Summary of VTE prophylaxis for patients admitted to the orthopaedic service

- All patients admitted to T&O must be assessed for their risk of VTE versus the risk of complications from VTE prophylaxis using the approved T&O VTE Prophylaxis Decision Aid.

Emergency admissions

- All patients over 16 (or 12-16 if high risk) admitted with hip or pelvic fractures should be given LMWH from admission for 28 days (stopped 12hours prior to surgery and restarted 6-12 hours post op).
- TEDs or mechanical devices not required unless LMWH contraindicated.
- All patients over the age of 16 (or 12-16 if high risk) who will be immobile for 48 hours or more should be offered LMWH if not contraindicated during the period of immobilisation.
- All patients over 16 (or 12-16 if high risk) put in ankle immobilisation should be offered LMWH during the period of immobilisation (for not more than 42 days) unless contraindicated.

Elective Surgery (all options to be considered against potential contraindications)

Hip replacement

- Option 1: LMWH for 10 days post op followed by aspirin 150mg for 28 days
- Option 2: LMWH for 28 days post op plus TEDs until discharge
- Option 3: Rivaroxaban for 35 day post op

Knee replacement

- Option 1: Aspirin 150mg for 14 days post op
- Option 2: LMWH for 14 days post op plus TEDs until discharge
- Option 3: Rivaroxaban for 14 days post op

All other elective orthopaedic surgery

- LMWH should be considered for all patients over 16 years (or 12-16 years if high risk) who will be immobile for 48 hours or more or who will be in lower limb immobilisation post op. LMWH should be continued until mobile or lower limb immobilisation removed.
- Please see specific guidance on the T&O VTE prophylaxis decision aid regarding patients who are normally anticoagulated.

Author A Murray / Orthopaedic Directorate **Approved by** ADTC Jan 2021
Review date Jan 2024

NHS Lanarkshire – Trauma and Orthopaedics

Guideline for prophylaxis against venous thromboembolism for patients admitted to the orthopaedic service

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CONTENTS

CONSULTATION AND DISTRIBUTION RECORD	
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Distribution:	Charge nurses In-patient orthopaedic wards UHH and UHW All consultants and junior medical staff in T&O ANP and Trauma Liaison workforce T&O CD anaesthesia UHH and UHW Pre-assessment teams UHW, UHH, UHM Pharmacists UHW/ UHH

CHANGE RECORD			
Date	**Author**	**Change**	**Version No.**

INTRODUCTION

AIM, PURPOSE AND OUTCOMES

- **Aim**

- The aim of this guideline is to ensure that all patients admitted to the trauma and orthopaedic service in NHS Lanarkshire for inpatient management are risk assessed and when appropriate, provided with prophylaxis against venous thromboembolism (VTE)**.**

- **Outcomes**

- **All patients admitted for planned or emergency care will:**

- Be assessed for risk of VTE and risk of bleeding by the Orthopaedic Consultant on admission

- Have all medicines reconciled at pre-assessment where this service is available.

- Have a documented decision for thromboprophylaxis during the perioperative period in the case notes.

- Be assessed for suitability for thromboprophylaxis by the Orthopaedic Consultant in the immediate postoperative period and during their hospital admission.

- Have an approved plan for thromboprophylaxis at discharge documented in the case notes

SCOPE

- **Who is the Guideline intended to Benefit or Affect?**

- The guideline is intended to be used for all patients admitted to NHS Lanarkshire Trauma and orthopaedics for planned or emergency care. This document does not address patients with orthopaedic conditions who are managed as out-patients.

- **3.2 Who are the Stakeholders**

- The stakeholders are the medical, nursing and pharmacy staff caring for patients in the Trauma and Orthopaedic service.

