

Quick reference guide

Issue date: January 2010

Venous thromboembolism: reducing the risk

Reducing the risk of venous thromboembolism
(deep vein thrombosis and pulmonary embolism)
in patients admitted to hospital

This guideline updates NICE clinical guideline 46
and replaces it

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About this booklet

This is a quick reference guide that summarises the recommendations NICE has made to the NHS in 'Venous thromboembolism: reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital' (NICE clinical guideline 92).

This guidance is an update of NICE clinical guideline 46 (published April 2007) and replaces it.

For more information on how NICE clinical guidelines are developed, go to www.nice.org.uk

Assessing risks of VTE and bleeding

Patients who are at risk of VTE

Medical patients

- If mobility significantly reduced for ≥ 3 days **or**
- If expected to have ongoing reduced mobility relative to normal state plus any VTE risk factor.

Surgical patients and patients with trauma

- If total anaesthetic + surgical time > 90 minutes **or**
- If surgery involves pelvis or lower limb and total anaesthetic + surgical time > 60 minutes **or**
- If acute surgical admission with inflammatory or intra-abdominal condition **or**
- If expected to have significant reduction in mobility **or**
- If any VTE risk factor present.

VTE risk factors¹

- Active cancer or cancer treatment
- Age > 60 years
- Critical care admission
- Dehydration
- Known thrombophilias
- Obesity (BMI > 30 kg/m²)
- One or more significant medical comorbidities (for example: heart disease; metabolic, endocrine or respiratory pathologies; acute infectious diseases; inflammatory conditions)
- Personal history or first-degree relative with a history of VTE
- Use of HRT
- Use of oestrogen-containing contraceptive therapy
- Varicose veins with phlebitis

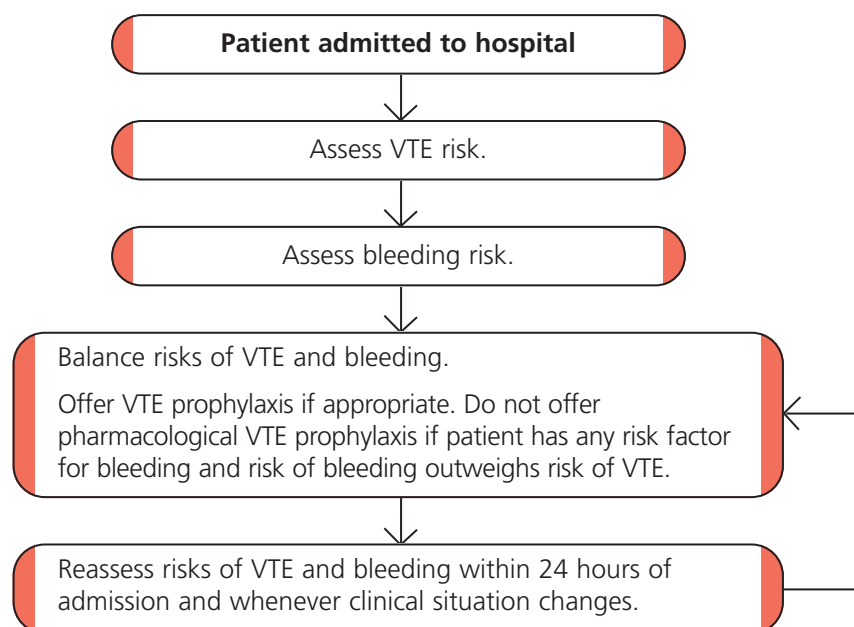
¹ For women who are pregnant or have given birth within the previous 6 weeks see page 23.

Patients who are at risk of bleeding

All patients who have any of the following.

- Active bleeding
- Acquired bleeding disorders (such as acute liver failure)
- Concurrent use of anticoagulants known to increase the risk of bleeding (such as warfarin with INR > 2)
- Lumbar puncture/epidural/spinal anaesthesia within the previous 4 hours or expected within the next 12 hours
- Acute stroke
- Thrombocytopenia (platelets $< 75 \times 10^9/l$)
- Uncontrolled systolic hypertension ($\geq 230/120$ mmHg)
- Untreated inherited bleeding disorders (such as haemophilia or von Willebrand's disease)

Care pathway



For all patients

- Do not allow patients to become dehydrated unless clinically indicated.
- Encourage patients to mobilise as soon as possible.
- Do not regard aspirin or other antiplatelet agents as adequate prophylaxis for VTE.
- 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 active malignancy) if mechanical and pharmacological VTE prophylaxis contraindicated.

For patients having elective surgery

Oral contraceptives and HRT

- Advise women to consider stopping oestrogen-containing contraceptives or HRT 4 weeks before surgery.

Pre-existing antiplatelet therapy

- Assess risks and benefits of stopping pre-existing antiplatelet therapy 1 week before surgery. Consider involving the multidisciplinary team in the assessment.

Anaesthesia

- Consider regional anaesthesia, in addition to other methods of VTE prophylaxis, as it carries a lower risk of VTE than general anaesthesia. Take into account patient preferences, suitability for regional anaesthesia and any other planned method of VTE prophylaxis.
- If regional anaesthesia is used, plan the timing of pharmacological prophylaxis to minimise risk of epidural haematoma. If antiplatelet or anticoagulant agents are being used or their use is planned, refer to the summary of product characteristics for guidance about safety and timing of these agents in relation to regional anaesthesia.
- Do not routinely offer pharmacological or mechanical VTE prophylaxis to patients having surgery with local anaesthesia by local infiltration with no limitation of mobility.

Overview of care

Who	When	What
Patients having elective surgery	Before admission	<ul style="list-style-type: none"> Advise women to consider stopping oestrogen-containing oral contraception or HRT 4 weeks before surgery. Assess the risks and benefits of stopping antiplatelet therapy 1 week before surgery. Plan anaesthesia (see page 4).
All patients	At admission	<ul style="list-style-type: none"> Assess risk of VTE. Assess risk of bleeding. Offer patients verbal and written information on VTE. Offer VTE prophylaxis if appropriate.
All patients	During ward-based care	<ul style="list-style-type: none"> Reassess risks of VTE and bleeding. Review VTE prophylaxis. Monitor use of mechanical VTE prophylaxis (see page 10). Keep patients hydrated and encourage them to mobilise as soon as possible.
All patients	Before discharge	<ul style="list-style-type: none"> Offer information on signs and symptoms of DVT and PE. Offer information on the importance of seeking medical help and who to contact if DVT, PE or other adverse event suspected.
Patients discharged with VTE prophylaxis	Before discharge	<ul style="list-style-type: none"> Offer information on correct use and duration of VTE prophylaxis to be used at home and who to contact for help. Ensure patients are able to use the VTE prophylaxis at home, or have someone available to help them. Offer information on signs and symptoms of adverse events related to VTE prophylaxis and who to contact for help. Inform GP that patient has been discharged with VTE prophylaxis.

Introduction

An estimated 25,000 people in the UK die from preventable hospital-acquired venous thromboembolism (VTE) every year². Treatment of non-fatal symptomatic VTE and related long-term morbidities is associated with considerable cost to the health service.

VTE is a condition in which a blood clot (a thrombus) forms in a vein. It most commonly occurs in the deep veins of the legs; this is called deep vein thrombosis. The thrombus may dislodge from its site of origin to travel in the blood – a phenomenon called embolism.

VTE encompasses a range of clinical presentations. Venous thrombosis is often asymptomatic; less frequently it causes pain and swelling in the leg. Part or all of the thrombus can come free and travel to the lung as a potentially fatal pulmonary embolism. Symptomatic venous thrombosis carries a considerable burden of morbidity, sometimes over a long term because of chronic venous insufficiency. This in turn can cause venous ulceration and development of a post-thrombotic limb (characterised by chronic pain, swelling and skin changes).

