Random VIVAs (Pharmacology)

shakEM

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2013.1.1

Question 1: **PHARMACOKINETICS** LOA: 2	Describe the pharmacokinetic changes that occur in the elderly	**Absorption**: nutritional deficits; delayed gastric emptying (diabetics); co ingested agents (laxatives, antacids) **Distribution:** ↑ body fat, alpha-acid glycoprotein (bases); ↓ lean body mass, body water, albumin (weak acids); **Metabolism**: ↓ phase 1 reactions P450; ↓ liver blood flow, liver disease, CCF, nutritional defic **Elimination:** ↓ renal CL; renal disease; ↓ resp capacity; resp disease	**Hepatic metabolism↓** **Renal clearance↓** **+ 1 other**

2011.2.1

Question 5 Antivenoms	a) What is an antivenom? b) What antivenoms are used in Australasia? c) What are the side effects of antivenom? d)What animals are used in the production of different antivenoms?	a) Immunoglobulin or **antibody** (specifically IgG FAB) produced by another **animal** in response to a venom. Used in humans IV or IM to neutralise venom after an envenomation. **b) Snake –polyvalent and monovalent** (black, brown, death adder, tiger, taipan, sea snake); stonefish, redback spider, box jellyfish, funnelweb spider c) Allergy, **anaphylaxis, serum sickness** **d) Horse –snake**, stonefish, redback; Sheep –box jellyfish; Rabbit –funnel web	Must get Ab or Ig produced by animal Must get Snake – polyvalent & monovalent & 2 others Must get bold Must get horse/snake and 1 other

2010.1.1

Question 5: Passive immunisation in ED p1073-8	1. What is passive immunisation? 2. What is passive immunisation useful for? 3. What passive immunisations might we consider in ED?	Giving preformed antibodies to a recipient. Source may be human, animal 1. prevention of disease when time does not allow immunisation 2. treatment of disease normally prevented by immunisation 3. for patients unable to form antibodies 4. for treatment of conditions for which active immunisation is unavailable or not possible eg snakebite tetanus, botulism. measles, rubella, vaccinia, varicella Hep B, Hep A; diphtheria, rabies. antivenoms – spiders, snakes; Rhesus incompatibility	Concept 2 uses Tetanus + 1 other

2010.1.2

Question 5: Evaluation of drugs and clinical trials Katzung 68-73	1. During clinical drug trials, what factors might confound the results? *What are some of the host factors?* *What are some of the observer factors?* *Why do you blind trials?* 2. What can be done to minimise the confounders?	1. variable natural history of most diseases 2. presence of other diseases and risk factors 3. subject and observer bias 1. large populations over sufficient time; cross-over trials 2. exclusion criteria; randomisation; cross-overs 3. placebo controls; blinding; cross-overs	Bias Bonus points for comment

2010.1.3

Question 5: Therapeutic drug monitoring p46-49	1. What pharmacokinetic variables affect drug levels? *Patient factors?* *Specific drug examples?* 2. What pharmacodynamic variables affect drug dosing?	absorption – eg small bowel abnormalities clearance – eg impaired renal, liver, cardiac function volume of distribution – changes in either tissue or plasma binding impact drug availability; eg decreased muscle mass in elderly, hypoalbuminaemia, drug interaction. maximum effect (Emax) – vs toxicity by increasing dosing beyond maximum effect sensitivity (EC50) – eg hyperkalemia decreases sensitivity to and effect of digoxin	2 variables

2010.2.1

5. a. List the advantages of eye ointments over eye drops.	More stable Less absorption into lacrimal ducts Longer retention time on conjunctival surface Safer with potent drugs Ointment bases provide protection and comfort at night	2 to pass
b. List by action the types of drugs used topically in the eye	Mydriatics Miotics Cycloplegics Decongestants Antibiotics Antivirals Antiseptics Corticosteroids Local anaesthetics Stains eg. Fluoroscein	4 to pass
c. List the ideal properties of an ocular local anaesthetic	Quick onset of action (10-20 secs.) Useful duration of action (10-20 mins) No obvious effects on function or healing No interactions with drugs used concurrently	Quick onset and useful duration of action

