The Princess Alexandra Hospital NHS Trust

MANAGEMENT OF ANTICOAGULATION AND ANTIPLATELET THERAPY IN THE PERIOPERATIVE/PROCEDURAL PERIOD GUIDELINE

Version	**4.0**
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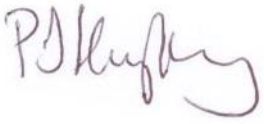


Signed……
Chair of Trust Policy Group

Contents

1.0 QUICK REFERENCE GUIDE

1.1 This policy provides information on how to adjust anticoagulant and antiplatelet medication before and after surgery or surgical procedures. The tables in Appendices A to F summarise the assessment of thromboembolic risk and bleeding risk and the associated changes needed to anticoagulant and antiplatelet medication around surgery and surgical procedures.

2.0 INTRODUCTION

2.1 These guidelines don't provide answers to every possible scenario. They are meant to cover common situations. Those situations that are not covered by these guidelines should be discussed with a haematologist, preferably at a consultant level.

2.2 The perioperative management of patients on anticoagulation depends on many factors, the most important of which are:

a) Thromboembolic (TE) risk of the patients
b) The type of surgery and the bleeding risk involved
c) The type of anticoagulation used
d) Comorbidities such as renal or liver functions impairment

Remember that the risk of TE is more common and more often fatal compared to the consequences of major bleeding.

2.3 The Trust Is committed to treating people with dignity and respect in accordance with the Equality Act 2010 and Human rights Act 1998. Throughout the production of this policy due regard has been given to the elimination of unlawful discrimination, harassment and victimisation (as cited in the Equality Act 2010).

3.0 PURPOSE

3.1 The purpose of these guidelines is to ensure the safe and optimal use of anticoagulants before and after surgical intervention. Guidance is given for the assessment of thromboembolic risk and bleeding risk for a particular patient undergoing a particular procedure. This is then used to inform any changes that will be needed to medication in the peri-operative/procedural period.

4.0 DEFINITIONS

4.1 PAHT – Princess Alexandra Hospital NHS Trust

4.2 Vitamin K Antagonists (VKA) – oral anticoagulants that exert their effect by blocking the action of the clotting factors which depend on vitamin K. These include warfarin, acenocoumarol and phenindione.

4.3 Direct Oral Anticoagulants (DOACs) – oral anticoagulants that block the action of clotting factor Xa (e.g. rivaroxaban, apixaban and edoxaban) or block the

action of thrombin (e.g. dabigatran).

4.4 **Low Molecular Weight Heparin (LMWH)** – These are derived from unfractionated heparin. They have a longer duration of action than heparin, allowing for once daily subcutaneous administration, and have a lower risk of heparin-induced thrombocytopenia.

4.5 **Bridging** – This is the replacement of VKA with heparin while it is not clinically appropriate for a patient to receive a VKA.

4.6 **Thromboembolism (TE)** - Formation in a blood vessel of a clot (thrombus) that breaks loose and is carried by the blood stream to plug another vessel

4.7 **CHA_2DS_2VASc score** – This is a tool for assessing stroke risk in patients with atrial fibrillation. Each letter represents a different risk factor. The more risk factors for stroke that a patient has, the higher the score (see Appendix A - Table 2).

4.8 **APTR** – Activated Partial Thromboplastin Time Ratio (APTR), used for monitoring heparin therapy.

5.0 DUTIES

5.1 **Consultant performing a procedure or surgery** has the primary role in following this guideline with discussion with consultant haematologist when faced with complicated cases. They are also responsible for prescribing pre and post-operative anticoagulation.

5.2 **Consultant from relevant specialties** have a primary role in ensuring patient is discharged with enough heparin until post-operative INR is therapeutic. Post-operative INR can take up to 2 weeks after restarting warfarin .Patients who do not achieve therapeutic INR before discharge should be supplied with 10 days full dose heparin which should be included on TTA. The discharging team has the duty to inform the warfarin clinic at PAH of the discharge plans and fill the relevant forms.

5.3 **All Prescribers** will follow these guidelines and seek advice when faced with complicated cases.

5.4 **Anticoagulant Nurses** will follow these guidelines and will escalate to the consultant haematologist if these guidelines are not being adhered to.

5.5 **All Nurses** will follow these guidelines and will escalate to senior nurses if these guidelines are not being adhered to.

5.6 **Pharmacists** will monitor prescriptions for anticoagulant and antiplatelet medication to ensure that it is prescribed in accordance with these guidelines; will highlight to prescribers the need to monitor renal and hepatic function, during treatment with anticoagulants, and will check for interactions between anticoagulants and prescribed medication, non- prescribed medication and

herbal products.

