Surrey and Sussex NHS
Healthcare NHS Trust

An Organisation-Wide Clinical Guideline for the safe prescription and administration of intravenous unfractionated heparin

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Ratifying Board:	Management Board for Quality and Risk/ Performance/ Strategy
Approved Sponsor Group:	
Type of Procedural Document	Clinical Guideline
Owner:	Dr Barry Jackson
Owner's job title	Haematology Consultant
Author:	Dr Barry Jackson
Author's job title:	Haematology Consultant
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Unique Document Number:	

Equality statement

This document demonstrates commitment to create a positive culture of respect for all individuals, including staff, patients, their families and carers as well as community partners**.** The intention is, as required by the Equality Act 2010, to identify, remove or minimise discriminatory practice in the nine named protected characteristics of age, disability, sex, gender reassignment, pregnancy and maternity, race, sexual orientation, religion or belief**,** and marriage and civil partnership. It is also intended to use the Human Rights Act 1998 to promote positive practice and value the diversity of all individuals and communities. This document is available in different languages and formats upon request to the Trust Procedural Documents Coordinator and the Equality and Diversity Lead.

Please do not delete the Equality Statement. It's presence in your Guideline helps the Trust to demonstrate its Equality Obligations.

Contents

When completing the Contents Page, please:

1) Provide your main guideline content in chapter 1. Give this chapter a relevant title.
2) List any subsections on the contents page (do not use more than one decimal point).
3) As required, add extra lines for additional subsections to chapter 1
4) Add page numbers to the final draft
5) Delete this explanatory text box.

How to add extra lines to the Contents Page (chapter 3 only):

1) Position the curser to the left of the table
2) Left-click the mouse to highlight a line in the table
3) Right-click the mouse and choose ‘insert rows’
4) A new row will be inserted above the line that you highlighted
5) To delete a row that you have created, repeat steps 1 to 3 above and choose ‘delete rows’*.

*Please only add or delete rows within chapter 1 – all other chapters in the template are mandatory.

1 Main content of Guideline (add chapter title)

1.1 Introduction

Unfractionated heparin has a vital role in reducing the risk of venous thromboembolism in certain patient groups. It is ideal in patients who have a high VTE risk in whom stopping anticoagulation for prolonged periods poses a risk (such as mechanical heart valves) and those patients at high risk of bleeding when the effects of anticoagulation can be reversed quickly. This guideline is intended for all doctors involved in the prescribing of unfractionated heparin to adult patients to standardise practice and ensure safe and appropriate dosing and monitoring.

1.2 Pre-infusion instructions

Once it has been decided that iv UFH is to be commenced it is necessary to check a baseline clotting screen, FBC, U+E and LFT. If the baseline APTT is abnormal then please discuss with haematology consultant.

