Government of JERSEY

Health and Community Services

Adult Major Haemorrhage Guideline

September 2021

DOCUMENT PROFILE

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CONTENTS LIST:

1. INTRODUCTION

1.1 Background

Adult Major Haemorrhage (AMH) is defined by one of the following parameters;

- loss of more than one blood volume over 24 hours (approximately 70ml/kg).
- 50% total blood loss in a three hour period.
- there is bleeding at a rate >150ml/min.
- clinical judgement: systolic BP <90 mmHg, tachycardia, no response to initial, resuscitation (JPAC, 2020).

1.2 Scope

This guideline is to aid the management of major haemorrhage in all adult patients except for those with obstetric haemorrhage and applies to all Clinicians, Nurses, Theatre Staff and Transfusion trained Biomedical Scientists.

1.3 Principles

This guideline relates to management of Adult Major Haemorrhage (AMH).

2. ADULT MAJOR HAEMORRHAGE ALGORITHM

2.1 Algorithm development

The AMH algorithm has been adapted from the existing Jersey Catastrophic Haemorrhage document (et al., 2012); The Joint United Kingdom (UK) Blood Transfusion and Tissue Transplantation Services Professional Advisory Committee Transfusion Handbook “7.3: Transfusion management of major haemorrhage” (2020); and from the Midlands Trauma Network “Adult & Paediatric Major Haemorrhage in Trauma Guidelines/Flowchart v4” (2018).

The Algorithm is reproduced full-size in the Appendix section as Appendix 1 of this document for reference/display purposes.

