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Coronavirus (COVID-19): guidance on treating patients

Guidance from the Chief Medical Officer (CMO)

COVID-19 position statement:

The prevention and management of thromboembolism in hospitalised patients with COVID-19-related disease

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Contents

Introduction

The purpose of this guideline is to provide clinicians in NHSScotland with advice on the prevention of thromboembolism, particularly pulmonary thromboembolism, and the appropriate use of anticoagulation in patients with SARS-CoV-2 (COVID-19)-related disease who are admitted to hospital.

This guideline is for:

- health and care practitioners working in clinical areas
- health and care staff involved in planning and delivering services.

The recommendations are based on advice from specialists in intensive care, respiratory medicine and haematology working in NHSScotland, and a rapid review of the published evidence on extended thromboprophylaxis in patients with COVID-19 related disease, undertaken to support this guidance.

This guidance will be reviewed and updated as new evidence emerges. Other consensus-based guidance on this topic is available (see References section).

For the purposes of this document, the following definitions apply:

- patients are classified with COVID-19-related disease if they have a positive reverse transcription polymerase chain reaction (RT-PCR) test result or show strong clinical evidence of COVID-19 infection (eg compatible chest X-ray, lymphopenia, high transaminases)
- patients with COVID-19 pneumonia have radiological evidence of lung infiltrates and fulfil the above criteria.

This guidance does not apply to the management of patients with COVID-19-related disease in primary and community care settings.

In this guideline, where reference is made to thromboprophylaxis, it pertains to pharmacological thromboprophylaxis, unless otherwise specified.

RECOMMENDATIONS

- All inpatients with COVID-19-related disease who have no known contraindications to thromboprophylaxis, should receive thromboprophylaxis as soon as possible following their admission to hospital.
- In non-critical care wards, standard thromboprophylaxis, as per local protocol, should be administered to every inpatient who has or is suspected of having COVID-19-related disease and who has no known contraindications to thromboprophylaxis. There is no evidence to recommend higher prophylactic doses in this ward-based group. Where a low molecular weight heparin (LMWH) is used, a standard, weight-based, renal function-adjusted, prophylaxis dose should be used.
- In critical care settings, an intermediate dose of thromboprophylaxis should be considered to reduce the risk of venous thromboembolism (VTE) in patients who have or are suspected of having COVID-19-related disease and who have no contraindications to thromboprophylaxis.
- Patients who have COVID-19-related disease and who are stepped down from a critical care setting to a medical ward can continue to receive an intermediate dose for the rest of their inpatient stay if there is ongoing concern that they remain at very high risk of VTE and they have no significant bleeding risks. Otherwise, thromboprophylaxis should revert to standard prophylactic dosing when it is clinically appropriate.
- Any patient with COVID-19-related disease who deteriorates with sudden worsening of hypoxaemia or haemodynamic collapse, should be investigated for pulmonary thromboembolism (PTE).
- If a patient with COVID-19-related disease is too unstable to be moved for a computed tomography pulmonary angiogram (CTPA) then indirect evidence, such as right-ventricular (RV) dysfunction on an echocardiogram (ECHO), may provide evidence of PTE.
- Following treatment for COVID-19-related disease, consider giving extended prophylactic anticoagulation for two weeks following discharge if there is clinical concern that there is an ongoing high risk for VTE but a low risk of bleeding and no known contraindications. There is no evidence suggesting one agent is better than any other in this specific situation: LMWH or a direct oral anticoagulant (DOAC) should be considered on a case by case basis.
- A VTE that occurs during an acute episode of COVID-19-related disease should be treated as a 'provoked' event, with anticoagulation continuing for at least 3 months. Patients with PTE should be followed up in a respiratory/post-PTE clinic prior to anticoagulation being discontinued.

1. Background to thromboembolism in patients with COVID-19-related disease

There is increasing recognition that the disease COVID-19, caused by the SARS-CoV-2 virus, can result in an increased risk of thromboembolism in patients.[1] This includes both arterial and venous thromboembolism, especially pulmonary thromboembolism. There may be a number of reasons for this increased risk:

- patients are immobile for a prolonged period
- COVID-19-related disease is a pro-inflammatory condition
- the virus may have direct effects on the endothelium resulting in clotting cascade activation
- clotting cascade activation in patients with COVID-19-related disease leads to a hypercoagulable state with elevated fibrinogen, factor VIII, D-dimers, reduced antithrombin and the development of neutrophil extracellular traps (NETs).

