Treatment of venous thromboembolism (PE/DVT) in COVID-19 positive patients

Background

- This document is for adult patients only and is not recommended for dosing in pregnancy or the puerperium
- There can be heparin resistance in critically ill COVID-19 patients
- **As a result higher doses of heparin (either type) may be required for treatment of VTE.** The 2 options are:
  1. Treatment dose LMWH **(COVID-19 dosing)**
  2. Treatment dose unfractionated heparin infusion **(COVID-19 dosing)**

1. Treatment Dose LMWH

- LMWH should be used for most patients unless there is a specific indication for IV heparin such RRT
- See both tables below (note dose reduced if creatinine clearance less than 30mls/min)
- Twice daily dosing is preferred compared with previous once daily dosing in standard PE/DVT patients
- Order LMWH heparin assay on Trak to monitor (search for heparin)
- Take LMWH heparin assay 3-4 hours after administration of drug
  - In twice daily dosing this should be after the 3rd dose (if once daily dosing after the 2nd dose)
- Interpretation of LMWH heparin assay (anti-Xa)
  - Twice daily dosing aim level 0.5 to 1.0 units per ml (if once daily dosing aim level 0.5 to 1.5)
  - Discuss with haematology if levels require adjustment

Table 1. Suggested starting doses of Dalteparin in patients with CrCl greater than 30ml/min

Weight (kg)	Suggested starting dose by subcutaneous injection
Under 46	7,500 units once daily
46-56	5,000 units twice daily
57-68	7,500 units morning & 5,000 units evening
69-81	7,500 units twice daily
82-93	10,000 units morning & 7,500 units evening
94-106	10,000 units twice daily
107-118	12,500 units morning & 10,000 units evening
119-131	12,500 units twice daily
132-143	15,000 units morning & 12,500 units evening
144-157	15,000 units twice daily
158-172	18,000 units morning & 15,000 units evening
Over 172	18,000 units twice daily

Table 2. Suggested starting doses of Dalteparin in patients with CrCl less than 30ml/min*

Weight (kg)	Suggested starting dose by subcutaneous injection
Under 44	5,000 units once daily
44-56	6,500 units once daily**
57-69	8,500 units once daily**
70-84	5,000 units twice daily
85-103	7,500 units morning & 5,000 units evening
104-121	7,500 units twice daily
122-140	10,000 units morning & 7,500 units evening
141-159	10,000 units twice daily
160-178	12,500 units morning & 10,000 units evening
Over 179	12,500 units twice daily

**Requires use of 10,000 units graduated Dalteparin syringes

* Creatinine clearance could be calculated by using the CrCl calculator on the Intranet (see link below)

http://intranet.lothian.scot.nhs.uk/Pages/Search-Results.aspx?k=creatinine%20clearance%20calculator

2. Treatment dose unfractionated heparin infusion (COVID-19 dosing)

- Ideally use LWMH for DVT/PE treatment rather than unfractionated heparin infusion. However indications for unfractionated heparin would be:
    - Patient on Renal Replacement therapy
    - Concerns regarding bleeding or rapid reversal of anti-coagulation required
    - Invasive procedures planned
    - Clinician discretion
- Note the dosing of unfractionated heparin in COVID patients is different from the standard NHS Lothian unfractionated heparin dosing
- The unfractionated heparin dosing infusion and bolus is now weight based (actual body weight, capped at 125kg) in COVID and does not just start 1000units/hour as previous
- See next page for specific COVID +ve heparin infusion chart which explains weight based dosing .

**FOR INTENSIVE CARE USE ONLY **
Adult Heparin Infusion Chart for COVID-19 Patients

Consultant		Name of Patient	
Hospital / Ward		CHI Number	
Weight (kg)		DOB	

Medicine (Approved Name)	Final Concentration	Total Dose	Volume	Route	Prescribed / Transcribed By Sign & print name
Heparin	1000 units/ml	40,000 units	40 mls	IV	

*Please note that in NHS Lothian heparin sodium solution for infusion is available in a ready concentration of 1000units/ml so further dilution is not required. If in doubt, contact pharmacy for advice.

