



# Updated 2021 INTRAVENOUS HEPARIN INFUSION Learning Package for Nurses/Midwives

**Participant Name:**

**Assessor Name:**

**Date package Completed:**

**Date entered on to HETI:** / /

**HETI Code: 94741346 (or CSK 13976)**

NB this learning package has been updated to reflect the following Protocol changes:

- VTE ATE AF & other conditions protocol replaced by **Standard Risk protocol**
- STEMI (in conjunction with thrombolysis) protocol replaced by **Higher Bleeding Risk protocol**

## INTRODUCTION

Continuous intravenous infusion of **heparin sodium (IV heparin)** is used to prevent and manage venous and arterial thromboembolism. The clinical indications for IV heparin in SESLHD include acute myocardial infarction, deep vein thrombosis, pulmonary embolism, atrial fibrillation, peripheral artery disease and in some cases acute stroke. Systemic anticoagulation with **IV heparin** is also commonly used as bridging therapy for individuals ceasing oral anticoagulation temporarily for invasive procedures.

**Heparin** belongs to a group of medicines called **anticoagulants**. **Heparin** acts through inactivation of blood clotting factors. Anticoagulants have a narrow therapeutic index, meaning over or under anticoagulation can have devastating consequences. **Heparin** and other **anticoagulants** have a high risk of causing patient injury or death (related to extensive bleeding) if they are inadvertently misused or administered incorrectly. In addition to bleeding, patients can experience an uncommon but serious adverse reaction known as heparin induced thrombocytopenia (HIT) which carries a mortality rate of thirty percent.

IV **heparin** is a high risk medication and has been linked to serious adverse patient outcomes. Review of incidents revealed the importance of documenting the clinical indication for IV Heparin, using the appropriate IV heparin protocol and documenting the actions related to the infusion (i.e. titration).

To improve the safety of IV heparin management SESLHD facilities will implement the [Anticoagulation with Intravenous Heparin Sodium Infusion - SESLHDPR/402](#). The procedure standardises the process to prepare, prescribe and administer IV heparin. It includes the approved IV heparin infusion protocols which are:

- Standard Risk Protocol – used in conditions such as atrial fibrillation, venous or arterial thromboembolic disease and prosthetic heart valves where intravenous heparin therapy is indicated.
- Higher Bleeding Risk Protocol – used in conditions where risk of bleeding needs to be minimised such as acute coronary syndrome when intravenous heparin therapy is indicated.
- Acute Stroke Protocol - only used following consultation with the Attending Medical Neurologist. (Bolus rarely required. Seek advice of Attending Neurologist).

To centralise and improve the documentation of IV heparin, documentation will be recorded on the SESLHD Intravenous Heparin Sodium chart (SES130.030).

This learning package has been designed to ensure all nurses/midwives are aware of their professional responsibilities related to the preparation, administration, monitoring and documentation of IV **heparin**.

This learning package may be completed by Registered Nurses (RNs)/ Registered Midwives (RM) and Enrolled Nurses (ENs) who have completed all relevant board approved units of study for medication AND intravenous medication administration.

Titration (rate adjustment) of IV heparin can only be undertaken by nurses/midwives who have successfully completed the SESLHD Intravenous Heparin Infusion learning package.


## RESOURCES

This learning package can be completed by referring to the SESLHD Procedure 'Anticoagulation with Intravenous Heparin Sodium Infusion' (under 'H' for Heparin):

- [SESLHDPR/402 - Anticoagulation with Intravenous Heparin Sodium Infusion](#)
- [SESLHDPR/303 - Clinical Handover: Implementation of the ISBAR Framework and Key Standard Principles](#)
- [NSW Ministry of Health Policy Directive PD2013\\_043 - Medication Handling in NSW Public Health Facilities](#)
- [NSW Ministry of Health Policy Directive PD2016\\_058 – User-applied Labelling of Injectable Medicines, Fluids and Lines](#)

- [NSW Ministry of Health Policy Directive PD2020\\_045 - High-Risk Medicines Management](#)