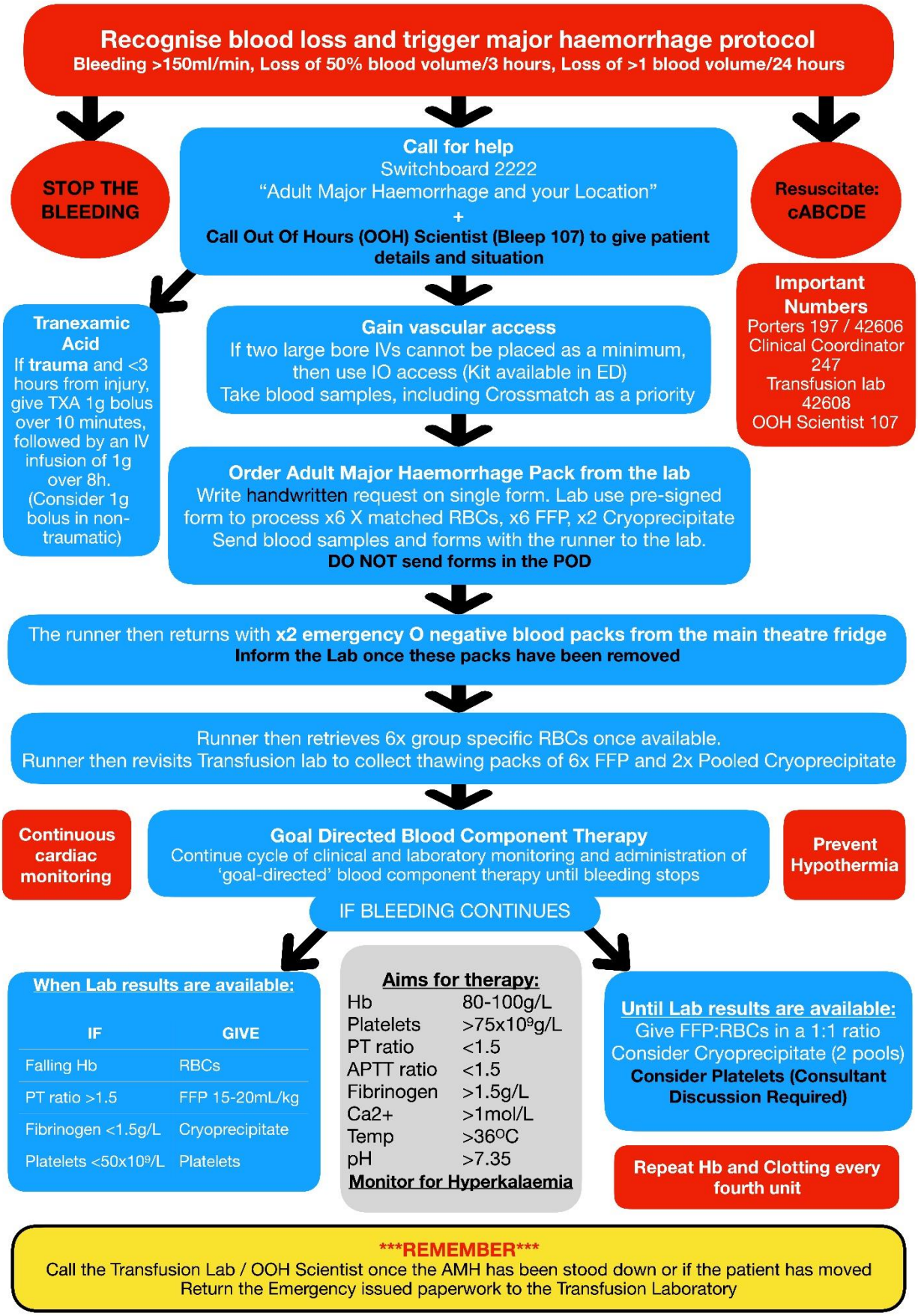

Figure 1. Jersey Adult Major Haemorrhage Algorithm 2021

3. PROCEDURE

3.1 Communicate

Pull the emergency buzzer.
Call switchboard on **2222** and state "**Adult Major Haemorrhage"**
State the **location** you calling from
Ask switchboard to confirm which call they are putting out

Contact numbers & bleeps
Transfusion Laboratory 42608/OOH Scientist 107

Porters 42606/192.

Clinical coordinators Bleep 247

3.2 Assign team roles:

Team leader - The most senior member of the team should be assigned. They are responsible for managing the team in resuscitation and ensuring the AMH algorithm is met.

Co-ordinator(s) - They are responsible for alerting switchboard of AMH by alerting switchboard on 2222. This role usually is carried out by another clinician or nurse. They may assist with rapid infusion pumps, blood warmers and warm air blowers and to give blood products.

The **clinical co-ordinator/site manager** will be alerted under the MHA 2222 call; they will be able to assist in resuscitation, manage haemorrhage and liaise with relevant teams if required i.e. theatre staff, surgeons, anaesthetics and gastroenterologists.

Runner - This should be a porter who is familiar with the hospital layout and with keycard access to the Transfusion Laboratory. They should know how to access the Emergency O negative blood packs (main theatres) and the adult major haemorrhage blood pack (transfusion laboratory).

3.3 cABCDE

All patients require an A-E assessment and resuscitated in line with Resuscitation Council UK Guidelines. Controlling catastrophic haemorrhage is the first step in the assessment (cABCDE), This AMH guideline focusses on key considerations to consider in a major haemorrhage but a full assessment must still be carried out as per Resuscitation Council Guidelines (Perkins et al, 2021).

Give 100% oxygen via a high concentration mask 15ml/min high flow, attach Sats probe and start Cardiac monitoring;

Secure access with x2 wide bore cannulas (IV) or intraosseous access (IO) (if no contraindications).

Take blood samples: Full Blood Count, Urea + Electrolytes, Coagulation screen and cross-match (XM) 6 units of RBCs. There is now one form available for the AMH pack which needs to be filled out and sent to the lab as per hospital blood transfusion policy. If blood samples are taken by IO remember to contact transfusion laboratory/Out of Hours Scientist first as IO samples can potentially damage laboratory machines.

Fluid resuscitation: Prescribe Hartmann's/N Saline 0.9% via a warming device based on the patient's fluid status and start transfusion as soon as blood products arrive.

Keep the patient warm - consider forced air warmers/heated mattresses (et al., 2012; , 2020)

Remember to reassess the patient after any intervention in the A to E assessment

*****Please note*****

The Transfusion laboratory/OOH biomedical scientist must be informed by the AMH co-ordinator within 2 minutes of the call going out.
The following details must be communicated:

- Patient details and their current location in the hospital.
- When the emergency O negative packs have been removed from the **main theatre fridge**
- When to stand down once the bleeding is under control

Forms required:

- One form for the AMH pack - send to the Transfusion Laboratory/OHH scientist
  (x6 type specific RBCs, x6 Fresh Frozen Plasma (FFP), x2 cryoprecipitate)
- Bottles and forms must be completed as per HCS blood transfusion policy.
- All samples must transported manually by a runner (porter) directly to the Transfusion laboratory

Do not use the pod system for sending blood samples/forms

3.4 Monitoring

All patients require continuous monitoring every 5 minutes initially. Central or arterial line can be considered to monitor biochemical markers (see appendix 1). Carefully document fluid balance, blood loss (weigh swabs used to control bleeding) and procedures undertaken. Once the bleeding has stabilised consider transfer to Intensive care setting for further monitoring (, 2020)

3.4 Stop the Bleeding

Practical steps
Use simple dressings and apply pressure or use a tourniquet for a bleeding limb.
Apply elevation or apply balloon tamponade techniques.
If gastrointestinal related consider endoscopy or damage control surgery for haemodynamically unstable patients not responding to resuscitation (et al., 2012; NICE, 2020).

