

Guidelines for the Perioperative Care of Elderly Hip Fracture Patients

This protocol has been agreed by colleagues from the departments of Anaesthesia, Haematology, Cardiology, Emergency Medicine, Orthogeriatrics and Orthopaedics.

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Useful Numbers

On call Orthopaedic	Bleep
On call Orthopaedic Registrar	Bleep
Trauma Coordinator	Bleep
Dr S Wong (Consultant Orthogeriatrician)	Bleep
Theatre 9	Ext
On call Anaesthetist	Bleep
Anaesthetic Office	Ext
Ward 34	Ext
Ward 35	Ext
Audrey (Anaesthetic PA)	Bleep
Orthopaedic Clinic	Ext
NHFD Data Clerk	Ext
Pacemaker Technician	Bleep
ED Consultant baton	Ext

Standards of Care

The majority of patients covered by the guideline are elderly and frail and have complex medical problems. Better care improves patient outcomes and reduces morbidity and mortality (NICE QS16, Appendix 1). The aim of this guideline is to help clinicians reduce unacceptable delays to surgery.

- All patients with a hip fracture should be admitted to an orthopaedic ward within 4 hours of hospital admission.
- All patients with a hip fracture who are medically stable should have surgery within 36 hours of admission.
- All patients with a hip fracture should receive a pre-operative assessment of cognitive function in the form of an abbreviated mini-mental test (AMTS) and a post-operative delirium screen using the 4AT.
- All patients with a hip fracture should be assessed and cared for to minimise their risk of developing pressure ulcers.
- All patients with hip fracture should receive a nutritional assessment during their admission.
- All patients presenting with a fragility fracture should be managed on an orthopaedic ward with shared access to Orthogeriatric support from the time of admission.
- All patients presenting with a fragility fracture should be assessed for the need for anti-resorptive therapy to prevent future osteoporotic fractures.
- All patients with a fragility fracture following a fall should be offered multidisciplinary assessment and intervention to prevent future falls – they require physiotherapy assessment on the day of or the day after surgery for BPT.

Emergency Department Protocol

Nursing Assessment

- Initial observations including NEWS
- Give Oxygen 4 l/min if SpO₂ < 94% (care with COPD patients)
- Intravenous access and bloods for FBC, biochemistry profile, G&S, INR
- 12 lead ECG
- Pain score and appropriate analgesia
- X-ray hip, pelvis and chest
- Intravenous fluid (Plasmalyte) administered at rate of 1 litre over 8 hours. Consider a resuscitation fluid bolus of 5-10 ml/kg
- Keep nil by mouth until orthopaedic assessment
- Pressure sore assessment
- Fascia iliaca block if trained
- Consider urinary catheter
- Bleep Trauma Coordinator during the day

Medical Assessment

- Confirm diagnosis
- Establish cause of fall
- History and examination using ED notes
- Examination to include neurovascular integrity of affected leg
- Exclude and treat other injuries
- Reassess pain
- Review blood results, ECG and X-rays
- Adjust intravenous fluids (see preoperative guidelines) depending on fluid status and any history of heart failure
- Fascia iliaca block if trained
- Complete drug chart including regular analgesia
- Consider Medical opinion if concurrent medical problems needing specialist input
- Fast Track patients must be signed off as medically stable by a senior ED Doctor and then admitted to the orthopaedic ward without the need for a prior assessment by an Orthopaedic Doctor
- The Trust 'Emergency Department Patient Management Flow' ensures that all patients are moved out of the ED by 4 hours
- The on call FY2 Doctor and the 599 bleep holder will be contacted to identify a ward bed

Orthogeriatric Trauma Unit

Patients with a fractured neck of femur will be admitted directly to ward 34 or 35. The patient's case notes should be ordered promptly.

The patient will be under the joint care of the on call Orthopaedic Consultant and an Orthogeriatrician.

The patient will be clerked using the Surgical Admission Document by the on call Orthopaedic FY2 Doctor between 8am – 5pm. Out of hours and at weekends patients will be clerked by the on call FY2 Doctor covering Orthopaedics. **The initial VTE and AMTS assessments should be completed by the admitting Doctor at the time of admission.** The on call FY2 Doctor will discuss the patient with senior members of the team. FY1 Doctors are ward-based and do not take part in the on call rota. An Orthopaedic FY2 Doctor is also allocated daily to ward patients.