The risk of developing VTE depends on the condition and/or procedure for which the patient is admitted and on any predisposing risk factors (such as age, obesity and concomitant conditions).

² House of Commons Health Committee (2005) The prevention of venous thromboembolism in hospitalised patients. London: The Stationery Office.

Definitions and abbreviations

Definitions

- Major bleeding: a bleeding event that results in one or more of the following:
 - death
 - a decrease in haemoglobin concentration of ≥ 2 g/dl
 - transfusion of ≥ 2 units of blood
 - bleeding into a retroperitoneal, intracranial or intraocular site
 - a serious or life-threatening clinical event
 - a surgical or medical intervention
- Renal failure: estimated glomerular filtration rate (eGFR) < 30 ml/min/1.73 m²
- Significantly reduced mobility: bedbound, unable to walk unaided or likely to spend a substantial proportion of the day in bed or in a chair

Abbreviations

BMI: body mass index

Dabigatran: dabigatran etexilate

DVT: deep vein thrombosis

Fondaparinux: fondaparinux sodium

HRT: hormone replacement therapy

INR: international normalised ratio (standardised laboratory measure of blood coagulation)

LMWH: low molecular weight heparin

PE: pulmonary embolism

UFH: unfractionated heparin

VTE: venous thromboembolism

Key priorities for implementation

Assessing the risks of VTE and bleeding

- Assess all patients on admission to identify those who are at increased risk of VTE.
- Regard medical patients as being at increased risk of VTE if they:
 - have had or are expected to have significantly reduced mobility for 3 days or more **or**
 - are expected to have ongoing reduced mobility relative to their normal state and have one or more of the risk factors shown on page 3.
- Regard surgical patients and patients with trauma as being at increased risk of VTE if they meet one of the following criteria:
 - surgical procedure with a total anaesthetic and surgical time of more than 90 minutes, or 60 minutes if the surgery involves the pelvis or lower limb
 - acute surgical admission with inflammatory or intra-abdominal condition
 - expected significant reduction in mobility
 - one or more of the risk factors shown on page 3.
- Assess all patients for risk of bleeding before offering pharmacological VTE prophylaxis³. Do not offer pharmacological VTE prophylaxis to patients with any of the risk factors for bleeding shown on page 3, unless the risk of VTE outweighs the risk of bleeding.
- Reassess patients' risks of bleeding and VTE within 24 hours of admission and whenever the clinical situation changes, to:
 - ensure that the methods of VTE prophylaxis being used are suitable
 - ensure that VTE prophylaxis is being used correctly
 - identify adverse events resulting from VTE prophylaxis.

Reducing the risk of VTE

- Encourage patients to mobilise as soon as possible.
- Offer pharmacological VTE prophylaxis to general medical patients assessed to be at increased risk of VTE. Choose any one of:
 - fondaparinux sodium
 - low molecular weight heparin (LMWH⁴)
 - unfractionated heparin (UFH) (for patients with renal failure).

Start pharmacological VTE prophylaxis as soon as possible after risk assessment has been completed. Continue until the patient is no longer at increased risk of VTE.

continued

³ Prescribers should consult the summary of product characteristics for further details of the drugs being used or planned for pharmacological VTE prophylaxis.

⁴ At the time of publication (January 2010) some types of LMWH do not have UK marketing authorisation for VTE prophylaxis in medical patients. Prescribers should consult the summary of product characteristics for the individual LMWH. Informed consent for off-label use should be obtained and documented.

Key priorities for implementation *continued*

Patient information and planning for discharge

- Before starting VTE prophylaxis, offer patients and/or their families or carers verbal and written information on:
 - the risks and possible consequences of VTE
 - the importance of VTE prophylaxis and its possible side effects
 - the correct use of VTE prophylaxis (for example, anti-embolism stockings, foot impulse or intermittent pneumatic compression devices)
 - how patients can reduce their risk of VTE (such as keeping well hydrated and, if possible, exercising and becoming more mobile).
- As part of the discharge plan, offer patients and/or their families or carers verbal and written information on:
 - the signs and symptoms of deep vein thrombosis and pulmonary embolism
 - the correct and recommended duration of use of VTE prophylaxis at home (if discharged with prophylaxis)
 - the importance of using VTE prophylaxis correctly and continuing treatment for the recommended duration (if discharged with prophylaxis)
 - the signs and symptoms of adverse events related to VTE prophylaxis (if discharged with prophylaxis)
 - the importance of seeking help and who to contact if they have any problems using the prophylaxis (if discharged with prophylaxis)
 - the importance of seeking medical help and who to contact if deep vein thrombosis, pulmonary embolism or another adverse event is suspected.

Patient-centred care

Treatment and care should take into account patients' individual needs and preferences. Good communication is essential, supported by evidence-based information, to allow patients to reach informed decisions about their care. Follow advice on seeking consent from the Department of Health or Welsh Assembly Government if needed. If the patient agrees, families and carers should have the opportunity to be involved in decisions about treatment and care.

Using VTE prophylaxis

Choice of VTE prophylaxis

- Base the choice of **mechanical** VTE prophylaxis on clinical condition, surgical procedure and patient preference. Choose any one of:
 - anti-embolism stockings (thigh or knee length)
 - foot impulse devices
 - intermittent pneumatic compression devices (thigh or knee length).
- Base the choice of **pharmacological** VTE prophylaxis on local policies, clinical condition (for example, renal failure) and patient preference.

Information for patients about VTE prophylaxis

- Consider offering synthetic alternatives to heparin to patients who have concerns about using animal products, since heparin is of animal origin.
- Before starting VTE prophylaxis, offer verbal and written information on:
 - risks and possible consequences of VTE
 - importance of VTE prophylaxis and its possible side effects
 - correct use of VTE prophylaxis
 - how to reduce risk of VTE.

Anti-embolism stockings

- Do not offer anti-embolism stockings to patients with:
 - suspected or proven peripheral arterial disease
 - peripheral arterial bypass grafting
 - peripheral neuropathy or other causes of sensory impairment
 - local condition in which stockings may cause damage, such as 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.