6.0 PROCESS

6.1 The Perioperative Management of Patients on a VKA (e.g. warfarin, acenocoumarol, phenindione)

- Patients should be assessed one week before surgery or earlier with assessment of risk of TE (Appendix A) and bleeding (Appendix B). FBC, clotting, U/Es and LFTs should be checked.
- Patients with low bleeding risk may not need to have their anticoagulation interrupted during surgery. However, if the surgeon decides that the anticoagulation should be stopped before surgery, then they should be managed as intermediate bleeding risk as per Table 5 (Appendix D).
- Patients on a VKA should have their anticoagulation stopped 5 days before surgery.
- VKA should be restarted in the evening of surgery or next day, if there is adequate haemostasis, at the patient's usual dose.
- Patients who are at high TE risk should have bridging in the perioperative period with low molecular weight heparin (LMWH) or unfractionated heparin (UFH).
- Patients who are at low risk of TE do not require bridging.
- Patients on therapeutic dose of LMWH before surgery should have their last dose 24 hours before surgery. UFH should be stopped 4-6 hours before surgery.
- Post operatively, therapeutic dose LMWH or UFH should be resumed no sooner than 24 hours after surgery in intermediate bleeding risk surgeries and 48-72 hours after surgery in high bleeding risk surgeries.

6.1.1 Choosing the bridging regimen (see Appendix C and Appendix D)

6.1.1.1 Low TE risk patients

i. Bridging is not required
ii. VKA can be restarted 12 hours postoperatively at the usual patient's dose
iii. In patients having minor dental, dermatologic or ophthalmologic procedures anticoagulation may not need to be interrupted

6.1.1.2 High TE risk patients:

i. Start bridging preoperatively with therapeutic (full) dose LMWH or UFH starting on day -4 and stopped at least 24 hours before surgery.
ii. Postoperatively the VKA should be restarted in the evening of the procedure or next day at the patient's usual dose
iii. Full dose LMWH should be started 24-48 hours postoperatively

6.1.2 Very high-risk patients (within 6 weeks of VTE)

6.1.2.1 Attempt should be made to postpone surgery or procedure until the TE risk decreases.

6.1.2.2 If the surgery or procedure has to be done then the interruption of anticoagulation should be minimised.

6.1.2.3 Discussion with Haematologist on call is warranted in some cases. Patients with a recent history of distal DVT don't need bridging unless they have history of recurrent DVT

6.1.2.4 One option is to admit patient and treat with therapeutic dose of UFH to be stopped 4-6 hours before surgery. Postoperatively LMWH can be administered at low dose (refer to Appendix C) at 12 hours and full dose next day if there was adequate haemostasis.

6.1.2.5 **IVC filter** –Stop anticoagulation if actively bleeding or patient requires urgent surgery or procedure associated with high risk of bleeding. Consider IVC filter. All cases should be discussed with on call haematologists.

6.2 The Perioperative Management of Patients on Direct Oral Anticoagulant Drugs DOACs)

6.2.1 This depends on the following factors:

i. Type of DOAC

ii. Renal function. It should be checked at least one week before surgery and postoperatively, by calculating creatinine clearance (using the Cockcroft and Gault equation), and management of the DOAC, especially dabigatran, adjusted accordingly.

iii. Risk of TE (Appendix A)

iv. Type of surgery/procedure and risk of bleeding (Appendix B)

v. Bridging with parenteral anticoagulation until the DOAC is re-started is not normally needed except postoperatively in patients with high TE risk and having high bleeding risk surgery/procedure when bridging with low dose LMWH may be considered.

6.3 Management of Antiplatelet Agents in the Perioperative/Procedural Period

6.3.1 Management of antiplatelet agents in the perioperative/procedural period depends on

- The type of operation and bleeding risk
- The cardiovascular (CV) risk factors
- The type of antiplatelet and its clearance half-life

6.3.2 Appropriate advice and written information will be provided to the patient to ensure that antiplatelet therapy is appropriately stopped before surgery and LMWH or UFH started where required.

6.3.3 The recovery from the effect of antiplatelet agents that irreversibly inhibit platelet function such as aspirin, clopidogrel and prasugrel depends on replenishment of platelet pool and not the drug half-life. This normally takes **7-10 days.**

6.3.4 Drugs that reversibly inhibit platelet function such as dipyridamole, cilostazol, ticagrelor and non-steroidal anti-inflammatory drugs have self-limiting effect depending on their half-life which tends to be short. The pre-procedure washout period is **2-3 days** (but manufacturer of ticagrelor advises 7 day washout).

6.3.5 Resumption of aspirin postoperatively will take a few minutes to reach maximal effect.

6.3.6 Resumption of clopidogrel at 75mg a day will take 5-10 days to attain maximal effect.

6.3.7 See Appendix F for details of management of antiplatelet agents according to bleeding risk of operation/procedure and CV risk.

6.4 Pre-assessment and Discharge plan

6.4.1 If LMWH or UFH is required as bridging therapy prior to surgery, this will be prescribed by the specialist.

6.4.2 Appropriate advice and written information will be provided to the patient to ensure anticoagulant/antiplatelet therapy is appropriately stopped before surgery and LMWH or UFH started where required.