Clerking of new patients will take place either in the Emergency Department or, if the patient is deemed medically stable, they can be fast-tracked onto the orthopaedic ward.

Between 8am – 6pm all new patients will be discussed with the Trauma Coordinator.

Urgent medical advice can be obtained from the Orthogeriatric team; if out-of-hours consult the on call Medical SpR.

The patient details will be added to the trauma admissions and discussed at the next trauma meeting. Unless there are convincing reasons to the contrary the patient will be scheduled for the next available trauma list. Where no trauma list exists (Sundays) and where circumstances permit the patient can undergo surgery on the emergency theatre list.

The Orthogeriatric team will see all new patients with a fractured neck of femur within 72 hours of admission. Patients deemed fit for theatre should not wait for Orthogeriatric review.

The Orthogeriatric team will see all patients with fractured neck of femur daily and ensure that an appropriate falls assessment and bone protection review are carried out.

The Orthopaedic team will continue to review patients until the wound is healed and the patient is fully weight-bearing.

There will be a daily boardroom meeting involving ward nurses, physiotherapists and occupational therapists. Ward 34 has a weekly MDT meeting with the Orthogeriatrician for all hip fracture patients.

Preoperative Guidelines

All patients should be clerked using the Surgical Admission Document.

Results of investigations should be documented in the notes. Abnormalities should be managed as per guidelines below or discussed with the Orthogeriatric or Anaesthetic team.

Ensure drug chart completed with:

- Analgesia
- Laxatives
- Thromboprophylaxis
- Previous medications, if appropriate to continue

Review intravenous fluids and nutritional supplements.

Intravenous fluids

Patients should be prescribed Plasma-Lyte 148 1 litre over 8 hours as maintenance fluids or 0.9% Saline with added KCl if hypokalaemic ($K^+ < 3.5$ mmol/l). U&Es should be checked daily if abnormal.

The Orthopaedic team will document the proposed time for theatre and the patient will be starved for 6 hours preoperatively. Encourage clear fluids until 2 hours preoperatively.

Analgesia

The following analgesia should be prescribed as routine:

- Paracetamol 1g po/iv 6° regularly
- Codeine 30mg po 6° PRN
- Oramorph 5-10mg po 2° PRN

Laxatives

First choice: Lactulose and Senna

For opiate-induced constipation where there has been an inadequate response to laxatives consider the use of Moventig (Naloxegol) 25mg po OD.

Nutritional supplements

These will need prescription in the **majority** of older patients with a hip fracture and for **all** patients with a MUST score of 2 or more. They should be given in addition to meal times. Refer to the Malnutrition Universal Screening Tool (MUST) procedure CORP/PROC/076. Dietetic advice is available.

Antibiotic prophylaxis

Flucloxacillin 1g iv and Gentamicin 3mg/kg BW on induction. Further doses of Flucloxacillin 1g iv at 6, 12 and 18 hours postoperatively.

Cefuroxime if penicillin-allergic or CKD (see Trust antibiotic formulary CORP/GUID/101).

Venous Thrombo-Embolism Prophylaxis

A risk assessment must be carried out on admission using the Trust tool and patients should be prescribed Dalteparin 5000 units sc once daily. The dose is increased to 7500 units if patient's body weight > 100kgs.

LMWH should be given **no earlier than** 4 hours after the procedure.

A spinal anaesthetic is contraindicated within 12 hours of a dose of LMWH so an evening dose will enable spinal anaesthesia the following day.

Patients who are on warfarin will receive prophylactic Dalteparin until the decision is made to restart anticoagulation.

Potential Delays to Surgery and Immediate Management

In general the risks of delaying surgery will invariably outweigh the risks of proceeding i.e. the presumption should be in favour of operating. However the following should be borne in mind:

Anaemia

Should not delay surgery.

If Hb < 80 g/l – X-match 2 units. Transfuse 1st unit then check Hb. Give 2nd unit if Hb < 80 g/l. Blood can be given perioperatively so surgery should not be delayed. Consider Furosemide 20mg if signs of fluid overload.

