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1 INTRODUCTION & SCOPE

This guideline is for the clinical management of patients *on oral anticoagulant therapy,* with a hip fracture in whom surgery is being considered. Oral anticoagulants in use are warfarin and direct oral anticoagulants (DOAC). DOAC include: factor Xa inhibitors (apixaban, edoxaban and rivaroxaban) and a factor II (thrombin) inhibitor (dabigatran).

2 RECOMMENDATIONS, STANDARDS AND PROCEDURAL STATEMENTS

Up to about 15% of patients with hip fracture are on anticoagulation with warfarin or a DOAC, either for stroke prevention in the context of atrial fibrillation, or, for prophylaxis or treatment of venous thromboembolism. A structured management pathway is essential for ensuring prompt and safe operative management.

2.1 Immediate management: Pre-operative phase

- Stop anticoagulant
- Record anticoagulant details (drug, dose, indication, time of last dose and hours from last dose)
- Establish IV access and ensure adequate hydration, oxygenation and blood pressure maintenance
- Send urgent venous blood samples for FBC, U&E, G&S, coagulation profile (INR, PT, APTT) and fibrinogen
- PRINT AND COMMENCE AUDIT RECORD (APPENDIX 3) AND FILE IN MEDICAL NOTES – please ensure forms printed with barcode, boxes crossed clearly and write legibly to allow direct scanning.
- Follow advice for overall management in accordance with the flowchart (see APPENDIX 1) - print flowchart for patient record and tick relevant boxes.

2.1.1 Warfarin

If initial INR <=1.5, proceed with operation.
If initial INR >1.5, then administer Vitamin K 5mg slow IV and repeat INR in ~6 hours – if INR remains >1.5 at this time point, prothrombin complex concentrate (PCC; (Octaplex® or Beriplex®)) may be considered to expedite surgical intervention (MDT decision).

Discuss with haematology about appropriateness and timing of PCC prior to operation.

Intraoperative PCC and tranexamic acid may be considered.

NOTE: Vitamin K has no role in management of patients on DOAC irrespective of INR result.

2.1.2 Dabigatran

Contact Haemostasis team (weekdays 9-5) or on-call Haematology Registrar for

- Agreement to give reversal agent - Idarucizumab (Praxbind®) (to be administered by anaesthetist, and only indicated if APTT is prolonged – see notes below)

- Peri-operative bridging plan in high risk or unstable patients (see APPENDIX 1)

Proceed to surgery following multi-disciplinary discussion involving orthopaedics, anaesthesia, orthogeriatrics, haematology, and patient &/or representative, where appropriate.

Notes:

i. Whilst a normal thrombin time (TT) rules out clinically significant plasma concentration of Dabigatran, a prolonged TT only indicates presence of Dabigatran but gives no indication as to the degree of anticoagulation. A normal APTT suggests very minimal plasma concentration of Dabigatran, in which situation surgery is probably safe from an anticoagulant perspective. Discuss with haematology.

ii. Thus, prolonged APTT is the deciding factor indicating the need for Idarucizumab (specific antidote for Dabigatran only, trade name: Praxbind).

iii. Idarucizumab should be given by an anaesthetist in theatre as there is a small risk of severe allergic / anaphylactic reaction. It is given intravenously as 2 consecutive infusions of 2.5g/50 ml, each over 5 to 10 minutes. If infused through a pre-existing IV line, this must be flushed with 0.9% sodium chloride before and after the infusion.

2.1.3 Factor Xa inhibitors: Apixaban / Edoxaban / Rivaroxaban

If ingested within 2 hours, give activated charcoal (available in ED).

In patients with a creatinine clearance >30 mls/min, 24 hours since the last dose can be considered sufficient time elapsed to proceed to anaesthesia and surgery, based on a multidisciplinary assessment balancing the risk of residual anticoagulation against delays to surgery, with no routine requirement for undertaking DOAC assay.

To calculate creatinine clearance, go to https://reference.medscape.com/calculator/creatinine-clearance-cockcroft-gault

A DOAC assay should only be requested for patients who are more than 24 hours past their last dose ***and*** have a creatinine clearance of ≤30 mls/min.

Contact Haemostasis team (weekdays 9am-5pm) or on-call Haematology Registrar to

- Seek agreement to perform drug specific DOAC assay.
- Discuss peri-operative bridging plan in high risk or unstable patients (see APPENDIX 1).

