Phenytoin

UKAS MEDICAL 7880 Accredited to ISO 15189:2012

Synonyms	Epanutin
Clinical Indication	Phenytoin is a primary anticonvulsant for prophylaxis and treatment of partial and generalised tonic-clonic seizures. It is particularly appropriate where once daily dosing is an advantage. Main indications for monitoring are: • On initiating therapy • During I.V. therapy in status epilepticus • Unexpected deterioration in seizure control • As an adjunct to the diagnosis of toxicity • When interacting drugs are added or withdrawn • In pregnancy **Drug Kinetics:** Phenytoin is metabolised by the hepatic mixed-function oxidase system, which has a limited capacity and can become saturated at phenytoin concentrations within the target range. When levels are close to the saturation point a small increase in dose can result in a marked increase in serum concentration: this saturation point varies widely between patients. **Toxicity**: Symptoms of neurotoxicity (nausea, vomiting, tremor, and ataxia) are increasingly frequent as levels exceed 20 mg/L. **Overdose:** Following overdose and confirmation of toxicity there is not a case for continuous monitoring of levels to decide when to resume therapy. Phenytoin half-life is usually between 24 and 48 hours but due to the saturation kinetics, levels will gradually fall and then plummet i.e. half-life will be dependent on serum levels. Usually, phenytoin is stopped for 2 to 3 days and then the normal dose resumed. Serum levels should be monitored 7-10 days later after steady state has been obtained. An information sheet is available from National Poisons Service (Toxbase).
Part of Profile / See Also	
Request Form	Combined Pathology manual Blood form or ICE request. Please state dosage on request form.
Availability / Frequency of Analysis	On request during routine hours. Laboratory must be contacted regarding urgent requests.
Turnaround Time	Same day
Patient Preparation	Steady state levels. This is 4-5 days following a change in dose.
Sample Requirements	
Specimen Type	Serum and plasma
Volume	2 ml
Acceptable Containers	 Yellow top (SST) tube

 Green top (lithium-heparin) tube

 paediatric orange top (lithium-heparin)

 paediatric green top (lithium-heparin)

Plain serum samples may also be used.

Reference Range & Units	Therapeutic range: 5 - 20 mg/L. This range is indicative only, and some patients tolerate higher levels and require them to achieve effective control. Other patients are adequately controlled at lower concentrations and there is no need to use higher doses in such patients. Phenytoin is over 90% protein-bound in healthy adults on monotherapy, but binding is substantially reduced in neonates, pregnancy, renal or hepatic disease. In such cases, effective or toxic free drug levels are obtained at lower total serum pheytoin levels. To convert from µmol/L to mg/L multiply by 0.253
Interferences	
Interpretation & Clinical Decision Value (if applicable)	Critical phoning limit >25 mg/L
References	Beckman kit insert Pathology Harmony Group, Clinical Biochemistry Outcomes, January 2011 (www. pathologyharmony.co.uk)
Test code	PHNY
Lab Handling	Analysed from primary tube and stored at 4°C. Serum and plasma samples stable for 7 days at 2-8°C.