PRINCIPLE CONTENT

- **Risk Assessment**

- A VTE is a potentially fatal condition which can occur sporadically in the general population. It is recognised that the risk of VTE is increased in certain conditions and situations:

- Prolonged recumbency (>48 hours admission)
- Prolonged lower limb immobilisation
- Lower limb or pelvic trauma
- Obesity
- Pregnancy or <6 weeks post-partum
- Age >60 years
- Use of hormone replacement therapy or oestrogen containing oral contraceptive
- Hypercoagulable states – e.g. malignancy, sepsis, dehydration, smoking
- Congenital predisposition – e.g. factor V Leiden, protein C and S deficiencies

- It can be seen that many of the risk factors above could apply to patients admitted to the T&O service. The risk of VTE can be reduced, but not completely abolished, with appropriate prophylaxis. The following have been identified as prophylactic measures:

- The first three points above are addressed by maintaining a high quality of perioperative preparation, in-patient and anaesthetic management and enhanced recovery. In NHSL we consider each of these elements fundamental to our standards of care for all patients.

- Pharmacological agents are effective but have side effects and contra-indications which must be considered in balancing the risk versus potential benefit of their use.

- The following are potential contraindications for the use of pharmacological agents:

- Coagulation disorder e.g. haemophilia
- Low platelet count (<75)
- Active or recent history of gastrointestinal bleed or peptic ulceration
- Recent cerebrovascular haemorrhage (within 6 months)
- Uncontrolled hypertension
- History of previous drug reaction to the agent including Heparin Induced Thrombocytopenia (HIT)
- Lumbar puncture or epidural within the last 4 hours or next 12 hours

- In addition, the potential complications of VTE prophylaxis must be considered:

- Wound leakage leading to slow healing and increased risk of infection
- Bleeding
- Heparin Induced Thrombocytopenia

- Mechanical devices have been shown to offer some benefit in reducing the risk of VTE when pharmacological agents cannot be used. There is no clear evidence for

their use in addition to pharmacological agents. Pneumatic compression (*e.g.* foot pumps) and/or TED stockings can be used during a period of bed rest but do not need to be continued once a patient is mobilising out of bed. These devices can cause problems with pressure sores and arterial insufficiency and should not be used in the following situations:

- Peripheral vascular disease
- Previous arterial bypass grafting
- Leg oedema
- Known allergy to the material
- Pressure ulceration
- Fragile skin
- Excessive leg size prohibiting correct fitting

    - **In NHSL T&O we believe that all patients admitted to the service should have a risk assessment carried out for VTE. This should include consideration of potential complications and contraindications of management options. The risks and benefits of VTE prophylaxis for the individual patient should then be discussed with them to allow an informed decision by the patient on the appropriate management of their VTE risk.**

    - The NHSL T&O consultant team have agreed to follow the most recent NICE guidelines 2018 www.nice.org.uk/guidance/ng89

    - **Guidelines for specific conditions and procedures**

    - **Lower limb immobilisation**

    - Consider pharmacological VTE prophylaxis with LMWH for people with lower limb immobilisation whose risk of VTE outweighs their risk of bleeding. Consider stopping prophylaxis if lower limb immobilisation continues beyond 42 days.

    - **Fragility fractures of the pelvis, hip and proximal femur**

    - Offer VTE prophylaxis for 28 days to people with fragility fractures of the pelvis, hip or proximal femur if the risk of VTE outweighs the risk of bleeding. Choose LMWH, starting 6–12 hours after surgery.

    - Consider pre-operative VTE prophylaxis for people with fragility fractures of the pelvis, hip or proximal femur if surgery is delayed beyond the day after admission. Give the last dose no less than 12 hours before surgery for LMWH.

    - Consider intermittent pneumatic compression for people with fragility fractures of the pelvis, hip or proximal femur at the time of admission if pharmacological prophylaxis is contraindicated. Continue until the person no longer has significantly reduced mobility relative to their normal or anticipated mobility.

- **Elective hip replacement**

- Offer VTE prophylaxis to people undergoing elective hip replacement surgery whose risk of VTE outweighs their risk of bleeding.

- Choose any one of:

- LMWH for 10 days followed by aspirin 150mg once daily for a further 28 days.
- LMWH for 28 days combined with anti-embolism stockings (until discharge).
- Rivaroxaban for 35 days from the day of surgery

- Consider the following if none of the options above can be used:

- Apixaban :https://www.nice.org.uk/guidance/ta245

- Consider anti-embolism stockings until discharge from hospital if pharmacological interventions are contraindicated in people undergoing elective hip replacement surgery.

- **Elective knee replacement**

- Offer VTE prophylaxis to people undergoing elective knee replacement surgery whose VTE risk outweighs their risk of bleeding.

