Phenytoin Intravenous for Adults

Who can administer

May be administered by registered competent doctor or nurse/midwife

Important information

- **LOADING dose depends on weight** (see dose below)
- **NEVER exceed the maximum rate** of administration (50mg per minute)
- There are **numerous important drug interactions** - check latest BNF
- **In-line filter MUST** be used
- **Flush line PRE and POST** infusion with Sodium chloride 0.9% to minimise phlebitis

Available preparations

Epanutin 250mg per 5mL ampoule

Phenytoin 250mg per 5mL ampoule (Mercury brand)

Reconstitution

Already in solution

Draw up using a 5 micron filter needle

Infusion fluids

Sodium chloride 0.9% **only**

Methods of intravenous administration

Intermittent intravenous infusion (preferred route for both loading and maintenance doses)

Administer using an electronically controlled infusion device

- Administer into a large vein through a large-gauge needle or IV catheter
- Add required dose to a suitable volume of infusion fluid - **the concentration cannot exceed 10mg/1mL** (see table 1 below)

Table 1: Dilution of Phenytoin injection

Required dose	Volume of Sodium chloride 0.9%

Less than 500mg	50mL
500mg to 1000mg (loading doses)	100mL
Greater than 1000mg (loading doses)	250mL

- The rate of administration **cannot exceed 50mg per minute** - example 1400mg as loading dose over at least 30 minutes
- A rate of 25mg per minute or lower may be appropriate in some patients including the elderly and those with heart disease [ref 2]
- Administration should commence immediately after the mixture has been prepared and must be completed within **60 minutes**
- An in-line 0.2 micron filter **must** be used, available from Pharmacy (Braun filter 0409 9303)

Slow intravenous injection (maintenance doses only) (infusion preferred)

- Administer at a rate **not exceeding 50mg per minute**
- A rate of 25mg per minute or lower may be appropriate in some patients including the elderly and those with heart disease [ref 2]
- Administer into a large vein through a large-gauge needle or IV catheter

Important

- Each injection or infusion of phenytoin should be preceded and followed by an injection of sterile sodium chloride 0.9% through the same needle or catheter to avoid local venous irritation due to alkalinity of the solution
- **Ensure remainder of drug solution in the administration set is administered - flush through with Sodium chloride 0.9% at the same rate at which the phenytoin was given**

Dose in adults

Status epilepticus only [ref 5]

- Give a loading dose of 20mg/kg to a maximum dose of 2000mg- see table 2 below
- The loading dose should be followed by **maintenance doses** of 100mg orally or IV every six or eight hours

Table 2: Phenytoin loading dose in status epilepticus [ref 5]

Body weight (kg)	Loading dose 20mg/kg (to a max dose of 2000mg)
40	800mg
50	1000mg
60	1200mg
70	1400mg
80	1600mg
90	1800mg
100kg or more	2000mg (maximum dose)

General dosage information

- **Dosage increases should be gradual** (saturable metabolism)
- Patients with impaired liver function, elderly patients or those who are gravely ill may show early signs of toxicity

- **Therapeutic drug monitoring is required:** See under Monitoring below
- **Intravenous to oral switch:** see table below [ref 3,4]

Intravenous dose	Oral capsule equivalent dose	Oral suspension equivalent dose [ref 3]
Phenytoin (sodium) 100mg **three times a day** IV	Phenytoin (sodium) capsules 300mg **once daily**	Phenytoin (base) suspension 270mg **once daily**

When changing from **intravenous to oral doses**- either capsules or suspension, the total dose should be administered once daily

When changing from **oral to intravenous doses**- the intravenous dose should be given in divided doses

Monitoring

- Continuous ECG and BP monitoring is required
- Monitor respiratory rate
- Monitor injection site during and for 72 hours following administration [ref 2]
- Adjust dose as per levels below, as clinically indicated

Therapeutic range (total phenytoin*)	10 to 20mg/L (40 to 80micromol/L)
When to take levels [ref 4]	• Take a level 6 to 24 hours after loading dose • However, if rapid therapeutic levels are needed, initial levels may be drawn 2 hours after the IV loading dose, to aid determination of maintenance dose or need to reload • Take a trough level 2 days after initiation, then again 3 to 5 days later. • If no change in plasma level/albumin status, then monitor every 7 days • More frequent levels may be needed in: high risk patients (liver impairment, hypoalbuminaemia, malabsorption, lack of seizure control and patients on concomitant medication that interact via CYP isoenzymes) • Check serum levels 5 to 7 days following any change in dose [ref 1]
Time to steady-state[ref 1]	**Normally** 5 to 10 days

* as only **free-phenytoin** is pharmacologically active, **total phenytoin levels may be misleading** in uraemia, renal failure, hypoalbuminaemia, elderly patients or in patients taking drugs which displace phenytoin from albumin e.g. sodium valproate

Note: Free phenytoin levels are currently unavailable in this hospital. There are methods to determine corrected phenytoin levels in patients with renal or hepatic disease, or in those with hypoalbuminaemia. For example,see MDCalc, or ClinCalc

Storage

- Store below 25^{0}C
- Do not use if a precipitate or haziness develops in the ampoule or diluted solution

References

SPC (Epanutin) March 2023

1: Uptodate: downloaded Jan 26th, 2024

2: Injectable medicines guide, downloaded from Medusa 14th March 2024

3: Handbook of Drug administration via enteral feeding tubes- accessed online via medicinescomplete 14th March 2024

4: Leeds teaching hospital: Intravenous Phenytoin for Status Epilepticus in adult November 2022

5: Status epilepticus, GUH treatment algorithm for adults, March 2023

Therapeutic classification

Anti-epileptic