

This section is designed to test your knowledge of selected topics in this issue of the journal. The correct answers are given at the foot of the page.

# Self-assessment

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## MULTIPLE CHOICE QUESTIONS

### 1 The use of atypical analgesics by intravenous (IV) infusion for acute pain: evidence base for lidocaine, ketamine and magnesium

Which of the following are true regarding the benefits of intravenous infusion of lidocaine when given perioperatively?

- A.  Reduces the incidence of ileus and promotes enhanced recovery
- B.  Systemic lidocaine may reduce the neoproliferation of active sodium channels in damaged tissue
- C.  The greatest effect on pain was found using a high low-dose regime (>2 mg/kg/hr) for more than 24 hours
- D.  The analgesic benefits of lidocaine infusion lasted up to 48 hours after laparoscopic surgery
- E.  There is evidence of a reduction in chronic post-surgical pain at 3–6 months following breast surgery

### 2 Techniques of opioid administration

Which of the following are true regarding the pharmacology and uses of Tapentadol?

- A.  Acts by inhibition of reuptake of norepinephrine
- B.  It is ineffective for management of neuropathic pain
- C.  Has a higher incidence of serotonin syndrome compared with tramadol
- D.  There is significant inter-individual variability requiring cautious dose titration
- E.  Has a very high oral bioavailability

### 3 The neurobiology of chronic pain states

Which of the following are true about the NMDA receptor?

- A.  Is an ion channel receptor
- B.  At the resting membrane potential the receptor is blocked by calcium ions
- C.  Substance P plays an important role in recruiting NMDA receptors during chronic pain
- D.  Acute pain transmission via C-fibres is mediated by glutamate acting on NMDA receptors
- E.  Ketamine is an NMDA receptor antagonist

### 4 Techniques of opioid administration

Which of the following are true about transdermal opioid administration?

- A.  Transdermal patches utilise lipophilic opiates' ability to be actively absorbed through the skin
- B.  Continuous drug delivery provides constant plasma levels
- C.  Alternative analgesia often needs to be prescribed to account for breakthrough or incident pain
- D.  Steady state plasma concentration is usually attained within 6 hours after application
- E.  Increase in body temperature may affect the drug absorption

## SINGLE BEST ANSWER

### 5 A 40-year-old woman is attending the clinic for chronic pain management. She is a known epileptic and is on regular carbamazepine. Which of the following opioids would you prefer in her initial pain management considering possible drug interactions with carbamazepine?

- A.  Buprenorphine
- B.  Fentanyl
- C.  Oxycodone
- D.  Tramadol
- E.  Codeine

### 6 An 88-year-old female is brought into the emergency department following a fall at a nearby nursing home. X-ray reveals a fractured neck of femur. She has no major medical comorbidities apart from severe dementia. Which of the following is true regarding the pain assessment of this patient?

- A.  She will experience a lot less pain than someone without dementia
- B.  Self-assessment pain tools can be used as a guide to analgesia
- C.  Behaviours such as frowning, groaning, grimacing is always indicative of pain
- D.  The visual analogue scale (VAS) is widely used for pain assessment in this group of patients
- E.  The Abbey Pain Scale is a recommended tool for this patient

1. Correct answers. A, B, E.

2. Correct answers. A, D.

3. Correct answers. A, C, E.

4. Correct answers. B, C, E.

**5. Correct Answer: A.** Most opioids are metabolised via phase II metabolism employing glucuronidation or methylation (dealkylation) in the liver. For morphine, hydromorphone and buprenorphine, glucuronidation is the major metabolic pathway. However, with other opioids, such as fentanyl, oxycodone, tramadol and codeine, the main metabolic pathways are phase I metabolism via cytochrome p450 (CYP) isoenzymes, mainly CYP2D6 and CYP3A4/5. CYP3A4/5 is inducible (becomes more effective and increases drug metabolism) by drugs such as carbamazepine or rifampicin and inhibited (metabolism is less effective) by other substances such as ciprofloxacin. Additionally, genetic variability in cytochrome p450 isoenzymes exists. CYP2D6 genetic variation can significantly influence metabolism. Around 5–10% of caucasians have reduced activity, therefore are less effective at metabolising drugs such as codeine into their active components. Conversely, gene duplication, in around 3% of caucasians, is associated with ultrarapid metabolism of codeine to morphine. Individuals achieve high levels of morphine quickly following codeine administration. This can be dangerous in children under 12 years old who receive higher morphine doses than expected from a standard codeine dose, and in lactating mothers who will have higher concentrations of morphine in their breast milk, both of which risks opioid overdose and side effects such as respiratory depression. Other metabolic pathways such as human uridine 5 diphospho glucuronosyltransferases (for example UGT2B7) show genetic polymorphisms; however, the clinical impact of these is not clear, and these enzymes can also be both inhibited or induced by other medications.

**6. Correct Answer: E.** Acute pain is often the consequence of injury or disease and generally improves with healing and rest. It is encountered in a wide variety of clinical circumstances, e.g. postoperative, trauma and medical illness. Acute pain is generally considered to be nociceptive, but it can be neuropathic or a combination.

Assessment needs to be made for static pain (pain at rest) and dynamic pain (pain on movement, deep breathing or coughing). In patients with cognitive impairment, pain is reported less but not experienced less. Self-assessment tools can be used in most patients with mild to moderate cognitive impairment, although recall may be affected. Pain reporting in non-communicative patients is more challenging and observational tools are required, but behaviours such as frowning, groaning, grimacing may not indicate pain. Tools available include the Faces Scale and Abbey Pain Scale.

The VAS is a 100 mm long line with 'no pain' at one end and 'worst pain imaginable' at the other. Patients place a mark on the line to represent their intensity of pain. It requires understanding, the ability to make a mark on the line and equipment (paper, pen and ruler).