsy	Abdominal hernia repair	
Percutaneous gastrostomy placement	Haemorrhoid surgery	
Endoscopic retrograde cholangiopancreatography (ERCP)	Bronchoscopy +-biopsy	
Cardiac surgery	Epidural injection	
Spinal surgery		
Colonic polyp resection		

9. Thrombotic risks:

This guideline recommends stratification of thrombotic risk as Low risk or High risk based on the indication for anticoagulation (table 2 below). The risk assessment influences decision making about the need for therapeutic bridging anticoagulants for those taking warfarin/VKA. The thrombotic risk is less relevant for patients taking DOACs because full therapeutic bridging would generally not be required because of the pharmacokinetic properties. Low risk in this context is simply relative to high risk for patients prescribed anticoagulants rather than indicating absolute thrombotic risk. These risks should also be considered in the wider context of VTE risk assessment, which is a standard of care for all patients.

Table 2: Thrombotic risks by indication for anticoagulation

High thrombotic risk	Low thrombotic risk
Mechanical valve replacement: mitral position	Mechanical valve replacement: aortic position, modern bileaflet type WITHOUT additional cardiovascular risk factors*
Mechanical valve replacement: aortic position, modern bileaflet type WITH additional cardiovascular risk factors*****	
Mechanical valve replacement: aortic position-valve type uncertain, esp if replaced > 25 years ago	
Arterial thromboembolism, including stroke and left ventricular thrombus	
Non-valvular atrial fibrillation with CHA2DS2Vasc score ≥ 6	Non-valvular atrial fibrillation with CHA2DS2Vasc score < 6
Venous thromboembolism with target INR > 2.5	Venous thromboembolism with target INR 2.5
Antiphospholipid syndrome with any history of arterial or venous thrombosis	Cerebral/obstetric antiphospholipid syndrome/Positive laboratory results for antiphospholipid syndrome WITHOUT thrombosis
*****Age > 75 years, Diabetes mellitus, Hypertension, Atrial fibrillation, Congestive cardiac failure, non-bileaflet mechanical valve (more likely for valves replaced 25 years+ ago)	

- N.B. This document provides general guidance only and is not a substitute for clinical judgment of an individual patient. Complex patients or patients in whom there are specific concerns regarding thrombosis or bleeding risk may be discussed with a haematologist when making a preoperative anticoagulation plan.

10. Education and Training

This guideline replaces a previous similar guideline for peri-operative management of anticoagulation. As such, it will be familiar to those areas who need to manage this clinical scenario. Communications will be sent out after ratification and publication of the guideline

It is the responsibility of operating teams to familiarise themselves with the policy and adapt and use according to their particular needs. Additional training and education may be available on request from the anticoagulation nursing team.

11. Monitoring and Audit Criteria

Key Performance Indicator	Method of Assessment	Frequency	Lead
Evidence of risk assessment pre-op	audit	annual	Surgical specialty lead
Peri-op plan in notes	audit	annual	Surgical specialty lead
Peri-op thrombosis rate	audit	annual	Surgical specialty lead
Peri-op bleeding rate	audit	annual	Surgical specialty lead

12. Legal Liability Guideline Statement

See section 6.4 of the UHL Policy for Policies for details of the Trust Legal Liability statement for Guidance documents

13. Supporting Documents and Key References

- McKenna R . Abnormal coagulation in the postoperative period contributing to excessive bleeding Med Clin North Am . 2001 ; 85 (5): 1277 - 1310 .
- Tinker JH, Tarhan S. Discontinuing anticoagulant therapy in surgical patients with cardiac valve prostheses. Observations in 180 operations . JAMA . 1978 ; 239 (8): 738 - 739.
- Katholi RE , Nolan SP , McGuire LB . The management of anticoagulation during non- cardiac operations in patients with prosthetic heart valves. A prospective study. Am Heart J . 1978 ; 96 (2): 163 - 165
- Torn M , Rosendaal FR . Oral anticoagulation in surgical procedures: risks and recommendations . Br J Haematol . 2003 ; 123 (4): 676 - 682.
- Kearon C, Hirsh J. Management of anticoagulation before and after elective surgery. N Engl J Med 1997; 336: 1506
- Douketis DJ et al. Perioperative Bridging Anticoagulation in Patients with Atrial Fibrillation. June 22, 2015DOI: 10.1056/NEJMoa1501035
- Tincani E, Mannucci C, Casolari B, et al. Safety of dalteparin for the prophylaxis of venous thromboembolism in elderly medical patients with renal insufficiency: a pilot study. Haematologica 2006; 91:976-979
- Cook D, Douketis J, Meade M, et al. Venous thromboembolism and bleeding in critically ill patients with severe renal insufficiency receiving dalteparin thromboprophylaxis: prevalence, incidence and risk factors. Crit Care. 2008; 12(2): R32