If Hb 80 – 100 g/l with a history of cardiac disease. X-match 2 units. Low threshold for transfusion of 1-2 units perioperatively. Check Hb after 1st unit.

If Hb 80 – 100 g/l with no history of cardiac disease. X-match 2 units of blood to be available in theatre.

Consider the use of intravenous iron perioperatively in place of blood transfusion.

Patients admitted with anaemia should be investigated and treated appropriately. This may need to be continued as an outpatient.

NICE guidelines now recommend the use of Tranexamic Acid intraoperatively to reduce blood loss.

Anaesthetic problems

The Anaesthetist should be contacted regarding the following patients:

- History of difficult intubation, limited mouth opening, restricted neck movements (e.g. ankylosing spondylitis, rheumatoid arthritis).
- Previous anaesthetic-related problems e.g. malignant hyperpyrexia, suxamethonium apnoea, previous ICU admissions.

Discuss with the Physicians Assistants or the Anaesthetist assigned to the trauma list.

Atrial Fibrillation

Patients with AF should have a controlled ventricular rate of less than 100 preoperatively.

Exclude and treat factors which may lead to new or fast AF e.g. hypovolaemia, pain, sepsis, cardiac ischaemia, hypokalaemia, hypomagnesaemia.

For previously undiagnosed AF: treat with Amiodarone 300mg iv bolus over 1 hour via a large bore cannula. This should be followed by an Amiodarone infusion over 24 hours.

For patients on treatment for known AF: treat exacerbating factors as above and consider increasing the dose of rate control medication. If the rate is between 100 and 120 it may be possible to proceed – discuss with Anaesthetist.

Consult the Medical or Cardiology SpR for specialist advice if necessary.

Cardiac Implantable Electronic Devices (CIEDs)

All patients with a CIED have routine checks. A pacemaker check preoperatively is only necessary if the pacemaker appears to be malfunctioning or follow up is overdue.

Pacemaker malfunction is suggested by:

- Unexplained syncope or near syncope
- Bradycardia
- Evidence of non-capture on ECG

The majority of devices will not require changes prior to or after surgery. If in doubt consult the Cardiology SpR or the patient's follow-up clinic. **Always** inform Anaesthetics and Cardiology if the patient has an implanted cardioverter/defibrillator as these will need to be switched off prior to surgery by contacting the pacemaker technician.

The operating surgeon should always be made aware of patients with a pacemaker. Where surgical diathermy is essential and is to be used at a site remote from the implanted device, then there is a low risk of an effect on the device. The use of bipolar diathermy should be considered wherever possible.

Implantable loop recorders monitor cardiac signals and there is no risk to the patient with any surgical procedure. The device may interpret diathermy interference as a rapid heart rhythm. Therefore it may be useful to interrogate the device before the procedure and clear the diagnostic memory after the procedure in case the memory becomes saturated with episodes of detected electrical interference.

Heart Failure & Echocardiograms

Echocardiograms are **rarely** required preoperatively in patients with fractured neck of femur. Patients with known left ventricular impairment should be discussed with the Anaesthetist but surgery should not be delayed except in severe decompensated heart failure likely to respond to additional therapy.

Aortic stenosis

An echocardiogram may **rarely** be required preoperatively to diagnose aortic stenosis as this may influence the type of anaesthetic. Severe aortic stenosis is suspected if the patient has an ejection systolic murmur in the aortic area in combination with

- Angina on exertion
- Unexplained syncope or near syncope
- Severe heart failure in the absence of other causes
- Absent 2nd heart sound
- LVH on ECG without hypertension
- CXR suggests AS

Ischaemic Heart Disease or Stroke on Anti-platelet agents

If patients are taking aspirin and/or clopidogrel, clearly document the indications. The adverse consequences of delaying surgery should be considered against the risk of excessive bleeding. **Ideally surgery should not be delayed.** The options are:

- (i) Early surgery under GA. If excessive bleeding, transfuse 1 bag of platelets.
- (ii) If GA contraindicated in the high risk group, surgery under spinal anaesthetic after 1 bag of platelets preoperatively.
- (iii) Wait for 72 hrs after last dose of Clopidogrel and surgery under spinal anaesthetic with no platelet cover in low risk group.

