‘Medical skin loss’: Stevens–Johnson syndrome/toxic epidermal necrolysis and staphylococcal scalded skin syndrome

1. Major skin loss from exfoliative dermatoses:
   (a). Is a dermatological emergency.
   (b). Leads to altered thermoregulation.
   (c). Leads to hypermetabolism.
   (d). Can be appropriately managed in a side room on a general medical ward.
   (e). Results from common dermatological diseases.

2. Major skin loss from toxic epidermal necrolysis (TEN):
   (a). Results from skin loss from deep within the dermal layer.
   (b). Is associated with gastrointestinal bleeding and haemoptysis.
   (c). Can lead to complete healing in 2–3 weeks in the absence of complications.
   (d). Is associated with higher mortality when ocular involvement is present.
   (e). Results in complete failure of immune function.

3. A 5-year-old boy presents with a widespread desquamating rash that initially affected the skin flexures. This was preceded by a sore throat for which his general practitioner had prescribed amoxicillin for presumed tonsillitis 2 days previously. Appropriate statements regarding this case include:
   (a). He requires prompt treatment with anti-staphylococcal antibiotics.
   (b). His condition is more common in patients with human immunodeficiency virus (HIV) infection.
   (c). Skin biopsy is essential to confirm the diagnosis.
   (d). He is likely to need extensive skin grafting.
   (e). He is at high risk of ocular complications.

4. The following skin structures play an important role in thermoregulation:
   (a). Sebaceous gland.
   (b). Dermal vascular plexus.
   (c). Eccrine sweat gland.
   (d). Stratum corneum.
   (e). Melanocytes.

 Nitrous oxide in modern anaesthetic practice

1. Nitrous oxide is scavenged from the breathing circuit:
   (a). Because exposure of female staff has been implicated in increased spontaneous abortion and reduced fertility rates.
   (b). To ensure that concentrations are kept below the UK average exposure limit of 25 ppm.
   (c). To enter the atmosphere, where it rapidly breaks down to nitrogen and oxygen.
   (d). To enter the atmosphere, where it can produce intermediates that destroy ozone.
   (e). To enter the atmosphere, where it is has a global warming potential 5 times that of CO2.

2. Regarding metabolism, nitrous oxide:
   (a). Oxidizes the iron atom at the centre of vitamin B12.
   (b). Reduces the production of methionine, essential for myelin production.
   (c). Should be avoided in patients with thiamine deficiency.
   (d). Reduces the plasma concentration of homocysteine.
   (e). Reduces tetrahydrofolate synthesis, leading to megaloblastic bone marrow changes after 12 h.

3. Appropriate statements regarding the clinical effects of nitrous oxide are:
   (a). Nitrous oxide increases the risk of death or cardiovascular complications after surgery.
   (b). Prophylactic anti-emetic treatment does not reduce the risk of postoperative nausea and vomiting after nitrous oxide anaesthesia.
   (c). Nitrous oxide use increases the rate of wound infection.
   (d). Nitrous oxide may reduce the incidence of postoperative chronic pain.
   (e). Any increases in cerebral blood flow (CBF), cerebral metabolic rate (CMR) and intracranial pressure (ICP) are all further increased by the concomitant use of intravenous anaesthetic agents with nitrous oxide.
4. When providing anaesthesia using nitrous oxide, the following physical principles have important consequences:

(a). Nitrous oxide diffuses into air-filled cavities faster than nitrogen can escape.
(b). Nitrous oxide augments ventilation by the second gas and concentration effects.
(c). Rapid diffusion of nitrous oxide from blood to the alveolus at the end of anaesthesia means that oxygen is not required after operation.
(d). Intraocular expansion of C3F8 gas from previous eye surgery can occur up to 6 weeks after surgery.
(e). A nitrous oxide concentration of 75% can lead to a theoretical 2-fold increase in cavity size.