- Lim W, Dentali F, Eikeelboom JW, and Crowther MA. Meta-analysis: low-molecular- weight heparin and bleeding in patients with severe renal insufficiency. Ann Intern Med 2006;144:673-684
- Symes J. Low molecular weight heparins in patients with renal insufficiency. CANNT J 2008;18(2)55-61
- Rabbat CG, Cook DJ, Crowther MA, McDonald E, Clarke F, Meade MO, Lee KA, Cook RJ. Dalteparin thromboprophylaxis for critically ill medical-surgical patients with renal insufficiency. J Crit Care. 2005 Dec;20(4):357-63
- Cannegieter SC, Rosendaal FR, Briet E. Thromboembolic and bleeding complications in patients with mechanical heart valve prostheses. Circulation 1994;89:635–41
- Douketis DJ et al. Antithrombotic therapy and prevention of thrombosis, 9TH Ed: ACCP GUIDELINES Chest 2012
- Douketis JD, Spyropoulos AC, Duncan J, et al. Perioperative Management of Patients With Atrial Fibrillation Receiving a Direct Oral Anticoagulant. JAMA Intern Med. 2019;179(11):1469–1478. doi:10.1001/jamainternmed.2019.2431
- Lip GY, Nieuwlaat R, Pisters R, Lane DA, Crijns HJ. Refining clinical risk stratification for predicting stroke and thromboembolism in atrial fibrillation using a novel risk factor-based approach: the euro heart survey on atrial fibrillation. Chest. 2010 Feb;137(2):263-72. doi: 10.1378/chest.09-1584. Epub 2009 Sep 17. PMID: 19762550.
- Ahmed, I. & Gertner, E. (2011) Safety of arthrocentesis in patients on chronic warfarin therapy with therapeutic INR. Journal of Hospital Medicine
- Perry, D.J., Noakes, T.J. & Helliwell, P.S. (2007) Guidelines for the management of patients on oral anticoagulants requiring dental surgery. Br Dent J, 203, 389-393.
- Jamula, E., Anderson, J. & Douketis, J.D. (2009) Safety of continuing warfarin therapy during cataract surgery: a systematic review and meta-analysis. Thrombosis Research, 124, 292-299

14. Key Words

Bridging, anticoagulation, anticoagulant, pre-assessment, peri-operative

This table is used to track the development and approval and dissemination of the document, and any changes made on revised / reviewed versions