Pharmacological treatment
The CRASH-2 trial (2010) was a large randomised placebo controlled trial (n = 20,211) across 40 different countries which was used to determine the prognostic effect of early use of Tranexamic Acid (TXA) in trauma patients. The results showed a significant decrease in all-mortality from early use of TXA. TXA should be given to patients with major haemorrhage within <3 hours of trauma. It should be given as 1g bolus over 10 minutes followed by an IV infusion of 1g over 8 hours. Consider 1g bolus if the cause of bleeding is non traumatic *(*Roberts. I et al., CRASH-2, 2010).

3.5 Anticoagulant Reversal Agents

See Appendix 2 for the reversal agents of common therapeutic anticoagulants, the doses required and where they are stored. The clinical coordinator should be able to provide this information to the team.

Direct oral anticoagulant reversal – Dabigatran can be reversed by Idarucizumab 2 x 2.5mg vials
Patient's on Rivaroxaban, Apixaban and Edoxaban should receive 3000 i.U Prothrombin Complex (Beriplex) and in high risk cases Andexanet can be given.

Warfarin Reversal - Prothrombin Complex (Beriplex) contains Factors II, VII, IX & X and reverses the warfarin effect instantly, when given by slow IV bolus. For adults give 3000 Units PCC. For children 40iU/Kg. Follow-up immediately with 0.5-10mg IV Vitamin K (PCC has a half-life of less than 8 hours).

Heparin Reversal - Protamine can be given but can cause hypotension. Heparin has a short half-life (12 hours), consider monitoring the patient instead of giving heparin reversal.

Clexane / Low Molecular Weight Heparin Reversal - Protamine is only 50% effective in reversing the anticoagulant effect of Low Molecular Weight Heparin (et al., 2012).

4. BLOOD PRODUCTS

4.1 Red Blood Cell (RBC) replacement

There are 4 units of O Negative RBCs located in the main theatre fridge which are available to give immediately during an AMH. The Transfusion laboratory/OOH scientist must be informed once the emergency packs have been removed from the theatre fridge. All emergency O Negative forms should be sent to the Transfusion laboratory so the units can been cross-matched retrospectively. The Transfusion laboratory/OOH will issue a report stating capability. If units are found to be incompatible, the Transfusion laboratory/OOH biomedical scientist will inform the co-ordinator. If a patient has a history of a red cell antibody, emergency O Negative units can be incompatible - a consultant haematologist must be contacted for advice.

6 units ABO/D Group specific red cells (type specific) are usually issued 20 minutes from receiving the first blood sample.

4.2 Restore coagulation

Fresh Frozen Plasma

Based on current recommendations, Fresh Frozen Plasma (FFP) should be used early during massive blood transfusion. The British Society for Haematology (BSH) amended their recommendations in 2017 for RBC:FFP from: “Give FFP:RBCs in a 1:1 ratio”, to: “Give FFP:RBCs in at least a 1:2 ratio (for trauma give FFP:RBCs in a 1:1 ratio)” (BSH, 2017). A systematic review of Major Haemorrhage protocols and outcomes found that there was no difference in 24-hour or 30-day mortality between a ratio of 1:1:1 (FFP:platelets:RBC) vs 1:1:2. However, a significantly higher number of patients achieved haemostasis in the 1:1:1 group (86% vs 78%). There was no difference in morbidity or transfusion reactions in the two groups. (McQuilten et al., 2018). Other larger centres may have multiple Major Haemorrhage protocols for differing causes of haemorrhage, however it was decided in Jersey that due to the infrequency of major haemorrhage it would streamline the protocol to have a single pack. As the evidence suggest, the 1:1

ratio RBCs:FFP should be used to provide optimal treatment for all causes of major haemorrhage (BSH, 2017).

Cryoprecipitate

Modern RBC packs have less plasma proteins therefore RBCs and FFP is given with cryoprecipitate in a 3:3:1 (FBC:FFP:CRYO) ratio to reduce the risk of dilutional coagulopathy. Both FFP and cryoprecipitate are stored frozen and usually requires 30 minutes to thaw. Continue to give FFP and cryoprecipitate with RBCs unless the coagulation screen becomes abnormal (et al., 2012).