6.4.3 Communicate perioperative management of patients' anticoagulant treatment to the Anticoagulant Clinic, including information of any interacting medicines prescribed on discharge.

6.4.4 Ensure that details of the perioperative management of patients' VKA treatment, including the current VKA dose, the date and result of the last INR and the date of the next blood test, are added to the discharge summary.

6.4.5 Ensure that the doses of VKA to be taken on the 3 days until the next blood test appointment are written in a yellow oral anticoagulant record book which is given to the patient (if discharging a patient on Thursday ensure patient is told to have their blood test on Friday).

6.4.6 If the patient is prescribed LMWH in addition to the VKA, ensure that they have appropriate advice and written information on this and that they are prescribed enough LMWH for a further 10 days.

7.0 TRAINING

7.1 Mandatory Training

There is no mandatory training associated with this policy.

7.2 Specific Training not covered by Mandatory Training

Junior doctors will receive training as part of their core medical teaching

8.0 MONITORING COMPLIANCE WITH THIS DOCUMENT

Element to be monitored	Method	Individual responsible	Frequency	Reporting arrangement
Inclusion in FY1/FY2 and CMT Training	Audit	Dr. AbuSitta /Judith Butcher	Yearly	Healthcare Group Audit Meetings
Compliance with the specific recommendations	Audit	Dr. AbuSitta	Six monthly	Healthcare Group Audit Meetings
Incidents reported on Datix	Audit	Dr. AbuSitta	Quarterly	Healthcare Group Audit Meetings

9.0 REFERENCES

9.1 Keeling D[1], Baglin T, Tait C, Watson H, Perry D, Baglin C, Kitchen S, Makris M; British Committee for Standards in Haematology (2011) *Guidelines on oral anticoagulation with warfarin*. Fourth edition. Br J Haematol. 2011 Aug;154(3):311-24. doi: 10.1111/j.1365- 2141.2011.08753.x. Epub 2011 Jun 14.

9.2 Keeling, D., Campbell Tait, R. and Watson, H. (2016). *Peri-Operative Management of Anticoagulation And Antiplatelet Therapy.* A British Society for Haematology Guideline October 2016.

9.3 Douketis, James D. (2011). *Perioperative management of patients who are receiving warfarin therapy: an evidence-based and practical approach*. Blood 117:5044-5049.

9.4 Patel. J, Clarke, B. and Gordon, S., (June 2015). *What doses of thromboprophylaxis are appropriate for adult patients at extremes of body weight?* HAT Committee, UK Clinical Pharmacy Association.

9.5 Summary of Product Characteristics (SPC). Accessed at www.medicines.org.uk/emc.

10.0 RELATED TRUST POLICIES AND GUIDELINES

10.1 Trust Regulations for the Storage, Control and Administration of Medicines

APPENDIX A - TABLE 1. PERIOPERATIVE THROMBOEMBOLIC RISK STRATIFICATION

Low risk	High risk
1- AF with CHA_2DS_2Vasc score of 0-4 2- VTE >3 months or single episode of distal DVT even if recent 3- Asymptomatic low risk thrombophilia such as heterozygote Factor V Leiden or heterozygote factor II Leiden and with no H/O thrombosis .Please discuss with haematologists if other thrombophilic defects.	1- Mitral or aortic valve prosthesis 2- Recent (within 3 months) CVA or TIA 3- AF with CHA_2DS_2Vasc score of >4 4- History of CVA or TIA with CHA_2DS_2Vasc score of $\geq$3 5- AF with Rheumatic valvular heart disease 6- Recent (within 3 months) VTE excluding single episode of distal DVT 7- VTE >3 months ago occurring whilst patient on therapeutic dose of anticoagulant (with target INR 3.5) 8- Recurrent VTE 9- Severe thrombophilia (deficiency of protein C, S or ATIII, APS, homozygous FVL or complex thrombophilia 10- Active cancer (treated within 6 months or palliative)

APPENDIX A - TABLE 2. CALCULATION OF CHA_2DS_2VASC SCORE

CHA_2DS_2VASC score = total number of points for individual risk factors

C	Congestive Heart Failure	1 point
H	Hypertension	1 point
A	Age >65 and <75 or Age >75	1 point or 2 points
D	Diabetes	1 point
S	History of Stroke, TIA or Thromboembolic disease	2 points
Va	Vascular disease	1 point
SC	Sex category female	1 point

APPENDIX B - TABLE 3. BLEEDING RISK FOR DIFFERENT TYPES OF SURGERY OR PROCEDURE

Low risk	Intermediate risk	High risk
1- Cataract surgery 2- Dental procedures 3- Cutaneous procedures 4- Laparoscopic hernia repair 5- Diagnostic gastroscopy with/without biopsy	1- Renal biopsy 2- Prostate biopsy 3- Abdominal surgery 4- Thoracic surgery 5- Invasive dental or ophthalmic procedures 6- Laparoscopic cholecystectomy 7 – Loop recorder implantation	1- Urologic (bladder, prostate) 2- AA repair and major vascular surgery 3- Pacemaker insertion/box change 4- Angiogram 5- Therapeutic gastroscopy (if possibility of polyps or stent, dilatation and varices banding) 6- Colonoscopy (especially if polypectomy is anticipated) 7- Surgeries and procedures in highly vascular organs 8- Bowel resection 9- PEG insertion 10- ERCP 11- Major cancer surgery 12- Major orthopedic surgery 13- Spinal Surgery 14- Liver biopsy