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

Foot impulse and intermittent pneumatic compression devices

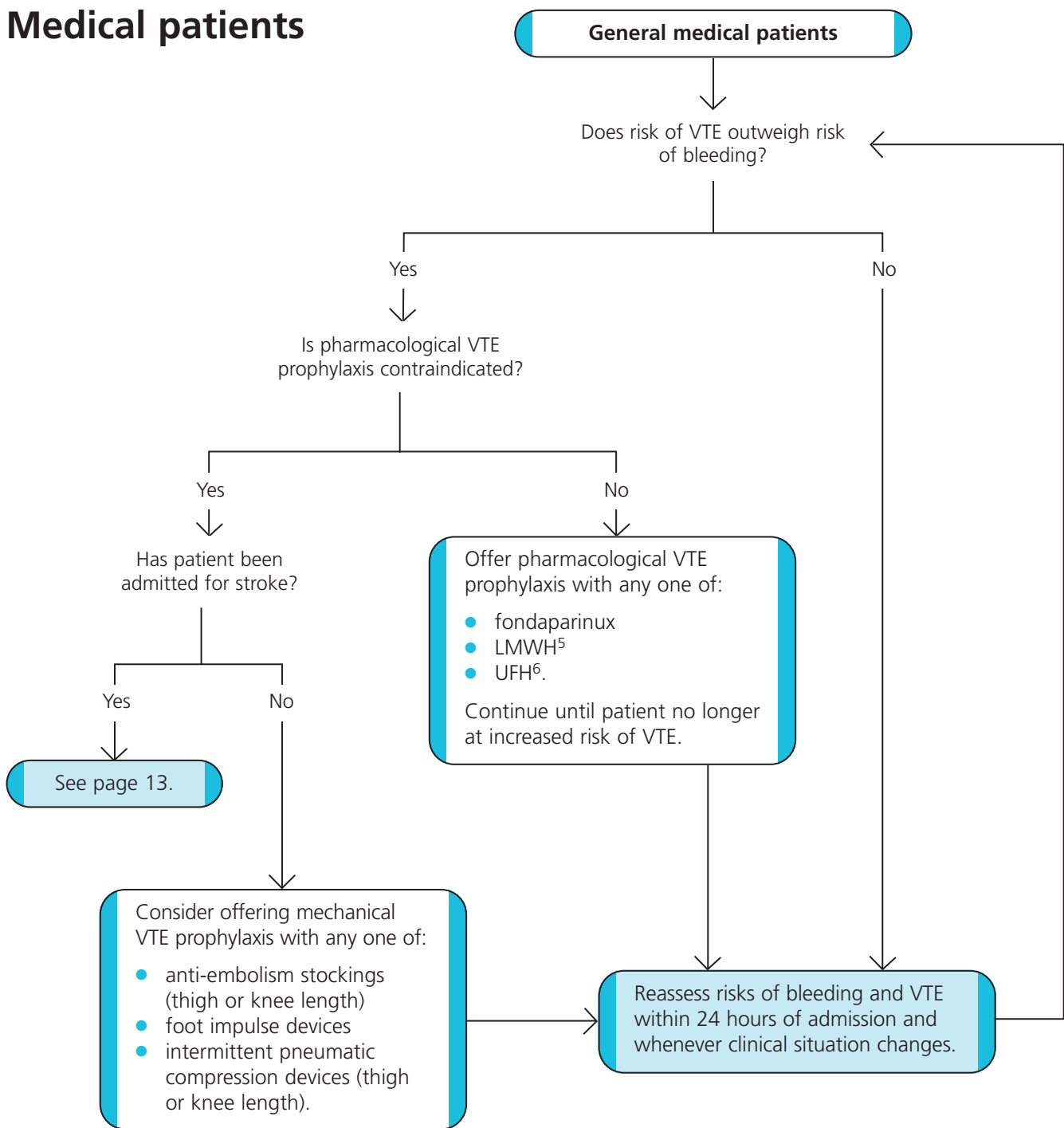
- Do not offer these devices to patients with a known allergy to the material of manufacture.
- Encourage patients on the ward who have these devices to use them for as much of the time as is possible and practical, both when in bed and when sitting in a chair.

VTE prophylaxis for patients already having antiplatelet or anticoagulant therapy to treat other conditions

- Consider offering additional mechanical or pharmacological VTE prophylaxis if patient is at risk of VTE. Take into account risk of bleeding and of comorbidities such as arterial thrombosis.
 - **If the risk of VTE outweighs the risk of bleeding**, consider offering pharmacological VTE prophylaxis according to the reason for admission.
 - **If the risk of bleeding outweighs the risk of VTE**, offer mechanical VTE prophylaxis.
- Do not offer additional pharmacological or mechanical VTE prophylaxis to patients who are taking vitamin K antagonists and who are within their therapeutic range, providing anticoagulant therapy is continued.
- Do not offer additional pharmacological or mechanical VTE prophylaxis to patients who are having full anticoagulant therapy (for example, fondaparinux sodium, LMWH or UFH).

Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.

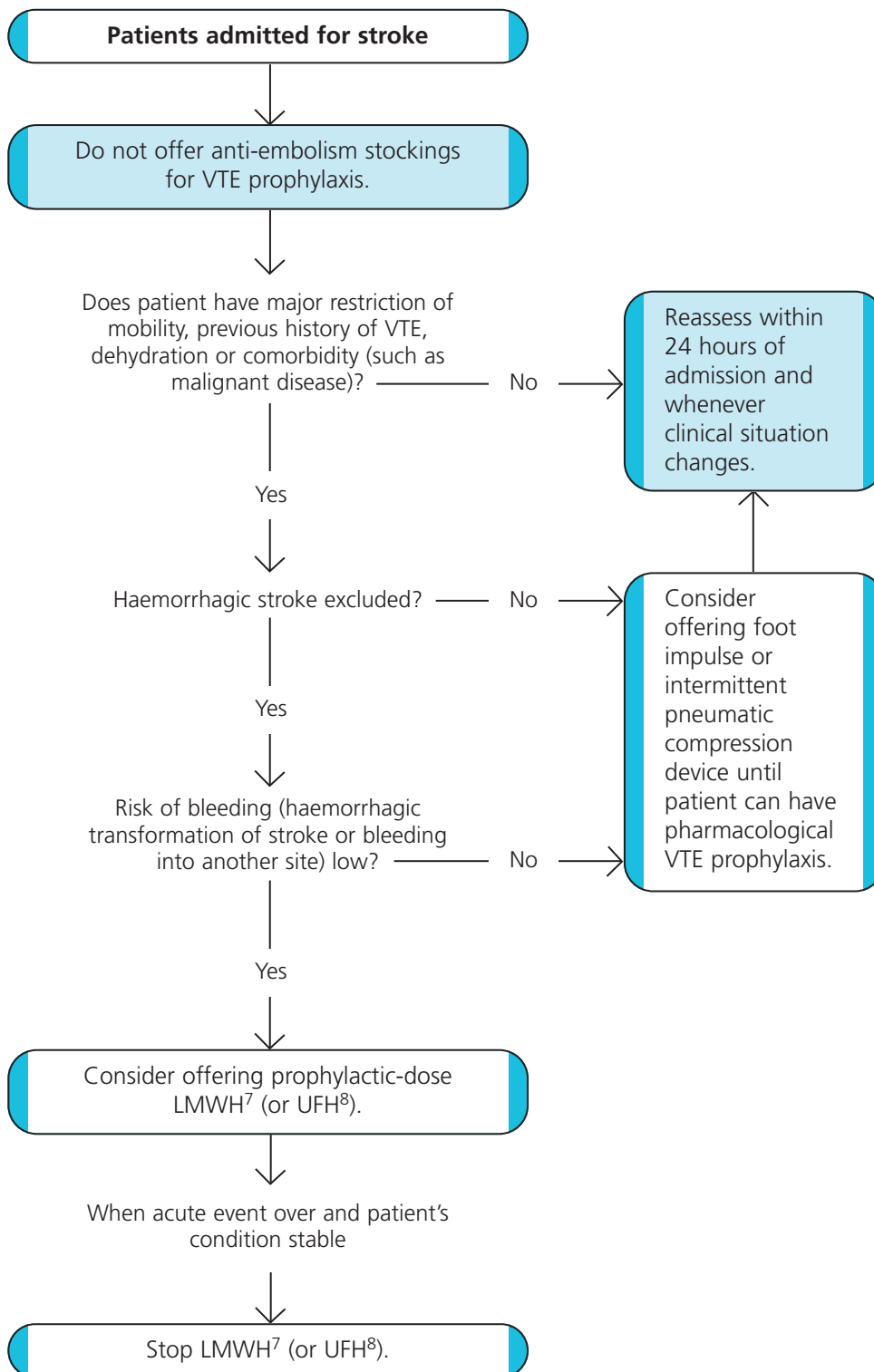
Medical patients



⁵ At the time of publication (January 2010) some types of LMWH do not have UK marketing authorisation for VTE prophylaxis in medical patients. Prescribers should consult the summary of product characteristics for the individual LMWH. Informed consent for off-label use should be obtained and documented.

⁶ For patients with renal failure.