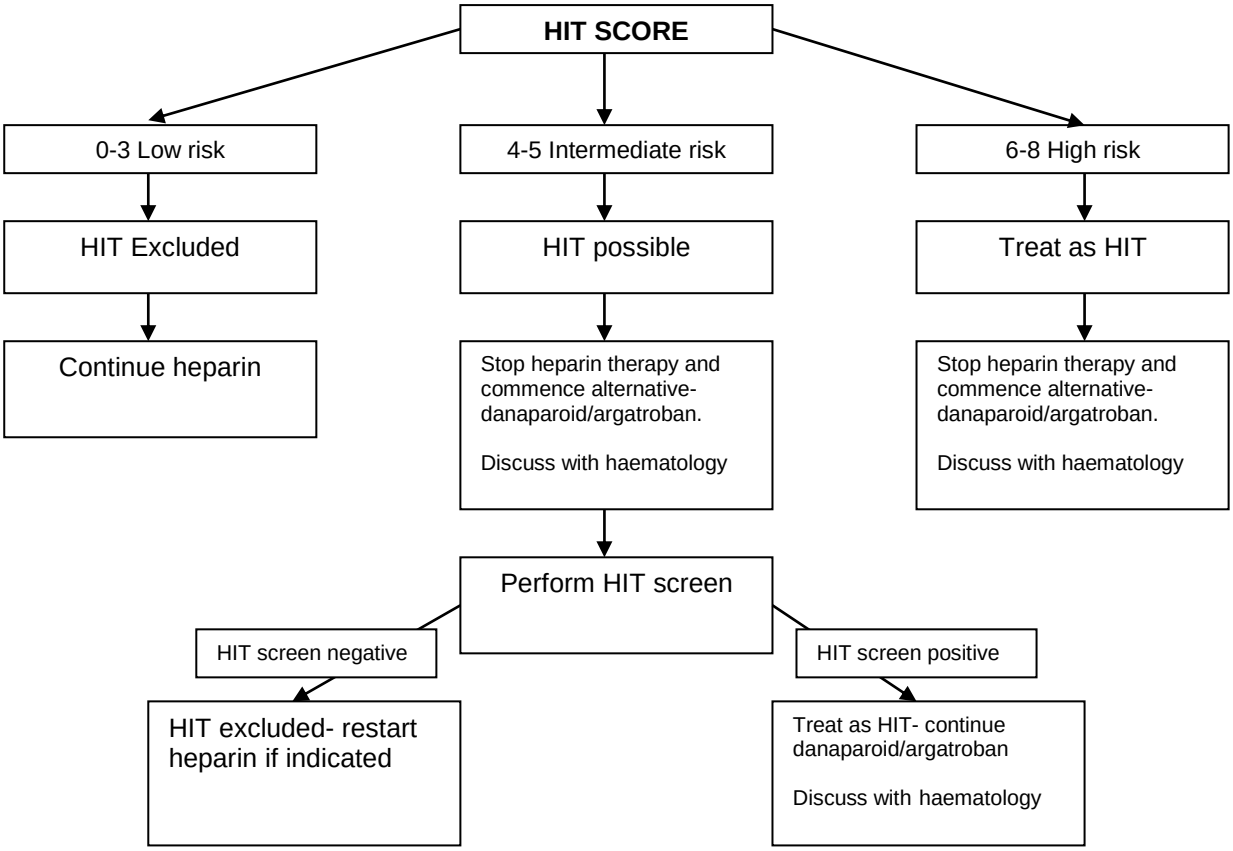
1.3 Contraindications to heparin

- Absolute contraindication- current or previous history of heparin induced thrombocytopenia or known hypersensitivity to heparin
- Relative contraindication- bleeding tendency, uncontrolled severe hypertension, severe liver failure, active peptic ulcer disease, thrombocytopenia

1.4 Heparin Induced Thrombocytopenia (HIT)

- There are many reasons why hospitalised patients develop thrombocytopenia, with sepsis and medications the most common. HIT is rare but needs to be considered
- Platelet count must be checked prior to commencing UFH infusion and every 48-72hrs thereafter
- HIT is a clinicopathological diagnosis
    - Use the HIT score table below to give a pre-test probability
    - This will either exclude HIT or advise on further management (see flow chart)
- If HIT is suspected, do not give platelets unless discussed with a haematologist

HIT SCORE	2	1	0
Thrombocytopenia	>50% fall and platelet nadir ≥ $20x10^9$/L	30-50% fall or platelet nadir 10-19 x 10^9/L	Fall <30% or platelet nadir <10 $x10^9$/L
Timing of platelet count fall or other sequelae	Clear onset between days 5 and 10; or ≤ 1d (if heparin exposure within past 30d)	Consistent with immunisation but not clear (e.g. missing platelet counts) or onset of thrombocytopenia after day10; or fall ≤ 1d (if heparin exposure 30-100d ago)	Platelet count fall ≤ 4d (without recent heparin exposure)
Thrombosis or other sequelae (e.g. skin lesions)	New thrombosis; skin necrosis; post-heparin bolus acute systemic reaction	Progressive or recurrent thrombosis; erythematous skin lesions; suspected thrombosis not yet proven	None
Other cause for thrombocytopenia evident	No other cause for platelet count fall is evident	Possible other cause is evident	Definite other cause is present