2.1.4 Ordering DOAC assay

To request DOAC assay for drug-specific plasma concentration:

a) Specify DOAC being taken – the assay is specific to individual DOAC
b) Take two citrated samples (green topped bottles) filled to the mark and transport by hand to Special Haematology laboratory (extension 6619), Level 2 Sandringham Building, Leicester Royal Infirmary.
c) Do not send samples via hospital chute system. Tests should be done near to the time of surgery (e.g. in the morning for proposed afternoon surgery). Lab staff are on site 0830 – 1730 Monday – Friday, and Saturday mornings. It is not expected that the test will be needed out-of-hours, however, if deemed urgent after haematology oncall consultation, on-call staff can be contacted.

Table 1. Interpretation of DOAC assay

DOAC assay result (PLASMA CONCENTRATION)	ACTIONS, ASSUMING ALL HIP FRACTURE SURGERY HAS HIGH BLEEDING RISK
< 50 ng / L	Proceed With Surgery
50 – 100 ng / L	• Multi – Disciplinary Assessment of Risk vs Benefit of surgery (Anaesthesia, Orthopaedics, Orthogeriatrics, Haematology) • Ensure Hydration • Monitor Fluid Balance • Consider Octaplex (Prothrombin Complex Concentrate) 20 units /kg (can be repeated up to total dose 50 iu/kg: discuss with haematology). Please note that PCC is NOT a specific reversal agent for DOACs. • Avoid neuraxial anaesthesia
100 – 400 ng / L	• Delay surgery by a minimum of 24 hours. • Ensure hydration and monitor fluid balance. • Repeat anti-Xa assay after 24 hrs, and then every morning
Patients going to surgery after 24 hours without a DOAC dose, but in whom the level is not yet known	• all the standards regarding seniority of surgeon and anaesthetist and measures to reduce and manage blood loss detailed above still apply

2.2 Intra-operative Management of Patients with Residual DOAC Effect (Factor Xa >50ng/L)

- Consultant Surgeon and Consultant Anaesthetist to do case
- Give tranexamic acid unless contraindicated
    - **CONTRAINDICATIONS**
        - known sensitivity to tranexamic acid
        - arterial or venous thrombosis within the last 3 months
        - history of epilepsy / seizures
        - significantly impaired renal function - CrCl<20
    - **DOSE**
        - 10 mg/kg if CrCl 20-30 ml/min (max 1g)
        - 1g if CrCl >30 ml/min
        - If subsequent doses required use 10mg/kg IV OR 0.5-1g IV TDS.
- Consider intra-operative cell salvage
- Ensure cross matched blood available
- Maintain Hb > 80 (> 90 if cardiovascular disease)
- Consider Intraoperative PCC (Octaplex®)
- Consider use of TEG (note currently no data to support use of TEG in patients on DOAC)
- Fill in audit form and keep in medical notes

2.3 Post-Operative Management

- Check FBC and U&E day 1 post surgery
- Enoxaparin should be used in accordance with a thrombotic risk assessment as summarised in APPENDIX 1. Follow bridging plan where recommended by Haemostasis & Thrombosis team.
- Restart DOAC after 48-72 hours providing bleeding risk low.
- Complete audit form before discharge and give to Trauma Scheduler – all forms to be collated for Audit Team to scan in; and subsequent analysis directed by Audit Lead.

3 EDUCATION AND TRAINING

Training on use of the guideline will comprise awareness training, including awareness of thrombotic risk assessment and perioperative management of anticoagulated patients, and training for routine audit data collection.

4 MONITORING AND AUDIT CRITERIA

Data to be collected according to audit tool in appendix 3.

Monitor and track achievement of Best Practice Tariff (operation <36 hours) and specifically report BPT metric for patients on anticoagulation.