- Choose any one of:

- Aspirin 150 mg once daily for 14 days.
- LMWH for 14 days combined with anti-embolism stockings until discharge.
- Rivaroxaban for 14 days from day of surgery

- Consider intermittent pneumatic compression if pharmacological prophylaxis is contra-indicated in people undergoing elective knee replacement surgery. Continue until the person is mobile.

- **Non-arthroplasty orthopaedic knee surgery**

- Be aware that VTE prophylaxis is generally not needed for people undergoing arthroscopic knee surgery where:

- total anaesthesia time is less than 90 minutes and
- the person is at low risk of VTE

- Consider LMWH 6–12 hours after surgery for 14 days for people undergoing arthroscopic knee surgery if:

- total anaesthesia time is more than 90 minutes or
- the person's risk of VTE outweighs their risk of bleeding

- Consider VTE prophylaxis for people undergoing other knee surgery (for example, osteotomy or fracture surgery) whose risk of VTE outweighs their risk of bleeding.

- **Foot and ankle orthopaedic surgery**

- Consider pharmacological VTE prophylaxis for people undergoing foot or ankle surgery:

- That requires immobilisation (for example, arthrodesis or arthroplasty); consider stopping prophylaxis if immobilisation continues beyond 42 days.
- When total anaesthesia time is more than 90minutes.
- The person's risk of VTE outweighs their risk of bleeding.

- **Upper limb orthopaedic surgery**

- Be aware that VTE prophylaxis is generally not needed if giving local or regional anaesthetic for upper limb surgery.

- Consider VTE prophylaxis for people undergoing upper limb surgery if the person's total time under general anaesthetic is over 90 minutes or where their operation is likely to make it difficult for them to mobilise.

- **People under the age of 16 years**

- There are no current NICE or SIGN guidelines on the need for VTE prophylaxis in children <16 years old. The Association of Paediatric Anaesthetists of UK and Ireland have produced a guideline (2017) which offers sensible advice.

- https://www.apagbi.org.uk/sites/default/files/inline-files/APA%20Thromboprophylaxis%20guidelines%20final.pdf

- Key recommendations are as follows:

- Routine VTE prophylaxis is not normally required in children under 16 years undergoing orthopaedic surgery.
- For post-pubescent children with prolonged immobilisation (>48 hours) from major surgery mechanical prophylaxis should be considered.
- For post-pubertal children with prolonged immobilisation and additional risk factors LMWH can be considered.

- **Patients who are normally anti-coagulated**

- In the majority of patients who are on anti-coagulation or anti-platelet medication pre-operatively (including clopidogrel, warfarin, and Factor Xa inhibitors), where the treatment is for prophylaxis only (e.g. AF), this can usually be safely discontinued pre-operatively, and recommenced post-operatively at the normal dose at the discretion of the responsible consultant, usually when the wound has stopped bleeding. It would be normal for these patients to receive prophylactic dose LMWH post operatively until normal anti-coagulation has been resumed and is considered to have achieved a therapeutic level. When there is uncertainty about the safety of discontinuing anti-coagulation or anti-platelet therapy this should be discussed with the relevant specialist (e.g. cardiology or haematology).

- The pre-assessment clinic will be aware of these drugs and will advise the patients to stop them at the appropriate time prior to elective surgery as per agreed protocols taking into account the risk of a thrombotic event. See NHS Lanarkshire Guideline for Elective, perioperative management of patients on warfarin:

- http://firstport2/staff-support/anaesthesia-intensive-care-medicine/Useful%20Items/pdfs/Anticoagulant_Warfarin%20Bridging%20protocol%202016.pdf

- These patients who have prior prophylactic anti-coagulation will not require the extended prophylaxis as per the protocol, once their anti-coagulation is re-established.

- Patients with extremely high risk of thrombotic events such as recent or multiple DVT/PE, significant thrombophilia or metallic heart valves, should be discussed with haematology prior to admission, or at the time of an emergency admission, so suitable bridging anticoagulation can be arranged.