2009.1.1

Question 5: Prescribing in the Elderly	1. In the elderly, what factors change with age and alter pharmacokinetics.	**Absorption**: No major change unless additional underlying associated condition with age **Distribution**: Dec lean body mass, Dec body water %, Inc fat body %, Dec serum albumin, Dec apparent Vd and sometimes increased Vd **Metabolism**: Liver metabolism does not decline for all drugs, Dec liver blood flow, Dec phase 1> phase 2 reactions, Liver slower to recover from injury **Elimination**: Dec renal function & Cr clearance, Half life inc of drugs variable, Dec excretion of volatile substances by the lung Associated age related illness affecting any of the above	Pass: renal function, 2 factors that may change Vd,
	2. Give some examples of drugs commonly used in the emergency department that must have their prescribing altered in the elderly?	Benzodiazepines – liver metabolism, renal function; PD sensitivity Opiods –PD sensitivity respiratory effects Antipsychotics –PD sensitivity; lean body mass NSAID – GI, renal Colchicine –renal, narrow therapeutic index Other drugs narrow therapeutic index Drugs primarily excreted renally –gentamicin, acyclovir Digoxin loading dose with dec Vd Amiodarone loading – Vd and PD sensitivity Many drugs as polypharmacy and must check for interactions i.e. Warfarin. So could argue extra precautions with all –polypharmacy, increase risk of error, compliance and administration issues Interactions with age related disease – IHD, COPD (B agonists or B Blockers) Sulphurs/Bactrim –adverse reactions Anticoagulants – falls Drugs which switch to zero order kinetics -phenytoin	Must get 4 relevant and plausible examples with correct associated mechanism & must include benzos and opiods. Prompts: • What about commonly used intravenous agents in the ED? • What about analgesic agents used in the ED? • What about sedative agents used in the ED? • Are there any drugs to be reduced with impaired renal function?

2009.1.2

Question 5: Prescribing in Pregnancy	1. List the factors affecting placental drug transfer?	Lipid solubility Molecular size Placental transporters Protein binding Placental and foetal drug metabolism	Pass: 2 of 5
	2. What is meant by foetal therapeutics?	Drug administration to the pregnant woman with the foetus as the target	
	3. Give examples of drugs administered for this purpose?	Corticosteroids (for lung maturation) Phenobarbitone (induce enzymes for glucuronidation of bilirubin) Antiretrovirals (decrease HIV transmission) Antiarrhythmics	

2009.1.3

Question 5 Prescribing in children	1. In children, what factors change with age and alter pharmacokinetics?	Body Size and Composition – Growth of child – most doses calculated in mg/kg Adult is 50% water 20% extracellular Term neonate 70-75% water 40% extracellular Pre term neonate 85% water Influences drugs distributed in extra cellular space Fat 15% in adults 1% in pre term infants Plasma proteins Albumin – Decreased levels in neonate Potential for increased toxicity in neonates if drugs are highly protein bound Jaundiced neonates – if drug highly protein bound, will displace bilirubin and cause kernicterus Drug Metabolism Most drugs metabolised in liver Only 50-70% of adult values Slow clearance and prolonged elimination half lives Drug excretion GFR lower in newborns than older infants Neonate 30-40% adult values 3 weeks 50-60 % adult values 6-12 months Adult values	Pass: body size and composition, and drug metabolism and excretion.

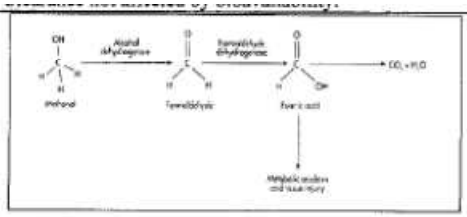
2009.2.1

Question 5: Activated Charcoal	(a) In a poisoned patient what modalities are available for decontamination?	Skin – remove clothes, wash contaminated skin GIT – emesis, gastric lavage, activated charcoal & cathartics / whole-bowel irrigation	3 of 5 to pass
	(b) How does activated charcoal work?	Adsorption due to its large surface area	
	(c) Name some drugs or agents that activated charcoal is NOT effective in adsorbing?	Ions: Fe, Li, K Alcohols, cyanide Corrosives (acids and alkalis)	2 examples
	(d) Name a drug where repeated doses of activated charcoal may assist in elimination of the drug	Carbamazepine, dapsone, theophylline	One drug

2009.2.2

Question 5: Amphetamines	(a) What is the mechanism of action of amphetamines?	**- Indirectly cause increased release of catecholamines at synapses** - Competitively inhibits dopamine transport in pre-synaptic neurone (DAT), inhibits VMAT causing non-vesicular release of dopamine into synapse (& similarly for other catecholamines)	First point to pass
	(b) Describe the effects of amphetamines?	1. Catecholamines; (increased arousal & decreased sleep) elevated HR (dysrhythmias) and BP (CVA) 2. Dopamine release; euphoria, potentially abnormal movements & psychosis 3. Serotonin; Appetite suppression, hallucinogenic & hyperthermia	CNS stimulation and cardiovascular effects to pass