For management of perioperative anticoagulation see Appendix G for Gastroenterology and Appendix H for Cardiology

APPENDIX C - BRIDGING WITH ENOXAPARIN (LMWH) OR UNFRACTIONATED HEPARIN (UFH)

Dose regimens:

10.2 Prophylactic (low) dose:

10.2.1 Enoxaparin (Table 4)

10.2.2 UFH 5000 units BD

10.3 Therapeutic (full) dose:

10.3.1 Enoxaparin (Table 4)

10.3.2 UFH at the standard dose (as per pink anticoagulation chart) to achieve APTR of 1.5-2.

APPENDIX C - TABLE 4: ENOXAPARIN DOSE ADJUSTMENT

Weight	**Enoxaparin Dose**	**Adjustment if eGFR<30ml/min/1.73m^2**
Low dose		
<40kg	20mg od	No dose adjustment
>40-100kg	40mg od	20mg od
100-150kg	40mg bd	40mg od
>150kg	60mg bd	60mg od
Full dose		
<30kg	40mg od	20mg od
30-40kg	60mg od	40mg od
40kg-130kg	*As per pink anticoagulation chart*	
>130kg* (*See notes below in relation to anti Xa)*	1mg/kg bd up to max150mg bd	1mg/kg od up to 150mg od

*It is imperative that these patients have anti Xa level checked 4 hours after the 3rd dose and enoxaparin dose adjusted accordingly.

APPENDIX D – TABLE 5. PERIOPERATIVE MANAGEMENT OF PATIENTS ON VKA (WARFARIN, ACENOCOUMAROL, PHENINDIONE)

Day	**Typical management of a high TE risk patient who is on a VKA and requiring low/intermediate bleeding risk surgery**	**Typical management of a high TE risk patient who is on a VKA and requiring high bleeding risk surgery**	**Typical management of a low TE risk patient who is on a VKA and requiring surgery regardless of bleeding risk**
-7 or earlier	Assess patient for risk of TE (Table 2) and bleeding risk (Table 3) and perform FBC, clotting, U/Es & LFTs Assess patient for thromboprophylaxis risk factors as per Trust guidelines	Assess patient for risk of TE (Table 2) and bleeding risk (Table 3) and perform FBC, clotting, U/Es & LFTs Assess patient for thromboprophylaxis risk factors as per Trust guidelines	Assess patient for risk of TE (Table 2) and bleeding risk (Table 3) and perform FBC, clotting, U/Es & LFTs Assess patient for thromboprophylaxis risk factors as per Trust guidelines
-6	Last dose of VKA	Last dose of VKA	Last dose of VKA
-5	No anticoagulation	No anticoagulation	No anticoagulation
-4	Start therapeutic dose of LMWH or UFH in the morning	Start therapeutic dose of LMWH or UFH in the morning	No anticoagulation
-3	Therapeutic dose LMWH or UFH in the morning	Therapeutic dose LMWH or UFH in the morning	No anticoagulation
-2	Therapeutic dose LMWH or UFH in the morning	Therapeutic dose LMWH or UFH in the morning	No anticoagulation
-1	Last dose of therapeutic dose LMWH stopping at least 24 hours before surgery. UFH should be stopped 4-6 hours before surgery Check INR if >1.5 give Vit K	Last dose of therapeutic dose LMWH stopping at least 24 hours before surgery. UFH should be stopped 4-6 hours before surgery Check INR if >1.5 give Vit K	No anticoagulation Check INR if >1.5 give Vit K
0	**Surgery/Procedure**	**Surgery/Procedure**	**Surgery/Procedure**
0 (12h after surgery)	Start VKA and consider patient for prophylactic dose LMWH if haemostasis is adequate	No anticoagulation	Start prophylactic dose LMWH and VKA if haemostasis is adequate. If bleeding risk high start next day
1	Continue VKA and consider starting patient on therapeutic dose LMWH or UFH 24 hours after surgery. If this dose is deemed unsafe, give prophylactic dose LMWH or UFH	Start VKA and prophylactic dose LMWH	Continue VKA and prophylactic dose LMWH
2	Continue VKA and therapeutic dose LMWH or UFH, or prophylactic dose if haemostasis is inadequate	Continue VKA and prophylactic dose LMWH	Continue VKA and prophylactic dose LMWH
3 onward	Continue VKA and therapeutic dose LMWH. Check INR and then 2-3 days later. When INR >2 stop LMWH	Continue VKA and therapeutic dose LMWH if haemostasis adequate. Check INR and then 2-3 days later. When INR >2 stop LMWH	Low dose LMWH. Check INR and then 2-3 days later. When INR >2 stop LMWH