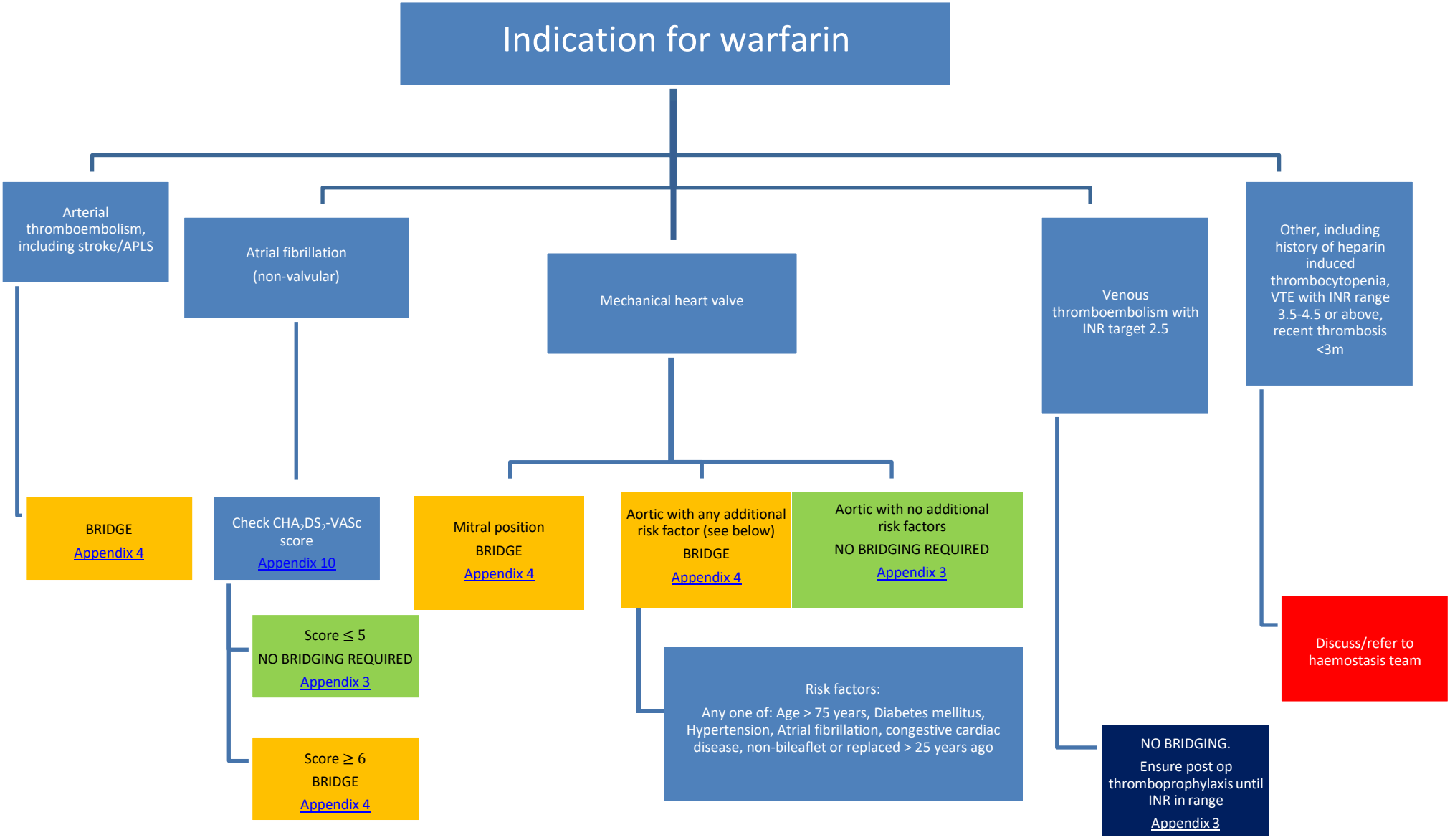
DEVELOPMENT AND APPROVAL RECORD FOR THIS DOCUMENT		
Author / Lead Officer:	Dr Stella Salta	**Job Title:** Haematology consultant
Reviewed by:	Dr A Mistri, Dr S Salta, Dr B Myers, Jo Mahoney, Mr A Boddy, Gynaecology pre- assessment nursing team, Dr J Stewart, Haemostasis nursing team	
Approved by:		**Date Approved:**

REVIEW RECORD			
Date	**Issue Number**	**Reviewed By**	**Description Of Changes (If Any)**
4/6/2024		S. Rudge, S Salta	Change Dalteparin to Enoxaparin, INR target in appendix 1 from 2.5 to range 3.5 - 4.5
18/10/2024		Dr Omar Mukhlif	Review and update.