This position statement aims to clarify the approach to the prevention of thromboembolism in patients with COVID-19-related disease who are admitted to hospital. The evidence base for these recommendations is evolving and the recommendations represent the best practice guidance currently available.

2. Thromoboprophylaxis in patients with COVID-19-related disease

2.1 Who should receive thromboprophylaxis?

Since there is evidence that COVID-19-related disease represents a hypercoagulable state, all patients with COVID-19-related disease who are admitted to hospital should receive thromboprophylaxis unless there is a significant risk of bleeding and/or another contraindication. Thromboprophylaxis should be administered as soon as possible following admission.

Patients with a contraindication to pharmacological thromboprophylaxis should be considered for mechanical thromboprophylaxis with intermittent pneumatic compression (IPC).

2.1.1 Contraindications to pharmacological thromboprophylaxis with heparins

Contraindications to pharmacological thromboprophylaxis with heparins include:

- platelet count ≤25 x 10^9/litre (≤50 x 10^9/litre for intermediate-dose thromboprophylaxis) (please note that these reduced platelet count thresholds apply specifically to patients with COVID-19 disease)
- receiving anticoagulation for another reason
- patient considered to be at high bleeding risk, for example recent intracranial haemorrhage, untreated inherited/acquired bleeding disorders
- trauma with high bleeding risk
- active bleeding
- heparin-induced thrombocytopaenia (HIT)
- acute stroke (use IPC if immobile and contact the stroke team for guidance)
- within 12 hours of procedures, for example surgery, lumbar puncture (6 hours for unfractionated heparin)
- acute bacterial endocarditis
- persistent hypertension (blood pressure ≥230/120 mm Hg)
- liver failure and international normalised ratio (INR) >2.

In patients with suspected or confirmed COVID-19-related disease, thromboprophylaxis should only be provided to those who are admitted to hospital.

2.2 Which pharmacological agents and in what dose should prophylactic anticoagulation be used?

Options for pharmacological thromboprophylaxis will depend on local protocols. The options are:

- unfractionated heparin (UFH)
- low molecular weight heparin (LMWH)
- fondaparinux.

Where LMWH is used, a standard, weight-based, renal function-adjusted, prophylactic dose should be used, as per local protocols.

Although some direct oral anticoagulants (DOACs) may be used as inpatient thromboprophylaxis these are not recommended at this stage as these agents may have potential unknown interactions with other experimental agents used to treat COVID-19.[2]

The dose of thromboprophylaxis to be used depends on the patient setting within the hospital.

2.2.1 Patients on wards

Standard thromboprophylaxis, as per local protocol, should be given to every inpatient on a medical ward who has or is suspected of having COVID-19-related disease and who has no contraindications to thromboprophylaxis. Thromboprophylaxis should be started as soon as possible following admission to hospital.

There is currently no evidence to suggest that higher doses should be used in this patient population.

2.2.2 Patients in critical care settings

The incidence of VTE is higher in patients with COVID-19-related disease compared with the usual population of patients with pneumonia in critical care.[3]

For this reason, an intermediate dose of thromboprophylaxis, as per local protocol, should be considered for every inpatient within a critical care setting (critical care units (CCU), (renal or standard) high-dependency units (HDU), (renal or standard) intensive care units (ICU), or respiratory ward requiring continuous positive airway pressure (CPAP)) who has, or is suspected of having, COVID-19-related disease and who has no contraindications to thromboprophylaxis.

One example of intermediate dose thromboprophylaxis is a doubling of daily standard, weight-based, renal-adjusted, prophylactic dose LMWH (for example, increasing enoxaparin from 40 mg once daily to 40 mg twice daily). The rationale for twice-daily dosing is to avoid a significant increase in the peak whilst providing a higher trough level of anticoagulation, with the aim of achieving more effective thromboprophylaxis without increasing bleeding risk. There is, however, currently no evidence to support the use of higher doses of thromboprophylaxis in this patient group.

Using thresholds of D-dimer to guide management strategies (such as the dose of LMWH for thromboprophylaxis) is currently not advised due to lack of evidence.

