Our Vision
To provide every patient with the care we want for those we love the most

Norfolk and Norwich University Hospitals NHS
NHS Foundation Trust

Trust Clinical Guideline for the Prevention of Venous Thromboembolism (VTE) for Adult Surgical Patients 16 years and over

A Clinical Guideline recommended

For use in:	All clinical areas
By:	All medical and nursing staff
For:	All adult (16 and over) inpatients and day case patients having surgery under General Anaesthetic. Elective and Emergency. Includes all surgical specialties.
Division responsible for the document:	Surgery
Key words:	Risk assessment, Venous thromboembolism (VTE), Thrombosis, Hospital Associated Thrombosis (HAT), Bleeding, Prophylaxis.
Name and job titles of document authors:	Dr Anna Lipp, Consultant Anaesthetist Mr David Loveday, Consultant Orthopaedic Surgeon Mr Mike Lewis, Consultant General Surgeon
Name of document author's Line Manager:	Dr Tim Leary
Job title of authors Line Manager:	Chief of Surgical Division
Supported by:	Dr Ajay Kamath, Chair of the Thrombosis and Thromboprophylaxis Committee
Assessed and approved by:	Thrombosis and Thromboprophylaxis Committee Clinical Guidelines Assessment Panel Chair's approval
Date of approval:	26 March 2019
Reported as approved to the:	Clinical Safety and Effectiveness Sub-Board
To be reviewed before:	26 March 2022
To be reviewed by:	Thrombosis and Thromboprophylaxis Committee
Reference/Trustdocs ID:	ID 12096
Version No:	4
Description of changes:	Aspirin removed from orthopaedic section
Compliance links:	NICE NG89
If yes – does it deviate from recommendations of NICE? If so why?	No

This guideline has been approved by the Trust's Clinical Guidelines Assessment Panel as an aid to the diagnosis and management of relevant patients and clinical circumstances. Not every patient or situation fits neatly into a standard guideline scenario and the guideline must be interpreted and applied in practice in the light of prevailing clinical circumstances, the diagnostic and treatment options available and the professional judgement, knowledge and expertise of relevant clinicians. It is advised that the rationale for any departure from relevant guidance should be documented in the patient's case notes.

The Trust's guidelines are made publicly available as part of the collective endeavour to continuously improve the quality of healthcare through sharing medical experience and knowledge. The Trust accepts no responsibility for any misunderstanding or misapplication of this document.

Objective of Guideline

To reduce the number of inpatients surgical and day case patients having surgery under General Anaesthetic who develop VTE during their hospital stay and in the 90 days following discharge.

Rationale for Recommendations

Patients are at increased risk of venous thromboembolism (VTE) following admission to hospital.

To comply with the NICE guidance NG89 (2018) Venous Thromboembolism in over 16s; reducing the risk of hospital acquired deep vein thrombosis or pulmonary embolism www.nice.org.uk/guidance/NG89

Definitions and Abbreviations

Hospital Associated Thrombosis: Thrombosis (Deep Vein Thrombosis DVT or Pulmonary Embolism PE) occurring during admission or during the 90 days following discharge are classified as Hospital Associated Thrombosis (HAT).

Immobility: NICE defines 'significantly reduced mobility' to denote patients who are bedbound, unable to walk unaided or likely to spend a substantial proportion of the day in bed or in a chair.

Abbreviations

DVT	Deep Vein Thrombosis	EDL	Electronic Discharge Letter
HAT	Hospital Associated Thrombosis	PE	Pulmonary Embolus
TTO	To Take Out	VTE	Venous Thromboembolism

Trust Clinical Guideline for the Prevention of Venous Thromboembolism (VTE) for Adult Surgical Patients 16 years and over

1. Thromboprophylaxis General Principles for Surgical Patients

General Advice for Reducing the Risk of VTE

- **All patients should receive adequate hydration.**
- **All patients to be encouraged to mobilise as soon as possible**
- **Do not regard aspirin or other antiplatelet agents as adequate prophylaxis for VTE- review this statement once orthopaedics consider use of aspirin**

Mechanical Thromboprophylaxis

Patients admitted for a procedure under GA or regional anaesthesia should be given correctly fitted anti-embolism stockings to wear on admission unless contraindicated until they are normally mobile.

