Guideline

Low Molecular Weight Heparin (LMWH) Guidelines

1. Purpose

Low Molecular Weight Heparins (LMWH) are used for the prophylaxis and treatment of venous thromboembolism.

The following are guidelines only and may need to be adapted in individual circumstances:

- Administration and maintenance of LMWH
- Adverse events
- LMWH Antidote
- Administration LMWH / Surgical procedures

This clinical guideline outlines the requirement for use of Low Molecular Weight Heparin (LMWH) at the Women's.

2. Definitions

Not applicable

3. Responsibilities

Staff caring for a patient who requires administration of LMWH should be aware of this guideline.

4. Guideline

- weigh patient
- obtain baseline FBE , APPT, INR and fibrinogen
- timing of commencement of therapy (especially post-procedural) should be individualised
- duration of therapy is determined on an individualised basis, based upon indication for treatment.

	Dalteparin	**Enoxaparin**
Prophylaxis	2500-5000 units daily	20-40mg daily
DVT treatment	100 Units/kg BD	1mg/kg BD or 1.5mg/kg daily

Monitoring of the anti-Xa level is not required except in the following circumstances:

- pregnancy (note: once daily administration for therapeutic anticoagulation is not recommended in pregnancy)
- extremes of body weight (<50kg, >100 kg)
- impaired renal function
- prosthetic heart valves: desired anti-xa is higher e.g. 0.8-1.2.

4.1 Nomogram for Low Molecular Weight Heparin Therapy

A **therapeutic** anti-Xa level for LMWH is 0.5-1.0 IU/mL 4 hours after a dose of LMWH.

A **prophylactic** anti-Xa level for LMWH is 0.1-0.3 IU/mL 4 hours after a dose of LMWH.

To locate the correct specimen tube refer to the shared Pathology service (RCH and the Women's) Specimen Collection Handbook: Anti-Xa .

The APTT is irrelevant in LMWH monitoring.

The table below outlines dose adjustments required for a given anti-Factor Xa result in patients requiring therapeutic anticoagulation with LMWH.

Anti-factor Xa level	Hold Next Dose	Dose Change	Repeat anti-Xa level
< 0.35 Units/mL	No	Increase by 25%	4 hours post next a.m. dose
0.35-0.49 Units/mL	No	Increase by 10%	4 hours post next a.m. dose
0.5-1.0 Units/mL	No	No change	According to underlying disorder
1.1-1.5 Units/mL	No	Decrease by 20%	4 hours post next a.m. dose
1.6-2.0 Units/mL	3 hours	Decrease by 30%	Trough level pre next dose, then 4 hours post next a.m.dose.
>2.0 Units/mL	Until aXa level <0.5 Units/mL	Decrease by 40%	Trough level pre next dose and if not <0.5 Units/mL repeat BD

The above nomogram assumes there is no bleeding.

Doses may be rounded up or down to the nearest commercially available dose size eg calculated dose 7000IU bd, round up to 7500 bd and recheck anti-Xa level after 2 more doses.

A platelet count should be obtained during initial therapy. If there is an abrupt decrease in the platelet count (approx. 50%) consideration must be given to the possibility of Heparin Induced Thrombocytopaenia (HIT). Consult Haematology if concerned.

Avoid the concurrent use of NSAIDS (as this can potentiate the anticoagulant effects of LMWH).

Avoid IM injections and arterial punctures if possible during treatment with LMWH.

4.2 Adverse events

The major adverse event related to treatment with LMWH is bleeding. If a patient on LMWH develops a major bleed, withhold further doses and seek an urgent Haematology consult.

4.3 LMWH antidote

The antidote for LMWH is Protamine sulphate.

Protamine is a medication that requires a high level of caution when being prescribed and administered.

Protamine reverses some, but not all, of the effects of LMWH. The dose of protamine sulphate given is dependent upon the dose of LMWH administered and the time of administration. If protamine is given within 8 hours of the LMWH then a maximum neutralizing dose is 1mg Protamine/100units (or 1mg) of LMWH given in the last dose.

If more than 8 hours have passed since the dose of LMWH was given, administer 0.5mg Protamine per 100 Units (or 1mg) of LMWH given. Protamine is administered by slow IV infusion (over 10 mins) to avoid a hypotensive reaction. The maximum dose of protamine sulfate, regardless of the amount of heparin received is 50mg except for reversal of heparin following cardiopulmonary bypass. Protamine sulfate is usually administered in a concentration of 10mg/mL at a rate not to exceed 5mg/minute. If administered too quickly, protamine sulfate may cause cardiovascular collapse. Patients with known hypersensitivity reactions to fish, and those who have received protamine- containing insulin or previous protamine therapy may be at risk of hypersensitivity reactions to protamine sulfate.

4.4 Special note regarding administration of LMWH around the time of procedures

As with other anticoagulant medications, consideration must be given to the management of LMWH prior to invasive procedures such as spinal injections, epidural anaesthesia and surgery. In general, regional anaesthesia is contraindicated if the patient has received LMWH within the last 24 hrs (for therapeutic doses) or 12 hours (for prophylactic doses).

The anti-Xa level and/or APTT is not predictive of the risk of neuraxial bleeding.

If urgent surgery or delivery is required in a therapeutically anticoagulated patient, management advice should be obtained from the haematologist on call and the obstetric and anaesthetic consultants.

LMWH may be given at prophylactic dose 6 hours following spinal injection or removal of the epidural catheter. Traumatic needle or catheter placement increases the risk of spinal haematoma and LMWH should be deferred for at least 24 hours.

Concurrent use of LMWH and NSAIDS increases the risk of spinal haematoma.

Non-steroidal anti-inflammatories (NSAIDs) eg. Aspirin/ voltaren, should NOT be administered to patients receiving LMWH who have an epidural insitu. Removal of epidural catheters should be delayed until 12 hours after an injection of LMWH.

5. Evaluation, monitoring and reporting of compliance to this guideline

Compliance to this guideline will be monitored via incidents reported through VHIMS.

6. References

- Ansell J, Hirsh J, Hylek E, Jacobson A, Crowther M, Palareti G. Pharmacology and Management of the Vitamin K Antagonists, Chest. Antithrombotic and Thrombolytic Therapy: American College of Chest Physicians Evidenced-Based Clinical Practice Guidelines (8th Edition). June 2008 133:160S-198S
- Baker RI, Coughlin PB, Gallus AS, Harper PL, Salem HH, Wood EM, The Warfarin Reversal Consensus Group. Warfarin reversal: consensus guidelines, on behalf of the Australasian Society of Thrombosis and Haemostasis. MJA • Volume 181 Number 9 • 1 November 2004 http://www.mja.com.au/public/issues/181_09_011104/bak10441_fm.pdf
- Bates SM, Greer IA, Pabinger I, Sofaer S, Hirsh J. Venous Thromboembolism, Thrombophilia, Antithrombotic Therapy, and Pregnancy. American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). Chest June 2008 133:844S-886S
- Schulman S, Beyth RJ, Kearon C, Levine MN. Hemorrhagic Complications of Anticoagulant and Thrombolytic Treatment. American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition), Chest. 2008 Jun;133(6 Suppl):257S-298S
- The Royal College of Obstetricians and Gynaecologists. Thromboprophylaxis during Pregnancy, Labour and after Vaginal Delivery (Green-top 37), January 2004
- Refer to Women's guidelines:
  - Thromboprophylaxis: Caesarean Section
  - Thromboprophylaxis: Gynaecological Surgery

7. Legislation/Regulations related to this guideline

Not applicable

8. Appendices

Not applicable.

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