Clopidogrel should ideally not be stopped in patients treated with coronary stents within the previous 12 months. But if patients are considered to be a high perioperative bleeding risk then a minimum period of uninterrupted DAPT following stenting must have elapsed before considering stopping the Clopidogrel – for patients treated with bare metal stents this is four weeks, and for patients treated with drug-eluting stents it is six months. If in doubt take advice from Cardiology.

Studies of platelet function are not reliable. If Clopidogrel is stopped, recommence the day following surgery provided there is a definite indication for its administration.

Acute Coronary Syndrome

Firstly consider if surgery is indicated. Surgery will give the best outcome as non-operative treatment leads to longer hospital stays and increased loss of dependence at 6 months, not to mention complications related to prolonged immobilisation including death. In most, if not all, patients the benefit of proceeding with urgent surgery outweighs the risks of waiting.

Perioperative medical optimisation is important in reducing morbidity and mortality but **unnecessary delays should be avoided.** LMWH and anti-platelet agents should be considered and a preoperative echocardiogram should be performed. These patients should be admitted postoperatively to the High Dependency Unit for more intensive monitoring.

Hypokalaemia

Ideally K^+ > 3.5 mmol/l for surgery to proceed.

If K^+ 3-3.5 mmol/l: use 0.9% Saline with 40 mmol/l KCl as maintenance fluid and prescribe Sando-K 2 tablets po tds.

If K^+ < 3 mmol/l: as above but consider a central venous catheter for KCl replacement. Investigate the cause.

Hyponatraemia

If Na^+ 120-130 mmol/l:

- Check previous Na^+ results
- Stop causative agents e.g. diuretics, hypotonic iv fluids
- Check urine and plasma osmolality, LFTs, TFTs and random cortisol
- Review CXR
- Discuss management with Orthogeriatrician

If Na^+ < 120 mmol/l: needs urgent medical opinion.

Prompt correction of most electrolyte abnormalities should still allow surgery to proceed on the same day as, or the following day after, admission.

Low Platelet Count

Surgery should not be delayed if the platelet count is > 50.

A platelet count of < 50 may require a platelet transfusion and should be discussed with a Haematologist, Surgeon and Anaesthetist. It is always worth repeating the sample as clumping may cause spurious results.

When treatment is indicated, a single adult therapeutic dose of platelets should be transfused shortly before surgery and the post-transfusion count checked.

Patients presenting with a low platelet count should be appropriately investigated in the postoperative period.

Pneumonia

A chest infection/pneumonia is rarely a reason to delay surgery. This should only happen if the pneumonia is severe and the patient is likely to improve rather than deteriorate with additional treatment. Antibiotics should be started promptly (see hospital policy CORP/GUID/101 on choice of antibiotic).

Reversal of Warfarin/INR

Patients who are anticoagulated will inevitably be admitted requiring urgent surgery. Access to theatre in a timely manner will provide the best treatment and the highest chance of survival. **Surgery should not be delayed because of a high INR.**

Stop the warfarin and give Vitamin K 2.5-5mg iv (dose dependant on INR). This will generally allow full reversal in 4-6 hours. The INR must be checked to ensure adequate correction prior to surgery. If the check INR is still high give Prothrombin Complex Concentrate (PCC) in preference to further doses of Vitamin K.

NB Some patients benefit from surgery on the same day of admission and **cannot** wait for vitamin K to take effect. In this instance stop warfarin, give vitamin K 2.5-5mg iv and PCC. The dose is dependent on the initial INR. Repeat INR 30 mins after PCC. More PCC may be required.

- INR < 5 15 units/kg (round to nearest 500 unit vial)
- INR > 5 30 units/kg (round to nearest 500 unit vial)

For postoperative management it is important to identify the indication for warfarin treatment and stratify patients according to the risk for perioperative thromboembolism:

Low risk

- CHADS₂ score 0-2 (and no prior stroke or TIA) (see Appendix 2)
- Bileaflet AVR without major risk factors for stroke
- VTE > 12 months ago and no other risk factors

Resume maintenance dose of warfarin on evening of surgery. Give prophylactic LMWH on evening of surgery. Measure INR on day 4 postop and discontinue LMWH if INR > 2.