Pneumatic calf compression devices may be used peri-operatively as an alternative to anti-embolism stockings, but not in addition.

Note anti-embolism stockings should not be put on patients undergoing arterial procedures unless requested by the Consultant.

Summary of NICE guidance for Anti-Embolism stockings

Do not offer anti-embolism stockings to patients who have

- suspected or proven peripheral arterial disease
- peripheral arterial bypass grafting
- peripheral neuropathy or other causes of sensory impairment
- any local conditions in which stockings may cause damage, for example fragile 'tissue paper' skin, dermatitis, gangrene or recent skin graft
- known allergy to material of manufacture
- cardiac failure
- severe leg oedema or pulmonary oedema from congestive heart failure
- unusual leg size or shape
- major limb deformity preventing correct fit
- use caution and clinical judgement when applying anti-embolism stockings over venous ulcers or wounds

- Ensure that patients who need anti-embolism stockings have their legs measured and that the correct size of stocking is provided. Anti-embolism stockings should be fitted and patients shown how to use them by staff trained in their use.

- Ensure that patients who develop oedema or postoperative swelling have their legs re-measured and anti-embolism stockings refitted.
- If arterial disease is suspected, seek expert opinion before fitting anti-embolism stockings.
- Use anti-embolism stockings that provide graduated compression and produce a calf pressure of 14–15 mmHg.
- Encourage patients to wear their anti-embolism stockings day and night until they no longer have significantly reduced mobility.
- Remove anti-embolism stockings daily for hygiene purposes and to inspect skin condition. In patients with a significant reduction in mobility, poor skin integrity or any sensory loss, inspect the skin two or three times per day, particularly over the heels and bony prominences.
- Discontinue the use of anti-embolism stockings if there is marking, blistering or discolouration of the skin, particularly over the heels and bony prominences, or if the patient experiences pain or discomfort. If suitable, offer a foot impulse or intermittent pneumatic compression device as an alternative.
- Show patients how to use anti-embolism stockings correctly and ensure they understand that this will reduce their risk of developing VTE.
- Monitor the use of anti-embolism stockings and offer assistance if they are not being worn correctly.

Pharmacological Thromboprophylaxis

LMWH (or a DOAC) should be offered to **all** patients ***except* most day cases patients** (see section 3.1) who have no bleeding risk factor. For dosing guidance see **advice sheet**

Contraindications to prophylactic anticoagulation include:

- Active bleeding
- Acute stroke
- Hypersensitivity to heparin/LMWH or history
- Inherited or acquired bleeding disorder or platelets<75x109/l
- Patient receiving therapeutic anticoagulation
- Spinal surgery / trauma – discuss with spinal surgeon first
- Uncontrolled hypertension (230/120 mmHg or higher)
- Patients deemed by operating surgeon to be at risk from heparin-induced post-operative bleeding. In these circumstances the operating surgeon's opinion should be clearly stated in the operation note and the drug chart signed appropriately to state that the patient is not to have thromboprophylaxis.

Timing of LMWH

See below section 2.4 for patients with regional Anaesthesia.

Elective surgery

Pre operatively: Administer LMWH at 18.00 hours so that at least 12 hours normally elapse before surgery.

Postoperatively: prescribe dose for 6pm if on morning list or 10pm if on evening list providing haemostasis is secured. Subsequent doses should be prescribed at 6pm or bd at 6am and 6pm if patient weighs >100kg.

Emergency surgery

LMWH to start after surgery ***unless*** not anticipated within 24 hours when prophylaxis should start on admission.

If surgery delayed >24 hours reassess whether thromboprophylaxis should be given and record decision in patient's record/TRA.

Regional Anaesthesia and Heparin

For patients to have regional anaesthesia see guideline JCG0003 for further information.

Extract

Low Molecular Weight Heparin (LMWH) Prophylactic dose range

If LMWH administered before block	Wait at least 12 hours before block insertion
If block inserted before LMWH	Wait at least 4 hours before LMWH administration
Epidural catheter removal	Wait at least 12 hours since last dose and 4 hours before next dose of LMWH

For the majority of elective patients these criteria will be met by use of the following dosing schedules:

1. Administer LMWH at 18.00 hours so that at least 12 hours normally elapse before surgery.

2. Remove epidural catheters between 10.00 and 14.00 hours to allow suitable intervals between doses of LMWH administered at 18.00 hours. In patients greater than 100kg miss the morning dose on the day of removal.