The thromboprophylactic dose used during a patient's stay in critical care should be reviewed on discharge from this area. Where it is felt that there remains a high risk of thromboembolism and low risk of bleeding, the intermediate dose can be continued. Otherwise, thromboprophylaxis should revert to standard prophylactic dosing when it is clinically appropriate.

Examples of local protocols for thromboprophylaxis strategies used in the management of patients with COVID-19-related disease are included at Appendix 1 and Appendix 2.

2.3 Should the dose of prophylactic anticoagulation be increased in patients with COVID-19-related disease and a high body mass index?

Obesity is a risk factor for VTE and is a predictor of adverse outcome in patients with COVID-19-related disease.[4] Weight-based dose adjustment of thromboprophylaxis is recommended in patients of high body weight, as per local protocols.

To aid management, Anti-Xa monitoring should be undertaken in patients at extremes of weight and/or with impaired renal function, as per local protocols.

2.4 What evaluations should I perform in patients whom I suspect of having a venous thromboembolism?

The evaluation for pulmonary thromboembolism (PTE) in patients with COVID-19-related disease may be difficult because of the similarity in symptoms between the two conditions and the risks associated with moving a potentially infected, unstable patient to a computed tomography (CT) scanner.

Any patient with COVID-19-related disease who deteriorates with sudden worsening of hypoxaemia or haemodynamic collapse, should be investigated for PTE. It is important to attempt to obtain an objective diagnosis of VTE to prevent exposing patients to unnecessary therapeutic anticoagulation and the associated bleeding risks. This includes those patients in the critical care setting.

If a patient can be safely transferred, then they should undergo standard investigations for VTE:

- Doppler ultrasonography for deep vein thrombosis (DVT)
- computed tomography pulmonary angiography (CTPA) for PTE.

If a patient with COVID-19-related disease is too unstable to be moved for a CTPA then indirect evidence, such as right ventricular (RV) dysfunction on an echocardiogram (ECHO), may provide evidence of pulmonary thromboembolism.

In those patients who are intubated and deteriorating from a respiratory perspective, with no other clear cause (for example cardiac dysfunction or progressive acute respiratory distress syndrome, ARDS), then consideration should be given to empirical full-dose anticoagulation.

However this decision must be balanced with the acceptance that there may be increased bleeding risks with this approach. Features which may support using empirical therapeutic anticoagulation for those patients unable to obtain an objective diagnosis of VTE would be:

- patients with evidence of worsening RV dysfunction on echocardiography without worsening radiological features of ARDS
- patients who have clinical features of VTE (for example, superficial thrombophlebitis).

Although progressive RV dysfunction on ECHO does not always imply the development of PTE (it may, for example, reflect progression of the underlying lung disease), it should be considered an important biomarker for the development of PTE in a deteriorating patient.

2.5 What is the role of D-dimer?

In patients with COVID-19-related disease, laboratory findings commonly include:

- elevated D-dimer (frequently >1,000 ng/ml)
- elevated fibrinogen
- mild thrombocytopenia (or normal platelet count).

D-dimer is frequently elevated in patients with COVID-19-related disease and baseline values seem to track with overall prognosis, with higher levels being associated with a worse outcome.[5,6] However D-dimer is elevated in acute phase responses to severe disease and does not necessarily imply the presence of VTE.

A normal D-dimer is currently believed to be sufficient to exclude the diagnosis of VTE/PTE unless there is high clinical suspicion.

Elevated D-dimer is not, on its own, sufficient to make the diagnosis of VTE/PTE. Other evidence should be sought, for example imaging of the chest if the patient is sufficiently stable.

Using thresholds of D-dimer to guide management strategies (such as the dose of LMWH for thromboprophylaxis) is currently not advised due to lack of evidence.

2.6 Should I use extended thromboprophylaxis in patients following discharge from hospital?

There is currently no evidence to suggest that patients with COVID-19-related disease who do not require admission to hospital and who are managed in the community are at increased risk of VTE compared with the general population. There is also no evidence that they are at increased risk of VTE compared with those with COVID-19 related disease who are hospitalised. The same applies, in most cases, to those who have been discharged home following a stay in hospital. There are anecdotal reports of patients recently discharged from hospital following COVID-19 related disease who return to hospital with a VTE. Medical inpatients are at increased risk of VTE for up to 12 weeks following discharge from hospital with the highest risk being in the first 3 weeks.[7] There is, however, no evidence that patients with COVID-19 related disease are at higher risk of VTE following discharge than other medical inpatients.