APPENDIX E - TABLE 6. MANAGEMENT OF DOACS IN THE PERIOPERATIVE PERIOD

Procedure with low bleeding risk	Interruption is not indicated
Endoscopic GIT without biopsy	Interruption is not indicated
Endoscopic GIT with organ puncture	Stop as in Table 7 and restart 12 hours later if no bleeding
Cardiac Catheterisation	Stop as in Table 7 and restart 12 hours later
All other procedures	Follow Table 7

APPENDIX E - TABLE 7. INTERRUPTION AND RESUMPTION OF DOACS IN THE PERIOPERATIVE PERIOD

DOAC	Renal function as creatinine clearance ml/min	Preoperative suspension of DOAC		Postoperative resumption of DOAC	
		Low bleeding risk	Moderate to High bleeding risk	Low bleeding risk	Moderate to High bleeding risk
Dabigatran	>80	24 hours	48 hours	12-24 hours*	48-72 hours*
	50-79	24-48 hours	48-72 hours		
	30-49	72 hours	96 hours		
Apixaban	>50	24 hours	48 hours	12-24 hours*	48-72 hours*
	≤50	48 hours	72 hours		
Rivaroxaban	>30	24 hours	48 hours	12-24 hours*	48-72 hours*
	≤30	48 hours	72 hours		
Edoxaban	>30	24 hours	48 hours	12-24 hours*	48-72 hours*
	≤30	48 hours	72 hours		
* In patients with high TE risk (Table 1) consider starting low dose LMWH after high bleeding risk procedure or full dose LMWH after low bleeding risk procedure (Table 3) starting 24 hours after procedure until DOAC is resumed. When DOAC is resumed the dose should replace next LMWH dose					

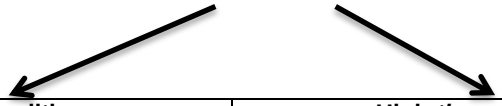
APPENDIX F - TABLE 8: PERIOPERATIVE MANAGEMENT OF ANTIPLATELET AGENTS

Type of procedure (see Appendix B table 3)	CV Risk	Antiplatelet Agent	Perioperative Management	Restart 24 hours after procedure provided patient is hemodynamically stable and not actively bleeding.
Low risk procedure (i.e. minor dental or dermatologic procedure or cataract surgery)	Low risk - Secondary prevention of CV disease	Aspirin and/or Clopidogrel, Ticagrelor or Prasugrel	Continue Aspirin. Stop Clopidogrel/ Ticagrelor /Prasugrel 7 days before procedure*. *Provided surgery is not required within 4 weeks of bare-metal stents or 3 months of drug-eluting stent	
All Risk Procedures	Moderate to High Risk – Medical management due to co-morbidities (not treated with PCI)	Aspirin and/or Clopidogrel, Ticagrelor or Prasugrel	Continue Aspirin and/or Clopidogrel/ Ticagrelor/ Prasugrel peri-operatively. Discuss with Cardiologist.	
*Low to high risk procedure required within 4 weeks of bare- metal stent or 3 months of drug-eluting stent	High risk CV disease	Aspirin and/or Clopidogrel, Ticagrelor or Prasugrel	Continue dual antiplatelet therapy perioperatively or defer surgery Discuss with Cardiologist.	
All risk procedures	N/A	Cilostazol	Stop Cilostazol 5 days before procedure	
All Risk Procedures	Low – High risk	Dipyridamole	Stop Dipyridamole 2 days before high bleeding risk procedure	

APPENDIX G - ENDOSCOPY COAGULATION PATHWAY FOR VITAMIN K ANTAGONISTS (WARFARIN, ACENOCOUMAROL, PHENINDIONE)

Pathway 1: Low *bleeding* Risk Procedures
Gastroscopy/*OGD* with/without biopsy– to continue on normal dose of Warfarin till procedure regardless of the patient's risk stratification

High Risk procedures
(Colonoscopy, polypectomy, ERCP, PEG, OGD with polypectomy, Stent, dilatation or banding)



Low *thrombotic* risk condition
Pathway 2

1. Aortic valve replacement (tissue valve) with no atrial fibrillation.
2. Atrial fibrillation with CHA_2DS_2-VAS_c score 0-4 (see appendix)*
3. VTE after first 3 months of diagnosis
4. Asymptomatic low risk thrombophilia such as heterozygote Factor V Leiden or heterozygote factor II Leiden and with no H/O thrombosis

How to do it

1. Stop Warfarin 5 days before endoscopy. No bridging required.
2. Check INR prior to procedure to ensure <1.3.
3. Restart Warfarin evening of procedure with maintenance dose.
4. Check INR in 5 days to ensure it is in therapeutic range
   i.e between 2-3.

