Anticoagulation 2: Heparin

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In Part 2 of our podcast series about anticoagulation, James talks to Dr Ed Abadir about the use of heparin on the wards.

In Part 1 we discussed warfarin. To catch up on that podcast, please visit Anticoagulation 1: Warfarin.

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About Dr Ed Abadir

Edward Abadir is currently a Haematology registrar at Royal Prince Alfred Hospital and Concord Hospital. He studied medicine at the University of Sydney prior to internship and completed his residency at Royal Prince Alfred Hospital. Ed completed his Basic Physicians Training at Royal Prince Alfred Hospital in 2013.

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With Dr. Edward Abadir, Haematology Registrar at Royal Prince Alfred Hospital and Concord Hospital, New South Wales, Australia.

Case 1 – You are asked to heparinise a patient with a CTPA proven pulmonary embolus. Outline your approach, especially what influences your decision to use either low molecular weight heparin or unfractionated heparin.

Unfractionated Heparin

- Pros
    - Anticoagulant action is reversible. Short half-life, so stopping the infusion is often effective, but more rapidly reversed with protamine sulphate.
    - Dose independent of renal function.
- Cons
    - Therapeutic unfractionated heparin is more difficult to administer as a continuous IV infusion is required (subcutaneous is only for prophylaxis). It needs to be monitored. Regular aPTT monitoring tests, starting 6 hours after the beginning of the infusion and 6 hours after any dose change. Once stable monitoring can be undertaken every 24 hours.

Low Molecular Weight Heparin – Enoxaparin (Clexane)

- Pros
    - Ease of administration. Twice or once daily subcutaneous injection rather than infusion.
    - No monitoring is required for most patients. LMWH has much more stable pharmacokinetics.
    - It is thought to be marginally more effective than unfractionated heparin in some situations.
- Cons
    - Accumulates in patients with impaired renal function. These patients will need to have dose monitoring or are not suitable, depending on their renal function.
        - eGFR>30 – dose monitoring using anti-Xa levels. This is done by taking a peak anti-Xa level 4 hours after administration.
        - eGFR<30 – LMWH is not absolutely contraindicated but most clinicians would not feel comfortable using it below this level.
    - There is little evidence for dosing or effectiveness at extremes of weight – there is less evidence for patients >100kg, with unknown pharmacokinetics >150kg. Dose monitoring can also be performed in these patients.
- **Do patients require a coagulation check prior to starting anticoagulation?**
    - Not usually, unless there is a suspicion of something raising their APTT prior (like lupus anticoagulant).
- **What is your approach when the APTT comes back high whilst on a heparin infusion? Say >120?**
    - The best approach generally is to consult whatever guidelines you are working with. The RPA guidelines suggest stopping for 2 hours and then rechecking the APTT, before recommencing it at a lower dose.
    - Heparin is nearly impossible to use without guidelines, because ofthe variability between patients is so great.
- **What situations would you monitor enoxaparin dosing?**
    - Enoxaparin is monitored using Anti-Xa levels. They are useful in the setting of impaired renal function. Often the creatinine may be borderline, but you still feel enoxaparin is the right drug.
    - Monitoring is done by taking an anti-Xa level at the peak of effect, which is usually 4 hours post administration.
    - Anti-Xa levels can also be used at extremes of weight, as we know patients can be subtherapeutic or supratherapeutic.
- **How is clexane dosed?**
    - 1mg/kg BD and 1.5mg/kg daily
    - Above 100kg (so >100mg BD or 150mg once daily) the risk of bleeding increases, but somewhat paradoxically so does the risk of subtherapeutic dosing and clotting. Generally best to confirm with the boss that they are happy to start on a dose >100mg.

- **What is your approach to a patient who is bleeding whilst on heparin?**
    - The first step is standard management of bleeding; so resuscitation if required, compress the area if possible and consider interventions to stop the bleeding.
    - Stop the infusion immediately. Be sure to check that it has actually stopped as it may be overlooked during the chaos.
    - The next step to consider is reversal with protamine sulphate. Protamine binds heparin and removes it from the system, it is very effective but not without its difficulties in administration. As such it should be given in consultation with someone who has experience giving it – generally anaesthetics or haematology.
- **What is your approach to a patient who is bleeding whilst on clexane?**
    - The standard resuscitation steps as above, as well as stopping clexane, however this is generally less of an issue due to the intermittent dosing.
    - Protamine sulphate does bind heparin – but only about 60%. Again, it needs to be given in consultation with someone who has experience giving it.

– Case 2 - Going back through the notes for this patient, you find they were never charted DVT prophylaxis. Which patients should receive DVT prophylaxis and how do you chart it?

- Who should receive it is a bit controversial.
    - Medial patients who are very ill and especially those who are bedridden should receive it. Any patients who have impaired mobility, especially stroke patients, should also receive it (but make sure that neurology is happy).
    - Surgical patients– the pro inflammatory state of surgery creates a high risk scenario so all surgical patient should, unless the thought is that the risk of bleeding is too high. The exception is day only surgery when the patient is ambulating immediately afterwards – these patients do not require prophylaxis.
- How to chart it:
    - Enoxaparin 40mg daily is the standard dose (20mg daily in small elderly, consider increasing in obese patients but 40mg is the standard accepted dose for most.
    - Heparin 5000 units BD (2500 units in <40kg).

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- Anticoagulation 1: Warfarin
- Anticoagulation 3: New oral anticoagulants

- Atrial fibrillation

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