5 LEGAL LIABILITY GUIDELINE STATEMENT

See section 6.4 of the UHL Policy for Policies for details of the Trust Legal Liability statement for Guidance documents

6 SUPPORTING DOCUMENTS AND KEY REFERENCES

none applicable

7 KEY WORDS

Hip fracture

Anticoagulants, DOAC, NOAC, warfarin, rivaroxaban, apixaban, dabigatran

Antidotes, vitamin K, idarucizumab, Praxbind, PCC, Beriplex, Octaplex, tranexamic acid

8 APPENDICES

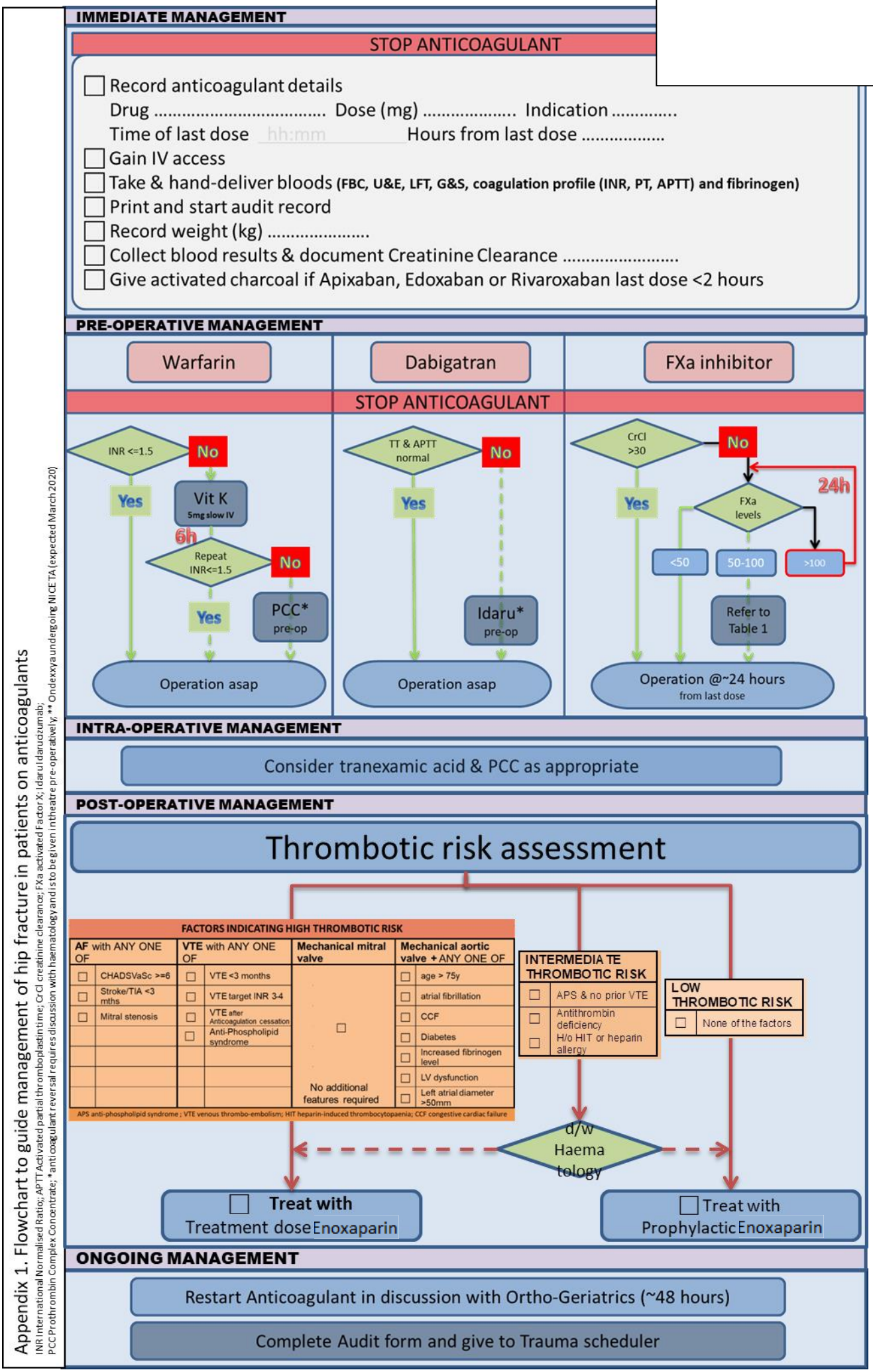
APPENDIX 1
Flowchart to guide management of hip fracture patients on anticoagulation

APPENDIX 2
CHA_2DS_2VaSc – stroke risk stratification in atrial fibrillation
(online reference: chadsvasc.org)

