Digoxin Intravenous for adults

Who can administer

INFUSION may be administered by registered competent doctor or nurse/midwife.

Bolus injection- Restricted see appendix 1

Important information

- **Always prescribe** the dose in **micrograms**
- For dose guidance for **transferring patients from PO to IV** therapy- see under 'Dose'
- See **monitoring** requirements
- **Renal** dose adjustments are required

Available preparations

Lanoxin 500 microgram per 2ml ampoule

Reconstitution

Already in solution

Draw up using a 5micron filter needle

Dilute further prior to administration

Infusion fluids

Sodium chloride 0.9% or Glucose 5%

Methods of intravenous administration

Intermittent intravenous infusion (using an electronically controlled infusion device) (preferred route)

- Add required dose to 100ml of infusion fluid [ref 1]
- A 50ml infusion may be used if required (eg fluid restriction) but the residual volume in the infusion line must be flushed through at the same rate to avoid significant underdosing
- **Loading doses:**
  - If loading with divided doses (e.g. 50%, 25%, 25%) the infusion may be given over 10 to 20 minutes
  - However, in an emergency situation, where loading dose is given as a single dose (e.g. 750microgram to 1000microgram),a minimum infusion time of 2 hours is suggested [ref 1]
- If using a two hour infusion time, protect infusion solution from light

Slow intravenous injection (not generally recommended)

- Intravenous infusion is preferred but if essential digoxin may be administered by slow intravenous injection as follows:
- **Bolus administration is more likely to cause adverse effects.** Patients should be monitored closely for signs of digoxin toxicity; hypertension and reduced coronary flow [ref 1]
- **Either** dilute at least four fold (add 1ml drug solution to 4ml diluent) with either Sodium chloride 0.9%

or Glucose 5% and administer over 10 to 20 minutes[ref 1,3] **OR**
- **If fluid-restricted:** administer undiluted via a large vein or central line over at least 5 minutes [ref 3] (unlicensed)

Dose in adults

LOADING DOSE (for patients who have not been given cardiac glycosides within the previous two weeks)

- **The normal loading dose is 500 to 1000 microgram** (depending on age, lean body weight and renal function)
- This is usually given in three divided doses of 50%, 25%, 25%
- Each part of the dose should be given four to eight hours after the last
- Example: total dose required is 1000microgram:
  - Give 500micogram
  - Followed by 250microgram four hours later
  - Followed by a further 250microgram after a further four hours
- An assessment of clinical response should be performed before giving each additional dose

Urgent (emergency) loading required [ref 2]

- Give 750 to 1000 microgram over a minimum of 2 hours
- A reduced loading dose may be needed if the patient has received digoxin in the last 2 weeks

MAINTENANCE DOSE

- Where a patient is on oral digoxin, and a temporary switch to IV is indicated eg if a patient is unable to take oral digoxin, the intravenous dosage should be reduced by approximately 33% - for example, 250 micrograms tablet is approximately equivalent to 166 micrograms IV - round to 175 micrograms
- Monitor levels closely if switching between routes of administration

Renal impairment

Guidelines differ, so clinical judgement must be used

Loading doses

- Some references suggest that no dose reduction is necessary [ref 4]
- Others suggest a 50% dose reduction if CrCl<15mL/min [ref 5]

Maintenance doses [ref 6]

- The elimination half-life of digoxin is prolonged and it therefore takes longer to reach steady state and longer for toxicity to resolve
- In addition, the presence of hyperkalaemia in patients with renal impairment may reduce sensitivity to the effects of digoxin
- Because of the reduction in renal clearance of digoxin, maintenance doses must be reduced
- Drug levels should be monitored

Monitoring

Telemetry monitoring during administration [ref 7]

Monitoring of levels

- At least **6 or more hours after the last dose** to allow for redistribution

Therapeutic range

- **Heart failure:** Trough levels usually between 0.64 to 1.28 **nanomols/L** (0.5 to 1nanograms/ml)
- **Other indications**: Trough levels usually between 0.64 and 2.6 **nanomol/L** (0.5 to 2 nanograms/ml) [ref 6)]
- However, toxicity may occur with lower digoxin serum concentrations. In deciding whether a patient's symptoms are due to digoxin, the clinical state together with the serum potassium level and thyroid function are important factors.

Further information

- Intramuscular injection is NOT RECOMMENDED, as it is painful and is associated with muscle necrosis
- An antidote (Digifab) is available for suspected digoxin toxicity

Storage

- Store below 25^{0}C

References

SPC downloaded 17th April 2025

1. Medusa Injectable Medicines Guide downloaded February 2025

2: BNF accessed online 16th April 2025

3: Minimum Infusion Volumes for Fluid Restricted Critically Ill Patients 4rd Ed

4. Critical Illness, accessed through Medicines Complete 17th April 2025

5. UpToDate, accessed online 17th April 2025

6. Martindale, accessed through Medicines Complete 17th April 2025

7. Local guidelines on file January 2017

Therapeutic classification

Cardiac glycosides