**Question 6**

Which of the following statements regarding neuromuscular junction blockers is incorrect?

A Vecuronium is predominantly renally excreted

B Pancuronium and vecuronium are both steroid neuromuscular blocking drugs

C Pancuronium has a longer duration of action than vecuronium

D Atracurium is inactivated by Hofmann elimination

Explanation A

Vecuronium is excreted by the liver- 85% and renal- 15%.

Pancuromium’s duration of action is >35m and vecuronium’s 20-35min.

Vecuronium, pancuronium, pipecuronium and rocuronium are steroidal neuromuscular blocking drugs.

Tubocurarine, atracurium and doxacurium are isoquinoline neuromuscular blocking drugs.

Atracurium is inactivated by Hofmann elimination

Note: Atracurium is so extensively metabolised that its pharmacokinetics are independent of renal and hepatic function, and less than 10% is excreted unchanged by renal and biliary routes. Two separate processes are responsible for metabolism:

Ester hydrolysis- this action is catalysed by non-specific esterases, not by acetylcholinesterase or pseudocholinesterase.

Hofmann elimination- a spontaneous non-enzymatic chemical breakdown occurs at physiologic pH and temperature

**Question 11**

A patient complains of muscle pain post-operatively. Which of the following drugs is most likely to cause this?

A Propofol

B Ketamine

C Atracurium

D Suxamethonium

Explanation D

Muscle pain due to the depolarizing action of suxamethonium

**Question 12**

Which of the following muscle relaxants has the longest duration of action?

A Atracurium

B Rocuronium

C Vecuronium

D Pancuronium

Explanation D

atracurium-20-35m

mivacurium-10-20m

vecuronium-20-35m

rocuronium 20-35m

Pancuronium 35-45 min

**Question 13**

Which of the following drugs has the greatest MAC?

A Nitrous oxide

B Methoxyflurane

C isoflurane

D Halothane

Explanation A

NO-100%

halothane-0.75%

isoflurane 1.4%

methoxyflurane-0.16%

**Question 14**

All the following drugs are anaesthetic agents except?

A Midazolam

B Etomidate

C Propofol

D Glycopyrolate

Explanation D

Propofol is a hypnotic/amnesic used for induction and maintenance of general anaesthetic. Midazolam is a benzodiazepine amnesiac used for sedation during GA. Etomidate (GABA receptors) is used in ED for conscious sedation and RSI. Glycopyrolate is a muscarinic antagonist that is used during sedation to dry up oral secretions.

**Question 15**

At low dose, which of the following muscle relaxants is most commonly associated with tachycardia?

A Suxamethonium

B Gallamine

C Vecuronium

D Atracurium

Explanation B

Vecuronium, pipecuronium, rocuronium have little or no CVS effects. Pancuronium causes a modest increase in HR and a smaller increase in cardiac output, with little or no change in systemic vascular resistance. Atracurium has no effects on autonomic ganglia or on cardiac muscarinic receptors

Gallamine increases heart rate by both vagolytic action and sympathetic stimulation.

Succinylcholine causes various cardiac arrhythmias. The drug stimulates all autonomic cholinoreceptors. In low doses, negative inotrope and chronotrope occur, in higher doses positive inotropic and chronotropic effects may occur. Bradycardia is often observed when a second dose of the drug is given within 5minutes.

**Question 16**

Which of the following drugs is not an amide local anaesthetics?

A Lignocaine

B Prilocaine

C Benzocaine

D Bupivicaine

Explanation C

Other amide local anaesthetics include mepivacaine, etidocaine and ropivocaine.

Extra: Amide local anaesthetics have two "i"s in their names i.e lignocaine, prilocaine, bupivicaine, Esters only have one "i" in their names i.e. Procaine, benzocaine

**Question 17**

Which of the following is an ester local anaesthetic?

A Prilocaine

B Bupivicaine

C Lignocaine

D Tetracaine

Explanation D

Ester local anaethetics: cocaine, procaine, tetracaine, benzocaine.