APPENDIX 3
DOAC Audit tool

Addressograph

8.1 APPENDIX 1



Appendix 1. Flowchart to guide management of hip fracture in patients on anticoagulants

INR International Normalised Ratio; APTT Activated partial thromboplastin time; CrCl creatinine clearance; FXa activated Factor X; Idaru Idarucizumab; PCC Prothrombin Complex Concentrate; *anticoagulant reversal requires discussion with haematology and is to be given in theatre pre-operatively; ** Ondexxya undergoing NICE TA (expected March 2020)

8.2 APPENDIX 2

CHA_2DS_2VaSc – stroke risk stratification in atrial fibrillation
Use this risk calculator for patients with atrial fibrillation to estimate cardio-embolic risk (online reference: chadsvasc.org)

RISK FACTOR	**POINTS**
Congestive heart failure	1
Hypertension	1
Age 65-74 years	1
Diabetes mellitus	1
Stroke/TIA/systemic thromboembolism	2
Vascular disease	1
Age ≥ 75 years	2
Sex **C**ategory (Female)	1
CHA_2DS_2VaSc Score	Total points
Score >=6 indicates high thrombotic risk for purposes of this guideline.	

8.3 APPENDIX 3

APPENDIX 3 9497

NHS University Hospitals of Leicester NHS Trust

Direct Oral Anti-Coagulant (DOAC) Audit Tool

Completion Guidance: Please answer all questions accordingly, making sure you use a black or blue pen. Please mark all boxes with a cross eg [X] and write all numbers and letters clearly as they will be read by a scanner.
Printing Guidance: Please use Print room copies only. Email the PDF version of the form supplied by the Clinical Audit Team to the print room. Alternatively contact the Clinical Audit Team for advice.
Locally printed forms or photocopies **Do Not** scan.

Audit No. ☐☐☐

1a. Date of Arrival: d d / m m / y y y y

1b. Time of Arrival: h h : m m

2a. Date of Referral (if already in-patient): d d / m m / y y y y

2b. Time of Referral (if already in-patient): h h : m m

3. DOAC indication:

4. Dose: ☐☐☐ mg

5. Time of last dose: h h : m m

6. Praxbind given: Yes ☐ No ☐

6a. If yes please state time: h h : m m

7. DOAC levels checked: Yes ☐ No ☐

7a. If yes please state time: h h : m m

7b. Result

7c. Action

8. Time to theatre: h h : m m

9. Tranexamic Acid given: Yes ☐ No ☐

9a. If yes please state time: d d : m m

9b. Dose: ☐☐☐ mg

10. Estimated intraoperative blood loss: ☐☐☐☐ mls

11. Transfusion during admission: Yes ☐ No ☐

11a. If yes please state time: d d : m m

11b. Amount given: ☐☐☐☐ mls

12. Reasons for delay to theatre > 36

13. Any Comments

This table is used to track the development and approval and dissemination of the document and any changes made on revised / reviewed versions

DEVELOPMENT AND APPROVAL RECORD FOR THIS DOCUMENT		
Author / Lead Officer:	Dr Nicolette Morgan	**Job Title:** Consultant Physician
Reviewed by:	The Hip Fracture Group	
Approved by:	**UHL Anti-Coagulation Committee** **MSS Board**	**Date Approved:**

REVIEW RECORD			
Date	**Issue Number**	**Reviewed By**	**Description Of Changes (If Any)**
Jan 2020	2	Dr Amit Mistri (Chair, UHL Anti-Coagulation Committee)	Guidelines updated in line with evidence & audit Updated flowchart & corresponding text Structured into sections: Pre-op; intra-op; post-op; ongoing management
Oct 2023	3	N Morgan/I Musa/D Morfey	Onydexxa reversal agent not indicated for DOAC reversal in hip fracture via NICE technology appraisal 2021 approval for life threatening upper GI bleeding only so removed as potential option from guideline update

DISTRIBUTION RECORD:			
Date	**Name**	**Dept**	**Received**
Jan 2020	Dorothea Morfey	Anaesthetist	
Jan 2020	Irfana Musa	Orthogeriatrics	
Jan 2020	Nicolette Morgan	Orthogeriatrics	
Jan 2020	Desislava Kondova	Orthogeriatrics	
Jan 2020	Jennifer Nicholls	Orthopaedics	
Jan 2020	Richard Gooding	Haematologist	
Jan 2020	Martin Wiese	Emergency Department	
Jan 2020	Rahil	Orthopaedic Fellow	
Oct 2023	Jennifer Nicholls	Orthopaedic NOF lead	
Oct 2023	Alwyn Abraham	Orthopaedics	
Oct 2023	Dorothea Morfey	Anaesthetist	
Oct 2023	Rahil Mandalia	Anaesthetist	
Oct 2023	Martin Wiese	Emergency Department	