High risk

- CHADS₂ score 5-6
- Any mitral valve prosthesis
- AVR with additional stroke risk factors
- Recent VTE (< 3 months) or previous VTE during interruption of anticoagulation
- Severe/multiple thrombophilias e.g. protein C deficiency
- Recent stroke/TIA (< 3 months)

Resume maintenance dose of warfarin on evening of surgery. Give prophylactic LMWH on evening of surgery. Give treatment dose LMWH on day 1 postop. Measure INR on day 4 postop and discontinue treatment dose LMWH if INR > 2.

New Oral Anticoagulants (NOACs)

These include direct oral thrombin inhibitors, such as Dabigatran, and direct oral Factor Xa inhibitors, such as Rivaroxaban and Apixaban. Their half-life is relatively short. Patients taking these drugs should have aPTT and PT measured – although the drug effect is variable, a normal test would suggest that haemostatic function is not impaired. Similarly, the

thrombin time can be used to detect the presence and therapeutic effect of Dabigatran. Where possible, at least 24 – 48 hours should be allowed between the last dose and surgery; longer if renal function is impaired especially Dabigatran (see CORP/PROC/610 and appendix 3).

Idarucizumab (PraxBind) is licensed for use in the reversal of the anticoagulant activity of Dabigatran in **life threatening bleeding or before emergency surgery**.

Postoperatively, if adequate haemostasis is achieved, they can be restarted at the preoperative dose. If in doubt, take advice from Haematology but **do not delay surgery longer than is necessary**.

Renal Impairment

- If creatinine > 200 this may be a very significant elevation in a small elderly patient. It should not prevent the patient going to theatre but will need additional information.
- Check old results. If new request urgent Orthogeriatric/Medical opinion
- Stop potentially nephrotoxic drugs e.g. NSAIDs, ACEI, diuretics
- Ensure patient is well hydrated
- Exclude urinary retention
- Catheterise the patient and start a fluid balance chart
- Check creatinine kinase if patient found on the floor

Diabetes

Refer to Trust guidelines on perioperative management of diabetes (SURG/GUID/001).

Diet-controlled diabetics virtually never need an insulin sliding scale.

Tablet-controlled diabetics do not usually need an insulin sliding scale. Their diabetic medication should be omitted on the day of surgery.

Insulin-controlled diabetics should usually be started on an insulin sliding scale.

High blood sugars should not delay surgery unless the patient is dehydrated and ketotic. Start treatment and discuss with the Anaesthetic team.

Cancellation of Surgery

The aim is for all fractured neck of femur patients to undergo surgery within 36 hours of admission. This allows time for preoperative assessment and resuscitation. Surgery should not be delayed unless there is a specific medical condition which can be improved.

Even if significant rehabilitation is deemed unlikely, operative repair of a hip fracture will often assist with pain management and facilitate nursing care.

Acceptable reasons for cancelling surgery are:

- Imminent death within hours or days. Such patients will require senior review as they will need a DNACPR decision and are likely to be appropriate for an end-of-life pathway

Acceptable reasons for delaying surgery (to allow other treatment) are:

- Correctable serious cardiac arrhythmias
- Severe pneumonia/sepsis
- Uncontrolled diabetes i.e. ketoacidosis
- Decompensated heart failure
- INR > 1.5
- Severe anaemia (Hb < 80g/l)
- Acute kidney injury (with hyperkalaemia, acidosis and/or fluid overload)

The earlier the definitive treatment is started, the earlier the patient will receive their surgery. If in doubt as to the correct treatment, consult the Orthogeriatrician or on call Medical SpR or the Consultant Anaesthetist covering the trauma list.

Postoperative Care

All patients should return to ward 34 or 35.