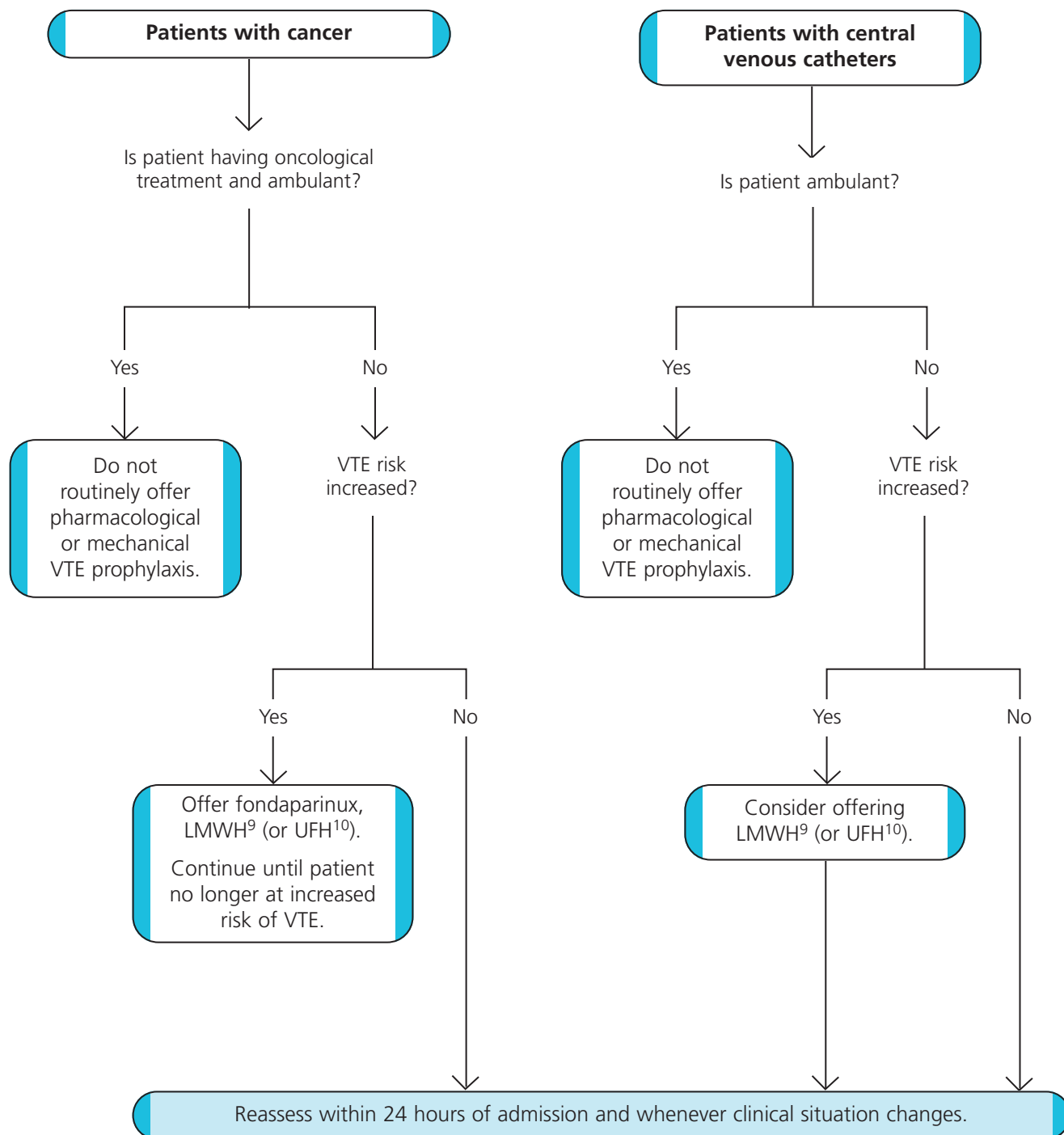
Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.



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⁸ For patients with renal failure.

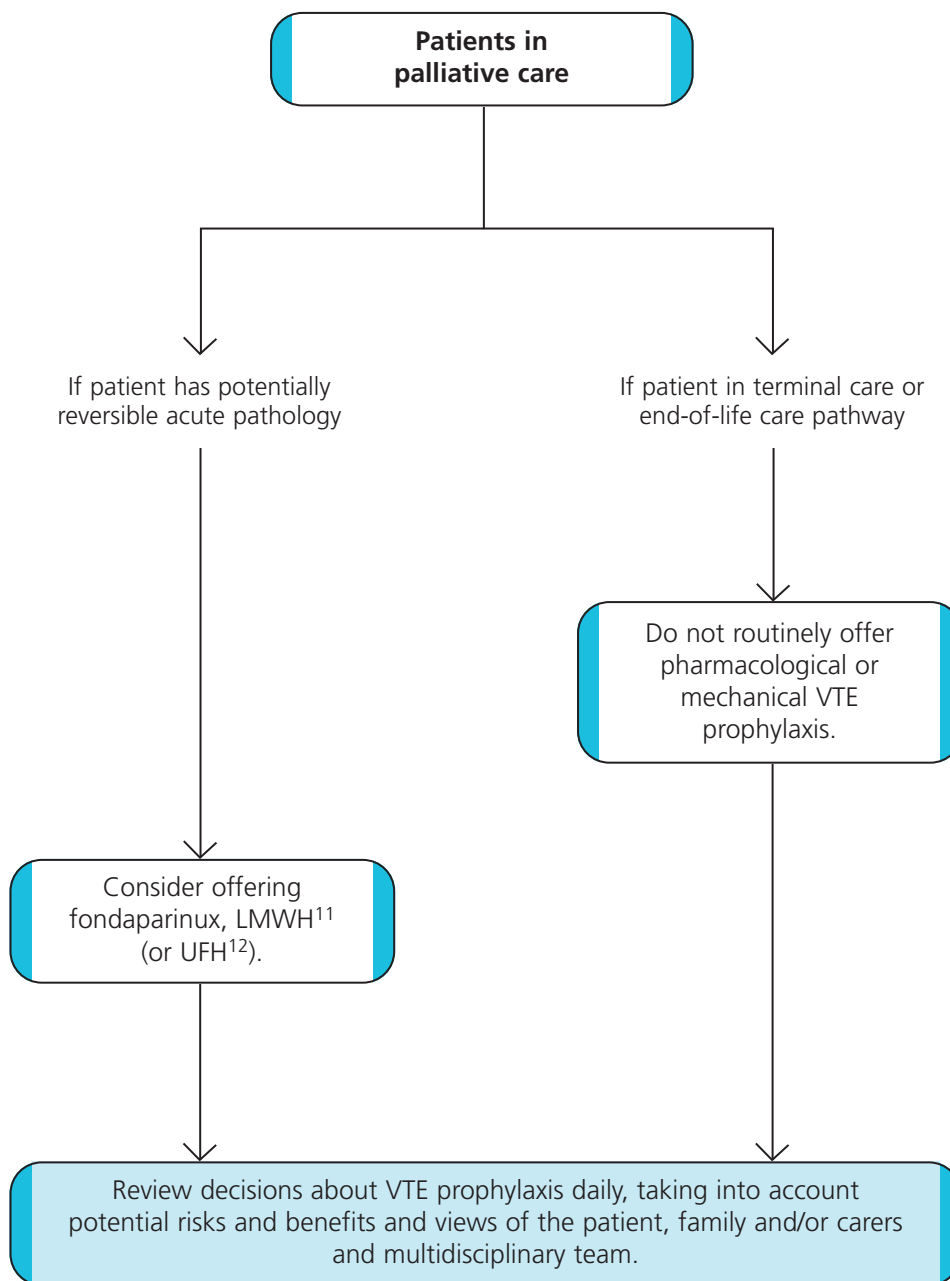
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¹⁰ For patients with renal failure.

Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.