Initiation of therapy

- Check baseline FBC, INR, APTT, urea, creatinine
- Prescribe loading dose and infusion on the patient Main Prescription Chart.
- Loading dose: 80 units /kg (maximum 10,000 units). Administer as a slow IV bolus over 5 minutes. Immediately start continuous infusion of heparin 18 units /kg/hour (maximum 2,250 units/hour). Use actual body weight capped at 125kg.
- For patients with a high risk of bleeding, a lower starting rate may be required

Infusion Rate Instructions

	Date	Time	Rate ml/hr	Prescribed by	Adjusted by	UFH Anti-Xa level (units/ml)	Reason for Change/Comment
Initial Rate							
Change 1							
Change 2							
Change 3							
Change 4							
Change 5							
Change 6							

Dose Adjustment Instructions

TARGET UFH Anti-Xa LEVEL 0.3-0.7 units/ml

Anti-Xa level	INFUSION ADJUSTMENT:	REPEAT UFH Anti-Xa level:
>1.2	Stop for 1 hour and decrease rate by 500 units (0.5ml)/hr	2 hours
0.9-1.2	Decrease infusion rate by 300 units (0.3ml)/hr	6 hours
0.71-0.9	Decrease infusion rate by 200 units (0.2ml)/hr	6 hours
0.3-0.7	No change in infusion rate	next day AM
0.15-0.29	Increase infusion rate by 100 units (0.1ml)/hr	6 hours
0.06-0.14	Increase infusion rate by 200 units (0.2ml)/hr	6 hours
<0.06	Increase infusion rate by 400 units (0.4ml)/hr	6 hours

Other Instructions

- UFH stands for unfractionated heparin (iv heparin)
- UFH-anti-Xa levels are taken in a green citrated tube; fill tube to the level, send to haematology
- To order on TRAK: go to “search for order”, click on “order item” then enter “heparin”, then click on “Unfractionated Heparin assay All sites”: call RIE laboratory to inform sample is coming; WGH and SJH sites must courier samples to RIE lab.(ext 26093, OOH page 6550)
- Check UFH Anti-Xa level 6 hours after initiation, then adjust rate to achieve therapeutic range of **0.3-0.7 units/ml** using the **dose adjustment table** above. Measure the UFH-anti-Xa level 6 hours after each dose change
- Monitor FBC daily and be vigilant for heparin-induced thrombocytopenia
- No IM injections, no non-steroidal anti-inflammatory drugs
- If therapeutic range for UFH-anti-Xa level is not reached within 24 hours, seek advice from haematology
- Do <u>not</u> stop the heparin infusion to check the UFH-anti-Xa sample
- Do <u>not</u> take the UFH-anti-Xa sample from the limb with the infusion (or the same line in the case of central lines)

Medicine	Heparin	**Infusion Device Type**		**Name of Patient**	
Concentration	1000 units/ml	**Device Service Number**		**Patient Number**	Or affix patient label
Expected Completion Time				**DOB**	

Preparation Details	**Batch Number**	**Quantity**	**Prepared By**	**Checked By**
Heparin				
			Date:	Time:

Check infusion device 15 mins after set up and then every hour thereafter. **Sign box when the device has been checked.**

A	B	C	D	E	F	G	H	I	J
Date	Time	Site check	Rate (ml/hr)	Volume (ml) remaining in syringe – visual check	Volume (ml) infused since last check – calculated from E	Total volume (ml) infused – calculated from E	Total volume (ml) infused – device reading	Initials (two to set up / change rate)	Comments

Use a new page with every new syringe prepared, or if the infusion device is changed.
Syringe pumps must have the line purged and the volume recorded in column E. Start-up time may affect volume actually given to the patient.