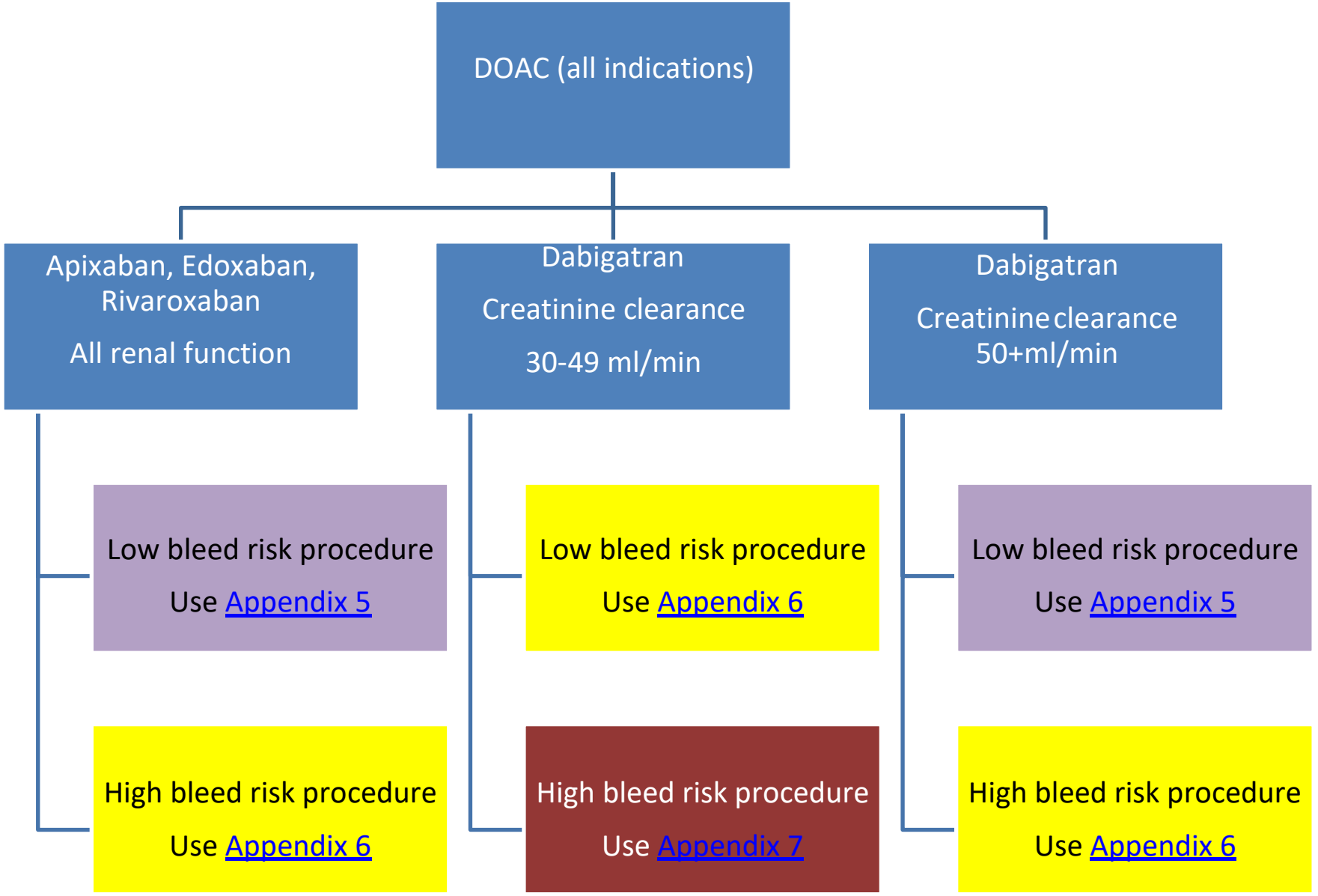
DISTRIBUTION RECORD:			
Date	**Name**	**Dept**	**Received**

15. Appendices

Appendix 1 - Warfarin: flowchart for choosing bridging template



Appendix 2 - DOACs: flowchart for choosing bridging template



Appendix 3. Peri-op plan for warfarin: no bridging

S Number Name Date of Birth Address	Procedure: Date of procedure: Operator: Location:

Day	Warfarin dose	Enoxaparin Dose
-6 **(Tested INR in the range 3.0-4.0 or 2.5-3.5)** **Date:**	**Last dose of warfarin**	**No therapeutic bridging.** **Assess need for thromboprophylaxis as per UHL guidelines.** **Tick boxes below if required**
-5 **(INR range 2.0-3.0)** **Date:**	**Last dose of warfarin**	
-4 **Date:**	**No warfarin**	
-3 **Date:**	**No warfarin**	
-2 **Date:**	**No warfarin**	
-1 **Date:**	**No warfarin**	
0 (day of procedure) **Date:**	**Restart warfarin at usual maintenance dose in the evening**	**6 hours post Prophylactic Enoxaparin (provided haemostasis is secure)** **Tick box if required (mandatory if prior history of VTE)** □
+1 **Date:**	**Warfarin at maintenance dose**	**Prophylactic Enoxaparin** □ **Dose:**
+2 **Date:**	**Warfarin at maintenance dose**	**Prophylactic Enoxaparin** □ **Dose:**
+3 (Check INR) **Date:**	**Warfarin at maintenance dose**	**Prophylactic Enoxaparin** □ **Dose:**
+4 (Check INR) **Date:**	**Dose titrate warfarin until INR in therapeutic range (Check INR)**	Stop **Enoxaparin** when INR is in therapeutic range.

Completed by: Signed Date:

Appendix 4. Peri-op plan for warfarin: bridging required
CrCl >30 ml/min

S Number Name Date of Birth Address	Procedure: Date of procedure: Operator: Location:

Day	Warfarin dose	Enoxaparin Dose	
-6 (INR range 3.0-4.0 or 2.5-3.5, age >75 years, Congestive cardiac failure) Date:	**Last dose of warfarin**	**Nil**	
-5 (INR range 2.0-3.0) Date:	**Last dose of warfarin**	**NIL**	
-4 Date:	**No warfarin**	**NIL**	
-3 Date:	**No warfarin**	**1mg/kg am Dose:**	**1mg/kg pm Dose:**
-2 Date:	**No warfarin**	**1mg/kg am Dose:**	**1mg/kg pm Dose:**
-1 Date:	**No warfarin**	**1mg/kg am Dose:**	**Omit evening dose**
		LAST DOSE ADMINISTERED NO LESS THAN 24 HOURS PRE-OPERATIVELY	
0 (day of procedure) Date:	**Restart warfarin at usual maintenance dose**	**Pre: NIL Post: Start prophylactic dose Enoxaparin from 6 hrs post procedure providing haemostasis secure**	
+1 Date:	**Warfarin at maintenance dose**	**Prophylactic dose Enoxaparin Dose:**	
+2 Date:	**Warfarin at maintenance dose**	**Prophylactic dose Enoxaparin Dose:**	
+3 Date:	**Warfarin at maintenance dose (Check INR day +3, day +4 or day+5)**	**Recommence 1mg/kg BD Enoxaparin Dose: Twice daily**	
Onward management plan:	**Dose titrate warfarin until INR in therapeutic range. Check INR as indicated by previous result**	**Stop Enoxaparin when INR is in therapeutic range**	

Completed by: Signed Date:

Appendix 5. Peri-op plan for DOAC: anti-Xa drugs: low bleed risk

S Number Name Date of Birth Address	Procedure: Date of procedure: Operator: Location:

Day	DOAC Insert name of DOAC here: ……	Enoxaparin
-2 **Date:**	**Last dose of DOAC**	
-1 **Date:**	**No DOAC**	
0 (day of procedure) **Date:**	**No DOAC**	**Start prophylactic Enoxaparin 6-12 hrs post procedure following VTE risk assessment providing haemostasis is secure** **Tick box if required** ☐ **Dose:**
+1 **Date:**	**Start DOAC 24h after procedure Delay DOAC if ongoing bleeding risk and reassess every 24h**	**Stop Enoxaparin when DOAC starts**
Onward management plan:	**Continue DOAC**	**Stop Enoxaparin when DOAC starts**

Completed by: Signed Date:

Appendix 6. Peri-op plan for DOAC: anti-Xa drug with high bleed risk OR Dabigatran (see notes on bleed risk and CrCl)

S Number Name Date of Birth Address	Procedure: Date of procedure: Operator: Location:

Day	DOAC Insert name of DOAC here: ……	Enoxaparin
-3 **Date:**	**Last dose of DOAC**	**No pre-operative Enoxaparin**
-2 **Date:**	**No DOAC**	
-1 **Date:**	**No DOAC**	
0 (day of procedure) **Date:**	**No DOAC**	**Start prophylactic Enoxaparin 6-12 hrs post procedure following VTE risk assessment providing haemostasis is secure** **Tick box if required** ☐ **Dose:**
+1 **Date:**	**No DOAC**	**Prophylactic Enoxaparin** **Dose:**
+2 **Date:**	**Start DOAC from 48h post procedure. Delay DOAC if ongoing bleeding risk and reassess every 24h**	**Stop Enoxaparin when DOAC starts**
Onward management plan:	**Continue DOAC**	

Completed by: Signed Date:

Appendix 7. Peri-op plan for Dabigatran: high bleed risk
(with CrCl 30-49ml/min)

S Number Name Date of Birth Address	Procedure: Date of procedure: Operator: Location:

Day	Dabigatran	Enoxaparin
-5	**Last dose of Dabigatran**	**No pre-operative Enoxaparin**
-4	**No dabigatran**	**No Enoxaparin**
-3 **Date:**	**No Dabigatran**	**No Enoxaparin**
-2 **Date:**	**No Dabigatran**	
-1 **Date:**	**No Dabigatran**	
0 (day of procedure) **Date:**	**No Dabigatran**	**Start prophylactic Enoxaparin 6-12 hrs post procedure following VTE risk assessment providing haemostasis is secure** **Tick box if required** ☐ **Dose:**
+1 **Date:**	**No Dabigatran**	**Continue prophylactic Enoxaparin until bleeding risk reduced and safe to start DOAC**
+2 **Date:**	**Restart Dabigatran from 48 hrs post procedure. Delay DOAC if ongoing bleeding risk and reassess every 24h**	**Stop Enoxaparin when DOAC starts**
Onward management plan:	**Continue Dabigatran**	

Completed by: Signed Date:

Appendix 8. Peri-op plan for Enoxaparin: pause and restart
CrCl >30 ml/min

S Number Name Date of Birth Address	Procedure: Date of procedure: Operator: Location:

Day	**Enoxaparin AM**	**Enoxaparin PM**
-2 **Date:**	**1mg/kg am** **Dose:**	**1mg/kg pm** **Dose:**
-1 **Date:**	**1mg/kg am** **Dose:**	**Omit evening dose**
	LAST DOSE ADMINISTERED NO LESS THAN 24 HOURS PRE-OPERATIVELY	
0 (day of procedure) **Date:**	**Pre: NIL** **Post: Start prophylactic dose Enoxaparin from 6 hrs post procedure providing haemostasis secure**	
+1 **Date:**	**Prophylactic dose Enoxaparin OD** **Dose**	
+2 **Date:**	**Prophylactic dose Enoxaparin OD** **Dose:**	
+3 **Date:**	**Recommence Enoxaparin 1mg/kg am** **Dose:**	**Enoxaparin 1mg/kg pm** **Dose:**
Onward management plan:	**Enoxaparin may continue twice daily OR convert to once daily OR switch to oral anticoagulant depending on thrombotic factors**	

Completed by: Signed Date:

Appendix 9. Peri-op plan for minimal bleed risk procedure: no interruption of anticoagulation

S Number Name Date of Birth Address	Procedure: Date of procedure: Operator: Location:

Anticoagulation management plan:

This procedure carries a very low bleeding risk and so you will not need to significantly interrupt your anticoagulant therapy.

Please do the following (please circle):

Continue all doses

Omit the morning dose then continue as usual

Omit all doses on the day of the procedure then continue as usual

Other: ……

Completed by: Signed Date:

Appendix 10 The CHA2DS2VASc score for estimation of stroke risk in the setting of ATRIAL FIBRILLATION

Tick as required

Congestive heart failure	1	
Hypertension	1	
Age 65-74	1	
Age 75+	2	
Diabetes mellitus	1	
Previous stroke/TIA	2	
Vascular arterial disease (including coronary, carotid, peripheral)	1	
Female	1	

Score	

Completed by: Signed Date: