MONOGRAPH

Enoxaparin

Scope (Staff):	Medical, Pharmacy, Nursing, Anaesthetic Technicians
Scope (Area):	All Clinical Areas

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this DISCLAIMER

⚠ HIGH RISK MEDICINE ⚠

QUICKLINKS

Dosage/Dosage Adjustments	Administration	Compatibility	Monitoring

DRUG CLASS

Enoxaparin, a low molecular weight heparin (LMWH), is an anticoagulant. Enoxaparin inactivates clotting factors IIa (thrombin) and Xa by activating antithrombin III.[1]

Enoxaparin is a High Risk Medicine.

INDICATIONS AND RESTRICTIONS

- Treatment and prevention of thrombosis or thromboembolism (including deep vein thrombosis, pulmonary embolism and cerebral thromboembolism).[1, 2]
- Thrombosis prophylaxis (including patients with central venous access device (CVAD) still in place and has completed initial 3 months treatment for venous thromboembolism (VTE)).[1-3]
- Bridging therapy for patients on pre-existing treatment with warfarin when international normalised ratio (INR) is below target range.

CONTRAINDICATIONS

- Hypersensitivity to enoxaparin or any component of the formulation (including porcine products), other low molecular weight heparin or unfractionated heparin.[1]
- Active major bleeding (e.g. gastrointestinal bleeding).[1]
- Acute immune-mediated heparin-induced or LMWH-induced thrombocytopenia (within the past 100 days or in the presence of antibodies).[1]
- Haemophilia or other bleeding disorders.[1]

PRECAUTIONS

- Disease state with increased risk of bleeding (e.g. infective endocarditis, peptic ulcer disease, inflammatory bowel disease, thrombocytopenia, severe hepatic disease, uncontrolled hypertension).[1, 4]
- Avoid intramuscular administration of any medications in patients receiving enoxaparin – risk of bleeding, bruising or haematoma.[1]
- Regional technique or lumbar puncture procedure[4, 5]:
    - Treatment dose enoxaparin – withhold enoxaparin for at least 24 hours prior to placement or removal of regional catheter, or lumbar puncture.
    - Prophylactic dose enoxaparin – withhold enoxaparin for at least 12 hours prior to placement or removal of regional catheter, or lumbar puncture.
    - Consider withholding enoxaparin for at least 4 hours after the procedure.
- Surgical patients – withhold enoxaparin for approximately 24 hours prior to surgery.[4, 5]
    - High bleeding risk surgery – resume enoxaparin approximately 48 – 72 hours post-surgery.
    - Non-high bleeding risk surgery – resume enoxaparin approximately 24 hours post-surgery.

FORMULATIONS

Listed below are products available at PCH, other formulations may be available, check with pharmacy if required:

- Enoxaparin 20 mg, 40 mg, 60 mg, 80 mg, 100 mg and 120 mg pre-filled syringes.

Imprest location: Formulary One

DOSAGE & DOSAGE ADJUSTMENTS

Neonates: Refer to Neonatal Medication Protocols

Calculate dose based on actual (measured) body weight.[4]

Age	Prophylaxis	Treatment
≤2 months	0.75 mg/kg/dose every 12 hours	1.5 mg/kg/dose every 12 hours
>2 months-18 years	0.5 mg/kg/dose (max 20 mg) every 12 hours	1 mg/kg/dose every 12 hours

Systemic thromboembolism: Patient may step down from treatment to prophylaxis dose following acute thrombotic episode treatment period, **in consultation with a haemalogist**.[3]

CVAD-related VTE: Consult haematologist's advice regarding anticoagulation requirements prior to CVAD removal.

Total daily **prophylactic** doses may be given ONCE daily to aid compliance and minimise distress to patient.[3, 6]

High risk patients requiring enoxaparin for thromboprophylaxis pre-operatively should receive a dose 2 hours before the surgery (preferred) or on induction.[7]

Renal impairment:

- Unfractionated heparin is preferred. If use of enoxaparin is warranted, use the following recommended initial dose[1]:
  - CrCl >30 mL/min – No adjustment required.
  - CrCl 10 – 29 mL/min – Reduce initial dose by 30%.[8]
  - CrCl <10 mL/min – Reduce initial dose by 50% and administer 24 hourly[9].
- eGFR calculator

Hepatic impairment:

- Reduce dose and monitor closely in severe impairment as patient may be at higher risk of bleeding.[2]

ADMINISTRATION

- 60 mg, 80 mg, 100 mg and 120 mg pre-filled syringes are graduated and may be used to administer a smaller dose if necessary.[10]
  - Do not expel the air bubble prior to administration (including when excess volume is being discarded from a proprietary pre-filled syringe).[10]
  - Non-standard doses should be ordered from Pharmacy Compounding Services (PCS) during pharmacy operating hours. Air bubble should be removed from PCS manufactured syringes as they have excess volume in each syringe to account for the dead space of the syringe.
- Do not administer enoxaparin intramuscularly – may cause bleeding, bruising or haematoma formation.[4]

- Administer by subcutaneous injection[11]; Insuflon™ may be used to reduce need for repeated subcutaneous injections.
- Rotate injection site with each dose.[11]
- Do not rub the injection site after administration as bruising may occur.[10]

COMPATIBILITY *(LIST IS NOT EXHAUSTIVE)*

Compatible fluids: Sodium Chloride 0.9%, Glucose 5%[11]

Compatibilities of IV drugs must be checked when two or more drugs are given concurrently.

MONITORING

Therapeutic drug monitoring for enoxaparin is **not routinely required** unless clinically indicated (e.g. signs of or at high risk of bleeding, disease progression, altered pharmacokinetics or drug/disease interaction).

If dosing adjustment based on antifactor Xa level is clinically indicated for **treatment dose**, consider the following dose adjustment recommendations.[4]

Take the first blood sample 4 – 6 hours **after the third or fourth dose**.[1, 9]

Antifactor Xa	Dose Titration	Time to Repeat Antifactor Xa Level
<0.35 units/mL	Increase dose by 25%	4 – 6 hours after the third or fourth dose
0.35 – 0.49 units/mL	Increase dose by 10%	4 – 6 hours after the third or fourth dose
0.5 – 1 units/mL	Keep the same dose	The next day, then 1 week later, then monthly or as directed by haematologist (4 – 6 hours after next dose)
1.1 – 1.5 units/mL	Decrease dose by 20%	Before the next dose
1.6 – 2 units/mL	Withhold dose for 3 hours and decrease dose by 30%	Before the next dose, then 4-6 hours after the next dose
>2 units/mL	Withhold dose until antifactor Xa is 0.5units/mL then decrease dose by 40%	Before next dose and every 12 hours until antifactor Xa is <0.5 units/mL

Prophylactic dose:

Monitoring of antifactor Xa is **not routinely required**.[2] Consider monitoring in patients with altered pharmacokinetics, at high risk of bleeding, or if there is evidence of active bleeding. Take blood sample 4 – 6 hours after dose.

Target range: 0.1-0.3 units/mL.[3]

Other monitoring parameters:

Monitor baseline coagulation profile, full blood picture, UEC (urea, electrolytes, creatinine) before commencing on enoxaparin[4] and repeat when clinically indicated.

Monitor for signs of bleeding, haematoma, stool occult blood.[4]

Reversal of enoxaparin:

Consider using protamine sulfate to partially reverse enoxaparin overdose, in consultation with a haematologist.[4]

ADVERSE EFFECTS [2, 12]

Common: Bruising at injection site, haemorrhage, mild reversible thrombocytopenia, headache.

Infrequent: Severe immune-mediated thrombocytopenia, central nervous system haemorrhage, transient liver aminotransferases elevation.

Rare: Skin necrosis at injection site, cutaneous vasculitis, urticaria, anaphylaxis, alopecia, hyperkalaemia.

STORAGE

Store below 25°C. Do not freeze.[10]

Enoxaparin prefilled syringes do not contain any preservatives; any unused contents of syringes must be discarded after administration.[10, 11]

INTERACTIONS

This medication may interact with other medications; consult PCH approved references (e.g. Clinical Pharmacology), a clinical pharmacist or PCH Medicines Information Service on extension 63546 for more information.

Please note: The information contained in this guideline is to assist with the preparation and administration of Enoxaparin. Any variations to the doses recommended should be clarified with the prescriber prior to administration

Related CAHS internal policies, procedures and guidelines

PCH Clinical Practice Manual: Subcutaneous Injections

Subcutaneous Insuflon™ Catheter

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