Routine daily postoperative care includes:

- Prophylactic antibiotics
- Oxygen as specified on the anaesthetic chart
- Physiotherapy assessment and early mobilisation of all patients the day following surgery (unless otherwise stated)
- Thromboembolic prophylaxis
- Check FBC and biochemistry the day after surgery
- Monitor hydration and fluid status
- Review prescribed medication. Avoid routine night sedation
- Monitor need for analgesics daily including type of drug and mode of administration
- Careful monitoring of bowel function. Review need for laxatives daily
- Remove urinary catheter as early as practicable after surgery
- Review pressure areas daily
- Record and action inpatient falls risk
- Continue nutritional supplements
- Monitor and manage delirium

Do Not Attempt Cardiopulmonary Resuscitation (DNACPR) Orders

The overall aim of treatment is to deal with the surgical and medical issues with a view to recovery and return home. This outcome is achieved for most patients. For all patients the presumption should be in favour of treatment.

For some patients a fractured neck of femur may be irrecoverable. Some frail, older patients will deteriorate perioperatively and a decision should be made regarding an appropriate ceiling of treatment e.g. would the patient be suitable for admission to critical care and would cardiopulmonary resuscitation (CPR) be appropriate in the event of a cardiopulmonary arrest.

Any CPR decision must be tailored to the individual circumstances of the patient. Decisions must not be made on assumptions based solely on factors such as the patient's age, disability, or on a subjective view of a patient's quality of life. The key issue to consider is what is in the best interests of the patient, taking account of all relevant factors, particularly the patient's own views. The duty to protect life must be balanced with the obligation not to subject the patient to inhuman or degrading and futile treatment, from which the patient will derive no overall benefit.

Such decision must be undertaken by a doctor of at least ST3 level or above. They must always be discussed with the Orthopaedic Consultant who is required to countersign the DNACPR form. For further guidance see the Trust DNACPR policy (CORP/PROC/003).

Appendix 1: NICE quality standards for hip fracture (QS16)

1. People with hip fracture are offered a formal hip fracture programme from admission.
2. The hip fracture programme team retains a comprehensive and continuing clinical and service governance lead for all stages of the pathway of care, including the policies and criteria for both intermediate care and early supported discharge.
3. People with hip fracture have their cognitive status assessed, measured and recorded from admission.
4. People with hip fracture receive prompt and effective pain management, in a manner that takes into account the hierarchy of pain management drugs, throughout their hospital stay.
5. People with hip fracture have surgery on the day of, or the day after, admission.
6. People with hip fracture have their surgery scheduled on a planned trauma list, with consultant or senior staff supervision.
7. People with displaced intracapsular fracture receive cemented arthroplasty, with the offer of total hip replacement if clinically eligible.
8. People with trochanteric fractures above and include the lesser trochanter receive extramedullary implants such as a sliding hip screw in preference to an intramedullary nail.
9. People with hip fracture are offered a physiotherapist assessment the day after surgery and mobilisation at least once a day unless contraindicated.
10. People with hip fracture are offered early supported discharge, led by the hip fracture programme team.
11. People with hip fracture are offered a multifactorial risk assessment to identify and address falls risk, and are offered individualised intervention if appropriate.
12. People with hip fracture are offered a bone health assessment to identify future fracture risk and offered pharmacological intervention as needed before discharge from hospital.

Appendix 2: CHADS₂ score

Score	CHADS ₂ risk criteria
1 point	Congestive heart failure
1 point	Hypertension
1 point	Age > 75 years
1 point	Diabetes mellitus
2 points	Stroke/TIA