Principles of total intravenous anaesthesia: basic pharmacokinetics and model descriptions

1. Regarding the principles of target-controlled infusion (TCI) pharmacokinetics:

(a). In the absence of a bolus dose of propofol, it takes 40–90 min for a constant-rate infusion of 10 mg kg⁻¹ to reach a clinically useful effect-site concentration.
(b). When the steady-state concentration is reached, the rate of TCI increases to match elimination.
(c). Once the central compartment, V1, is filled with a bolus, the subsequent infusion rate reflects rapid and slow drug transfer to V2, the rapidly equilibrating compartment, and V3, the slowly equilibrating compartment, respectively, as well as elimination from V1.
(d). Remifentanil by constant-rate infusion can achieve a rapid clinical effect without an initial bolus dose.
(e). Rate constants are fixed in TCI models.

2. Appropriate statements for propofol target-controlled infusion (TCI) include:

(a). The key difference between Marsh and Schnider plasma targeting is the calculated volume of the central compartment V1.
(b). The Marsh model ignores patient age and scales the three compartment volumes to patient weight.
(c). In Schnider TCI, doses are calculated on sex-specific total body mass.
(d). The Kataria and Paedfusor models both use child weight as the parameter for estimating the volumes of V1, the central compartment, V2 the rapidly equilibrating compartment, and V3, the slowly equilibrating compartment.
(e). The Kataria TCI model is validated in children under 15 kg.

3. The following statements are true with respect to effect-site targeting:

(a). The time to peak effect (TTPE) for propofol is dose-dependent.
(b). The rate constant for drug transfer from the central compartment (V1) to the brain (ke0) represents a key factor in TTPE.
(c). The calculated ke0 value is specific to a given pharmacokinetic model.
(d). Effect-site targeting is the recommended method when using the Schnider target-controlled infusion (TCI) model.
(e). For a given pharmacokinetic model, a larger ke0 value corresponds to a smaller initial propofol bolus dose.

4. In Minto target-controlled infusion (TCI) modelling for remifentanil:

(a). The ke0 (rate constant for drug transfer from the central compartment, V1, to the brain) for this model is derived from EEG parameters.
(b). High plasma concentrations of remifentanil can be associated with bradycardia and chest wall rigidity.
(c). The ke0 value for this model correlates well with the onset of remifentanil analgesic action.
(d). Lean body mass is calculated to predict relevant pharmacokinetic parameters for this model.
(e). Pharmacokinetic parameters are not adjusted with patient age.

Anaesthesia for nephrectomy

1. Renal cell carcinoma (RCC) is associated with the following risk factors:

(a). Polycystic kidney disease.
(b). Asbestos exposure.
(c). Diabetes mellitus.
(d). Female sex.
(e). Hypertension.

2. Radical nephrectomy:

(a). Involves excision of Gerota’s fascia and preservation of the ipsilateral adrenal gland.
(b). Is the principal surgical treatment for renal cell carcinoma stage II or above.
(c). Performed laparoscopically has similar recurrence rates compared with open surgery in small tumours (<10 cm in diameter).
(d). Is indicated in non-malignant disease.
Multiple Choice Questions

3. Concerning the perioperative management of nephrectomy:
   (a) Non-invasive cardiac output monitoring has demonstrated a reduction in renal injury in the early postoperative period.
   (b) Patients should have intraoperative cell salvage as routine.
   (c) Non-steroidal anti-inflammatory drugs (NSAIDs) should be avoided in patients with pre-existing chronic kidney disease.
   (d) Postoperative IV heparin therapy is indicated in patients with extensive cavo-atrial disease.
   (e) It should not be performed in patients with metastatic disease as no benefit to survival has been demonstrated.

4. When managing patients with renal cell carcinoma in whom there is extension of tumour mass and thrombus into the inferior vena cava (IVC):
   (a) Insertion of an IVC filter is the usual component of preoperative preparation.
   (b) Cardiopulmonary bypass during resection will invariably be required.
   (c) Trans-oesophageal echocardiography provides inferior image quality of the IVC and intracaval thrombus compared with fluoroscopy.
   (d) Cell salvage is an absolute contraindication.
   (e) Preoperative angio-embolization is seldom required.