Other Methods of Thromboprophylaxis

Consider offering temporary inferior vena caval filters to patients who are at very high risk of VTE (such as patients with a previous VTE event or an active malignancy) and for whom mechanical and pharmacological VTE prophylaxis are contraindicated.
See Trust guideline CA2101 Insertion of Vena Cava Filters: Trustdocs ID No: 1252

Extended (out of hospital) Thromboprophylaxis:

See speciality specific section for details

Patients who are significantly immobile as a result of the hospital admission or have had a previous episode of VTE should be considered for extended pharmacological thromboprophylaxis until they are normally mobile, generally 7 days.

As part of discharge process check if patient should be discharged with pharmacological thromboprophylaxis and that this is included in the discharge letter or EDL and TTOs.

Ensure that patients who are discharged with pharmacological and/or mechanical VTE prophylaxis are able to use it correctly, or have arrangements made for someone to be available who will be able to help them.

Notify the patient's GP if the patient has been discharged with pharmacological and/or mechanical VTE prophylaxis to be used at home.

Surgery and the Contraceptive Pill or Hormone Replacement Therapy

Progesterone only preparations (POP)

There is no evidence of increased risk of venous thromboembolism in the peri-operative period and these preparations should not be stopped.

Combined oral contraceptives (COC)

NICE (recommendation 1.5.1) suggests advising patients to consider stopping oestrogencontaining oral contraceptives **4 weeks before elective surgery**. If stopped, advice should be provided on alternative contraceptive methods.

HOWEVER although there is known to be a small absolute risk of post-operative thromboembolism in COC users (estimated to be 1% for users compared with 0.5% for non-users) this increased risk needs to be balanced against the risks of stopping the pill four to six weeks prior to major surgery. These include unwanted pregnancy, the effects of surgery and anaesthesia on the pregnancy, and risks associated with a subsequent termination. THRIFT suggests that there is therefore insufficient evidence to support a policy of routinely stopping the pill before major surgery. However each case should be judged on its merits weighing both additional risk factors and contraceptive difficulties.

NNUH local recommendation:

Whenever possible, possible risk should be discussed with the patient prior to elective surgery. The risk of thromboembolism (including any other personal predisposing factors for thromboembolism such as personal or family history of VTE, malignancy, obesity, severe varicose veins or prolonged bed rest) should be balanced against the possibility of unwanted pregnancy should the pill be stopped without adequate alternative contraception.

If a women states that she wishes to discontinue taking the COC, she should stop taking it at least four weeks before surgery and be referred back to her GP or Family Planning Clinic to arrange alternative contraception.

A record should be made in the case notes that potential advantages and disadvantages have been discussed with the woman.

In any case (emergency or elective) where the patient is admitted still taking the COC, it should be prescribed on the drug chart and not be discontinued. The patient should then receive thromboprophylaxis as outlined in the thromboprophylaxis guidelines.

Hormone Replacement Therapy (HRT)

NNUH recommendation

In general, there appears to be no need to advise patients to discontinue HRT before surgery if there are no predisposing factors for thromboembolism e.g. personal or family history of VTE, malignancy, obesity, severe varicose veins or prolonged bed-rest.

If there are predisposing risk factors, it may be prudent to review the need for HRT as the risks may exceed the benefits. Any patient wishing to stop should be referred back to her GP. HRT should be withdrawn slowly to minimise recurrence and exacerbation of menopausal symptoms.

The possible increased risk should be explained to the patient and the decision documented.

Patients continuing with HRT should have their medication prescribed on the drug chart and receive thromboprophylaxis as outlined in the thromboprophylaxis guidelines.

In any case (emergency or elective) where the patient is admitted still taking HRT, it should be prescribed on the drug chart and not be discontinued. The patient should then receive thromboprophylaxis if indicated as outlined in the thromboprophylaxis guidelines.

Surgery and Travel

See Trust guidance for staff- Surgery, travel and VTE risk for further information. In addition there is a patient information leaflet available from the Trust Intranet.

