**Pharm-09B2** What are the potential side effects of propofol and its formulations?

74%

**Background**

Propofol is 2,6-diisopropylphenol
Intravenous anaesthetic agent used for the induction and maintenance of general anaesthesia and sedation

It is lipophilic and has poor water solubility
Therefore, it is formulated as an emulsion with egg phosphatide, glycerol, soya bean oil, triglycerides, sodium oleate and sodium benzoate

**Side effects secondary to propofol per se**

*CNS* – excitatory phenomena (e.g. involuntary movements, twitches, tremors, hiccups) but nil epileptiform EEG; low therapeutic index between sedation and general anaesthesia; ↓ cerebral blood flow (may cause ischaemia)

*CVS* – dose dependent ↓ inotropy; ↓ SVR (via NO release) → ↓ MAP → may cause end organ hypoperfusion; ↓ HR (may cause asystole)

*RESP* – dose dependent respiratory depression ↓ TV and ↓ MV (may cause apnoea + hypoxaemia); blunts response to hypercapnia; loss of airway protective reflexes (↑ aspiration risk)

*OTHER* – produces green hair and urine (after prolonged infusion)

*Pregnancy* – category C; crosses placenta and results in neonatal depression

**Side effects secondary to propofol formulation**

Lipid emulsion is prone to bacterial contamination → ↑ risk of bacteraemia

Lipid emulsion + pH 7 ~ 8.5 → pain on injection

Lipid emulsion → lipaemia after prolonged infusion

Propofol infusion syndrome = metabolic acidosis, hyperlipidaemia, rhabdomyolysis

Components of formulation may cause allergic reactions/anaphylaxis

**Examiner’s comments** – 74% of candidates passed this question.

Expected was a brief description of the clinical uses and the most common formulation of propofol. At this point candidates who performed well divided their answer to adverse effects due to propofol and those secondary to the formulation.

Common cardio-respiratory effects of propofol were well described. That propofol resulted in sedation and anaesthesia was almost universally recognised but few
commented on the narrow therapeutic window between the two. Again, most candidates identified excitatory movements with induction but fewer correctly described the mechanism or explained the contradictory EEG effects and the use of propofol for status epilepticus. Common side effects related to the formulation including pain, bacterial contamination, use of preservatives were well discussed. Metabolic effects from prolonged infusion including lipaemia, propofol infusion syndrome and the propensity to produce green coloured hair and urine was discussed by the majority. Few however mentioned alternative solvents including liposomes, medium chain triglycerides and cyclodextrins. That subclinical doses of propofol produce euphoria and explain the abuse potential unique to this drug also received a mark. Common mistakes were to discuss the pharmacokinetics of propofol, adverse effects related to the formulation only and beneficial central nervous system effects.