- Please see NHS Scotland Consensus statement on Management of anticoagulants and anti-platelet drugs in patients with hip fracture

- https://www.shfa.scot.nhs.uk/_docs/2018/Consensus-Statement-for-Management-of-Anticoagulants-180913.pdf

- **Discharge arrangements**

- **Enoxaparin** – The following arrangements should be made for patients discharged home on enoxaparin:

- Sharps boxes should be provided to patients on discharge to allow the safe disposal of used enoxaparin syringes. The patient should return these to an agreed facility for safe disposal.

- The Hospital Pharmacy will supply the full treatment course.

- Nursing staff should provide education and training on administration of enoxaparin to patients and/or carers as an inpatient. If it is thought that the patient and/or carer will not be able to administer the medicine safely then nursing staff should arrange a district nurse on discharge to administer the injection.

- No routine blood monitoring should be required on discharge for patients being treated with enoxaparin. Patients should be advised to contact the orthopaedic team should any side effects of bruising or bleeding occur.

- **Rivaroxaban** – The following arrangements should be made for patients discharged home on rivaroxaban:

- Pharmacy will support the education of patients on rivaroxaban prior to discharge. Patients will also receive a rivaroxaban alert card.

- The hospital pharmacy department will supply the full treatment course of rivaroxaban on discharge.

- No routine blood monitoring should be required for patients treated with rivaroxaban. Patients should be advised to contact the orthopaedic team if there were any concerns about bleeding or bruising.

- **Aspirin** – should be continued 150mg once daily for 14 days following total knee replacement and 28 days (after 10 days LMWH) following total hip replacement. No routine blood monitoring should be required for patients treated with aspirin. Patients should be advised to contact the orthopaedic team should any side effects of bruising or bleeding occur. The Pharmacy Department with supply the full treatment course.

- **Drug Information**

Rivaroxaban Drug Information	
Indication	• Prevention of venous thromboembolism (VTE) in adult patients undergoing elective hip (THR) or knee (TKR) replacement surgery • Treatment intent – prevention of VTE.
Eligibility criteria	• Inclusion criteria - Elective admissions for THR or TKR surgery • Exclusion criteria - Patients already on warfarin, apixaban, dabigatran or any other anticoagulant should not be given rivaroxaban and will be assessed by a Consultant Anaesthetist at pre-assessment clinic • Patients on combination antiplatelet therapy and/ or at very high risk of cardiovascular events will be assessed in pre-assessment clinic by a consultant anaesthetist and an individual management plan should be completed.
Pre-Treatment Evaluation/Investigations	• Baseline monitoring of U+Es, liver function tests, full blood count. • Any drop in haemoglobin or low blood pressure which is otherwise unexplained should be investigated. • Rivaroxaban does not require routine monitoring of INR/APPT during exposure.
Treatment Requirements	• Rivaroxaban Dose (oral): • Total Knee Replacement: rivaroxaban 10mg once daily for 14 days. • Total Hip Replacement: rivaroxaban 10mg once daily for 35 days. • No dose adjustment required for body weight or age with rivaroxaban. • Swallowing difficulties/ Feeding tubes: The crushed tablet should be mixed with water or apple puree immediately prior to administration. Can be given in a small amount of water via a gastric tube and flushed with water. • Rivaroxaban will be administered by nursing staff on the ward as an inpatient and will be taken by the patient as an outpatient.
Precautions, contraindications and adverse effects	• Removal of an epidural catheter should occur at least 18 hours after the last administration of rivaroxaban. The next dose of rivaroxaban should be administered after 6 hours following removal of the catheter.