### Other resources to assist with completion of learning package:

- Further information regarding IV heparin may be found at the links below: IV heparin. Full Product Information  
<https://www.ebs.tga.gov.au/ebs/picmi/picmirepository.nsf/PICMI?OpenForm&t=&q=heparin>
- POW intranet page >'services' >under Haematology (non cancer ), >'Antithrombotic management' (see link below)  
[http://seslhnweb/powh/Services/Haematology/Antithrombotic\\_Management/](http://seslhnweb/powh/Services/Haematology/Antithrombotic_Management/)
- MIMS manual
- NSW Policy Directives and South Eastern Sydney Local Health District Policies.
- CIAP portal accessed through the  icon on computer desktops located in your ward. Through this portal the following can be accessed: Australian Injectable Drug Handbook; Australian Medicines Handbook; BNF Children Therapeutic Guidelines and MIMS Manual.

### OBJECTIVES

The purpose of this learning package is to:

- Provide staff with education to increase their knowledge regarding the basic pharmacology of IV heparin as a therapeutic anticoagulant including class of medication, mechanism of action, principles of administration, monitoring, common adverse effects, and management of bleeding.
- Provide staff with education to increase their knowledge regarding the clinical indications and SESLHD approved protocols used for anticoagulation with IV heparin
- Facilitate safe practice and adherence to SESLHD procedure in regards to the **preparation, administration, monitoring and documentation** of IV heparin.

### LEARNING OUTCOMES

The learner who successfully completes this learning package will comprehend the nursing/midwifery responsibilities involved with preparation, administration, monitoring and documentation of anticoagulation with IV heparin.

### ACKNOWLEDGEMENTS:

This learning package was developed by members of the SESLHD Heparin Working Party in April 2015.

The learning package was adapted from the POWH Intravenous Heparin Infusion Learning Package developed by Sarah Lyons CNC Venous Thromboembolism (VTE)

prevention in January 2014 as part of initiatives undertaken by the POWH Heparin and other Anticoagulants High Risk Medicine Working Party.

The format of this learning package has been adapted from the 'S4D & S8 MEDICATION' learning package which was based on the original work by Parkes 4 Oncology Unit & Dickinson 2 North Surgical Unit POWH

## INSTRUCTIONS

Read the Anticoagulation with Intravenous Heparin Sodium Infusion Procedure – [SESLHDPR/402 - Anticoagulation with Intravenous Heparin Sodium Infusion](#). Circle or underline the correct response.

Sample Question:

Q. The approved IV Heparin infusions in SESLHD are:

- a. Standard Risk Protocol
- b. Higher Bleeding Risk Protocol
- c. Acute Stroke
- d. All of the above

## QUESTIONS

**Q1. Heparin belongs to the class of medications known as?**

- a. Antiplatelet medications
- b. Anticoagulants
- c. Anti-inflammatory medications
- d. Fibrinolytic medications

**Q2. Heparin is a high risk medication. The main risk with ‘Anticoagulation with IV heparin is:**

- a. Bleeding
- b. Infection
- c. Allergic reaction
- d. Anemia

**Q3. Safe administration of ‘Anticoagulation with Intravenous IV heparin’ requires:**

- a. Appropriate dosing according to clinical indication and body weight
- b. Individualisation of Heparin infusion rate by measurement of APTT and protocol directed rate (dose) adjustments
- c. Regular review of the patient’s clinical progress and documentation of IV heparin therapy on the Intravenous IV Heparin Sodium Chart
- d. All of the above

**Q4. In regards to bolus doses of IV heparin which statement is the most correct?**

- a. All patients must receive a bolus to achieve therapeutic levels of Heparin quickly
- b. Bolus prescriptions are weight and protocol dependant
- c. The initial bolus dose must be given by the responsible medical officer
- d. Bolus dosing can be administered via a volumetric pump using the premixed Heparin infusion rather than using the Heparin 5000 units in 5 mL solution

**Q5. Not all patients will require a bolus dose of IV heparin sodium. The responsible Medical Officer must refer to the relevant protocol for instructions regarding bolus dose prescription.**

**An IV bolus of heparin is given in conjunction with the initiation of the IV Heparin infusion if an immediate anticoagulant effect is required.**

**A patient would NOT receive a bolus dosing of heparin sodium if:**

- a. The patient is already therapeutically anticoagulated (e.g. switching from Warfarin to IV Heparin infusion where the INR is therapeutic).
- b. The Acute Stroke protocol is in use (a patient has been diagnosed with an acute ischaemic stroke and is at risk of a bleeding or haemorrhagic transformation).
- c. The responsible Medical Officer has deemed the bolus is not indicated or safe for an individual patient in a specific clinical situation (i.e. the patient does not require or should not receive immediate anticoagulation). In this instance this rationale has been documented in the patient's Health Care Record. An example may include restarting IV Heparin infusion following a high bleeding risk surgery such as a craniotomy.
- d. All of the above.