High *thrombotic* Risk condition
Pathway 3

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1. Mitral or aortic valve prosthesis
2. Patient on indefinite Warfarin therapy for causes other than AF.
3. Atrial fibrillation with CHA_2DS_2-VAS_c score5 – 9.
4. Atrial fibrillation with rheumatic valve disease.
5. Metal aorta/any mitral valve prosthesis.
6. Recent (within 3 months) CVA or TIA.
7. History of CVA or TIA with CHA_2DS_2-VAS_c score of >3
8. Recent (within 3 months) VTE.
9. VTE >3 months ago occurring whilst patient on therapeutic dose of anticoagulant (with target INR 3.5).
10. Recurrent VTE.
11. Severe thrombophilia (deficiency of protein C, S or ATIII, APS, homozygous FVL or compound thrombophilia factors.
12. Active cancer (treated within 6 months or palliative).

STOP WARFARIN
Full bridging with Enoxaparin (treatment dose)
How to do it

1. Stop Warfarin 5 days before endoscopy.
2. Start treatment dose Enoxaparin at 9.am 3 days before procedure. Check INR day before procedure to ensure it is <1.3. Please prescribe 10 days' supply of enoxaparin based on body weight and eGFR (see tables on next page)
3. Omit Enoxaparin on day of procedure, check INR ensure < 1.3
4. Restart Enoxaparin 8 hours post procedure or when haemostasis is secure.
5. Restart maintenance dose of Warfarin on the evening of the procedure if haemostasis is secure provided the procedure is on Monday, Tuesday and Friday but if the procedure is on Wednesday or Thursday, re-start warfarin on Friday.
6. Continue **Warfarin and Enoxaparin** until INR is back in therapeutic range then stop Enoxaparin.
7. On the 3rd day of re-starting warfarin, patients

Appendix - Atrial fibrillation CHA_2DS_2-VAS_c Score:

Congestive Heart Failure = 1
Hypertension = 1
Age>65 = 1
Age>75 = 2
Diabetes = 1
Stroke/TIA/VTE = 2
Vascular disease = 1
Sex female = 1.

need an INR check and will be advised by anticoagulation clinic about their next dose. Endoscopy discharge nurse needs to provide patients with blood form for INR check on day 3.

Table 1 - Full bridging dose

Body Weight (kg)	40 - 49	50 - 59	60 -74	75 - 89	90-95	96-106	107-114	115-130	***In extremes of body weight:*** <40kg 1.5mg/kg OD
Syringe size (mg) Sub-cut daily	60	80	100	120	140 (60+80)	150	160 (80+80)	180 (100+80)	>130kg 1mg/kg BD max. 150mg BD

Table 2 - Bridging dose based on severe renal impairment

Body Weight (Kg)	**40-49**	**50-69**	**70-89**	**90-109**	**110-130**
Syringe Size (mg)	40	60	80	100	120
Frequency If eGFR <30mL>15ml/min/1.73m^2	OD	OD	OD	OD	OD
If eGFR<15ml/min/1.73m^2	Consider using unfractionated heparin				

- For weights below 40kg or above 130kg Discuss with Haematology team

APPENDIX H - GUIDELINES FOR MANAGEMENT OF ANTICOAGULATION / ANTITHROMBOTICS IN PATIENTS UNDERGOING CARDIAC CATHETERISATION

For patients on WARFARIN	
ATRIAL FIBRILLATION CHA_2DS_2VASc of 1 to 4 (Score 0 but on anticoagulation awaiting DCCV or Ablation procedures)	Stop 5 days before procedure Bridging is not required VKA can be restarted 12 hours post-operatively at the patient's usual dose
CHA_2DS_2VASc of greater than 4 VTE: Patients with a VTE within previous 3 months Very high risk patients such as patients with a previous VTE whilst on therapeutic anticoagulation. AF: Patients with a previous stroke/TIA in last 12 months	Consider starting bridging preoperatively with therapeutic (full) dose LMWH or UFH (renal impairment with EGFR <15) starting on day – 4 and stopped 24 hours before surgery Post-operatively: *Radial procedure* - Warfarin should be restarted on the evening of the procedure at the usual patient dose Full dose LMWH or UFH should be started on the day after the procedure *Femoral procedures* - Warfarin should be restarted the day after the procedure at the usual patient dose Full dose LMWH or UFH should be started the day after the procedure
MECHANICAL VALVES	As per AF with CHA_2DS_2VASc of 4 or above
OTHER INDICATIONS (PE / DVT / Blood disorders)	As per AF with CHA_2DS_2VASc of 4 or above

For patients on ANTI-PLATELET AGENTS	
Single or Dual anti-platelet (DAPT)	**Continue antiplatelet (s)**
Single or Dual anti-platelet (DAPT) + Warfarin)	**Continue antiplatelet (s)** **Warfarin - as per guidelines for Atrial Fibrillation**

Guidelines for management of Anticoagulation / Antithrombotic in implantation of cardiac devices (Pacemaker, Box changes, Loop recorders)

Reason for new guidance:- There has been strong evidence to suggest that uninterrupted anticoagulation decreases the risk of bleeding peri-operatively including pocket haematomas, compared with heparin bridging for cardiac device implantation.