	• Care should be taken if patients are prescribed anticoagulants or NSAIDs concomitantly with rivaroxaban. There is no known pharmacokinetic interaction; however there is a likely increased risk of bleeding if both agents are used.
Precautions, contraindications and adverse effects (continued)	• Renal: Use not recommended in patients with creatinine clearance of <15ml/min. Cautioned in patients with a creatinine clearance of 15-29ml/minute due to increased plasma concentration. In these situations, prescribing enoxaparin 20mg once daily would be an appropriate alternative provided no contraindications. • **Contraindications:** **<u>Rivaroxaban</u>** • Hypersensitivity to the active substance or to any of the excipients. • Active clinically significant bleeding. • Condition considered to be a significant risk for major bleeding. • Concomitant treatment with unfractionated heparin, low molecular weight heparin, fondaparinux, warfarin, dabigatran or apixaban except under the circumstances of switching therapy to or from rivaroxaban or when UFH is given at doses necessary to maintain an open central venous or arterial catheter. • Hepatic disease associated with coagulopathy and clinically relevant bleeding risk including cirrhotic patients with Child Pugh B and C. • Pregnancy and lactation. • **Adverse effects:** **<u>Rivaroxaban</u>** • Bleeding, risk of haemorrhage, anaemia, thrombocytopenia • Nausea, dizziness, headache • Increased LFT's • Allergic reaction, pruritus, urticaria • Hypotension, wound secretion • Fever, oedema, reduced strength and energy
Investigations prior to subsequent treatment	N/A
Dose modifications e.g.	**<u>Rivaroxaban</u>** • Renal: Use not recommended in patients with creatinine clearance of <15ml/min. Cautioned in patients with creatinine clearance of 15-29 ml/min. • Hepatic: Contraindicated in hepatic disease associated with coagulopathy and clinically relevant bleeding risk including cirrhotic patients with Child Pugh B and C.

Audit/Evaluation of Response to Treatment	Ongoing audit will take place to ensure that adherence to this clinical guideline is met.

Enoxaparin Drug Information	
Indication	• Prevention of venous thromboembolism (VTE) in adult patients undergoing elective hip (THR) or knee (TKR) replacement surgery, prevention of venous thromboembolism following admission with other injuries or procedures considered high risk for VTE. • Treatment intent – prevention of VTE.
Eligibility criteria	• Inclusion criteria - Elective admissions for THR or TKR surgery. Admission with other injuries or procedures considered high risk for VTE. • Exclusion criteria - Patients already on warfarin, apixaban, dabigatran or any other anticoagulant should not be given enoxaparin in addition. They will be assessed by at pre-assessment clinic • Patients on combination antiplatelet therapy and/ or at very high risk of cardiovascular events will be assessed in pre-assessment clinic by a consultant anaesthetist and an individual management plan should be completed.
Pre-Treatment Evaluation/Investigations	• Baseline monitoring of U+Es, liver function tests, full blood count. • Any drop in haemoglobin or low blood pressure which is otherwise unexplained should be investigated. • Enoxaparin does not require routine monitoring of INR/APPT during exposure. • Enoxaparin sodium dose should be given no sooner than 4 hours after epidural catheter removal. • Dosage reduction in renal impairment advised. Dosage reduction to 20mg once daily if creatinine clearance less than 30ml/minute and/ or body weight less than 50kg. Enoxaparin is unlicensed if creatinine clearance is less than 15ml/min. In this situation a risk/benefit decision must be taken.
Treatment Requirements	• Enoxaparin Dose (subcutaneous injection): • Total Knee Replacement: enoxaparin 40mg once daily for 14 days. • Total Hip Replacement: enoxaparin 40mg once daily for 28 days (or 10 days followed by aspirin for further 28 days) • Fractured neck of femur, pelvis fracture: enoxaparin 40mg once daily for 28 days. • Other injuries or procedures considered high risk for VTE (as per this guideline) 40mg once daily. Duration as per guideline recommendations for individual cases. • Dose of enoxaparin should be reduced to 20mg once daily if body weight <50kg and/ or if creatinine clearance< 30ml/minute.