Older

Methanol metabolism and toxicity	Describe the metabolism of methanol. What specific modalities of treatment are available for the treatment of severe methanol poisoning?	 • Talk about alcohol dehydrogenase substrate, **ETOH.** • Mention **fomepizole as an ADH antagonist.** • **Correcting acid/base status** should be a priority because serious metabolic acidosis is common and a pH less than 7 is associated with poor prognosis. • Need to add adjuncts to minimise accumulation of formic acid - **folic acid** The elimination of methanol may be enhanced by administering folic acid, a cofactor in the conversion of formic acid to carbon dioxide • **dialysis** **(Alcohol + 1)**	•

Question 5 Addiction & drugs used in opiate addiction	a) Name some drugs that are used in the treatment of opiate addiction b) Outline the principles of how these agents work	**a) Methadone**, N acetylmethadol, buprenorphine clonidine, lofexidine, Naltrexone, naloxone *b) Methadone* –longer acting, opiate angonist, orally active –patient can be stabilised and gradually withdrawn but addictive also. *N acetylmethadol* –an even longer acting methadone analogue. *Buprenorphine* –partial opiod antagonist that can be given once daily, low doses for detoxification and higher doses for maintenance. *Clonidine* –central acting sympatholytic agent that mitigates signs of withdrawal sympathetic Overactivity. *Lofexidine* –clonidine analogue with less hypotensive effects *Naltrexone*-long acting orally active pure opiod antagonist, patients must be detoxified first Naloxone – rapid onset pure antagonist, short half-life, precipitate withdrawal	Must get methadone and 1 other Must get methadone principles and state that overall agents must be orally active and long acting. 1 other agents PD also.

5. St John's Wort	**What are the medical uses for St Johns Wort?** **What are its important drug interactions?**	**Depression** **Kinetic - CYP inducer (decrease drug effect)** **Dynamic – inhibits catechol reuptake (potentiates some drug effects)**	

5. PK in elderly	What factors affect drug distribution in the elderly? (3 FOR A PASS) Give examples of drugs where hepatic clearance does not change with age (BONUS)	Reduced lean body mass, Reduced body water (total and %), Increase in body fat (%), Decreased serum albumin, Overall a decreased apparent volume of distribution Salicylate, Warfarin, Ethanol, Oxazepam, Nitrazepam, Lignocaine, Prazosin	

3.5 Anti-sepsis: Chlorhexidine	What is an antiseptic? Describe the actions and uses of chlorhexidine When is chlorhexidine contraindicated	A **chemical** disinfectant applied to living tissue (skin, mucous membranes and wounds) which decreases the number of organisms by **killing, removing, diluting** and has generally **low toxicity to tissues** low skin sensitising or irritating capacity; oral toxicity low (poorly absorbed from the alimentary tract); -active against bacteria (most effective against G pos cocci), mycobacteria, moderate against fungi & viruses -not inhibited by blood or organic products middle ear surgery (causes sensorineural deafness), neurosurgery as neural toxicity allergy	/1

1.5 OTT (AS)	Name some of the ingredients in over-the-counter preparations that may cause toxicity (3 of 7 to pass) Give one example	1 ethanol 2 antihistamines 3 salicylates 4 caffeine 5 local anaesthetics 6 sodium 7 sympathomimetics 1 sympathomimetics and Type-1 DM, HT, asthma, hypothyroidism 2 salicylates and children (Reye's syndrome), PUD, coagulopathies 3 antihistamines, ethanol and drowsiness 4 sympathomimetics and caffeine and agitation, headaches, interstitial nephritis 5 drug interactions	

2.5 Penicillamine (MS)	What are the therapeutic uses of Penicillamine (2) List the adverse effects of D-Penicillamine (occur in up to 1/3 of patients) (2).	• Wilsons disease • Copper poisoning • Severe rheumatoid arthritis (occasionally) • Nausea and Vomiting • Nephrotic Syndrome • Hypersensitivity (avoid if history of penicillin allergy) • Pancytopaenia • Pemphigus • Myasthenia • Optic atrophy • Arthropathy	/2

3.4 Acetazolamide (SB)	What are the actions of acetazolamide What are the toxic effects of acetazolamide? (at least one) PROMPT: Can renal &/or hepatic disease increase the risk of adverse effects?	**Carb anhydrase inhibitor**, ciliary body, choroid plexus, prox. renal tubules (plus one organ) , • Hyperchloraemic metabolic acidosis • Renal stones (PO_4, Ca) • Renal K^+ wasting • Drowsiness, parasthesia • Increased risk of neurological toxicity with renal failure (reduced renal elimination) • Hepatic encephalopathy in patients with cirrhosis (reduced renal excretion of NH_4^+)	/2