Anticoagulation / Antiplatelet therapy	**Recommended action**
For patients on WARFARIN	
AF patients on Warfarin (CHA_2DS_2VASc score 0 but on anticoagulation awaiting DCCV or Ablation procedures)	Bridging is not required VKA can be restarted 12 hours post-operatively at the patient's usual dose
CHA_2DS_2VASc of 1 to 4	Stop 5 days pre-procedure
CHA_2DS_2VASc of greater than 4	Continue Warfarin (with diathermy availability) Aim INR 2.0-3.0
Other indications (PE / DVT / Blood disorders)	Continue Warfarin (with diathermy availability) Aim INR 2.0-3.0
Mechanical valves on warfarin	Continue Warfarin (with diathermy availability) Aim INR 2.5-3.0 AVR, INR 3.0-3.5 MVR
For patients on ANTI-PLATELETS	
Dual anti-platelet (DAPT)	Continue Aspirin ONLY
Drug eluting stents >3 months or Bare metal stents >4weeks	Stop Clopidogrel/Prasugrel/Ticagrelor 7 days before procedure
Triple therapy (DAPT + Warfarin)	Warfarin and Anti-platelet agents as instructed above, continue Aspirin

DOACs (Rivaroxaban, Dabigatran, Apixaban, Edoxaban). For use of DOACs in peri-operative and post-operative period please refer to Appendix E Table 7: Interruption and resumption of DOACs in the peri-operative period. Bridging with parenteral anticoagulation until the DOAC is re-started is not normally needed except postoperatively in patients with high TE risk and having high bleeding risk surgery/procedure when bridging with low dose LMWH may be considered. Patients considered high risk should be discussed with a cardiologist.
Guidance notes:- Situations that are not covered by these guidelines should be discussed with the Consultant. Warfarin may need to be omitted the day before procedure if it has been persistently high, the procedure may need to be rescheduled if INR on the day is >3.0 Heparin / LMWH bridging is no longer required. Restart anticoagulation / anti-thrombotic as per usual dose after haemostasis has been achieved.

If patients on antiplatelets develop bleeding during or post procedure platelet transfusion may be required. Please contact Haematology for further advice.

APPENDIX 1 - VERSION CONTROL SUMMARY

Document Title: Guidelines for the Management of Anticoagulation and Antiplatelet therapy in the Perioperative/Procedural Period

Version Number	Purpose / Changes	Author	Date Changed
1	New procedural document	Faris Al-Refaie/Shilpa Sondagar	
2.0	Correction of error in table; clarify a sentence to avoid misinterpretation regarding bridging before DOAC restarted; change of reference source.	Faris Al-Refaie/Shilpa Sondagar	12.06.2018
3.0	Update to include appendices for endoscopy and cardiology procedures and section on the discharge plan.	Abed AbuSitta/Shilpa Sondagar	01.02.2019
4.0	Update to wording in relation to full dose LMWH instead of enoxaparin. Postoperatively LMWH wording removal of 40mg and replaced with refer to Appendix C Update to mention advice and written information will be provided for pre-assessment and discharge plan. Appendix E – Correction of error in patients with high TE risk, table no. changed to Table 1. Update to Perioperative management for patients with bare metal or drug eluting stents. Update to management of anticoagulation in implantation of cardiac devices with patients on warfarin.	Simon Tokatly/Shilpa Sondagar	12.07.19

APPENDIX 2 - CHECKLIST FOR PROCEDURAL DOCUMENTS

To be completed by the author and attached to any document which guides practice when submitted to the appropriate committee for consideration and approval / ratification.

Document Title and Version No.	Management of Anticoagulation and Antiplatelet Therapy In The Perioperative/Procedural Period Guideline

		Yes/No/ Unsure	Comments
1.	**Title**		
	Is the title clear and unambiguous?	Yes	
	Is it clear whether the document is a guideline, policy, protocol or standard?	Yes	
2.	**Rationale**		
	Are reasons for development of the document stated?	Yes	
3.	**Development Process**		
	Is the method described in brief?	Yes	
	Are individuals involved in the development identified?	Yes	
	Do you feel a reasonable attempt has been made to ensure relevant expertise has been used?	Yes	
	Is there evidence of consultation with stakeholders and users?	Yes	
4.	**Content**		
	Is the objective of the document clear?	Yes	
	Is the target population clear and unambiguous?	Yes	
	Are the intended outcomes described?	Yes	
	Are the statements clear and unambiguous?	Yes	
5.	**Evidence Base**		
	Is the type of evidence to support the document identified explicitly?	Yes	
	Are key references cited?	Yes	
	Are the references cited in full?	Yes	
	Are local/organisational supporting documents referenced?	Yes	
6.	**Approval**		
	Does the document identify which	Yes	