2. Pathway for TRA Completion, Thromboprophylaxis Prescribing and Patient Information

Elective inpatient admissions **Emergency inpatient admissions**

3. Specialty Advice

Day Case Surgery under General Anesthetic

The risk of venous thromboembolism (VTE) is traditionally considered less for patients having day surgery compared to the in-patient population but there is little recent, published data relating specifically to this population of patients. Patients are generally discharged home within 6-12 hours of surgery. NICE www.nice.org.uk/guidance/NG89 states to take account of individual patient factors and to consider continuation of pharmacological VTE thromboprophylaxis *if the patient is expected to have significantly reduced mobility after discharge*. Day case surgery patients do not generally have significantly reduced mobility after discharge.

The advice outlined in this section is based on our own review of the incidence of VTE in day surgery patients at NNUH and surveys carried out by others. It takes into account patient VTE history and type of surgery. Further details can be found in appendix 1.

Anti-embolism stockings: As for all surgical patients (section1) - patients should be given correctly fitted anti-embolism stockings to wear on admission unless contraindicated and until they are normally mobile according to NICE guidance.

Heparin prophylaxis: This should be considered for the following day case patients, taking into account the bleeding and thrombotic risks on the TRA:

- Patients with a previous history of VTE
- Patients having varicose vein surgery under GA if total anaesthetic and surgical time > 90 minutes or patients risk of VTE outweighs risk of bleeding
- Patients having lower limb orthopaedic surgery with post operative immobilisation who are at high thrombotic risk (see guideline CA5064 thromboprophylaxis for adult orthopaedic patients placed in lower limb immobilisation http://nnvmwebapps01/TrustDocs/ViewDoc.aspx?id=8302
- Any patient identified at risk of VTE, where the surgeon considers the benefit of heparin outweighs the risks

Heparin should be prescribed by the surgical team by completing and signing pre printed prescription in TTO section of blue paper drug chart. The first dose should be given before discharge when the surgeon is happy that any bleeding is controlled and more than 4 hours have elapsed after spinal or epidural injection. Subsequent doses should be self-administered at home after surgery where possible or by practice nurse if patient unable to self administer.

The standard duration is minimum **7days except** for non-arthroplasty knee surgery when 14 days recommended (www.nice.org.uk/guidance/NG89) Shorter or longer courses may be prescribed at the discretion of the surgeon, taking into account the duration of post-operative reduced mobility. See trust advice sheet for dosing guidance. http://nnvmwebapps01/TrustDocs/viewdoc.aspx?id=1697

- Patients should be given instructions for safe disposal of sharps after use.
- Timing of the first dose should consider any surgical bleeding and risks of bleeding from regional anaesthesia. Please refer to specific guideline JCG0003 Regional Anaesthesia (Spinal or epidural anaesthesia) in patients receiving venous thromboprophylaxis with anticoagulant and antiplatelet drugs for further information.

Reassessment of risk: Patients who require unplanned overnight admission need to have TRA reviewed by admitting doctor as risk status may have changed due to reason for admission.

On discharge: It should be confirmed that the patient has received the leaflet "Preventing hospital associated blood clots", and if not another copy of this leaflet should be given.

Flowchart of process for completion of TRA and prescribing heparin for day surgery patients

General Surgery and Urology inpatients

NICE standards www.nice.org.uk/guidance/NG89 apply during in patient stay see section 2

Extended (out of Hospital) Thromboprophylaxis for General Surgery and Urology patients

Extend pharmacological VTE prophylaxis to 28 days postoperatively for patients who have had major cancer surgery in the abdomen or pelvis.

Examples of major cancer surgery requiring extended thromboprophylaxis for 28 days post op:

- Adrenalectomy
- Colectomy (Right, left, subtotal, anterior resection, APER)
- Cystectomy
- Gastrectomy – total and subtotal (NOT laparoscopic GIST resection)
- Hartmanns Procedure
- Hepatectomy
- Laparoscopic or open radical nephrectomy (for renal cell carcinoma)
- Lymph node dissection (check with consultant)
- Nephroureterectomy
- Oesophagectomy
- Nephrectomy (partial, radical or simple)
- Radical prostatectomy
- Splenectomy

Gynaecology inpatients

NICE standards www.nice.org.uk/guidance/NG89 apply during in patient stay see section 2