1.5 Argatroban infusion guidelines (first line treatment of HIT)

- Involve haematology consultant in all patients where argatroban is considered
- Stop heparin infusion for 2 hours prior to starting and check baseline APTT and platelet count.
- In patients without hepatic impairment or critically ill commence infusion at 2mcg/kg/min
- The target range for steady state APTT ration is 1.5-3.0 and to not exceed 100 seconds.
- Dose adjustments may be required to attain the target APTT (see below)

	Standard dosing schedule Initial infusion rate 2 mcg/kg/min		Critically ill/hepatically impaired patients Initial infusion rate 0.5 mcg/kg/min	
APTT ratio	Infusion rate change	Next APTT	Infusion rate change	Next APTT
<1.5	Increase by 0.5 mcg/kg/min	2 hours	Increase by 0.1 mcg/kg/min	4 hours
1.5-3.0 (not exceeding APTT of 100 secs)	No change	2 hours; after 2 consecutive aPTT's within target range Check at least once per day	No change	4 hours; after 2 consecutive aPTT's within target range Check at least once per day
>3.0 or APTT >100 secs	Stop infusion until the APTT ratio is 1.5-3.0. Resume at half the previous infusion rate	2 hours	Stop infusion until the APTT ratio is 1.5-3.0. Resume at half the previous infusion rate	4 hours

Argatroban causes prolongation of the PT and this needs to be considered in the transition of patients to warfarin therapy. Warfarin and argatroban should be overlapped for at least 5 d and an INR of ≥4 should be observed for two consecutive days before argatroban is discontinued. Stop argatroban if INR >5 and discuss with haematology

For patients with HIT and thrombosis, it is considered as a provoked VTE and warfarin should be continued for 3 months. If no thrombosis is seen then warfarin should be continued for 4 weeks.

1.6 Patients with previous history of HIT requiring thromboprophylaxis

LMWH heparin is contra-indicated in these patients. Where rivaroxaban/dabigatran is licensed as thromboprophylaxis (i.e. post hip or knee surgery) prescribing this is an acceptable option. In patients that would usually require heparin, prophylaxis dose fondarparinux should be used

1.7 Bleeding whilst on unfractionated heparin

- Anticoagulant effect of heparin lasts up to 4 hours post stopping intravenous infusion
- If minor bleeding, consider stopping heparin infusion
- If life threatening bleeding, discuss with haematology consultant. 25-50mg Protamine sulphate can be given to neutralise the heparin effect

1.8 Heparin infusion prescription

- Please see pages 5 and 6 of this policy- these can be printed and attached onto the patients drug chart

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HEPARIN INFUSION CHART (Page 1 of 2)

PATIENT NAME …… CONSULTANT……...

HOSPITAL NUMBER …….....

DATE OF BIRTH …….. WEIGHT …….kg

FOLLOW THE 3 STEPS BELOW IN ORDER TO COMPLETE THE IV HEPARIN INFUSION. PLEASE ENSURE YOU ARE FAMILIAR WITH THE TRUST GUIDELINES FOR PRESCRIBING PARENTERAL HEPARIN INFUSION

1. Bolus dose:

A loading dose of 75 units/kg iv UFH bolus should be given prior to starting infusion (rounded to nearest 100 units) unless baseline APTT ratio is >1.2 (discuss with haematologist)

Date	Time	Bolus dose (75units/kg)	Doctor signature	Time given	Nurse signature	Check signature

2. Initial infusion:

Draw up 20,000units (20ml) unfractionated heparin sodium (UFH) into pump. Concentration 1,000units/ml. (Weight capped at 100kg)