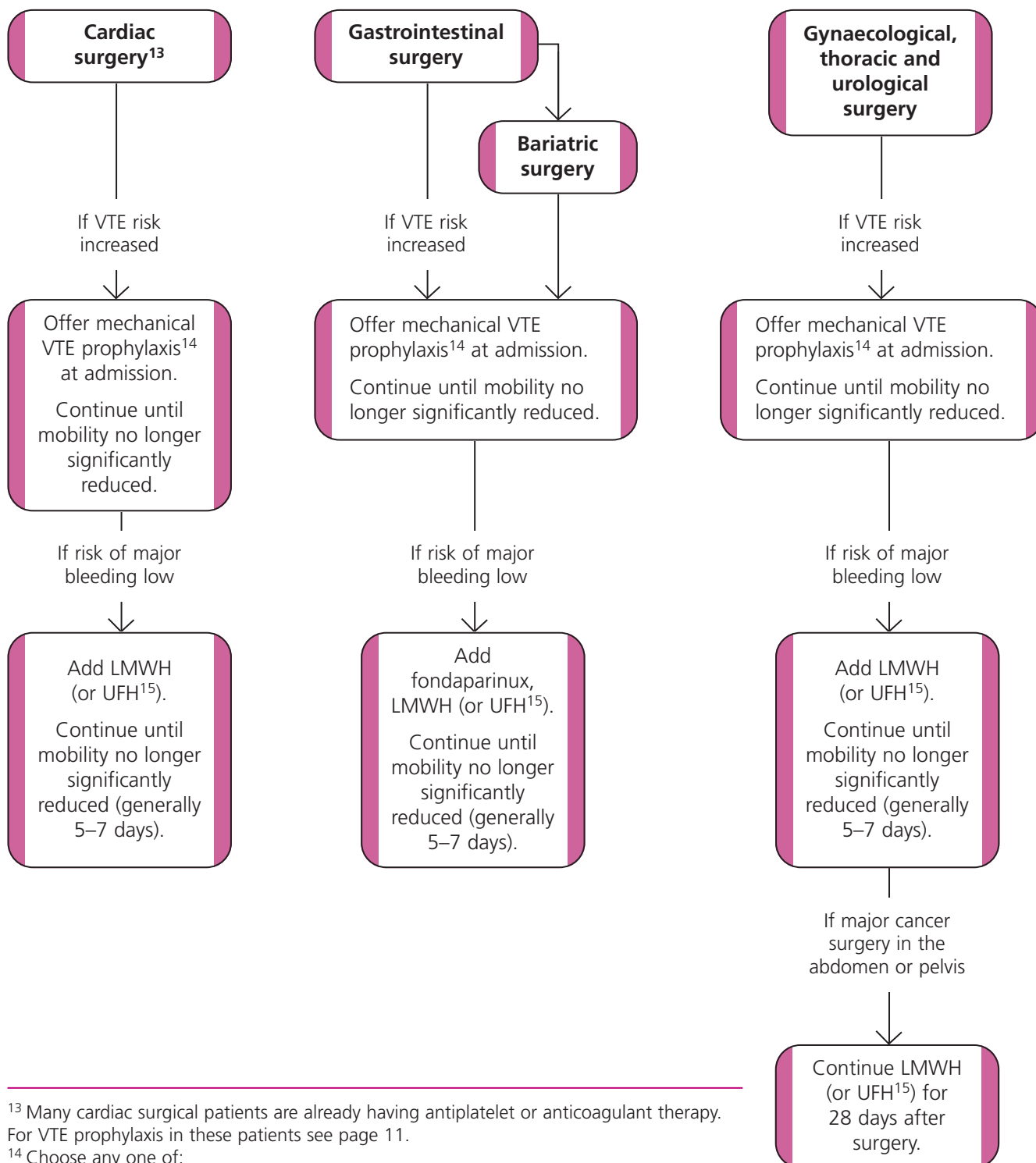


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¹² For patients with renal failure.

Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.

Non-orthopaedic surgery



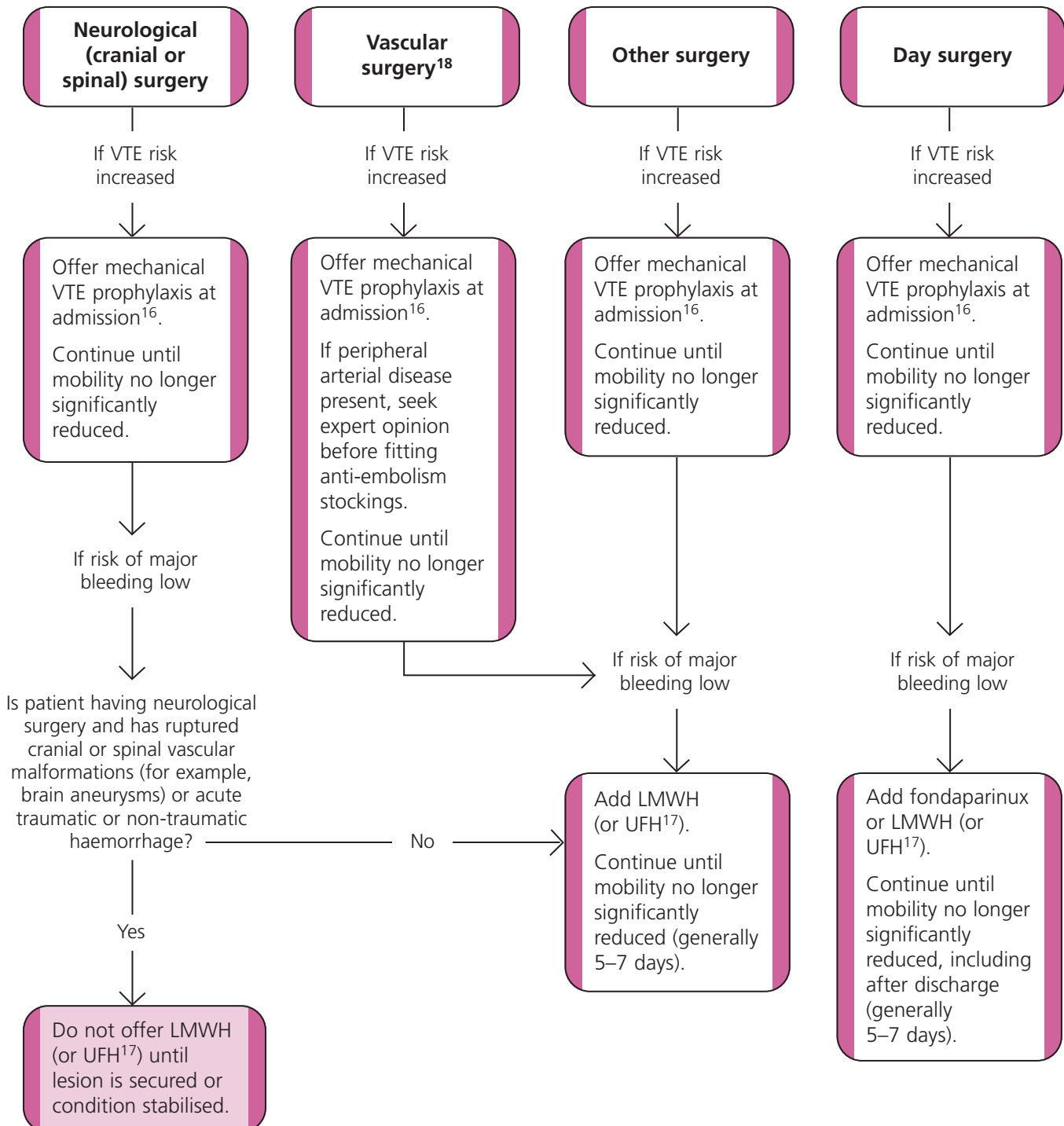
¹³ Many cardiac surgical patients are already having antiplatelet or anticoagulant therapy. For VTE prophylaxis in these patients see page 11.