Extended out of hospital Thromboprophylaxis for gynaecology patients

Indication	Medication (Standard dose) – see section 2 for <50kg and >100kg and if renal impairment	Duration (post procedure): unless otherwise requested by surgeon	
non cancer (benign) • pelvic surgery with total anaesthetic + surgical time >60 min	Dalteparin sc 5000 units od	7 days	Subtract days of post-op Dalteparin given in hospital from total quantity
cancer non major • laparoscopic surgery for ovarian, cervical, uterine cancer or complex atypical hyperplasia of the endometrium and BMI<40 and operative time < 4 hours • surgery for vulval cancer	Dalteparin sc 5000 units od	7 days	
cancer major • laparotomy for ovarian, cervical, uterine cancer _ • laparoscopic surgery for ovarian, cervical, uterine cancer or complex atypical hyperplasia of the endometrium with BMI>40 and/or operative time of >4 hours	Dalteparin sc 5000 units od	28 days	

Usually administer LMWH at 22.00 hours on the day when the surgery has been performed (or more than 4 hours have elapsed after spinal or epidural injection, whichever is later).

Note: specific instructions may vary on individual patients but will be clearly identified in the postoperative plan.

Trust Clinical Guideline for the Prevention of Venous Thromboembolism (VTE) for Adult Surgical Patients 16 years and over

Orthopaedic and trauma patients undergoing inpatient surgery

NICE standards apply during in patient stay see section 2. If total anaesthesia time > 90 minutes consider extended chemical thromboprophylaxis.

Pharmacological drug of choice while in patient = Dalteparin

NB for **MAJOR TRAUMA** offer VTE prophylaxis only when the benefits of reducing the risk of VTE outweigh the risks of bleeding and continue for minimum 7 days. Regularly reassess the patient's risks of VTE and bleeding.

Extended <u>out of hospital</u> Thromboprophylaxis

<table>
<tr><th>Indication</th><th>Medication (LMWH* = Standard dose – see section 2 for <50kg and >100kg and if renal impairment)</th><th colspan="2">Duration (post procedure)</th></tr>
<tr><td>Knee replacement surgery (total/bilateral/revision/ unicompartmental)</td><td>Dalteparin* sc 5000 units od <u>or</u> Rivaroxaban 10 mg od (if unable to self-inject on D/C) OR aspirin 75 mg ***od with PPI cover if surgeon states in op note</td><td>14 days

14 days</td><td rowspan="3">Subtract days of post-op Dalteparin or Rivaroxaban given in hospital from total quantity</td></tr>
<tr><td>Hip replacement surgery (total/bilateral/revision/ re-surfacing)</td><td>Dalteparin as IP and Rivaroxaban 10 mg od when discharged (if contraindicated consider Dalteparin*)</td><td>28 days</td></tr>
<tr><td>Diagnosis of # NOF or pelvic fragility # (hemiarthroplasty/DHS/ IMHS)</td><td>Dalteparin* sc 5000 units od</td><td>28 days</td></tr>
<tr><td>Inpatient (incl. day case surgery) or Outpatient with lower limb immobilisation** <u>and</u>
(a) history of previous VTE <u>or</u>
(b) pregnant/6 weeks post-partum <u>or</u>
(c) Achilles tendon rupture</td><td>Dalteparin* sc 5000 units od</td><td colspan="2">Consider LMWH for the duration of lower limb immobilization to maximum of 6 weeks**

(refer to outpatient guideline CA5064)
http://nnvmwebapps01/TrustDocs/ViewDoc.aspx?id=8302</td></tr>
<tr><td>Inpatient (incl. day case surgery) with lower limb immobilisation** and NOT meeting above criteria</td><td>At the discretion of consultant</td><td colspan="2">At the discretion of the consultant, check post-op instructions</td></tr>
</table>

Elective spinal surgery	LMW heparin if VTE risk outweighs bleeding risk, starting 24-48 hours after surgery according to clinical judgement.	Continue for 30 days or until patient mobile or discharged whichever is sooner
Spinal Injury	LMWH from 24 hours if surgery not anticipated in next 24-48 hours	Continue for 30 days or until patient mobile or discharged whichever is sooner
Major Trauma	Consider LMWH for patients with serious or major trauma after risk assessment . review VTE and bleeding risk daily	Continue for minimum 7 days
Upper limb	Not usually recommended for procedures under LA or regional anaesthesia. Consider LMWH if total anaesthesia time > 90 minutes	Continue for 7 days if indicated
Knee arthroscopy with> 90 mins total anaesthesia time	LMWH heparin	14 days
Knee surgery including rupture quads, tendon or patella fracture	LMWH heparin	6 weeks

**(lower limb cast/back slab/completion of plaster/splint/boot/shoe)
*** Do not use aspirin if patient on antiplatelet drugs pre op for other indication

Vascular surgery

All vascular inpatients (to include amputations)
NICE standards www.nice.org.uk/guidance/NG89 apply during in patient stay see section 2.

