Approved by Quality & Patient Care Committee
7 July 2016

BRIDGING ANTICOAGULATION – PROTOCOL FOR MANAGEMENT OF ANTICOAGULATION IN THE PERIOPERATIVE PERIOD

This LOP is developed to guide clinical practice at the Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this LOP.

1. AIM
To ensure appropriate patient protection from thromboembolic events whilst minimising the risk of surgical complications, particularly bleeding.

2. PATIENT
Woman requiring bridging anticoagulant therapy during the perioperative period

3. STAFF
Medical, midwifery, nursing staff

4. EQUIPMENT
Nil

5. CLINICAL PRACTICE
- Assess all patients at least 7 days before surgery to allow for planning of perioperative anticoagulant management, especially before major surgery.
- Provide patients with written instructions outlining the perioperative timing of warfarin and antiplatelet drug discontinuation and resumption, dose and timing of Low Molecular Weight Heparin (LMWH) bridging, and International Normalised Ratio (INR) measurement schedule.
    - This should include patient and caregiver education on injection technique when outpatient LMWH bridging is required.
- Test INR on the day before surgery, where appropriate and feasible, to identify patients with elevated INRs and permit timely use of corrective oral vitamin K thereby avoiding blood product administration or surgery deferral
- Assess postoperative hemostasis, preferably on the day of surgery and on the first postoperative day, to facilitate safe resumption of anticoagulant drugs.
- Determine the appropriate management of patients with a history of thromboembolism or currently taking anticoagulants or antiplatelet agents using the below procedure.

Ten days pre-operatively use the following tables to:

1. Assess the risk of thromboembolism: low, moderate, high – or indication for antiplatelet therapy – see Table 1a and 1b
2. Assess the potential bleeding risk associated with the planned procedure: high/moderate, low, very low – see Table 2
3. Determine the appropriate protocol to follow from Table 3
4. Institute appropriate protocol

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TABLE 1a

Risk of thromboembolism	
Low	• Venous thromboembolism (VTE) > 3/12 prior • Atrial fibrillation $CHADS_2$ score ≤2 (see below) • Cardiovascular disease • Cerebrovascular disease • Low risk prosthetic heart valve (bioprosthetic, newer model mechanical)

Moderate	• Arterial or Venous thromboembolism:
	  ○ within 4-12 weeks of proposed surgery
	  ○ recurrent
	  ○ with thrombophilia
	• Atrial fibrillation and:
	  ○ $CHADS_2$ score ≥3 (see below)
	  ○ Valvular heart disease
	• All other cardiac valves
	• Multiple strokes ortransient ischaemic attacks (TIAs)
	• Coronary artery stents

High	• Arterial or venous thromboembolism within 4 weeks of proposed surgery

$CHADS_2$ score for non-valvular atrial fibrillation

Congestive heart failure, past or current	**1 point**
Hypertension	**1 point**
Age ≥ 75 years	**1 point**
Diabetes	**1 point**
Stroke (ischaemic), transient ischaemic attack or thromboembolism	**2 point**

TABLE 1b

Indication for antiplatelet therapy		
Therapeutic	• Recurrent strokes or TIA • Recent (within 6-12 weeks) myocardial infarction, or coronary artery bypass graft or TIA • Bare metal coronary artery stents <12 weeks • Drug eluting coronary artery stents <12 months • Atrial fibrillation with $CHADS_2$ score ≥3	Use protocol 4b
Prophylactic	All other indications	Use protocol 4a

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TABLE 2

Bleeding risk of surgery	
High/ moderate	Radical pelvic & abdominal surgery, breast surgery History of bleeding or coagulopathy
Low	Abdominal wall surgery Non radical pelvic surgery
Very low	EUA, cystoscopy, brachytherapy, hysteroscopy

TABLE 3

	Bleeding risk			
		HIGH/ MODERATE	**LOW**	**VERY LOW**
Thromboembolism risk	**HIGH**	Protocol 3	Protocol 2	REMAIN ON USUAL TREATMENT
	MODERATE	Protocol 2	Protocol 2	↓
	LOW	Protocol 1	Protocol 1	↓
	ANTIPLATELET	Protocol 4a or 4b	Protocol 4a or 4b	↓
	NOVEL ORAL ANTICOAGULANTS	Protocol 5	Protocol 5	↓

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PROTOCOLS

Standard Anticoagulants i.e. warfarin

PROTOCOL 1:

- Cease warfarin 5 days prior (i.e. omit 4 doses)
- Check INR one day pre-op, if > 1.5 administer vitamin K (phytomenadione) 2mg orally
- Recheck INR on day of surgery

Post operatively

- Commence prophylactic LMWH
- Recommence warfarin as soon as possible
- Cease LMWH when INR ≥1.8

PROTOCOL 2:

- Cease warfarin 5 days prior (i.e. omit 4 doses)
- Commence therapeutic LMWH 2 days pre-op
- Administer last dose of LMWH 24 hours pre-op
- Check INR one day pre op, if > 1.5 administer vitamin K (phytomenadione) 2mg orally
- Recheck INR on day of surgery

Post operatively

- Resume prophylactic LMWH within 24hrs
- Increase dose to therapeutic LMWH at 24-48 hours
- Recommence warfarin as soon as possible
- Cease LMWH when INR ≥1.8

PROTOCOL 3:

- Consider IVC filter if VTE < 4/52 prior to surgery
- Cease warfarin 5 days prior (i.e. omit 4 doses)
- Admit for IV adjusted dose unfractionated heparin 2 days prior to surgery (as per relevant SESLHD protocol)
- Maintain therapeutic APTT
- Cease IV heparin 4 hours pre-op

Post operatively:

- Resume IV heparin (without loading dose), at previous therapeutic rate 6-24 hours post op
- Consider change to therapeutic dose LMWH after 24-48 hours if appropriate and cease unfractionated heparin 4-6 prior to first dose
- Recommence warfarin as soon as possible
- Cease LMWH/unfractionated heparin when INR > 2.0

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Antiplatelet therapy

PROTOCOL 4a:

- Cease all antiplatelet therapy 7-10 days prior to surgery
  (This includes aspirin, clopidogrel, ticlopidine, dipyridamole)

PROTOCOL 4b:

- Continue aspirin but cease all other antiplatelet agents 10 days prior to surgery i.e. clopidogrel, ticlopidine, dipyridamole

Patients receiving clopidogrel ± aspirin following insertion of a drug-eluting coronary artery stent are at increased risk of stent occlusion in the first 6-12 months following insertion. In these patients, clopidogrel should be ceased 10 days pre-op but aspirin continued. Consider the addition of prophylactic LMWH

Novel Oral Anticoagulants (NOACs) i.e. dabigatrin, rivaroxaban, apixaban

PROTOCOL 5:

Semi-acute or elective surgery:

- Assess the risk of bleeding against the risk of thrombosis as these agents may not need to be discontinued for minor procedures.
- Consider bridging anticoagulant therapy only if there is a high risk of thrombosis (see Table 1a).
- Measure activated partial thromboplastin time (APTT) and prothrombin time (PT) pre-operatively in situations where complete haemostasis is required. Note INR is NOT an indicator of bleeding risk in this setting.
- Dabigatrin is primarily renally excreted (80%) while rivaroxaban and apixaban are less dependent on renal clearance (25-33%).
- Discontinue anticoagulant based on the table below:

Renal function (CrCl mL/min)	Timing of discontinuation before surgery	
	Standard risk of bleeding	High risk of bleeding
> 80	24 hours	2-4 days
> 50 to ≤ 80	24 hours	2-4 days
> 30 to ≤ 50	At least 2 days (48 hours)	4 days
≤ 30	2-5 days	> 5 days

Emergency surgery:

- Consider delaying surgery if appropriate until sufficient time has elapsed for drug clearance (see above).
- Consider use of idarucizumab if patient taking dabigatran however consult with haematology first.
- Consult Haematology if urgent life-saving surgery cannot be delayed.

LOCAL OPERATING PROCEDURE

CLINICAL POLICIES, PROCEDURES & GUIDELINES

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6. DOCUMENTATION

- Integrated Clinical Notes
- Medication Chart
- Observation Chart

7. EDUCATIONAL NOTES

LMWH dosing:

Prophylactic LMWH

Enoxaparin 20-40mg by subcutaneous injection daily
Dalteparin 2500-5000 units by subcutaneous injection daily

Therapeutic LMWH

Enoxaparin 1mg/kg by subcutaneous injection twice daily
Dalteparin 100 units/kg by subcutaneous injection twice daily

Precautions of LMWH

- Modify dose in patients with renal impairment
- Monitor anti Xa levels in patients with renal insufficiency, weight >150kg.
- Care in patients with history of bleeding disorder, intracranial haemorrhage, GIT bleeding, recent trauma or surgery, severe liver disease
- Avoid in patients with past history of heparin induced thrombocytopenia (HITS) associated with previous exposure to LMWH

8. RELATED POLCIES/ PROCEDURES/ CLINICAL PRACTICE LOP

Heparin- anticoagulation with intravenous heparin sodium infusion
Thromboembolism prophylaxis and treatment

9. RISK RATING

Medium- review in 3 years

10. NATIONAL STANDARD

Medication safety

11. REFERENCES

Jaffer, AK, Brohman OJ, Chukwumertje, N. When patients on Warfarin need surgery. Clev Clin J Med, 2003, 70, 973-984

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Bridging Anticoagulation Peri-Operative Management