Title of P&G Document Being Reviewed:		Yes / No / Unsure	Comments
1.	**Title and Format**		
	Is the title clear and unambiguous?	Y	
	Is type of document clear (e.g. policy, guideline, procedure)	Y	
	Does the document follow UHL template format? *If no document will be returned to author*	Y	
3.	**Development Process**		
	Are the reasons for developing described (usually as part of introduction)	Y	
4.	**P&G Content**		
	Does the P&G have an introduction and aims?	Y	
	Is the P&G scope clear?	Y	
	Does the P&G set out clear roles and responsibilities?	Y	
	Are P&G Statements/Standards clear and easy to follow?	Y	
5.	**Associated policies and supporting references**		
	Are associated policies listed and key references clearly cited?	Y	
6.	**Consultation and Endorsement**		
	Has there been appropriate consultation? (see the consultation proforma)	Y	
	Does the Document identify which who has endorsed it?	Y	
7.	**Dissemination and Implementation**		
	Has the dissemination plan been completed? (see Admin Proforma)	Y	
	Have all implementation issues been addressed?	Y	
8.	**Equality and Benefits Realisation**		
	Has an Equality Impact Assessment Screening Tool been completed?	Y	
	Have potential costs / benefits been considered or anticipated outcomes described?	Y	
9.	**Process to Monitor Compliance**		
	Are there measurable outcomes / key indicators to support the monitoring of compliance?	Y	
	Is there a plan to audit compliance with the document?	Y	
	Have audit timescales and audit lead been identified?	Y	
10.	**Document Control, Archiving and Review**		
	Have details regarding document control and archiving been provided?	Y	
	Is the review date and reviewer identified?	Y	
	If reviewed document, are changes identified or is there a statement that no changes required and 'fit for purpose'?	Y	Major changes to whole document
11.	**Overall Responsibility for the Document**		
	Is it clear who is responsible for co-ordinating the dissemination, implementation?	Y	Dr Nicolette Morgan

9 INITIAL EQUALITY IMPACT ASSESSMENT TOOL

Pro-forma for the Initial Assessment
Name of Policy / guidance document :……

To be completed and attached to any procedural document (e.g. policies, guidance notes, etc) when submitted to the appropriate committee for consideration and approval.

An Equality Impact Assessment must always be carried out when there is a proposal to develop or change a function, e.g. Service Development within the Organisation.

		Comments	
1.	**What is the purpose of the proposal/ Policy**	Standardise management of patients with hip fracture who are on an oral anticoagulant (expanded to include patients on warfarin)	
2.	**Could the proposal be of public concern?**	No	
3.	**Who is intended to benefit from the proposal and in what way?**	Patients with hip fracture on anticoagulants Service: Orthopaedics, Anaesthetics, Orthogeriatrics, ED	
4.	**What outcomes are wanted for the proposal?**	Approval of updated guidelines	
		Yes/No	**Comments**
5.	**Is there a possibility that the outcomes may affect one group less or more favourably than another on the basis of:**		
	• Race	N	
	• Ethnic origins (including gypsies and travellers)	N	
	• Nationality	N	
	• Gender	N	
	• Culture	N	
	• Religion or belief	N	
	• Sexual orientation including lesbian, gay and transsexual people	N	
	• Age	N	
	• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	N	

		Comments	
6.	Is there any evidence that some groups are affected differently?	N	
7.	If you have identified that some groups may be affected differently is the impact justified E.g. by Legislation: National guidelines that require the Trust to have a policy, or to change its practice.	N	
8.	Is the impact of the proposal / policy likely to be negative?	N	
9.	If so can the impact be avoided?	N/A	
10.	What alternatives are there to achieving the proposal/ policy without the impact?	N/A	
11.	Can we reduce the impact by taking different action?	N/A	

If you have identified a potential discriminatory impact; please ensure that you do a Full Impact Assessment.

