

70.4 ANTICOAGULATION WITH INTRAVENOUS UNFRACTIONATED HEPARIN

Use in conjunction with [Guideline 238 Anticoagulant Treatment for Adult Patients with Venous Thromboembolism](#).

1. Anticoagulation with intravenous unfractionated heparin (UFH) requires close monitoring using activated partial thromboplastin time (APTT ratio) testing. Do reconsider this if the patient cannot be monitored adequately.
2. Target APTT ratio for this protocol is 1.5 - 2.5.
3. Check baseline APTT ratio and platelet count before starting treatment. Do not wait for results before commencing urgent treatment. Discuss with Haematology prior to starting treatment if abnormal clotting is suspected.
4. Only heparin sodium 1,000 units in 1 ml should be used.
5. Consideration should be made to omitting the bolus dose in certain circumstances (i.e. when a pre-existing anticoagulant effect is present and when the patient has not had a thrombus in the previous 3 months). When immediate anticoagulation effect is required, administer heparin sodium 5000 units IV bolus.
6. Adverse effects of heparin include bleeding and risk factors include age >70, recent surgery, trauma or renal failure. Heparin induced thrombocytopenia (HIT) is also associated with the use of unfractionated heparin.
7. Consider heparin resistance in patients needing >40,000 units/24 hours to maintain APTT ratio in therapeutic range. Anti-Xa levels are required to distinguish between true and apparent resistance. Please contact haematology prior to considering Anti-Xa levels.
8. UFH has a short half-life of 30 - 60 minutes, and stopping the infusion 3 - 4 hours before a procedure for patients with a therapeutic APTT ratio will usually bring the APTT into normal range.
9. UFH is completely reversed by the use of protamine. Consider the use of protamine in major bleeding or an emergency surgical procedure. 1 mg protamine neutralises 80 – 100 units of heparin when given within 15 minutes.³

Please see summary of product characteristics (SPC).²

DO NOT give fresh frozen plasma (FFP) as it can exaggerate the anticoagulant action of heparin.

Heparin Sodium Schedule:

- Load with 5000 units IV bolus over 5 minutes.
- Followed by continuous intravenous infusion, initially at 18 units/kg/hour (i.e. 30,000 units over 24 hours in 70 kg patient).³ Dosage reduction may be advisable in elderly, in patients with advanced renal or hepatic disease. The risk of bleeding is increased with severe renal impairment and in the elderly (particularly elderly women).² See [Table 1](#) overleaf for rates of infusion.
- Check the APTT after 4 - 6 hours and adjust the dose as per [Table 2](#) overleaf. This is particularly important to ensure adequate anticoagulation is achieved in the first 24 hours.

Table 1: Flow rate chart (for syringe pumps using heparin sodium 20,000 units/20 ml)

Dose to be given over 24 hours (units)	Rate of infusion (ml/hour)*
20,000	0.8
21,000	0.9
22,000	0.9
23,000	1.0
24,000	1.0
26,000	1.1
28,000	1.2
30,000	1.3
32,000	1.3
34,000	1.4
36,000	1.5
38,000	1.6
40,000	1.7

*Infusion rates have been rounded to the nearest decimal point.

Monitoring

- APTT ratio should be in the range 1.5 – 2.5 x control.
- Check APTT 2 to 6 hours after a change in dose and every 24 hours if the dose is stable. Send bloods early in the day.
- Repeat full blood count (FBC) on alternate days from day 4 – day 14 on UFH infusion to monitor platelet count.

Heparin induced thrombocytopenia (HIT) is an antibody mediated adverse effect of heparin with a strong association with both arterial and venous thrombosis.

- Calculate the HIT score using the 4 Ts: Thrombocytopenia, timing, thrombosis and other causes of thrombocytopenia.
- Intermediate or high risk score warrants a screening test - liaise with Haematology.

Table 2

APTT* ratio	Dose adjustment	When to re-check APTT
<1.2	Increase infusion rate by 400 units/hr (0.4 ml/hr)*	4 - 6 hours
1.2 - 1.5	Increase infusion rate by 200 units/hr (0.2 ml/hr)*	4 - 6 hours
1.6 - 2.5	No change	24 hours
2.6 - 3.0	Reduce infusion rate by 200 units/hr (0.2 ml/hr)*	4 - 6 hours
3.1 - 4.0	Reduce infusion rate by 300 units/hr (0.3 ml/hr)*	4 - 6 hours
4.1 - 5.0	Stop the infusion for 60 minutes. Reduce infusion rate by 400 units/hr (0.4 ml/hr)*	4 - 6 hours
≥5.1	Stop the infusion for 60 minutes. Reduce infusion rate by 500 units/hr (0.5 ml/hr)*. Inform doctor.	4 - 6 hours

* Infusion rates have been rounded to help calculation.

Note: If Cardiology or specialist centre recommends APTT ratio targets that differ to the above please amend chart (sign + date) and document in patient's notes.

References

- 1- Unfractionated Heparin Infusion Prescription. Imperial College Healthcare NHS Trust. v2015.
- 2- Summary of Product Characteristics. Heparin sodium 1000 units/ml solution for injection. www.medicines.org.uk. Last updated on eMC: 08 Oct 2018. Accessed on 08/02/2019.
- 3- Guideline on the use and monitoring of heparin. British Society of Haematology. 2006;133,19-34.
- 4- Guide to Anticoagulant Therapy. Heparin: A Statement for Healthcare Professionals from the American Heart Association. Circulation 2001, 103:2994-3018.

See also:

[Guideline 83FM](#) [Peri-operative Bridging of Warfarin Therapy in Adult Patients undergoing Elective Surgery or Invasive Procedures](#)

[Guideline 85](#) [Anticoagulation during Percutaneous Coronary Intervention](#)

[Guideline 191FM](#) [Protocol for Over-anticoagulation with Warfarin](#)

[Guideline 192](#) [Guideline for the use of Fresh Frozen Plasma \(FFP\) and Cryoprecipitate](#)

[Guideline 199](#) [Management of Anticoagulant and Antiplatelet Therapy for Elective Gastrointestinal Endoscopic Procedures](#)

[Guideline 222](#) [Adult and Paediatric Injectables Guide](#)

[Guideline 238](#) [Anticoagulant Treatment for Adult Patients with Venous Thromboembolism](#)

[Guideline 733FM](#) [Thromboprophylaxis in Adults](#)

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