Venous thromboembolism (VTE) prophylaxis for Neurosurgical Patients in DCCM

1. Purpose of document

To provide guidelines for venous thromboembolism (VTE) prophylaxis for neurosurgical patients in the Department of Critical Care Medicine (DCCM)

2. Responsibility

All medical and nursing staff providing care and treatment for neurosurgical patients admitted to the DCCM.

3.Background

Prevention of VTE in the neurosurgical population in critical care is challenging. There is an uneasy balance between the risk of VTE and the risk of intracerebral bleeding which are in direct conflict. The consequences of either can lead to significant additional morbidity or even mortality and although there are some studies and guidelines to help guide this decision, the evidence base is limited.

At joint meetings between DCCM and neurosurgery this decision has been raised several times, with morbidity illustrated more recently by two cases of massive pulmonary embolism in neurosurgical patients. There have also been historical cases of intracerebral bleeding which have caused consternation when deciding whether to commence chemoprophylaxis. Internal audit has shown that we have variable practice in applying VTE prophylaxis and it is frequently delayed for over a week.

There is general agreement between both DCCM and neurosurgical medical staff that the introduction of a consensus guideline will help to standardise management and to align practice with best available evidence and therefore improve outcomes.

Although neurosurgical patients are a very heterogenous group, studies or guidelines covering key pathophysiological subgroups including severe traumatic brain injury[1,2,3], subarachnoid haemorrhage[4,5], stroke (including ICH)[5], and postoperative[6] neurosurgical patients all outline that there is a high risk of VTE(16-35% for TBI, 16-29% for craniotomy, 15% for stroke) and indicate relative safety from intracerebral bleeding, and reduced risk of VTE if given chemoprophylaxis by 48-72 hours so long as there has not been an increase in intracerebral haematoma on repeat CT[7,8,9]. The risk of VTE rises sharply if delayed beyond 72-96hrs[9].

Several guidelines indicate that low molecular weight heparin (LMWH) is more effective than unfractionated heparin with similar rates of bleeding except for patients in renal failure, where unfractionated heparin is recommended due to delayed excretion of LMWH[3,5,9].

4. Inclusion Criteria

All neurosurgical patients admitted to the DCCM

5. Exclusion Criteria

Patient care may deviate from this guideline if:

- The duty intensivist and neurosurgical consultant determine a clinical indication for deviation from this document or deem the patient high risk for bleeding. In this case a consensus decision will be made between them (+/- thrombosis team involvement)
- The patient has a condition that is deemed unsurvivable and has been admitted for palliative care.
- The patient has a known bleeding or clotting disorder, which should precipitate careful discussion between the Intensivist, neurosurgeon (+/- thrombosis team if deemed necessary).
- The patient is receiving full dose anticoagulation for another indication. This does not include antiplatelet therapy.

6. VTE prophylaxis guideline for neurosurgical patients

Mechanical prophylaxis reduces the risk of VTE relative to no prophylaxis, and when combined with pharmacologic prophylaxis is more effective than either alone[9]. Therefore all patients should receive pneumatic compression stockings if able to tolerate.

In the absence of the above exclusion criteria, pharmacologic prophylaxis in the form of subcutaneous enoxaparin 40mg daily (or unfractionated subcutaneous heparin 5000units 8-12hourly in patients with renal impairment) should be initiated at 48-72 hours for all neurosurgical patients.

Most secondary bleeds occur in the first 3 days following TBI[10]. A repeat CT head may be performed in the first 48-72hrs after admission and prior to commencement of VTE prophylaxis if it is clinically indicated. If there has been a dynamic increase in haematoma size, VTE prophylaxis should be delayed until 48 hours after the haematoma has remained at a stable volume.
Dual antiplatelet therapy does not provide VTE prophylaxis, and is not a contraindication to giving usual pharmacologic VTE prophylaxis.

VTE prophylaxis can be commenced on patients with an EVD or ICP monitor. However, any EVD or ICP monitor insertion, manipulation or removal, or other invasive neurosurgical procedure should not occur within 6 hours of a VTE pharmacoprophylaxis dose unless acutely warranted.

7. References

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