ENOXAPARIN

<table>
<tr><td>Trade Name</td><td>Clexane® (Sanofi-Aventis)</td></tr>
<tr><td>Class</td><td>Anti-coagulant (Low Molecular Weight Heparin)</td></tr>
<tr><td>Mechanism of Action</td><td>Enoxaparin inhibits clot formation primarily by neutralising factor Xa, hence preventing conversion of fibrinogen to fibrin.</td></tr>
<tr><td>Indications</td><td>Prolonged period of anticoagulation due to a thrombus and where heparin is not possible</td></tr>
<tr><td>Contraindications</td><td>Active bleeding, haemophilia, neurological surgery, epidural/spinal analgesia/anaesthesia
Known hypersensitivity to heparin or pork products.
Use with caution in patients with kidney or liver impairment, severe hypertension or peptic ulcer disease
Use with caution in with a history of heparin induced low platelets</td></tr>
<tr><td>Supplied As</td><td>20mg/0.2ml graduated syringe containing a clear, pale yellow solution. The diluent in enoxaparin-prefilled syringes is sterile water.
For safety reasons contact pharmacy and ask the sterile production team to repack doses on an individual basis.</td></tr>
<tr><td rowspan="2">Dilution</td><td>Aim to keep the subcutaneous dose ≤0.5mL
If the dose is ≥ 5mg then further dilution is not required</td></tr>
<tr><td>If the dose is < 5mg then dilute to a 10mg/mL solution as below
<table>
<tr><th>Drug</th><th>Diluent</th><th>Final Volume</th><th>Final Concentration</th></tr>
<tr><td>Enoxaparin 20mg/0.2mL</td><td>Sodium Chloride 0.9%</td><td></td><td></td></tr>
<tr><td>0.2 mL</td><td>1.8 mL</td><td>2 mL</td><td>10mg / mL</td></tr>
</table>
Draw up 1.8 mL of sodium chloride 0.9% into a 2mL syringe, then add 0.2mL (= 20mg) of 20mg/0.2mL enoxaparin injection to give a final volume of 2 mL.
Final concentration = 20 mg/ 2mL = 10 mg / mL</td></tr>
<tr><td>Dosage</td><td>Treatment: 1.5 mg/kg/dose
Prophylaxis: 0.75 mg/kg/dose
Review dose and length of treatment on a case-by-case basis, with haematology advice</td></tr>
<tr><td>Interval</td><td>12 hourly</td></tr>
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<tr><td>Administration</td><td>Give by subcutaneous injection by rotating sites each dose.

Insert into a skinfold in the abdomen or the upper outer thigh. Hold the skinfold throughout the insertion and after needle removal do not rub the site but place firm, even pressure to the site for 1 minute to minimise bruising

Can also be give subcutaneously via a insuflon catheter in infants >3kg with adequate subcutaneous tissue

Do NOT give IM</td></tr>
<tr><td>Monitoring</td><td>Prior to Starting – FBC, Coag profile, renal function

During Treatment - Platelets, haemoglobin, signs of bleeding

Specific Monitoring - Antifactor Xa levels need to be taken after the <u>morning</u> <u>dose</u> (see below) to monitor/alter the enoxaparin dose.

Seek advice from the haematologists as to target levels required

The Paediatric Dosage Titration Chart[3,5] is a helpful guide
<table>
<tr><th>Antifactor Xa</th><th>Dose Titration</th><th>When to Repeat Antifactor Xa level</th></tr>
<tr><td><0.35 units/mL</td><td>Increase dose by 25%</td><td>4 hours after the next morning dose</td></tr>
<tr><td>0.35-0.49 units/mL</td><td>Increase dose by 10%</td><td>4 hours after the next morning dose</td></tr>
<tr><td>0.5- 1 unit /mL</td><td>Keep same dosage</td><td>4 hours after the dose 24 hrs later, then,
4 hours after the dose in 1 week, then,
4 hours after the dose monthly</td></tr>
<tr><td>1.1-1.5 units/mL</td><td>Decrease dose by 20%</td><td>4 hours after the next morning dose</td></tr>
<tr><td>1.6 – 1.9 units/mL</td><td>Delay dose by 3 hours and decrease dose by 30%</td><td>Trough before the next dose, then
4 hours after the morning dose</td></tr>
<tr><td>≥2 units/mL</td><td>Hold all doses until antifactor Xa is <0.5 units/mL, then decrease dose by 40%</td><td>Trough level before the next dose and if not <0.5 units/mL repeat trough level 12 hourly until antifactor Xa is <0.5 units/mL</td></tr>
</table></td></tr>
<tr><td>Compatible With</td><td>Do not mix with any other medications</td></tr>
<tr><td>Incompatible With</td><td>Do not mix with any other medications</td></tr>
<tr><td>Stability</td><td>Use within 24 hours of opening a syringe</td></tr>
<tr><td>Storage</td><td>Store below 25^{o}C, Do Not Freeze</td></tr>
<tr><td>Adverse Reactions</td><td>Fever, pain, bruising, haematoma at injection site, skin rash, nausea, diarrhoea

Anti-body-mediated heparin induced thrombocytopaenia (usually appears between day 5 and 21 of treatment). Consider this if the platelet count drops abruptly by 50%</td></tr>
<tr><td>Metabolism</td><td>Enoxaparin is metabolised by the liver to lower molecular weight, less active substances.

Approximately 40% of the dose is excreted by the kidneys in the form of active and non-active fragments.

The half life of enoxaparin appears to range between 4 and 7 hours however pharmacokinetic data from use on neonates is sparse</td></tr>
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Comments	Drugs which affect platelet function, eg non-steroidal anti-inflammatory agents (ibuprofen), aspirin and systemic corticosteroids (hydrocortisone), may increase the risk of haemorrhage and should be used with caution in patients receiving enoxaparin. Where concomitant use cannot be avoided, careful clinical and biological monitoring should be undertaken. Avoid IM injections if at all possible whilst anticoagulated If there are any signs of bleeding, stop treatment and call the Paediatric Haematologist for advice. The anticoagulant effects of enoxaparin can be largely neutralised by protamine. The dose required is dependent on the dose of LMWH being given. The data sheet states that 1mg of protamine neutralises 1mg of enoxaparin; if the dose of enoxaparin was given more than 8 hours prior then 0.5mg protamine per 1mg of enoxaparin may be sufficient. However dosing and the use of protamine would be on the advice of the Paediatric Haematologist. If given then protamine should be infused over 10mins iv to avoid hypotension Enoxaparin is not registered for use in children in New Zealand An application for Pharmac funding may be required for discharge prescriptions
References	1. Micromedex 2. www.medsafe.govt.nz 3. Lacy CF et al Drug information Handbook 17th Edition 2008/9 4. www.Uptodate.com 5. Low Molecular Weight Heparin Starship Child Health Guideline 2022
Updated By	P Schmidt, B Robertshawe — August 2005 A Lynn, B Robertshawe — Feb 2009, Oct 2009 A Lynn, B Robertshawe — June 2012 (re-order profile) A Lynn, M Wallenstein, B Robertshawe — May 2021(dosing update) A Lynn, N Austin, B Robertshawe — May 2022 (dilution update as per SSH 2022)