A rapid review of the published evidence relating to the benefits and harms of extended thromboprophylaxis in patients with COVID-19-related disease following discharge from hospital, undertaken to support this guidance, found no published evidence specifically in this patient population. The evidence that was found was largely based on expert opinion and related to outcomes for patients without COVID-19-related disease.

The rapid review identified 24 publications. Of these, two provide guidance developed through international collaboration (with conflicts of interest recorded), which included a description of the methodology including some form of systematic identification of the evidence, and an indication that some form of formal consensus method was used to develop the recommendations. The quality of these publications was not formally assessed. Both were based on studies in non-COVID-19 populations and, as outlined below, they reached different conclusions.

The CHEST Guideline and Expert Panel Report recommended inpatient thromboprophylaxis only on the basis that, "Despite evidence suggesting a higher risk of VTE during hospitalisation in patients with COVID-19 than in patients without COVID-19… post-discharge VTE and major bleeding rates in COVID-19 patients are currently unknown".[2] They did, however, remark that "Extended thromboprophylaxis…should be considered if emerging data…indicate a net benefit of such prophylaxis".

Conversely, the second guideline recommended that extended post-discharge thromboprophylaxis with LMWH or a DOAC should be considered for all hospitalised patients with COVID-19 that meet high VTE risk criteria. The duration of post-discharge treatment was given as between 14 and 30 days.[7]

2.6.1 Type and duration of extended thromboprophylaxis

In the absence of evidence specifically in patients with COVID-19-related disease, it is not possible to make specific recommendations about the type and duration of extended thromboprophylaxis.

COVID-19 may yield unknown long-term effects on lung function and cases of pulmonary cavitation have been seen. It is, therefore, important to be aware of this when choosing the agent for extended anticoagulation.

Concerns about the use of DOACs in patients with COVID-19-related disease (see section 2.2) extends to their use for extended thromboprophylaxis. In the rapid review, one report cautioned against their use due to the possibility of an increased DOAC-related bleeding risk when used with experimental antiviral treatments, and the potential for organ dysfunction.[8]

Although there is no good clinical evidence to support the need for extended thromboprophylaxis in patients discharged from hospital following COVID-19-related disease, or clear evidence as to which agent or duration of treatment to use, there is a clinical rationale for considering it in patients at high risk for VTE and low risk of bleeding.

The assessment of VTE risk can be undertaken systematically using one of the available validated scoring tools, such as International Medical Prevention Registry on Venous Thromboembolism (IMPROVE).[9] An online calculator is available to estimate the 3-month risk of VTE based on four risk factors known at or before admission (www.outcomes-umassmed.org/improve/) and a separate calculator which estimates 3-month risk of VTE based on seven factors occurring prior to and during hospital stay (www.outcomes-umassmed.org/IMPROVE/risk_score/index.html).

When extended thromboprophylaxis is considered to be appropriate, ie in a patient with COVID-19-related disease who is at high risk of thrombosis and low risk of bleeding, it is recommended that the choice of agent and duration of treatment be decided on a case by case basis after discussion between the patient and the clinician. Options for treatment may include a LMWH or DOAC for 14 days following discharge in patients without contraindications.

It is important to note that none of the DOACs licensed for use in the UK have a licence for thromboprophylaxis in medical inpatients. If used, local unlicensed medication policies, including patient consent, should be followed.

2.7 Treatment of (venous or pulmonary) thromboembolism

2.7.1 How should I treat VTE in patients with COVID-19 related disease?

Well recognised anticoagulation regimens for treatment of VTE can also be used to treat VTE in patients with COVID-19 related disease. These include:

- standard weight-based, renal function-adjusted, therapeutic dose LMWH alone or followed by warfarin (INR target range 2–3)
- standard weight-based, renal function-adjusted, therapeutic dose DOAC.

2.7.2 How long should I treat with anticoagulation in a patient with proven COVID-19-related PTE?

The development of VTE in patients with COVID-19-related disease is best regarded as a provoked event. It is likely to be a consequence of prolonged immobility, a pro-inflammatory and pro-coagulant state, and injured endothelium. For this reason, anticoagulation should be administered for at least 3 months.

Prior to stopping anticoagulation, patients with an objectively confirmed or presumed pulmonary embolism should be reviewed in a PTE follow-up clinic (or similar respiratory/haematology follow-up clinic) to ensure that there have been no long-term sequelae as a result of the PTE. The exact nature of follow up will be determined by the availability of local expertise and resources.