**Q6. Which statement, about the safe monitoring of a patient receiving a heparin infusion, is most accurate?**

- a. Coagulation studies should be included in the patient's daily blood tests.
- b. Blood should be taken to check the APTT 4- 6 hours after commencement of the heparin infusion and 4-6 hours after every heparin dosage change.
- c. APTT monitoring should be checked at the same time every day until stable
- d. Blood tests and results monitoring are the sole responsibility of the medical team.

**Scenario based questions:**

The following scenario based questions (Q.7 & 8) relate to **commencing a Heparin infusion**:

***You have been asked to commence a Heparin Infusion for one of your patients with a newly diagnosed Pulmonary Embolism. The patient has a history of a heart attack 10 years ago and a stroke 4 years ago.***

**Q7. The correct protocol that the prescribing medical officer should select is the:**

- a. Standard Risk Protocol
- b. Higher Bleeding Risk Protocol
- c. None of the above

**Q8. The patient has only one peripheral intravenous cannula *in situ* which is required for intermittent intravenous antibiotics. Do you:**

- a. Use this cannula to connect the heparin infusion to and stop it for antibiotics when required
- b. Arrange a maintenance fluid line to connect to the cannula for intermittent antibiotics and 'piggy back' the heparin infusion at the 'y site'
- c. Arrange for the insertion of dedicated intravenous access (peripheral intravenous cannula) for use for the continuous intravenous heparin infusion
- d. Liaise with the prescriber to have the heparin order changed to an alternate route (e.g. oral, intramuscular, subcutaneous)



**Q9. The dosing of heparin bolus and infusion is weight based. Which of the following is correct?**

- a. Ideal body weight is preferred
- b. An estimate of total body weight is preferred to weighing the patient
- c. Weighing the patient and recording the actual body weight is preferred
- d. The weight recorded in the patient care record from previous admissions is fine

**The following scenario based questions (Q. 10, 11, 12, 13, 14 &15) relate to the scenario outlined below:**

***You have been asked to commence a Heparin Infusion on one of your patients who usually takes warfarin but is now nil by mouth (NBM). The current INR is 1.5. The patient has a mechanical heart valve and weighs 70kg. The infusion will be administered via an infusion pump.***

**Q10. The correct protocol that the prescribing medical officer should select is the:**

- a. Standard Risk Protocol
- b. Higher Bleeding Risk Protocol
- c. None of the above

**Q11. The bolus dose (unless AMO orders a HIGHER weight based bolus) **prescribed is:****

- a. 1260 units
- b. 13 mL
- c. 2.5 mL
- d. 5000 units

**Q12. The commencement rate for the heparin infusion will be:**

- a. 1350 units
- b. 13 mL
- c. 2.5 mL
- d. 5500 units

**Q13. The APPT result was collected according to protocol and you have reviewed the result with another Nurse/ Midwife. The APTT result is 100 seconds. The required nursing action is:**

- a. Give a bolus dose of Heparin 5000 units and repeat the APTT in 4-6 hours
- b. Stop the infusion for 90 minutes, alert the Medical Officer to review the patient for bleeding and restart the infusion (after 90 minutes) at 2mL/hr less than the previous rate. Repeat the APTT in 4-6 hours
- c. Nil action. No change from current rate. Repeat the APTT in 6 hours
- d. Decrease the rate by 2mL/hr from the current rate. Repeat the APTT in 4-6 hours. Do not give a bolus. Do not stop the infusion

***The patient wants to go for a shower and needs to change their gown. The patient has asked to be disconnected from their intravenous heparin infusion so they can shower more freely.***

**Q14. The reason/s you must not comply with this request is (select the statement that is the most correct)**

- a. Continuous intravenous infusion of IV heparin is used for the prevention and management of venous and arterial thromboembolism in hospitalised patients
- b. Anticoagulation with intravenous heparin must be continuous in order to be therapeutic
- c. Interruption of parental therapeutic anticoagulation places the patient at risk of venous and/ or arterial thromboembolism
- d. All of the above

***While you were on your break the patient receiving the Heparin infusion was escorted to and from another Department by another nurse/midwife. When you next see your patient you observe that the infusion rate is running at an incorrect (increased) rate.***

Indicate if the following describes the subsequent nursing actions to be undertaken.