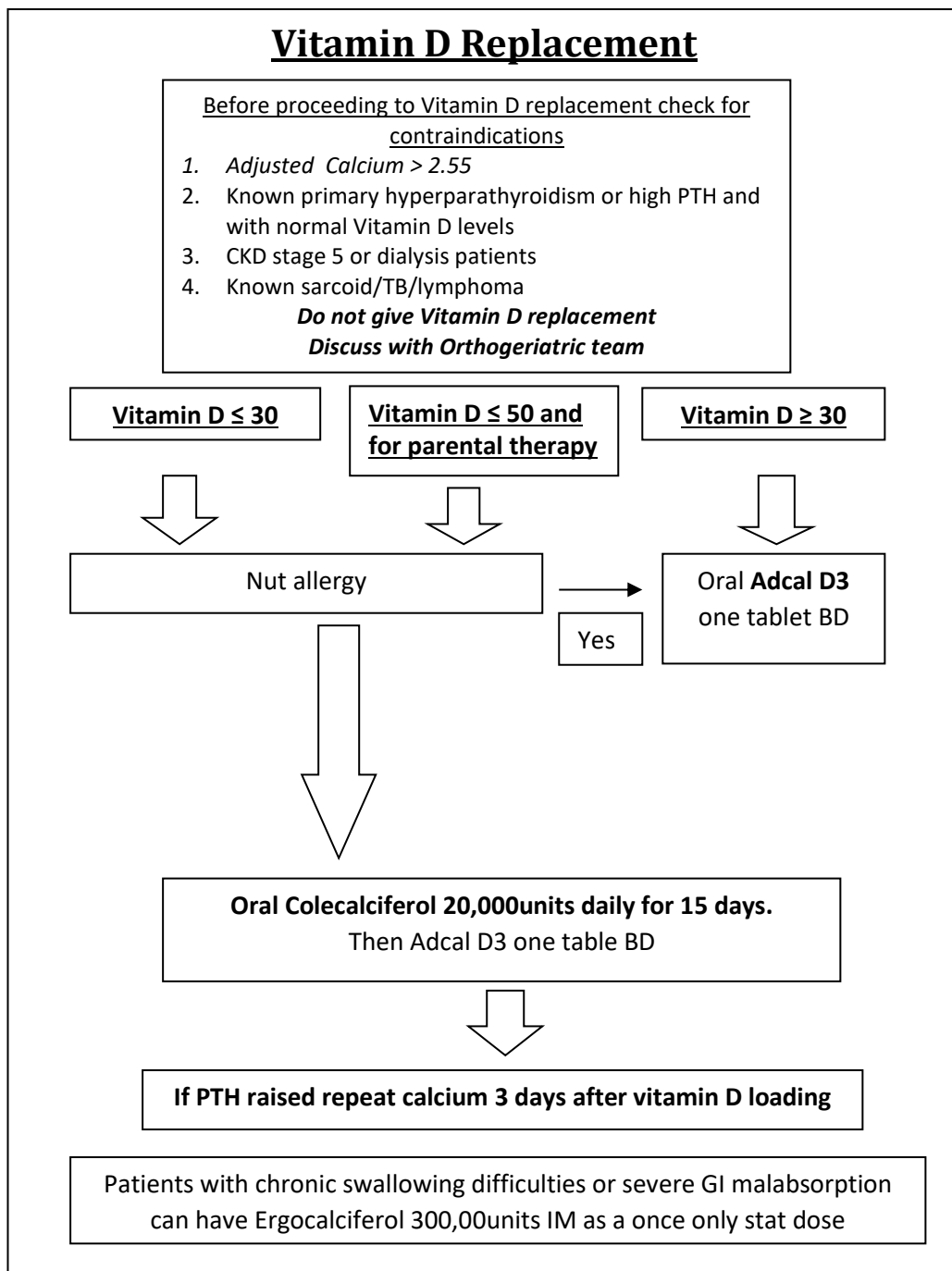
Appendix 3: AAGBI recommendations related to NOACs (prophylaxis)

Drug	Time to peak effect	Elimination half-life	Acceptable time after drug to block
Rivaroxaban (CrCL>30 ml.min ⁻¹)	3 hours	7-9 hours	18 hours
Apixaban	3-4 hours	12 hours	24-48 hours
Dabigatran (CrCL> 80 ml.min ⁻¹)	0.5-2 hours	12-17 hours	48 hours
Dabigatran (CrCL 50-80 ml.min ⁻¹)	0.5-2 hours	15 hours	72 hours
Dabigatran (CrCL 30-50 ml.min ⁻¹)	0.5-2 hours	18 hours	96 hours

Appendix 4: Vitamin D Guideline for Fractured Neck of Femur Patients

All fractured neck of femur patients need the additional bloods to screen for secondary causes of osteoporosis and Vitamin D deficiency.

TFT/PTH/Vitamin D
PSA if male. Myeloma if anaemic
Calcium levels also need checking



Fractured Neck of Femur **Osteoporosis** Treatment Pathway

All fractured neck of femur patients need PTH, Vitamin D, TFT's and calcium levels checking (PSA and Myeloma screen where appropriate) to rule out secondary causes of osteoporosis