Platelets

Aim to avoid giving platelets as there is only 1 pack of platelets available on Jersey at any one time. Platelet replacement is indicated if <50 x 10^9 g/L. This should be a consultant based decision and discussed with the Transfusion laboratory/OOH scientist. Aim to alert the OOH scientist if the platelet count drops below 75 x 10^9g/L. Cryoprecipitate may also be used as an alternative (et al., 2012).

4.3 Inherited coagulation disorders

If a patient is known to have a history of a coagulation disorder please consultant with a consultant Haematologist for consideration of factor VII replacement.

5. MASSIVE OBSTETRIC HAEMORRHAGE

Please refer to the Jersey General Hospital Massive Obstetric Haemorrhage Protocol Additional specific measures are required to control the uterus (, 2020).

6. ADVANCED DECISION TO REFUSE TREATMENT

The Advanced Decision to Refuse Treatment (ADRT) is a legal document which some patients sign in the event of not having capacity to make decisions. In the Emergency setting, healthcare should not delay treatment if there is no clear evidence of an ADRT document. If there is evidence of ARDT, its validity and applicability must be assessed as soon as possible. However, in the emergency setting the urgency to make decisions to provide life-saving treatment may make this assessment impossible. (Allard et al., 2012; JPAC, 2020; , 2015).

Refer to the Blood Transfusion Policy:

7. MONITORING AND REVIEW

The AMH guideline will be subject to an annual audit which will be reviewed by the Jersey General Hospital Transfusion committee.

8. DEVELOPMENT AND CONSULTATION PROCESS

8.1 Consultation Schedule

Name and Title of Individual	Date Consulted
Consultant Emergency medicine	01.08.2020
- Biomedical Scientist Team Manager	26.08.2020
– Blood Transfusion Nurse	26.08.2020
- Resuscitation Services Manager	11.09.2020

Name of Committee/Group	Date of Committee / Group meeting
Hospital Transfusion Committee	16/09/2020 09/12/2020 10/03/2021

9. REFERENCE DOCUMENTS

JPAC, 2020. *JPAC - Transfusion Guidelines*. [online] Transfusionguidelines.org. Available at: <https://www.transfusionguidelines.org> [Accessed 10 September 2020].

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10. IMPLEMENTATION PLAN

A summary of how this document will be implemented.

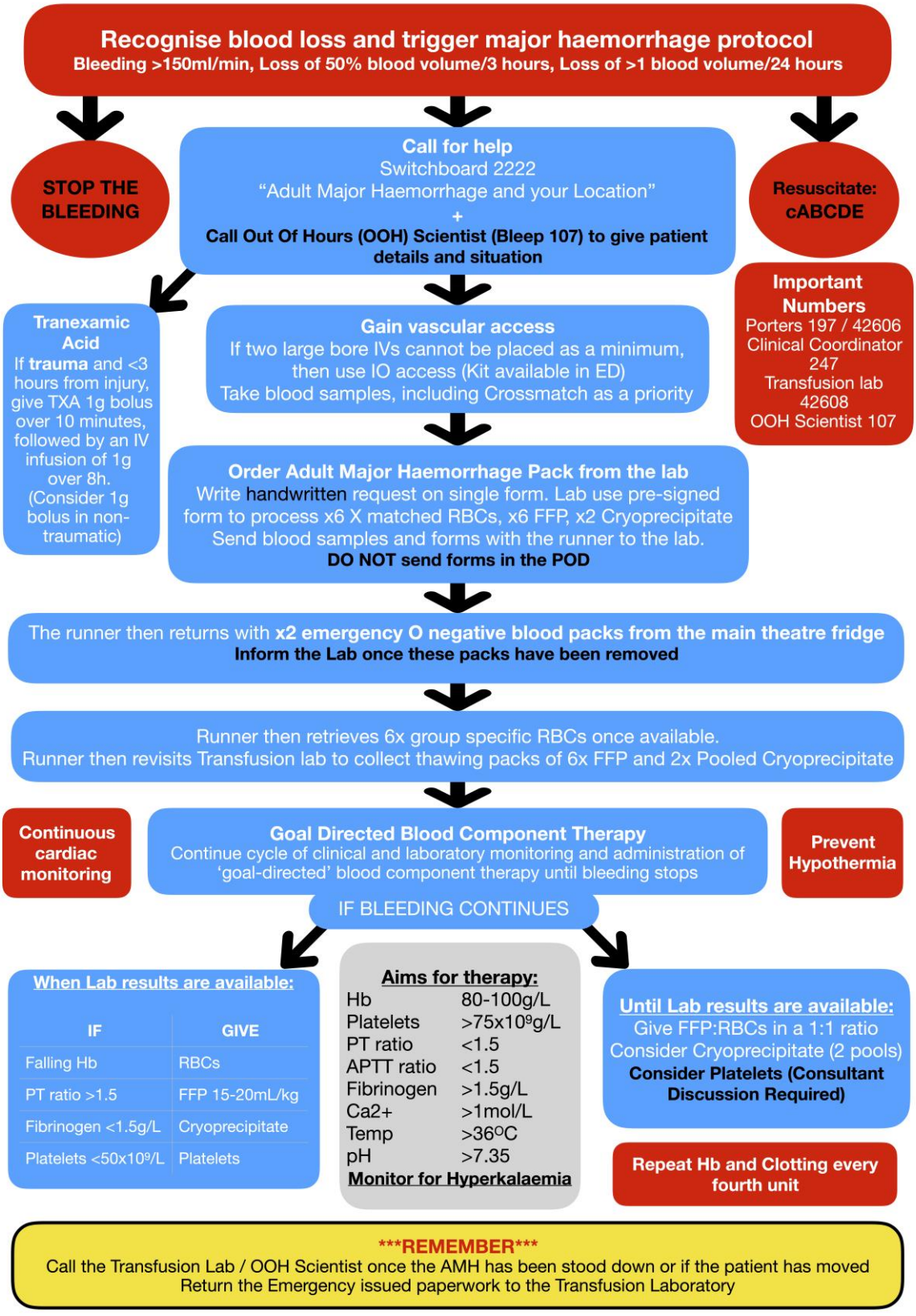
Action	Responsible Officer	Timeframe
Communicate guideline existence through email and in appropriate forums	Dr via Hospital Transfusion Committee	Upon receipt of record of ratification
Upload onto HCS MyStates	Information Governance	Upon receipt of record of ratification
Training	Presentation at Hospital Audit day, run simulations	Ongoing
Provide documents for Key locations including: • Manager - Resuscitation Services • Senior Charge Hand Porter	Dr via Hospital Transfusion Committee	Upon receipt of record of ratification