**Q15. True or False (please circle):**

Assess the patient for signs of bleeding (look for obvious and concealed bleeding, attend to vital signs), escalate appropriately if signs of bleeding are observed, inform the responsible medical officer immediately and seek advice on rate prescription, arrange for blood test monitoring as per the responsible Medical Officer, inform the patient and /or relatives, inform the nurse/midwife in charge, complete an IIMs, continue to monitor the patient and document appropriately on the IV Heparin Sodium Chart and in the patient's health care record.

**The following three (3) questions are in relation to the SESLHD Intravenous Heparin Sodium Chart (SES130.030)**

**Q16. The patient information at the top of the first page (page 1 of 2) including allergies, clinical indication, name of protocol in use, target APTT, weight, baseline APTT and platelet count should be completed by:**

- a. The prescribing medical officer
- b. The allocated nurse/midwife
- c. The pharmacist
- d. The SEALS laboratory staff

**Q17. True or False (please circle):**

The responsible medical officer must sign the IV Heparin Infusion Rate Titration Record at least once every 24 hours

**Q18. The routine monitoring of the APTT result, documentation of the APTT and subsequent actions on the IV Heparin Infusion Rate Record is the responsibility of:**

- a. The prescribing medical officer
- b. The staff member responsible for administration (usually the allocated nurse/midwife)
- c. The pharmacist
- d. The SEALS laboratory staff

**Q19. The nurse/midwife is completing the IV Heparin Infusion Rate Titration record section on the chart he/she is recording an increase in the heparin infusion rate based on an APTT result. What time does the nurse/midwife record in the *Time* section?**

- a. When the APTT was taken
- b. When the APTT was sent
- c. When the APTT was recorded in eMR
- d. When the APTT was reviewed (on the eMR) and actioned

**Q20. Your patient is receiving a heparin infusion and is also prescribed warfarin. Under what conditions would this be appropriate?**

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**Q21. You are preparing a heparin infusion that has been ordered for your patient. All patient lines used for administration of injectable medicines or fluids must be labelled with the NSW standard pre-printed labels to indicate the route. The administration lines dedicated for continuous infusion of heparin requires the use of two labels.**

**In regards to the labeling required for the preparation and administration of intravenous heparin what colour labels must be used?**

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**Q22. The state standard pre-printed “Medicine” label must be used. What active ingredient must be written on to the ‘medicines’ label if coloured pre-printed sticky-tape labels are not available?**

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**Q23. True or False** (please circle)

Labelling of injectable medicines, fluids and lines has been identified as a patient safety mechanism to help prevent errors related to wrong route, wrong drug, wrong patient or wrong dose. Labels should be applied near the injection port on the patient side. Labels should be placed so that they do not interfere with the administration of medications through the injection port and do not present an infection risk.

**The following question is in relation to the administration of a heparin infusion.**

**Q24. True or False** (please circle)

All intravenous medications administered by a nurse/midwife must be checked by a second person (one of whom must be a Registered Nurse/ Registered Midwife). The second person may be a Registered Nurse/ Registered Midwife, Medical Officer, Pharmacist or an Enrolled Nurse without notation. Enrolled Nurses can only check intravenous medications if they have completed all relevant board approved units of study for medication AND intravenous medication administration and who have been accredited within the last 12 months. The check must include the drug, dose, calculation, Intravenous fluid, rate limiting device, patient’s identity and countersigning the administration on the *Intravenous IV heparin Sodium Chart*

The following question is in relation to the nurse's/midwife's responsibilities regarding anticoagulation with IV heparin. You are asked to fill in the blanks (hint: refer to section 5.2 [SESLHDPR/402](#))

**Q25.** Understand and implement the principles of safe use of \_\_\_\_\_ and \_\_\_\_\_. Ensure blood samples for \_\_\_\_\_ monitoring are collected within the specified time limit. Check APTT test within \_\_\_\_\_ to \_\_\_\_\_ hours of collection and action any infusion \_\_\_\_\_ in conjunction with the MO. Review the patient for \_\_\_\_\_ or \_\_\_\_\_ or \_\_\_\_\_ (clot) extension. Achieve competency in managing intravenous heparin. Report any \_\_\_\_\_ occurring to the patients receiving heparin.