Note: A memory aid to memorize, which LA is an ester and which is amide. Amides have two "i's" in the name (e.g. Lignocaine) Esters have only one "i" in the name (e.g. Benzocaine)

**Question 18**

Regarding neuromuscular junction blockers, which of the following statements is correct?

A Pancuronium causes histamine release

B Gentamicin increases their efficacy

C Gallamine is eliminated by the liver

D Vecuronium is an isoquinolone derivative

Explanation B

Pancuronium does not cause histamine release. Vecuronium is a steroid derivative. The kidney eliminates Gallamine only.

Gentamicin reduces acetylcholine release causing end-plate ion channel blockade. This action potentiates the action of non-depolarizing neuromuscular agents.

Extra: of the non-depolarizing NM blockers, mivacurium causes the most histamine release. Atracurium also causes a slight increase in histamine release.

**Question 25**

Which of the following opiates is associated with seizures when given in high dose to patients with renal failure?

A Morphine

B Codeine

C Methadone

D Fentanyl

E Pethidine

Explanation E

Pethidine metabolite via liver cytochrome oxidases to Norpethidine and via liver carboxyesterases to Pethidinic acid and excreted by the kidneys Norpethidine is neurotoxic and thus build up of metabolites in the setting of repeated dosing and renal failure could lead to seizures

Note:

Morphine-3-glucuronide is a metabolite of morphoine produced by UGT2B7. It is not active as an opioid agonist but does have some action as a convulsant, which does not appear to be mediated through opioid receptors. It is mediated by GABA/glycinergic system. As a polar compound, it has a limited ability to cross the blood brain barrier, but renal failure may lead to its accumulation and result in seizures

**Question 37**

Regarding atracurium, which of the following statements is correct?

A It has a longer duration of action than vecuronium

B It is eliminated by non renal or liver dependant mechanisms

C It is a steroid derivative

D It is not associated with histamine release

Explanation B

Atracurium’s duration of action 20-35m which is the same as vecuronium. Atracurium releases histamine slightly. It is an isoquinolone derivative. And is eliminated by Hofmann (non renal/liver) elimination

Please note: I am not going to change the stem or the answer of the question BUT, Katzung does say that atracurium is inactivated by the Hofmann elimination in addition to hepatic metabolism. The table of the non depolarising drugs reads that it is only Hofmann elimination. Lots of online sources do not refer to hepatic metabolism of this drug

**Question 38**

Regarding pancuronium, which statement is incorrect?

A It is a steroid

B It has a shorter duration of action than vecuronium

C It is renally excreted

D It does not release histamine

Explanation B

Pancuronium’s (a steroid derivative) duration of action >35min. Vecuronium’s duration of action is 20-35m

**Question 40**

Which local anaesthetic causes methaemoglobinaemia?

A Lignocaine

B Prilocaine

C Bupivacaine

D Tetracaine

Explanation B

The side effect of methaemoglobinaemia is due to the accumulation of one of prilocaine's metabolites o-toluidine, an oxidising agent.

**Question 42**

All of the following drugs prolong the refractory period in normal cells, except?

A Amiodarone

B Procainamide

C Quinine

D Lignocaine

Explanation D

Lignocaine, Propanolol, Mexiletine and Moricizine shorten the RP in normal cells. Adenosine, Diltiazem, Esmolol, Flecanide,Tocainide and Verapamil have no effect on the RP of normal Cells

**Question 54**

The order of blockade by local anaethetics is?

A Sympathetic, pain, temperature, touch and propioception

B Pain, temperature, sympathetic, propioception and touch

C Sympathetic, propioception, pain, temperature and touch

D Pain, sympathetic, temperature, propioception and touch

Explanation A

Sensitivity to block:

Sympathetic postganglionic, dorsal root pain (type C fibres) and preganglionic autonomic (type B fibres)=4 + sensitive

Type A fibres:

Pain and temp (delta fibres)=3+ sensitive

Muscle spindles (gamma fibres) and touch, pressure (beta fibres)= 2+ sensitive

Proprioception and motor (alpha fibres)= 1+ sensitive

Note: beginning with sympathetic transmission and progressing to temperature, pain, light touch and finally motor block. Extra: Spinal block reflects this - the most vulnerable components achieving greater dermatomal (cephalad) spread. Loss of cold sensation roughly two segments above analgesic level for pinprick (pain), which will in turn be roughly two segments above loss of light touch.

