

Monitoring Narrow Therapeutic Range Drugs

If the concentration of narrow therapeutic range drugs increase above the therapeutic concentration window, serious toxicities can result.

Mnemonic: **Guys With Large Dongles Totally Make Perfect Internet Connections**

Narrow therapeutic range drugs	Effect of increased concentrations	Monitor	Starting drug	Subsequent monitoring/dosing	Adjusting dose
Gentamicin	Ototoxicity Renal failure	Gentamicin level	-Give initial loading dose (5mg/kg). -Determine maintenance dose <u>interval</u> from hospital protocol (dependant on creatinine clearance) <u>CrCl >30ml/min</u> -Measure a "pre-dose" (trough) level prior to the second dose. -Give the second dose regardless and review the pre-2 nd dose level before the 3 rd dose is given. -If the trough level was still in therapeutic window (>1mg/L), reduce dosing interval (according to hospital protocol). <u>CrCl <30ml/min</u> -Check level 24 hours after the loading dose. Wait for the result and only give 2 nd dose when level is sub-therapeutic (<1mg/L). -Adjust dosing interval if needed (according to hospital protocol).	Do pre-dose (trough) level and post-dose (peak) every 1-3 days depending on how ill patient is. If BD/TDS, monitor the last dose of the day. <i>Reference range: pre-dose level = <1mg/L; post-dose level = 5-10mg/L</i>	Adjust dose interval depending on pre-dose level. (Adjust dose quantity depending on post-dose level – rarely done)
Vancomycin		Vancomycin level	-Give initial loading dose (dependant on weight) -Select maintenance <u>dose & interval</u> from hospital dosing table (dependant on creatinine clearance) -Take a pre-dose (trough) level prior to the third dose, give the dose regardless, and then check the level prior to the next dose. -If level is too high/low, adjust the dose & interval to next level down/up in dosing table respectively.	Do pre-dose (trough) level every 3 days if renal function is stable <i>Reference range: pre-dose level = 10-15mg/L</i>	<u>Level too high</u> Adjust dose & interval to next level down in dosing table <u>Level too low</u> Adjust dose & interval to next level up in dosing table
Warfarin ON	Bleeding	INR	-Start with concomitantly with treatment dose LMWH if need immediate therapeutic effect. -Start 5mg each evening -Monitor INR on day 3, 4 and 5 – hospital warfarin dosing charts tell you how to adjust the dose depending on the INR.	Monitor in anti-coagulant clinic. Intervals depend on INR stability. <i>Target INR for most indications = 2-3</i>	Adjust dose. Best guess depending on INR and target INR.
Lithium	Tremor Coma	Lithium levels	Check level after 5 days. Then check weekly until level has been stable for 4 weeks.	Check levels every 3 months. <i>Reference range (12h post-dose) = 0.4-0.8mmol/L</i>	Adjust dose. Check compliance if low.
Digoxin OD	GI disturbance Xanthospia Arrhythmia	Digoxin levels	Loading dose given with ECG monitoring. Similar dose given 8 hours later. Maintenance dose started at 24 hours after the first loading dose.	Do levels at 7 days (do >6 hours post-dose). <i>Reference range (6-12h post-dose) = 1.0-2.6nmol/L</i>	Adjust dose.
Theophylline	Arrhythmias Seizures	Theophylline levels	PO: Measure levels at 5 days, and 3 days after any dose changes. Measure levels 4-6 hours post-dose. IV: Measure levels 4-6 hours after first dose. BOTH THEN: Daily levels until stable	Monitoring intervals are patient-dependant. <i>Reference range = 5-15µg/ml</i>	Adjust dose.
Methotrexate	Myelosuppression	FBC LFTs	Monitor before starting, then every 1-2 weeks until stabilised.	Monitor every 2-3 months.	Increase depending on response. Discontinue if not tolerated.
Phenytoin TDS	Arrhythmia Cerebellar syndrome	Phenytoin levels	Loading dose (20mg/kg) given in high-dependency area with ECG & BP monitoring. Check level 2 hours after. Start normal-100mg dose 6-8hourly after.	Do levels at 10 days. Do pre-dose (trough) level as indicated. <i>Reference range = 10-20mg/L</i>	Adjust dose.
Insulin	Hypoglycaemia	Capillary glucose HbA1C	Decide on regime and educate patient.	Review patient regularly with glucose monitoring book and check HbA1C and compliance.	Adjust doses. Change regime.
Ciclosporin	Renal failure	Blood-ciclosporin concentration Renal function	<u>IV</u> Start at 2mg/kg over 24 hour infusion IV. Do levels on day 3 and 5. <u>PO</u> Start at 5.5mg/kg/d in 2 divided doses. Do pre-dose levels at week 1 and 2 Initially, monitor creatinine and GFR twice weekly.	Monitor ciclosporin levels weekly until stable. More frequent if interacting drugs started. <i>Reference range: IV = 150-250nanograms/ml; Oral pre-dose = 100-200nanograms/ml</i>	Adjust dose.