3. Methodology

This guidance has been produced on behalf of the Scottish Government's Chief Medical Officer in response to the COVID-19 pandemic situation and so has not followed the standard process used by SIGN to develop guidelines. The recommendations are based on expert opinion and a rapid review of the evidence on extended prophylaxis in patients with COVID-19 related disease, with rapid expert peer review as assurance.

3.1 Updating the guidance

The guidance will be reviewed and updated in September 2020 or if significant new evidence emerges.

3.2 Contributors

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3.3 Peer review

This guidance was reviewed by members of the **Clinical Guidance Cell** and the following independent experts.

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3.4 Editorial review

As a final quality check, the guideline was reviewed by an editorial group, as follows:

Professor Tom Evans	Professor of Molecular Microbiology, Institute of Infection, Immunity & Inflammation, University of Glasgow And Consultant Infectious Disease Physician, NHS Greater Glasgow & Clyde
Dr Roberta James	Programme Lead, SIGN
Dr Safia Qureshi	Director of Evidence, Healthcare Improvement Scotland

Abbreviations

ARDS	acute respiratory distress syndrome
CCU	critical care unit
CPAP	continuous positive airway pressure
CT	computerised tomography
CTPA	computed tomography pulmonary angiography
DOAC	direct oral anticoagulant
DVT	deep vein thrombosis
HDU	high-dependency unit
HIT	heparin-induced thrombocytopaenia
ICU	intensive care unit
IMPROVE	International Medical Prevention Registry on Venous Thromboembolism
INR	international normalised ratio
IPC	intermittent pneumatic compression
LMWH	low molecular weight heparin
NET	neutrophil extracellular trap
PTE	pulmonary thromboembolism
RRT	renal replacement therapy
RT-PCR	reverse transcription polymerase chain reaction
RV	right ventricular
SIGN	Scottish Intercollegiate Guidelines Network
UFH	unfractionated heparin
VTE	venous thromboembolism

Appendix 1: Example of a local protocol for prevention of thrombosis in COVID-19 positive inpatients not receiving renal replacement therapy (RRT) on critical care wards

Prevention of thrombosis in COVID-19 +ve‡ adult inpatients not receiving renal replacement therapy (RRT) on Critical Care Wards‡‡

NHS Greater Glasgow and Clyde

‡Patients are classified as COVID-19 +ve if they have clinical features of COVID-19 infection and/or test positive for COVID-19

‡‡Includes COVID-19 +ve inpatients in Critical Care wards (High Dependency or Intensive Care)

- There is anecdotal and post mortem evidence that patients who are COVID +ve are at increased risk of venous thrombosis, particularly those who are most unwell
- It is possible that standard prophylactic doses of LMWH are less effective in COVID +ve patients
- Increasing the frequency +/- duration of prophylactic doses of LMWH may reduce the risk of venous thrombosis
- Clinicians involved in the development of this guideline have thoroughly considered the pros and cons of moving away from standard thromboprophylaxis doses

Recommendation

- **Prescribe enoxaparin SC 40 mg twice daily*** for every COVID +ve inpatient on Critical Care who has no contraindications. Please note dose adjustments and monitoring requirements below.
- ***Dose adjustments** (CrCl calculator available here)
  - Reduce enoxaparin dose to SC 20 mg twice daily if CrCl 15-29 ml/min or weight <50 kg
  - Increase enoxaparin dose to SC 60 mg twice daily if weight >120 kg (see below for additional monitoring if CrCl <30 ml/min)
  - Change to unfractionated heparin (UFH) SC 5000 units twice daily if CrCl <15 ml/min [recommended preparation: heparin sodium 5000 units in 0.2 mL ampoules]
  - For pregnant women weighing >90 kg, specialist advice should be sought from obstetrics/haematology
- **Monitoring requirements**

  AntiXa monitoring is recommended in the following patient groups:
  - **CrCl <30 ml/min:** check antiXa 4 hours post dose after 10 doses
  - **Weight <50 kg:** check antiXa 4 hours post dose after 10 doses
  - **Weight >120 kg:** check antiXa 4 hours post dose after 3 doses, repeat after 10 doses if CrCl <30 ml/min