Actual body weight (kg)	38-42.9	43-47.9	48-52.9	53-57.9	58-62.9	63-67.9	68-72.9	73-77.9	78-82.9	83-87.9	88-92.9	93-99.9	100+
UFH (Units per hour)	700	800	900	1000	1100	1200	1300	1300	1400	1500	1600	1700	1800
Rate of infusion (ml/hr)	0.7	0.8	0.9	1	1.1	1.2	1.3	1.3	1.4	1.5	1.6	1.7	1.8

Initial infusion rate (ml/hr)	Doctor signature	Nurse signature	Check signature

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HEPARIN INFUSION CHART (Page 2 of 2)

PATIENT NAME …… CONSULTANT……...

HOSPITAL NUMBER ……..

DATE OF BIRTH …….. WEIGHT …….kg

3. Ongoing infusion

APTT ratio must be checked 4-6 hours after UFH infusion has been commenced and infusion rate adjusted as follows aiming for an APTT ratio of 1.5-2.5:-

APTT ratio	Action to take	when to recheck APPT ratio
<1.2	Increase infusion rate by 400 units/hr (0.4ml/hr)	4-6 hours
1.2-1.5	Increase infusion rate by 200 units/hr (0.2ml/hr)	4-6 hours
1.5-2.5	No change	24hr (or following morning)
2.5-3.0	Reduce infusion rate by 200 units/hr (0.2ml/hr)	4-6 hours
3.0-4.0	Reduce infusion rate by 300 units/hr (0.3ml/hr)	4-6 hours
4.0-5.0	Stop infusion for 1 hour, reduce infusion rate be 400 units/hr (0.4ml/hr)	4-6 hours
>5.0	Stop infusion for 2 hours, reduce infusion rate by 500 units/hr (0.5ml/hr)	4-6 hours

Prescribe iv Unfractionated Heparin below:-

Date								
Time of APTT ratio blood test								
APTT ratio result								
New rate (ml/hr)								
Time of adjustment								
Time of next APTT ratio check								
Doctor signature								
Time new infusion commenced								
Nurse signature								
Check signature								

2 Rationale

The purpose of this guideline is to ensure the safe and consistent prescribing of intravenous unfractionated heparin.

The following articles have been used to develop this guideline.

1. Raschke RA et al. (1993) The weight based heparin namogram compared with a "standard care" namogram, a randomized controlled trial. *Annals Internal Medicine 119 (9) 874-881*
2. Baglin et al. (2006) Guidelines on the use and monitoring of heparin *British Journal of Haematology 133 (1) 19-34* BCSH guideline
3. NPSA Alert 18 (2007) Actions that can make anticoagulation therapy safer
4. Watson et al. (2012) Guidelines on the diagnosis and management of heparin-induced-thrombocytopenia: second edition British Journal of Haematology *159 (5) 528-540* BCSH guideline

3 Scope

This guideline is intending for all staff (doctors, nurses and pharmacists) involved in the management of a patient on intravenous unfractionated.

This guideline is intended for adult use only.

4 Responsibilities

Haematologists- responsible for advising doctors regarding any clinical questions associated with giving unfractionated heparin

Junior doctors- responsible for following this guideline in order to safely prescribe unfractionated heparin

Nurses/midwifes- assessed as competent to administer intravenous infusions and responsible for correct administration of prescribed infusion

Pharmacists- responsible for ensuring correct heparin concentration is released from pharmacy

5 Compliance Monitoring arrangements

Monitoring policy implementation

This guideline will be monitored via the haematology information governance departmental meeting using audit every 3 years.