Initial Assessment completed by:

Name:	**Amit Mistri**
Signed:	
Date:	**15th February 2020**
Contact number:	**0116 2585060**

If you require further advice please contact Service Equality Manager on 0116 2584382.

10 POLICY AND GUIDANCE CONSULTATION PROFORMA

(To be completed and attached to Policy and Guidance documents when submitted to the UHL Policy & Guidelines Committee)

Elements of the Policy or Guidance Document to be considered (this could be at either directorate or corporate level or both)	**Implica-tions** (Yes/ No)	**Local or Corpor-ate**	**Consul-ted** (Yes/ No)	**Agree with P/G content** (Yes/No)	**Any Issues** (Yes / No)	**Comments / Plans to Address**
Education (ie training implications)						
Corporate & Legal						
• Clinical Risk						
• Health & Safety						
• Manual Handling						
• Legal Issues						
IM&T (ie IT requirements)						
Infection Prevention and Control						
Human Resources						
Operations (ie operational implications)						
Facilities (ie environmental implications)						
Finance (ie cost implications)						
Staff Side (where applicable)						
Patients/Carers (where appropriate)						
Relevant CBUs or Divisions:						

Committee or Group (ie Directorate Board) that has formally reviewed the Policy or Guidance document	Date reviewed	Outcome / Decision

Lead Officer(s) (Name and Job Title)	**1.1.1. Contact Details**
Dr Nicolette Morgan. Consultant Physician	

Reviewer	**Contact Details**	**Review Date**
		November 2026

Please advise of other policies or guidelines that cover the same topic area:

Title of Policy or Guideline:

ED management of bleeding in adults taking a DOAC

Prothrombin Complex Concentrate user guideline

Direct Oral Anti-Coagulants for Atrial Fibrillation

Best practice tariff for hip fracture: components

1. ***Time to surgery within 36 hours of presentation**
2. Assessed by a geriatrician within 72 hours
3. Preoperative cognitive test using the AMT score
4. Assessment for bone protection
5. Specialist falls assessment
6. Nutritional assessment on admission
7. Postoperative delirium assessment using the 4AT tool
8. Assessed by a physiotherapist on the day of or the day after surgery

9. POLICY AND GUIDANCE ADMIN PROFORMA

(To be completed and attached to Policy and Guidance documents when submitted to the UHL Policy & Guidelines Committee)

Title of Policy / Guideline:	**Guideline for Patients on Oral Anticoagulant Therapy Requiring Urgent Surgery for Hip Fracture**
Policy / Guideline Lead:	Dr Nicolette Morgan, Consultant Physician
Date for P&G Review:	November 2026

IMPLEMENTATION Please advise how any implications around implementation have been addressed:	
Financial	Not applicable, update to existing guidelines
Training	Dissemination via MSS CMG mechanisms
Benefits realisation	Standardised quality of care for management of hip fracture for patients on anticoagulants; expanded to include patients on warfarin; appropriate achievement of key element of hip fracture best practice tariff (time to surgery within 36 hours of presentation) for patients on anticoagulation

REVIEW OF PREVIOUS P&G DOCUMENT		
Previous P&G already being used? Yes		**Trust Ref No:**
If yes, Title: Guideline for patients on direct oral anticoagulant therapy requiring urgent surgery for hip fracture		**C10/2017**
Changes made to P&G? Yes	**If yes, are these explicit** No **If no, is P&G still 'fit for purpose?** Yes	
Supporting Evidence Reviewed? Yes	**Supporting Evidence still current?** Yes	

VERSION CONTROL AND ARCHIVING
Where will previous versions be archived? P&G Archive
Proposed action to retrieve expired paper copies of P&G: **Via Trust P&G archives**

DISSEMINATION PLAN			
Date Finalised:	**Dissemination Lead (Name and contact details)** **Dorothea Morfey, Consultant Anaesthetist**		
To be disseminated to:	**How will be disseminated, who will do and when?**	**Paper or Electronic?**	**Comments**
MSS CMG	**Electronic version to be circulated as pdf and displayed in relevant clinical areas in Orthopaedics, Orthogeriatrics & Anaesthetics**	**Electronic**	

CATEGORY 'C' POLICIES OR GUIDELINES ONLY Divisional/CBU Approval Process:	
Approving Group / Committee:	
Any comments?	
Date of Approval:	