Venous thromboembolism (VTE) prophylaxis and treatment in COVID-19 patients in Critical Care Areas

This guidance applies to patients with +ve COVID-19 swabs or high suspicion in Critical Care Areas

Background

- COVID -19 is associated with a variety of coagulation defects including DIC, microvascular thrombus and VTE; raised D-dimers on admission are a poor prognostic factor
- Microvascular thrombus and VTE may be a major cause of morbidity and mortality
- Bleeding complications are rare in COVID-19
- Heparin resistance has been reported due to reduced anti-thrombin levels and other procoagulant factors

Coagulation testing

- **Daily coagulation tests are not required**. Consider after clinical assessment:
  - **APTTR, INR and platelets**: mild prolongation of APTTR, low platelets common
  - **Fibrinogen**: often high
  - **TEG/ROTEM**: consider if coagulopathy is suspected
  - **D-Dimers:** associated with disease severity. A sudden rise may indicate VTE or worsening DIC
  - **Anti-Xa activity:**
    - To confirm effectiveness of low molecular weight heparin (LMWH) measure anti Xa level 3-4h after 3rd dose for peak activity.
    - Please state type of heparin on form (ie: enoxaparin, tinzaparin or unfractionated heparin (UFH)
    - Sample must be processed within an hour
    - Pre-dose trough level if using LMWH in renal failure to avoid accumulation
  - **Anti-thrombin levels:** Useful when heparin resistance is suspected (discuss with consultant haematologist)

Enhanced VTE prophylaxis and Monitoring

- **Enoxaparin 0.5mg/Kg bd sub cut** (actual body weight, round to nearest syringe 20, 40, 60, 80mg)
- Mechanical calf compression device for all immobile patients
- Measure anti-Xa levels at 3-4h after 3rd dose to ensure efficacy (Aim for 0.2-0.4units/ml)
- Continue LMWH unless platelets<30 (reduce dose by half and frequent anti-Xa monitoring) or HIT suspected 9discuss with consultant haematologist).
- **Renal failure:**
  - **eGFR >30ml/minute:** continue enoxaparin at above dose
  - **eGFR <30ml/minute**: switch to Heparin 5000units tds sub cut or (consultant only decision) continue enoxaparin and monitor trough anti-Xa levels (Aim 0.2 – 0.4 units/mL)

Treatment of VTE

- **Tinzaparin 175units/Kg daily sub cut (use actual body weight)**
- Anti-Xa activity 3-4h after 3rd dose (Aim for 0.6-1 units/ml)
- **Renal failure:**
  - **eGFR>30ml/minute:** continue Tinzaparin

- **eGFR<30ml/minute:** UFH intravenous infusion (APTTR 2.0-2.5) or **reduce Tinzaparin to 125units/Kg sub cut** and check trough anti-Xa levels as above

Heparin resistance

- Failure to achieve Anti-Xa levels or APTTR with adequate dose increases
- Send anti-thrombin level (consultant haematologist advice)
- If using UFH consider switch to LMWH (monitor trough anti-Xa levels in renal failure as above)
- Consider switch to argatroban infusion (as per BSUH protocol on intranet) or oral dabigatran if eGFR>30ml/min. Seek consultant haematologist advice: agatroban will make monitoring for any deterioration in coagulopathy difficult
- When treating VTE with UFH infusion consider sending anti-Xa levels when at target APTTR to confirm therapeutic anticoagulation (ensure that UFH infusion is written on the request form)

Dose alterations

- Prophylaxis:
  - If peak level <0.2 increase dose by 10% and recheck anti-Xa after 3 increased doses
  - If peak level >0.4 omit one dose and reduce dose by 10% and recheck after 3 doses
- Treatment:
  - If peak level <0.6 increase dose by 10% and recheck anti-Xa after 3 increased doses
  - If peak level >1.0 omit one dose and reduce dose by 10% and recheck after 3 doses
- Renal failure:
  - If trough level >0.4 recheck level in 12h and re-dose once trough <0.4. Consider 10% dose reduction or increased dose interval guided by peak and trough Xa levels. Alternatively, switch to UFH.

Ward Discharge

- At discharge from critical care patients should revert to standard Trust guidance on VTE prophylaxis and treatment