	• Patients with extremes of body weight should have doses adjusted accordingly. Please see NHS Joint Formulary (appendix 1) https://www.medednhsl.com/meded/nhsl_formulary/index.asp?T=02&S=2.09 • Enoxaparin will be administered by nursing staff on the ward and will be administered by the patient/ patient carer/ district nurse on discharge.
Precautions, contraindications and adverse effects	**Caution: Enoxaparin** • Enoxaparin is to be used with extreme caution in patients with a history of heparin-induced thrombocytopenia with or without thrombosis. • Thrombocytopenia, should it occur, usually appears between the 5th and the 21st day following the beginning of therapy. Therefore, it is recommended that the platelet counts be measured before the initiation of therapy with enoxaparin sodium and then regularly thereafter during the treatment. • Can lead to hyperkalaemia due to suppressed adrenal secretion of aldosterone. • Placement or removal of an epidural catheter should be delayed for 10 - 12 hours after administration of DVT prophylactic doses of enoxaparin sodium. The subsequent enoxaparin sodium dose should be given no sooner than 4 hours after catheter removal. • Dosage reduction in renal impairment advised. Dosage reduction to 20mg once daily if creatinine clearance less than 30ml/minute and/ or body weight less than 50kg. **Contraindications: Enoxaparin** • acute bacterial endocarditis • active major bleeding • conditions with a high risk of uncontrolled haemorrhage, including recent haemorrhagic stroke, thrombocytopenia in patients with a positive in-vitro aggregation test in the presence of enoxaparin • active gastric or duodenal ulceration • hypersensitivity to either enoxaparin sodium, heparin or its derivatives including other Low Molecular Weight Heparins • in patients receiving heparin for treatment rather than prophylaxis **Adverse effects: Enoxaparin** • Bleeding, risk of haemorrhage, thrombocytosis, thrombocytopenia, anaemia • Hepatic transaminases increased • Allergic reaction, pruritus, urticaria, erythema • Injection site haematoma, injection site pain, other injection site reaction • Headache • Hyperkalaemia

	Cautions: Hepatic, renal impairment, Pregnancy, breast feeding
Investigations prior to subsequent treatment	Baseline investigations e.g. relevant biochemistry, LFTs, FBC etc. Any other tests specific to the drugs and the delivery plan for these tests.
Audit / Evaluation of Response to treatment	Ongoing audit will take place to ensure that adherence to clinical guideline is met.

Aspirin Drug Information	
Indication	• Prevention of venous thromboembolism (VTE) in adult patients undergoing elective hip (THR) or knee (TKR) replacement surgery. • Treatment intent – prevention of VTE.
Eligibility criteria	• Inclusion criteria - Elective admissions for THR or TKR surgery • Exclusion criteria - Patients already on warfarin, apixaban, dabigatran or any other anticoagulant should not be given aspirin and will be assessed by a Consultant Anaesthetist at pre-assessment clinic. • Patients on combination antiplatelet therapy and/ or at very high risk of cardiovascular events will be assessed in pre-assessment clinic by a consultant anaesthetist and an individual management plan should be completed. • Aspirin may be considered as an alternative to other chemical thromboprophylaxis agents. The American Academy of Orthopaedic Surgeons and American College of Chest Physicians have both advised the suitability of Aspirin as a thromboprophylactic agent in their recent guidelines. Recent large UK studies have also recommended Aspirin to be considered as a suitable alternative chemical thromboprophylactic agent following hip and knee replacement surgery.
Pre-Treatment Evaluation / Investigations	• Baseline monitoring of U+Es, liver function tests, full blood count. • Any drop in haemoglobin or low blood pressure which is otherwise unexplained should be investigated. • Aspirin does not require routine monitoring of INR/APPT during exposure.
Treatment	• Total Knee Replacement: Aspirin 150mg once daily for

requirements	14 days • Total Hip Replacement: Aspirin 150mg once daily for 28 days following 10 days of enoxaparin • Aspirin will be administered by nursing staff on the ward and will be administered by the patient/ patient carer/ district nurse on discharge. • Aspirin is not licensed for inpatient VTE prophylaxis therefore its use for this indication must be explained to the patient as off license and consent obtained.
Audit / Evaluation of Response to Treatment	Ongoing audit will take place to ensure that adherence to clinical guideline is met.

- **ROLES AND RESPONSIBILITIES**

  - **<u>Enoxaparin</u>**

  - **Nursing/ Medical:** Monitoring of full blood count, U+Es, LFTs, at baseline and (if appropriate) during treatment. Liaison with primary care regarding district nurse for administration if required. Education of patient on administration of enoxaparin with regards to dosage, side effects, duration, drug interactions as described above and provision of sharps boxes. Prescribing of enoxaparin if the practitioner is a prescriber and within their area of competence.

  - **Pharmacy:** Supply during inpatient stay and dispensing supply on discharge. Support the education of patient with regards to dosage, side effects, duration, drug interactions as described above. Prescribing of enoxaparin if the practitioner is a prescriber, it is within their area of competence and where this service is available.

  - **Laboratory & imaging services:** Processing of blood samples as inpatient.