  Target antiXa: 0.1-0.4 units/ml. If out with target, please seek advice from consultant haematologist.
- **Contraindications against thromboprophylaxis with UFH or LMWH**
  - Platelet count ≤ 50 x10^9/l (40mg enoxaparin once daily can be used if platelet count 25-49 x10^9/l)
  - Receiving anticoagulation for another reason
  - Patient considered to be at high bleeding risk e.g. recent intracranial haemorrhage, untreated inherited/acquired bleeding disorders
  - Trauma with high bleeding risk
  - Active bleeding
  - Heparin induced thrombocytopaenia – see details in page 2
  - Acute stroke (use IPC if immobile & contact stroke team for guidance)
  - Within 12 hours of procedures e.g. surgery, lumbar puncture
  - Acute bacterial endocarditis
  - Persistent hypertension (BP ≥230/120)
  - Liver failure and INR>2

Patients with contraindication for thromboprophylaxis should be considered for mechanical thromboprophylaxis with intermittent pneumatic compression (IPC).

When clinical condition improves and patient is moved to a downstream ward, standard prophylactic LMWH should be prescribed until discharge as per COVID Thromboprophylaxis Guideline.

Thromboprophylaxis during COVID19 pandemic v8, 28/4/20, CBagot, B Miles, G Chalmers, D McCarey, C Geddes

Appendix 2: Example of a local protocol for thromboprohylaxis in COVID-19 patients in non-critical care areas

COVID-19 patients in Non-Critical Care areas: Don't forget Thromboprophylaxis!

NHS Greater Glasgow and Clyde

For guidance on thromboprophylaxis in COVID-19 patients in Critical Care areas (Intensive Care and High Dependency) see separate guidelines on the Guideline Directory on Staffnet.

This document applies to non-pregnant patients only. For advice on thromboprophylaxis for pregnant patients with suspected or confirmed COVID-19, seek specialist advice and see separate guidance on the Guideline Directory.

- Patients with COVID-19 are at high risk of venous thrombosis
- Pulmonary Embolism (PE) occurs in patients with COVID-19
- Some deaths associated with COVID-19 may be due to PE
- Thromboprophylaxis reduces VTE by 65% in medical inpatients

Using thromboprophylaxis in patients with COVID-19 will likely save lives

- **Prescribe Enoxaparin SC 40 mg once daily**** for every patient, with no contraindications, admitted to hospital with possible or definite COVID-19
- ****Reduce dose to 20 mg od if eGFR <30 ml/min/1.73 m² or weight <50 kg**

  **** Increase dose to 40 mg bd if weight >120 kg** (see relevant GGC guideline for dose adjustments and monitoring in patients at extremes of body weight)

  - **Contraindications**
    - Platelet count < 25 x10⁹/l
    - Receiving anticoagulation for another reason
    - Patient considered to be at high bleeding risk e.g. recent intracranial haemorrhage, untreated inherited/acquired bleeding disorders
    - Trauma with high bleeding risk
    - Active bleeding
    - Heparin induced thrombocytopaenia
    - Within 12 hours of procedures e.g. surgery, lumbar puncture
    - Acute bacterial endocarditis
    - Persistent hypertension (BP ≥230/120)
    - Liver failure and INR>2
  - **In COVID-19 positive patients with ischaemic stroke:**
    - Prescribe enoxaparin SC 40 mg once daily** 48 hours after the onset of stroke and continue intermittent pneumatic compression (IPC)
    - Stop IPC 14 days after diagnosis of COVID and continue enoxaparin if no adverse effects and patient is still immobile
- **Remember**
  - Patients with COVID-19 can develop abnormal coagulation and thrombocytopaenia BUT bleeding symptoms are rare
  - Prolonged PT, APTT and TCT are not a contraindication to administering thromboprophylaxis as long as fibrinogen is ≥1.0 (this is measured automatically by the lab if TCT ≥18secs)
  - For guidance relating to mechanical thromboprophylaxis, see the general thromboprophylaxis guideline in the Adult Therapeutics Handbook.

Thromboprophylaxis during COVID19 pandemic v5.1 June 2020, CBagot on behalf of GGC Thrombosis Committee

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Other sources of information

Intercollegiate consensus document: Clinical guide for the prevention, detection and management of thromboembolic disease in patients with COVID-19

BTS Guidance on Venous Thromboembolic Disease in patients with COVID-19