The clinical use of methadone in cancer and chronic pain medicine

1. A 40-year-old woman has chronic resistant pelvic pain after cervical cancer and treatment with radical hysterectomy and radiotherapy. She has a high-output ileostomy and cannot reliably absorb most oral preparations, and she has previously used opioid patches, which have not been beneficial. She undergoes a methadone switch. She is currently taking morphine sulphate sustained-release tablets (MSTs) at a dose of 200 mg twice daily. The following are appropriate statements:
   (a) Using the ad libitum regime, an appropriate fixed dose of methadone is 30 mg every 6 h as required.
   (b) She will require a pretreatment ECG to look for QRS prolongation.
   (c) Conversion to a twice-daily dose must be performed on day 6.
   (d) If the switch has to be abandoned while in progress, she should restart her MSTs at 130 mg twice daily then retitrate back up over the next few days.
   (e) She will need hospital admission during the switch.

2. The same woman is successfully switched to 50 mg of methadone twice daily and her pain is well controlled. Just before discharge on day 7, she is found to have a QTc of 0.46 s on an ECG, whereas previously it was 0.43 s (the normal upper limit of QTc is <0.45 s). The following are appropriate statements:
   (a) She should have her opioids immediately converted back to morphine sulphate.
   (b) Her serum potassium level is found to be 3.2 mmol litre⁻¹ (normal range 3.5–5.0 mmol litre⁻¹). This should be corrected.
   (c) Methadone is unlikely to be the cause.
   (d) Her gender places her at higher risk of methadone-induced arrhythmia.
   (e) She should be digitalized prophylactically.

3. A 35-year-old man is taking methadone at a dose of 20 mg once daily to treat opioid dependency. He is undergoing major abdominal surgery and is expected to be nil-by-mouth on the high-dependency unit for 3 days after operation. The following are appropriate statements:
   (a) His methadone should be converted to an alternative long-acting opioid before surgery.
   (b) Patient-controlled analgesia (PCA) using morphine with a background infusion of 1 mg h⁻¹ with a 2-mg bolus and 5-min lockout is appropriate assuming an approximate conversion ratio of 1:2 methadone:intravenous morphine.
   (c) Oral methadone may be replaced by a reduced intravenous dose of methadone.
   (d) A regional technique is relatively contraindicated.
   (e) Once methadone is recommenced, a lower dose should be started, followed by up-titration.

4. Concerning the pharmacology of methadone:
   (a) It is a semisynthetic phenylheptylamine.
   (b) Its half-life usually increases with repeated dosage.
   (c) Its half-life may be reduced with prolonged administration.
   (d) The dose should be reduced in renal failure.
   (e) A patient taking 100 ml of methadone per day is on approximately 500 mg per day of oral morphine equivalent.
Pain after amputation

1. Stump pain after amputation:
   (a). Can be persistent in more than 80% of amputees.
   (b). Is closely associated with phantom limb pain.
   (c). Is primarily nociceptive pain in the acute setting.
   (d). Is reliably managed with strong opioids alone.
   (e). Can be effectively managed with regional anaesthesia.

2. Phantom limb pain:
   (a). Occurs in fewer than 10% of amputees.
   (b). Presents within the first week after amputation in 75% of cases.
   (c). Resolves within a year of amputation in most cases.
   (d). The incidence or severity is not affected by the use of regional anaesthesia.
   (e). Strong opioids are the treatment of choice for first-line management.

3. In the treatment of acute phantom limb pain, memantine:
   (a). Is an agonist at the N-methyl-D-aspartate (NMDA) receptor.
   (b). Should be administered before operation to prevent phantom pain.
   (c). Has no active metabolites.
   (d). Is licensed to be administered parenterally.
   (e). Has profound psychotropic effects.

4. Regarding heterotopic ossification after lower limb amputation:
   (a). It is more commonly found after traumatic amputation.
   (b). It can be prevented with the use of a bisphosphonate given perioperatively.
   (c). It is more severe if a patient requiring amputation has suffered a concurrent head injury.
   (d). It requires surgical excision in most patients.
   (e). Non-steroidal anti-inflammatory drugs (NSAIDs) can be used in the treatment of this condition.