¹⁴ Choose any one of:

- anti-embolism stockings (thigh or knee length)
- foot impulse devices
- intermittent pneumatic compression devices (thigh or knee length).

¹⁵ For patients with renal failure.

Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.



¹⁶ Choose any one of:

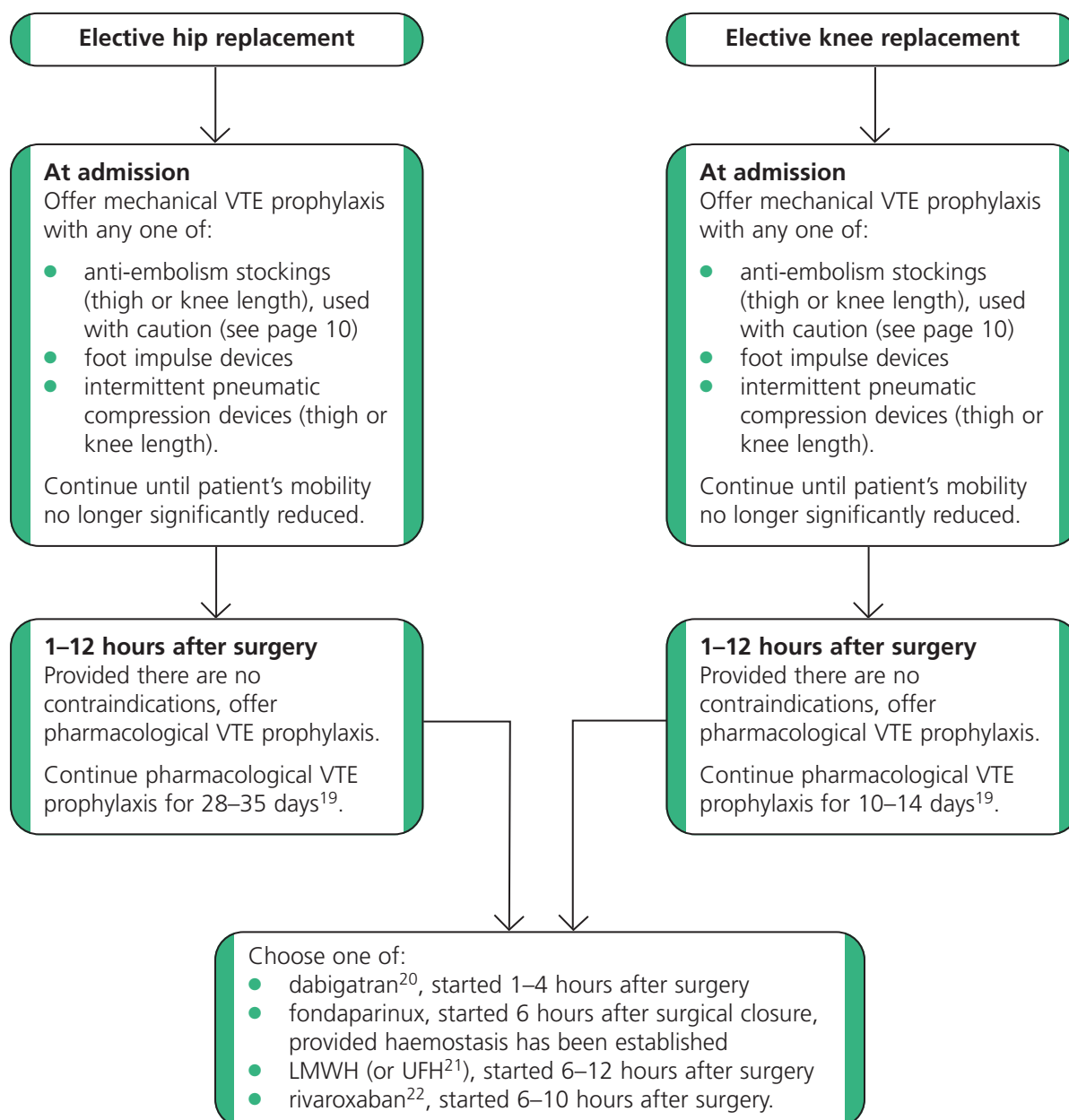
- anti-embolism stockings (thigh or knee length)
- foot impulse devices
- intermittent pneumatic compression devices (thigh or knee length).

¹⁷ For patients with renal failure.

¹⁸ Many vascular surgical patients are already having antiplatelet or anticoagulant therapy. For VTE prophylaxis in these patients see page 11.

Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.

Orthopaedic surgery



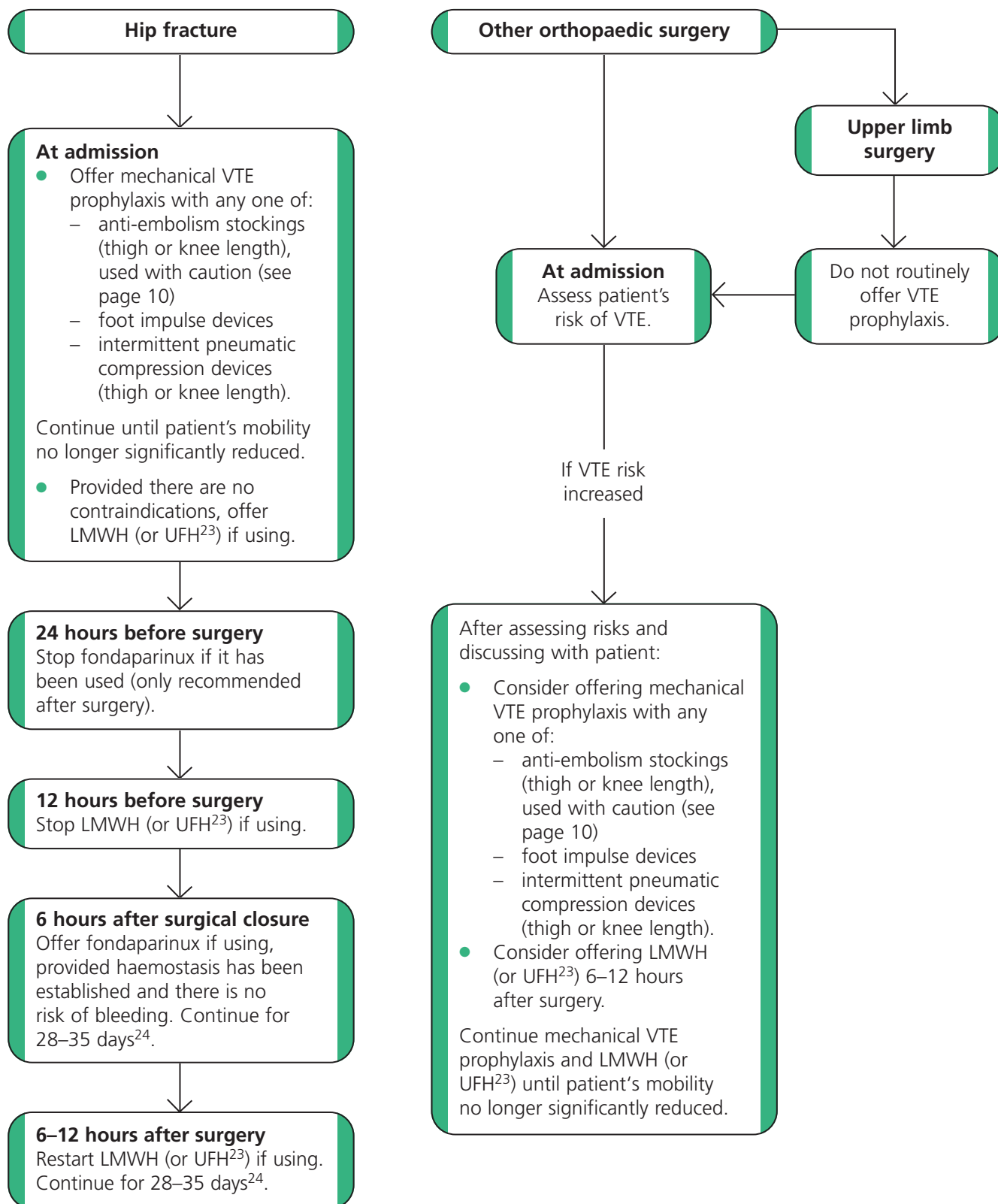
¹⁹ According to the summary of product characteristics for the individual agent being used.