NB Anti-embolism stockings should NOT be used on any patients with peripheral vascular disease and as a general rule should be avoided in patients undergoing AAA surgery unless specifically requested by the Consultant.

Extended out of hospital Thromboprophylaxis for vascular patients see www.nice.org.uk/guidance/NG89

Patients who have had varicose vein surgery under GA should have pharmacological thromboprophylaxis for duration of 7 days post procedure unless bleeding risk out weighs risk of thrombosis.

All other specialties not specifically mentioned above should follow recommendations in www.nice.org.uk/guidance/NG89

Clinical audit standards

Annual Audit of compliance with VTE risk assessment of patients.
Annual audit of prophylactic treatment regime for high risk patients.

Summary of development and consultation process undertaken before registration and dissemination

Guideline updated to align with NICE guideline: Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism (NG89) issued in March 2018.

It has been produced on behalf of the Trust by the Thrombosis and Thromboprophylaxis Committee who have reviewed and approved this version. This guideline is endorsed by the Clinical Guidelines Assessment Panel (CGAP).

Distribution list / dissemination method

Trust intranet.

References / source documents

www.nice.org.uk/guidance/NG89: Venous thromboembolism in over 16s: reducing the risk of hospital acquired deep vein thrombosis or pulmonary embolism.

Should the pill be stopped pre-operatively? Sue-Ling H, Hughes LE. BMJ 1988; 296:447-8.

Risk of and prophylaxis for venous thromboembolism in hospital patients. Second Thromboembolic risk factors (THRIFT II) Consensus Group. *Phlebology 1998; 13:87-97.*

Committee Safety Medicines document 2002: Tamoxifen and Venous Thromboembolism
https://webarchive.nationalarchives.gov.uk/20141206195206/http://www.mhra.gov.uk/home/groups/pl-p/documents/websiteresources/con007452.pdf

Appendix 1

Risk of VTE in day surgery

The risk of venous thromboembolism (VTE) is traditionally considered less for patients having day surgery compared to the in-patient population but there is little recent, published data relating specifically to this population of patients.

Since 2009 we have performed root cause analysis (RCA) to cases of thrombosis occurring following day case surgery. From August 2009 to March 2010 thrombosis was identified for the 30 days following surgery; from April 2010 for 90 days. Using this data we have calculated the incidence of VTE and reviewed the risk factors for VTE in patients attending for day case surgery under GA (general, gynaecological, urological and orthopaedic surgery but excluding ophthalmology) to help inform the NNUH day case Thromboprophylaxis guideline CA 5009. In that period 57,000 patients had a day surgery procedure under GA and 37 patients subsequently presented with VTE. This gave an overall rate of thrombosis following day case surgery of 0.07% (<7 per 10,000) at NNUH (Analysis of thrombosis following day case surgery April 2009-April 2014 report).

An older survey of nearly 40,000 patients in 1993 suggested that the incidence of PE was only 0.01% in day surgery patients compared to 1% within the in-patient population.

A prospective study of hospital admissions in one million middle aged women between 1996 and 2001 looked at risk of VTE after surgery compared to not having surgery. This showed that women were 70 times more likely to be admitted to hospital with a VTE after in-patient surgery and 10 times more likely after day case surgery .This is thought to be due to the selection of fitter patients for shorter procedures in day surgery units and early mobilisation.

However as performance of more complex, prolonged procedures such as laparoscopic cholecystectomies, interventional knee arthroscopies and orthopaedic foot surgery in older patients with more significant co-morbidity becomes possible on a day case basis the risk and incidence of VTE will grow.

The evidence above forms the basis for the recommendations for managing the peri operative risk of VTE in day surgery patients having procedures under GA.