		Yes/No/ Unsure	Comments
	committee/group will approve it?		
	If appropriate, have the joint Human Resources/staff side committee (or equivalent) approved the document?	N/A	
7.	**Dissemination and Implementation**		
	Is there an outline/plan to identify how this will be done?	Yes	Via Clinical Effectiveness
	Does the plan include the necessary training/support to ensure compliance?	Yes	
8.	**Document Control**		
	Does the document identify where it will be held?	Yes	Trust Intranet
	Have archiving arrangements for superseded documents been addressed?	N/A	
9.	**Process for Monitoring Compliance**		
	Are there measurable standards or KPIs to support monitoring compliance of the document?	No	Guideline not policy
	Is there a plan to review or audit compliance with the document?	No	Guideline not policy
10.	**Review Date**		
	Is the review date identified?	Yes	
	Is the frequency of review identified? If so, is it acceptable?	Yes	
11.	**Overall Responsibility for the Document**		
	Is it clear who will be responsible for coordinating the dissemination, implementation and review of the documentation?	Yes	Clinical Effectiveness

Completed by			
Name	Anne Rose	Date	30/01/2019
Job Title	Medication Safety Officer		

Acknowledgement: Cambridgeshire and Peterborough Mental Health Partnership NHS Trust

APPENDIX 3 – EQUALITY IMPACT ASSESSMENT

The organisation aims to design and implement services, policies and measures that meet the diverse needs of our service, population and workforce, ensuring that none are placed at a disadvantage over others. The Equality Impact Assessment Tool is designed to help you consider the needs and assess the impact of your policy.			
Name of Document:	Guidelines for the Management of Anticoagulation and Antiplatelet Therapy in the Perioperative/Procedural period		
Completed by:	Anne Rose		
Job Title:	Medication Safety Officer	**Date:**	30.01.2019

		Yes/No
1.	**Does the document/guidance affect one group less or more favourably than another on the basis of:**	
	• Race	No
	• Ethnic origins (including gypsies and travellers)	No
	• Nationality	No
	• Gender (including gender reassignment)	No
	• Culture	No
	• Religion or belief	No
	• Sexual orientation	No
	• Age	No
	• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No
2.	**Is there any evidence that some groups are affected differently?**	No
3.	**If you have identified potential discrimination, are there any exceptions valid, legal and/or justifiable?**	N/A
4.	**Is the impact of the document/guidance likely to be negative?**	No
5.	**If so, can the impact be avoided?**	N/A
6.	**What alternative is there to achieving the document/guidance without the impact?**	N/A
7.	**Can we reduce the impact by taking different action?**	N/A

If you have identified a potential discriminatory impact of this procedural document or the answer to any of the above is Yes, please refer it to the Head of Patient Experience, Tel 01279 444455 – Extn 2358 , together with any suggestions as to the action required to avoid/reduce this impact. In this case, ratification of a procedural document will not take place until approved by the Head of Patient Experience.

Date of approval by Head of Patient Experience:	*Evidence of approval must be available if requested*

APPENDIX 4 – DATA PROTECTION IMPACT ASSESSMENT SCREENING

Data Protection impact assessments (DPIAs) are a tool which can help organisations identify the most effective way to comply with their data protection obligations and meet individual's expectations of privacy. The first step in the DPIA process is identifying the need for an assessment.

The following screening questions will help decide whether a DPIA is necessary. Answering 'yes' to any of these questions is an indication that a DPIA would be a useful exercise and requires senior management support, at this stage the Information Governance Manager must be involved.

Name of Document:	Guidelines for the Management of Anticoagulation and Antiplatelet Therapy in the Perioperative/Procedural period		
Completed by:	Anne Rose		
Job title	Medication Safety Officer	Date	30.01.2019

	Yes or No
1. Will the process described in the document involve the collection of new information about individuals? This is information in excess of what is required to carry out the process described within the document.	No
2. Will the process described in the document compel individuals to provide information about themselves? This is information in excess of what is required to carry out the process described within the document.	No
3. Will information about individuals be disclosed to organisations or people who have not previously had routine access to the information?	No
4. Are you using information about individuals for a purpose it is not currently used for, or in a way it is not currently used?	No
5. Does the process involve the use of new technology which might be perceived as being privacy intrusive? For example, the use of biometrics.	No
6. Will the process result in decisions being made or action taken against individuals in ways which can have a significant impact on them?	No
7. Is the information about individuals of a kind particularly likely to raise privacy concerns or expectations? For examples, health records, criminal records or other information that people would consider to be particularly private.	No
8. Will the process require you to contact individuals in ways which they may find intrusive?	No

If the answer to any of these questions is 'Yes' please contact the Information Governance Manager, Tel: 01279 444455 - Extn: 1272 / Mobile: 07908 632215 tracy.goodacre@pah.nhs.uk / tracy.goodacre@nhs.net. In this case, ratification of a procedural document will not take place until approved by the Information Governance Manager.

IG Manager approval Name:	
Date of approval	