**Question 65**

Which of the following induction anaesthetics are contraindicated in a patient allergic to eggs?

A Propofol

B Midazolam

C Ketamine

D Thiopentone

Explanation A

Propofol is formulated as an emulsion containing 10% soybean oil, 2.25% glycerol and 1.2% lecithin, the major component of the egg yolk phosphatide fraction

**Question 66**

The risk of transient neurological symptoms is most likely to occur with which local anaesthetic?

A Lignocaine

B Bupivacaine

C Prilocaine

D Chloroprociane

Explanation A

Transient neurological symptoms (TNS) is a rare but devastating neurological complication that can occur with neuraxial (spinal and epidural) administration of local anaesthetic. TNS is a syndrome of transient pain and or dysaesthesia. The pain expeirenced can often be worse than the pain induced by the surgery alone. Lignocaine seems to be the drug most likely to cause TNS. The risk of other local anaesthetic causing TNS varies. Procaine and mepivacaine reduces the risk of TNS slightly. Risk of TNS with bupivacaine, prilocaine and chloroprociane is negligible

**Question 67**

Which of the following local anaesthetics is recommended for procedures during labour?

A Prilocaine

B Bupivacaine

C Lignociane

D Ropivoaaine

Explanation B

Bupivacaine requires low concentrations (<0.25%) to achieve prolonged peripheral anaesthesia and analgesia for postoperative pain control and pain control during surgery. It is often the agent of choice for epidural infusions for postoperative pain control and for labour analgesia. It is regarded as a very safe spinal anaesthetic agent, with a relatively favourable therapeutic index with respect to neurotoxicity and the development of transient neurologic symptoms.

**Question 70**

Which of the following is false with regards to the CNS effects of thiopentone?

A It provides neuroprotection from focal cerebral ischaemia

B They produce dose dependent analgesia

C It suppresses cerebral electrical activity

D It decrease cerebral blood flow

Explanation B

Thiopentone produces dose dependent CNS depression ranging from sedation to general anaesthesia. They do NOT produce analgesia. Some evidence suggests that they cause hyperalgesia. It is a potent cerebral vasoconstrictor and produce predictable decrease in cerebral blood flow, cerebral blood volume and intracranial pressure. They decrease CMRO2. They may provide neuroprotecttion from focal cerebral ischaemia (CVA, surgical resection, temporary clips during aneurysm clipping) but not form global cerebral ischaemia (due to cardiac arrest). They suppress cerebral electrical activity-anticonvulsants

**Question 73**

Which is false regarding the anaesthetic agent propofol?

A Propofol has desirable antiemetic properties

B Propofol causes most pronounced decrease in blood pressure compared to other induction drugs

C Due to greater reduction in upper airway reflexes, propofol allows easier placement of a LMA

D Propofol augments the neuromuscular blockade, allowing for lower doses of the neuromuscular blocker

Explanation D

The organ system effects of propofol

CNS: hypnotic effects, no analgesia. Reduction in cerebral blood flow, reduction in basal cerebral metabolic rate for oxygen, reduction in intracranial and intraocular pressure. Burst suppression of the EEG

CVS: most pronounced decrease in blood pressure compared to other induction drugs. Vasodilation of both arteries and veins leading to reduction in preload and afterload. Inhibition of the baroreflex resulting in only a modest increase in heart rate

Rep: respiratory depression and apnoea. Greater reduction in upper airway reflexes (than Thiopentone) allowing easier placement of a LMA

Other effects: Propofol does not augment other neuromuscular blockade. Propofol has desirable antiemetic properties. Pain at site of IVI injection can be reduced with the co-administration of lignocaine, slow injection rate and larger veins.

Mechanism of action: potentiation of the chloride current mediated through the GABAa receptor complex