²⁰ In line with 'Dabigatran etexilate for the prevention of venous thromboembolism after hip or knee replacement surgery in adults' (NICE technology appraisal guidance 157), dabigatran etexilate, within its marketing authorisation, is recommended as an option for the primary prevention of venous thromboembolic events in adults who have undergone elective total hip replacement surgery or elective total knee replacement surgery.

²¹ For patients with renal failure.

²² In line with 'Rivaroxaban for the prevention of venous thromboembolism after total hip or total knee replacement in adults' (NICE technology appraisal guidance 170), rivaroxaban, within its marketing authorisation, is recommended as an option for the prevention of venous thromboembolism in adults having elective total hip replacement surgery or elective total knee replacement surgery.

Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.

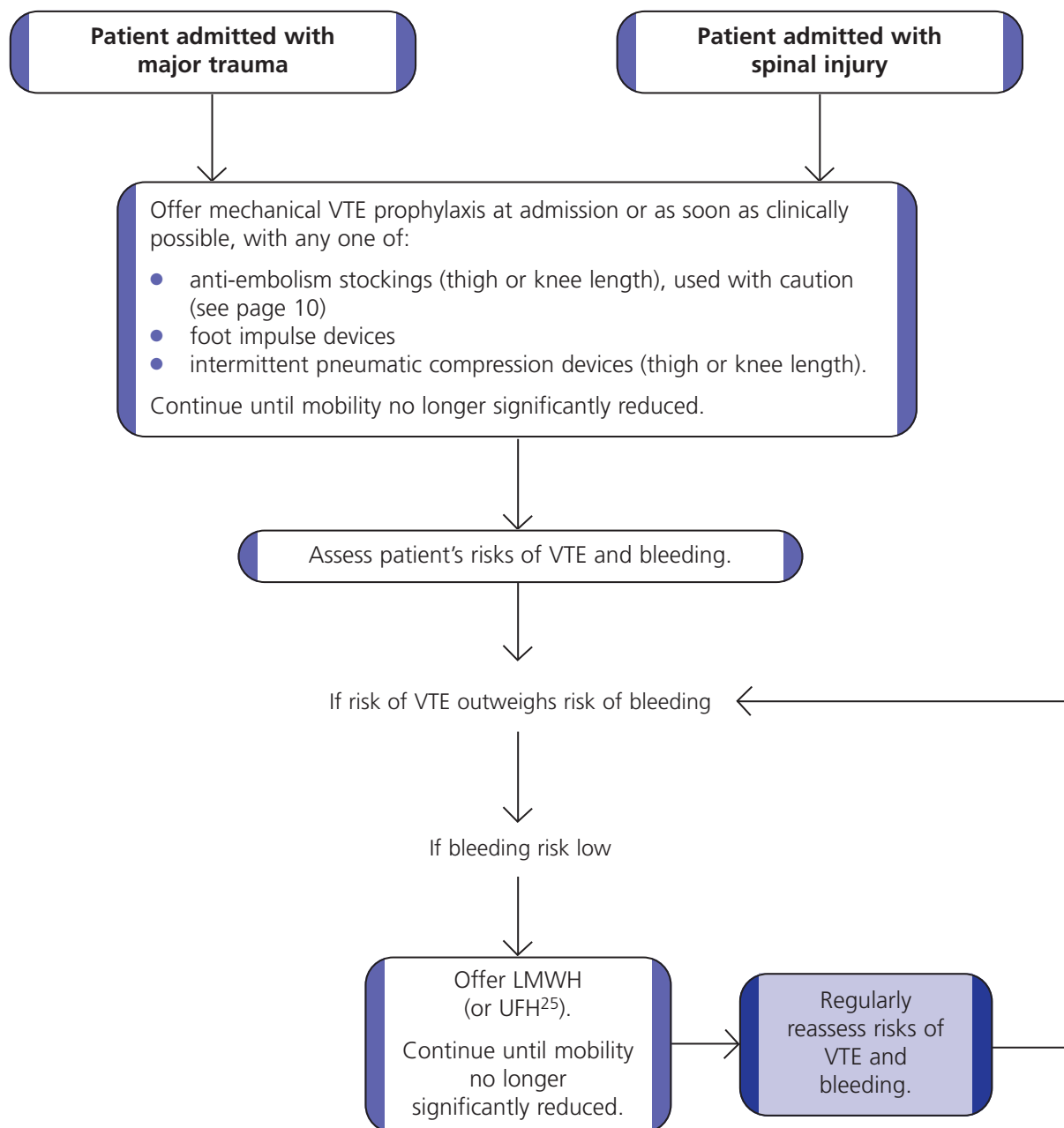


²³ For patients with renal failure.

²⁴ According to the summary of product characteristics for the individual agent being used.

Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.

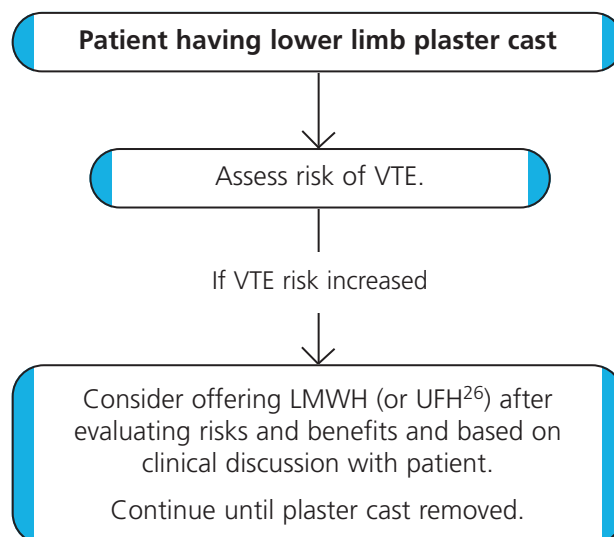
Major trauma or spinal injury



²⁵ For patients with renal failure.

Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.