Measurable standards

Number of patients requiring iv heparin infusion
Number of patients who are in target range
Number of patients requiring protamine in view of excess bleeding whilst on heparin

6 Training to ensure compliance with this guideline

Doctors

Safe prescription of medicines

Nurses

Safe administration of intravenous medications

7 References and associated documents

References

Organisation	Author	Date of publication	Title of document
Annals internal medicine	Raschke et al	1993	The weight based heparin namogram compared with a “standard care” namogram, a randomized controlled trial.
British Committee for Standards in Haematology	Baglin et al	2006	Guidelines on the use and monitoring of heparin.
NPSA Alert 18		2007	Actions that can make anticoagulation safer
British Committee for Standards in Haematology	Watson et al	2012	Guidelines on the diagnosis and management of heparin-induced-thrombocytopenia: second edition

Associated documents

Organisation	Author	Date of publication	Title of document

8 Glossary explanation of terms used in this document

Acronym/ Abbreviation/ Term	Meaning
UFH	Unfractionated Heparin
VTE	Venous Thromboembolism
FBC	Full Blood Count
U+E	Urea and Electrolyte
LFT	Liver Function Test
APTT	Activated Prothrombin Time
IV	Intravenous

9 Document Control

This procedural document supports:

Standard(s)/ Key Lines of Enquiry:	Para/ I.D. no.	Standard/title
NHS Litigation Authority (NHSLA)		
Care Quality Commission (CQC)		
NICE Guideline		
Other national guidance (e.g. Royal College Guidance) - please list:		

Consultation record

Relevant service	Speciality, Sponsor or User Group name	Individual's name	Job title	Date consulted	Date feedback received
Pharmacy		Ana Armstrong	Lead Pharmacist-medicine	March 2014	March 2014
Radiology					
Cancer Services					
Intensive care unit		Dr Fiona Lamb	Anaesthetic consultant	March 2014	March 2014
Medicine		Dr Virach Phongsathorn	Chief of Medicine	March 2014	March 2014

The tables on this page are to be extended, as required. (See overleaf for 'Change History')

9 Document Control (continued)

Change History

Version	Date (DD/MM/YYYY)	Author/ Lead	Job title	Details of Change	Ratification body	Archiving location
2.0	August 2005	Dr Simon Stern	Haematology consultant			

When revising an existing document update the 'Change History' box accordingly (add details of all known previous versions).

Appendices

Appendix 1 Equality Analysis (EqA)

By completing this document in full you will have gathered evidence to ensure, documentation, service design, delivery and organisational decisions have due regard for the Equality Act 2010. This will also provide evidence to support the Public Sector Equality Duty.

Name of the policy / function / service development being assessed		
Date last reviewed or created & version number		
Briefly describe its aims and objectives:		
Directorate lead		
Target audience (including staff or patients affected)		
Screening completed by (please include everyone's name)	**Organisation**	**Date**

Equality Group *(Or protected characteristic):*	**What evidence has been used for this assessment?**	**What engagement and consultation has been used**	**Identify positive and negative impacts**	**How are you going to address issues identified?**	**Lead and Timeframe**
Age					
Disability					
Gender reassignment					
Marriage & Civil partnership					
Pregnancy & maternity					
Race					
Religion & Belief					
Sex					
Sexual orientation					
Carers					

When answering the questions across the top of this page, cells can be merged where the same answer applies to several equality groups or protected characteristics (in column 1). To do this, highlight the blank cells to be merged, right click on the mouse and choose 'merge cells'. Then add your answer.

Appendix 2 *Title*

Add your additional appendices here

Temporary pages

(These pages will be deleted by The Corporate Governance Officer immediately prior to publishing on the intranet).