### **Monitoring and Management of Bleeding and Intravenous Heparin Infusions**

*Minor bleeding (including bruising, trivial epistaxis, microscopic haematuria, gum bleeding) is not uncommon on IV heparin therapy and requires review of IV heparin dose, APTT results, and risk factors for bleeding (concomitant anti-platelet therapy)*  
*Major bleeding needs to be managed aggressively as bleeding may be life-threatening. In addition to the usual resuscitative measures the following actions are indicated.*

### **The following question relates to Management of Bleeding and Intravenous Heparin Infusions**

Your patient was admitted with an Acute Myocardial Infarction and is currently receiving a Heparin Infusion. The patient's medical history includes peptic ulcer disease. Your patient starts to cough up bright red frank blood (approximately 50 mL)

**Q26.** For this question you are asked to fill in the blanks (hint: refer to [SESLHDPR/402](#) Section 7.10)

If major bleeding is suspected immediately \_\_\_\_\_ the IV heparin infusion and escalate via the \_\_\_\_\_ system. Collect blood for \_\_\_\_\_ and Blood Group and Antibody Screen. Fresh frozen \_\_\_\_\_ and/or \_\_\_\_\_ may be indicated and can assist in \_\_\_\_\_ the heparin effect. If reversal of heparin therapy with IV protamine sulphate is considered, \_\_\_\_\_ with the \_\_\_\_\_ prior to use.

**Q27. Your patient has an unwitnessed fall whilst on an intravenous heparin infusion. In regards to a patient fall, while on a heparin infusion which statement is the most accurate?**

- a. Patients on IV heparin who have had a fall (witnessed or unwitnessed) require immediate medical review
- b. Falling in hospital, with confirmed or unconfirmed blunt head injury, whilst on therapeutic anticoagulation is potentially fatal
- c. If there is evidence of head injury, immediate discussion with the patient’s doctor, measurement of APTT, cessation of IV heparin therapy, and urgent CT scanning is recommended
- d. All of the above

**You have completed the learning package. Well done.**

**Please forward your answers to the Educator on your unit/ward. Your Package will be assessed and completion details entered on the HETI system.**

THE PATIENT		THE PRESCRIPTION	
Allergies	past dose response	Clinical indication	<b>Protocol</b>
<b>Weight</b>	<b>Other Medications</b>	Bolus dose	Fluid volume/ type
Diagnosis	<b>Contraindications</b>	Infusion rate	<i>Handwriting</i>
Clinical Indication	Medical History	Communication	Dose calculations
<b>COAGULATION PROFILE</b>		Units of measure (mL, units, seconds)	
		Route	<b>Time</b>
		Date	<b>Sig</b>

**PREPARATION and ADMINISTRATION**

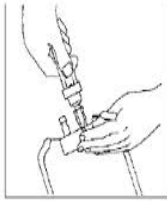
Bolus solution concentration

**Bolus dose**

Infusion Syringe/Bag

Lookalike labelling

**Premixed solutions**



Dose calculations

Intravenous access

Administration set

Second checker

**Labelling**

FLUID VOLUME/ TYPE

Standard concentration

**BEDSIDE CHECK**

**MONITORING AND DOCUMENTATION**

**Bleeding**

**APTT**

**haematuria**

Signatures

Labelling

**Epistaxis**

nursing actions

**Haematemesis**

*Spinal bleed*

clinical handover

**Flask record**

HITS

Intracerebral bleed



Rate adjustments

ocular bleeding

Second checker

Intravenous Heparin Sodium Chart

**trapezoidal**

**FALLS**

**retroperitoneal bleed**

mal a ena