  - Patients will receive treatment post-operatively for the above-mentioned duration dependant on the type of surgery. This will include treatment as an inpatient and outpatient.

  - **<u>Rivaroxaban</u>**

  - **Nursing/ Medical:** Monitoring of full blood count, U+Es, LFTs, at baseline and (if appropriate) during treatment. Liaison with primary care regarding district nurse for administration if required. Education of patient with regards to dosage, side effects, duration, drug interactions as described above. Prescribing of rivaroxaban if the practitioner is a prescriber and within area of competence.

  - **Pharmacy:** Advising on suitability of agent and dosage for the individual patient, monitoring as above, supply during inpatient stay and dispensing the remainder of the treatment course on discharge. Issue Rivaroxaban Alert Card to individual patients. Support the education of patient with regards to dosage, side effects, duration, drug interactions as described above. Prescribing of rivaroxaban if the practitioner is a prescriber, it is within their area of competence and where this service is available.

- **Laboratory & imaging services:** Processing of blood samples as inpatient.

- Patients will receive treatment post-operatively for the above-mentioned duration dependant on the type of surgery. This will include treatment as an inpatient and outpatient.

- Aspirin
- **Nursing/medical:** decision to use as part or sole agent for prophylaxis against VTE. Obtain consent from patient for off-license use. Education of patient with regards to dosage, side effects, duration, drug interactions as described above. Prescribing of aspirin if the practitioner is a prescriber and within area of competence.

- **Pharmacy:** Supply during inpatient stay and dispensing the remainder of the treatment course on discharge. Support the education of patient with regards to dosage, side effects, duration, drug interactions as described above. Prescribing of aspirin if the practitioner is a prescriber, it is within their area of competence and where this service is available.

- **Laboratory**: none

- **COMMUNICATION PLAN**

  - This guideline will be published on NHS Lanarkshire's intranet, FirstPort and will be available to all staff.

- **QUALITY IMPROVEMENT – Monitoring and Review**

  - The guideline will be reviewed every two years or sooner if further national guidance is published.

- **EQUALITY AND DIVERSITY IMPACT ASSESSMENT**

  - This guideline meets NHS Lanarkshire's EDIA
    - (tick box) X

REFERENCES

- Scottish Intercollegiate Guidelines Network, 2010. Prevention and Management of Venous Thromboembolism. A National Clinical Guideline 122. https://www.sign.ac.uk/sign-122-prevention-and-management-of-venous-thromboembolism

- NG89. NICE Guideline
- Venous thromboembolism in the over 16s: reducing the risk of hospital acquired deep venous thrombosis or pulmonary embolism. March 2018. https://www.nice.org.uk/guidance/ng89

- Association of Paediatric Anaesthetists of GB and Ireland. Prevention of perioperative venous thromboembolism in paediatric patients. 2017
- https://www.apagbi.org.uk/sites/default/files/inline-files/APA%20Thromboprophylaxis%20guidelines%20final.pdf

- Electronic Medicines Compendium [last updated 05 Nov 19] Xarelto 10mg film-coated tablets (accessed 31/07/20) https://www.medicines.org.uk/emc/product/6402/smpc

- Electronic Medicines Compendium [last updated 17 Mar 20] Inhixa 4,000 IU (40 mg) in 0.4 mL solution for injection in pre-filled syringe (accessed 31/07/20)
- https://www.medicines.org.uk/emc/product/784/smpc

Appendix 1 - NHS Lanarkshire Joint Formulary
Enoxaparin Dose adjustment for extremes of body weight

Suggested doses of LMWH for thromboprophylaxis in adult patients based on weight				
	<50kg	**50-100kg**	**100-150kg**	**>150kg**
Enoxaparin (SPC link)	20mg daily[‡]	40mg daily	40mg twice daily[‡]	60mg twice daily[‡]
Tinzaparin (SPC link)	3500 units daily[‡]	4500 units daily	4500 units twice daily[‡]	6750 units twice daily[‡]

[‡] 'off-licence' dose

RENAL IMPAIRMENT & ACTIVE CANCER: Please check summary of product characteristics link above for dose adjustments.

This table has been taken from UKMi medicines Q&A What doses of thromboprophylaxis are appropriate for adult patients at extremes of body weight? (June 2015)