Approval and Ratification Checklists

This checklist is to be used by the Sponsor Group to assess readiness for submission to Management Board for ratification:

	Sponsor Group Approval Checklist (Authors can also use this checklist to confirm that the document is ready for approval)	Policy for Procedural Documents (further information)
	Administration	
1	Was the document authorised at the correct level and does it avoid duplication with national guidance?	1.1, 1.3 Fig 1
2	Has the most appropriate type of document (strategy/ policy/ guideline) been selected?	1.2, 1.4 Fig 2
3	Has the author checked with Corporate Affairs to determine whether specific NHSLA requirements relate to this document?	2.1
4	Has the correct Sponsor Group been identified?	2.2, 5.1, 5.2 Appendix B
5	Has the correct approved template been used?	3.1
6	Are the document Control pages up to date?	3.4
7	Does the version number follow the recommended format?	3.5
8	Does the version number match the details in the Change History box?	3.4, 3.5
9	Is the review date and review frequency identified on the front of the document?	6.6 Fig 5
	Technical detail	
10	Does the 'Rationale' and 'Scope' reflect why a local level document is necessary and how it avoids duplication of national advice?	4.2
11	Strategies: are the objective(s) and intended outcomes of the document clear and unambiguous?	4.3
12	Have all relevant sources and supporting documents been cited in full in the main text and included within 'References'?	4.6
13	Does the Sponsor Group agree that the technical content is correct and up to date?	5.1 to 5.5
	Consultation	
14	Have all relevant specialities, Heads of Service and Divisional groups within SASH been consulted?	5.1/ 5.2
15	Have all relevant service users and staff groups for whom the document is intended been consulted?	5.3
16	Has the incorporation of stakeholder comments been discussed by the Sponsor Group?	5.4
	Monitoring and training	
17	Are arrangements for monitoring clearly stated?	4.4
18	Are there measurable standards and / or KPIs appropriate and sufficient?	4.4

19	Is there an audit tool or plan within the document to review SASH compliance?	4.4
20	Does the plan include the necessary training/ support to ensure compliance?	4.4, 4.5
21	Are the required resources in place to implement the procedure and if not, is there a business plan to accompany it?'	1.3, 4.1, 4.4, 4.5
	Preparing for approval	
22	Has the final draft been proof read for technical / clinical content?	5.5
23	Has the final draft been proof read for formatting and layout?	5.5
24	Is the Content's page easy to cross-reference with the main text?	-
25	Has the final draft been subject to an equality analysis EqA? (Evidence must be prepared at the planning stage and the analysis completed prior to submission to management board for ratification).	2.5 Appendix C
26	Revised documents: has the agreed pathway for approving key changes and/ or minor amendments been followed?	6.3/ 6.4 Fig 3
27	Is the document being sent to the correct ratifying body?	6.2 Fig 4
28	Is the document due to be published in the correct location?	6.2 Fig 4
	Dissemination and Publication	
29	Is there an outline plan to identify how this will be done and by whom?	7.1 to 7.3

This checklist is to be used by Management Board to guide the ratification process:

	Management Board Ratification Checklist Is Management Board assured that:	Policy for Procedural Documents (further information)
	Approval	
1	The correct, approved Sponsor Group has approved the document as suitable for ratification?	Appendix B
2	Consultation on the document has been sufficiently wide?	5.1 to 5.3
3	The correct approval pathway has been followed?	Figures 3 and 4
	Content	
4	The document is clear and accessible and the correct approved template has been used?	3.1, 3.2, 3.3
5	Controversial or difficult issues are (a) clearly stated and (b) suitably resolved?	4.7
	Monitoring and Training arrangements	
6	Monitoring and training arrangements are clearly stated in the document and have been properly embedded at ward/ office level?	4.4, 4.5
7	The required resources are in place to implement the procedure? If not, has a business plan been submitted?	1.3, 4.1, 4.4, 4.5
	Dissemination	
8	The posts that will be responsible for dissemination (and associated timescales) are clearly stated?	7.1

Safe prescription and administration of intravenous unfractionated heparin

Draft control

Draft details

Draft Number	Date (DD/MM/YYYY)	Details of Change

*Use the above table to record **draft** version details, to avoid confusion with approved version numbers.*

Technical Content Proof Reading

I confirm that I have proof-read the technical / clinical content of this draft procedural document	
Proof Reader's name (please print)	
Proof Reader's job title (please print)	
Proof Reader's signature	
Date:	