11. GLOSSARY OF TERMS / KEYWORDS AND PHRASES

ADRT	- Advanced directive to refuse treatment
AMH	- Adult Major Haemorrhage
cABCDE	- Method of assessing a patient –circulation, airway, breathing, circulation, disability and exposure.
CRYO	- cryoprecipitate
FBC	- full blood count
FFP	- Fresh frozen plasma
OOH	- out of hours
PCC	- Prothrombin Complex Concentrate
Sats probe	-oxygen saturation pulse oximetry probe
TXA	- Transexamic Acid

12. APPENDICES

Appendix 1: Jersey Adult Major Haemorrhage Algorithm, 2021



Appendix 2: Reversal agents for common therapeutic anticoagulants

Anticoagulants	Reversal Agent	Available from	Standard Dosage
Warfarin **Phenidione** **Coumarin**	Non-urgent - withhold drug and consider Vitamin K	Vitamin K from Pharmacy (laboratory staff not involved)	Vitamin K 0.5-10mg according to scenario
	URGENT 3000iU Beriplex + 0.5-10mg Vitamin K	Beriplex from Blood Transfusion	Beriplex initial dose 3000iU, then recheck INR
Dabigatran	Non-urgent - withhold drug	Emergency Drugs Cupboard (laboratory staff not involved)	Idarucizumab 2 x 2.5mg vials iv
	URGENT Idarucizumab		
Rivaroxaban **Apixaban** **Edoxaban**	Non-urgent – withhold drug	Beriplex from Blood Transfusion	Beriplex initial dose 3000iU
	URGENT 3000iU Beriplex NB: Andexanet available for high risk cases Requesting consultant's decision. Does not require Haematology Consultant's approval)	Andexanet from Emergency Drugs Cupboard or Emergency Department – if required (laboratory staff not involved)	Andexanet as per drug data sheet
Heparin **(UFH)**	Non-urgent - withhold drug	Pharmacy (laboratory staff not involved)	1.0mg Protamine for every 100iU of active Heparin
	URGENT Consider Protamine Sulphate		
Low Molecular Weight Heparin (LMWH) **(*Clexane*)**	Non-urgent - Withhold drug	Pharmacy (laboratory staff not involved)	1.0mg Protamine for every 100iU of active Heparin
	URGENT Consider Protamine Sulphate, but only 50% of LMWH effect is reversed by Protamine.		

Reversal agents for common therapeutic anticoagulants, Maguire 2021