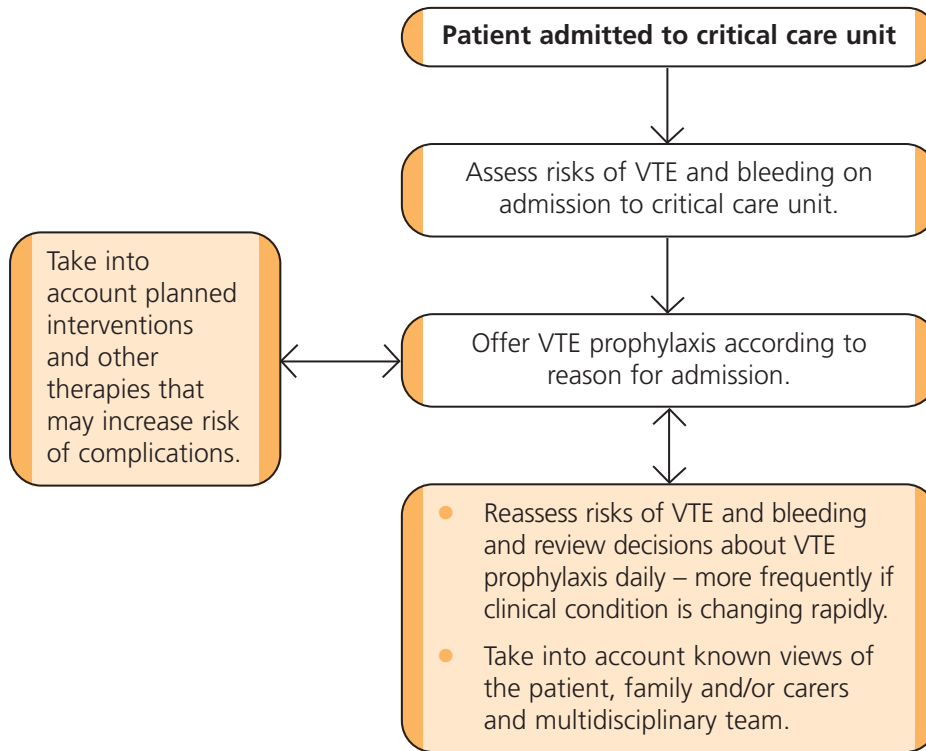
Lower limb plaster casts



²⁶ For patients with renal failure.

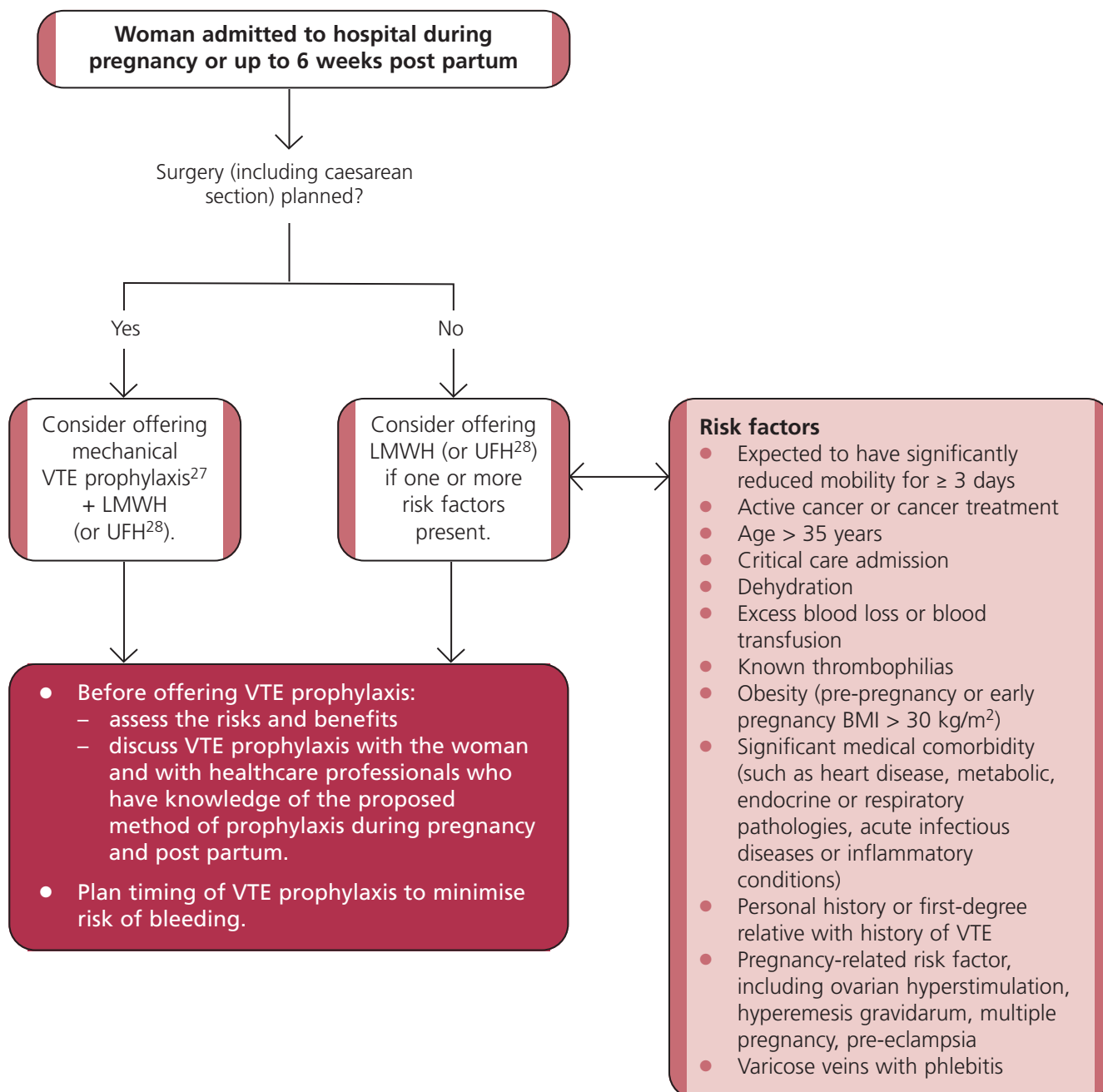
Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.

Critical care



Balance risks of VTE and bleeding before offering VTE prophylaxis. See page 3.

Pregnancy and up to 6 weeks post partum



²⁷ Choose any one of:

- anti-embolism stockings (thigh or knee length)
- foot impulse devices
- intermittent pneumatic compression devices (thigh or knee length).

²⁸ For women with renal failure.

Planning for discharge

- Offer patients and/or their families or carers verbal and written information on:
 - signs and symptoms of DVT and PE
 - importance of seeking medical help and who to contact if DVT, PE or other adverse event suspected.
- If discharged with VTE prophylaxis, also offer patients and/or their families or carers information on:
 - correct use and duration of VTE prophylaxis at home
 - importance of using VTE at home correctly and for recommended duration
 - signs and symptoms of adverse events related to VTE prophylaxis
 - who to contact if they have problems using VTE prophylaxis at home.
- If discharged with anti-embolism stockings, ensure that the patient:
 - understands the benefits of wearing them
 - understands the need for daily hygiene removal
 - is able to remove and replace the stockings or has someone who can do this
 - knows what to look for, such as skin marking, blistering or discolouration, particularly over heels and bony prominences
 - knows who to contact if there is a problem.
- If discharged with pharmacological or mechanical VTE prophylaxis ensure that:
 - the patient is able to use it or has someone who can do this
 - the patient's GP is notified.

Further information

Ordering information

You can download the following documents from www.nice.org.uk/guidance/CG92

- The NICE guideline – all the recommendations.
- A quick reference guide (this document) – a summary of the recommendations for healthcare professionals.
- ‘Understanding NICE guidance’ – a summary for patients and carers.
- The full guideline – all the recommendations, details of how they were developed, and reviews of the evidence they were based on.

For printed copies of the quick reference guide or ‘Understanding NICE guidance’, phone NICE publications on 0845 003 7783 or email publications@nice.org.uk and quote:

- N2080 (quick reference guide)
- N2081 (‘Understanding NICE guidance’).

Implementation tools

NICE has developed tools to help organisations implement this guidance (see www.nice.org.uk/guidance/CG92).

Related NICE guidance

For information about NICE guidance that has been issued or is in development, see www.nice.org.uk

- Rivaroxaban for the prevention of venous thromboembolism after total hip or total knee replacement in adults. NICE technology appraisal guidance 170 (2009). Available from www.nice.org.uk/guidance/TA170
- Dabigatran etexilate for the prevention of venous thromboembolism after hip or knee replacement surgery in adults. NICE technology appraisal guidance 157 (2008). Available from www.nice.org.uk/guidance/TA157

Updating the guideline

This guideline will be updated as needed, and information about the progress of any update will be available at www.nice.org.uk/guidance/CG92

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