Self-assessment

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.

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MULTIPLE CHOICE QUESTIONS

1 Anaesthesia for ruptured aortic aneurysm

Which of the following factors increase the risk of rupture in abdominal aortic aneurysm?

A. ☐ The risk of rupture of an aneurysm of 70 mm diameter is greater than one of 50 mm diameter

B. ☐ Symptomatic aneurysms

C. ☐ For a given aneurysm dimension the risk of rupture is greater in males than females

D. ☐ Smoking

E. ☐ Diabetes

2 Anaesthesia for open abdominal aortic surgery

Which of the following are true regarding the peri-operative anaesthetic management of open abdominal aortic aneurysm repair?

A. ☐ There is evidence suggesting improved outcomes with the use of cardiac output monitoring in open aneurysm repair

B. ☐ Evidence is emerging that suggests BIS-guided anaesthesia may be associated with a reduced incidence of postoperative cognitive dysfunction (POCD)

C. ☐ General anaesthesia with volatile anaesthetics has better postoperative outcome benefit compared to total intravenous anaesthesia (TIVA)

D. ☐ Thoracic epidural analgesia has been shown to reduce the duration of postoperative tracheal intubation

E. ☐ The severity of hypotension at unclamping is proportional to the cross-clamp time

3 Applied cardiovascular physiology

Which of the following physiological changes occur during normal pregnancy?

A. ☐ The fall in systolic blood pressure is more than the fall in diastolic blood pressure

B. ☐ ST depression is a normal finding on the ECG

C. ☐ Diastolic murmurs are normal during pregnancy

D. ☐ A decrease in systemic vascular resistance (SVR) occurs due to the vasodilatory effects of oestrogen

E. ☐ Blood flow to the liver remains constant

4 Postoperative care and analgesia in vascular surgery

Which of the following factors affect mortality following abdominal aortic aneurysm (AAA) surgery?

A. ☐ Emergency repair is associated with significant risk of postoperative renal dysfunction

B. ☐ There is evidence that pain-free patients have lower rates of myocardial ischaemia despite having no differences in vital signs compared to those patients with poor analgesia

C. ☐ Isolated troponin leak may not be associated with increased 30-day mortality

D. ☐ ARDS is the most common cause of death following open AAA surgery

E. ☐ Persistent acidosis in the postoperative period could be due to colonic ischaemia

SINGLE BEST ANSWER

5 A 70-year-old male smoker diabetic hypertensive presents with vague abdominal pain

CT of the abdomen is unremarkable apart from an incidental finding of a 6-cm abdominal aortic aneurysm. Which of the following is true about his further management?

A. ☐ He should be placed under the screening programme and a repeat ultrasound should be performed in 6 months' time

B. ☐ He should be operated immediately as the risk of his aneurysm rupture is around 1%

C. ☐ He should be started on statins as there is evidence that statins may slow the progression of aneurysm growth

D. ☐ The overall mortality remains the same whether the aneurysm is repaired via an open or an endovascular technique

E. ☐ He should be initiated on beta blockers in preparation for surgery as it improves outcome

6 A 65-year-old Afro-Caribbean male presents with a pale and severely painful left foot.

Movement of the limb is very limited. He has history of poorly controlled diabetes. His blood results show deranged renal function. An ECG shows atrial fibrillation with a ventricular rate of around 90. Which of the following is true about his further management?

A. ☐ Risk of perioperative myocardial infarction or death of >5%, due to the prevalence of multiple comorbidities

B. ☐ Pre-emptive analgesia with epidural infusions and intravenous ketamine are recommended immediately

C. ☐ Spinal or epidural blockade may have improved outcome compared to general anaesthesia

D. ☐ The patient should be optimised medically prior to considering revascularisation

E. ☐ Thrombosis secondary to pre-existing atherosclerosis could be the main cause

ANSWERS

1. Correct answers: A, B, D

2. Correct answers: B, D, E

3. Correct answers: B, E

4. Correct answers: A, B, E

5. Correct Answer: C. A National AAA Screening Programme (NAAASP) was set up in 2009 on the background of evidence presented by the Multicentre Aneurysm Screening Study (MASS) group. This suggested that screening could halve AAA-related deaths in men aged 65–74 and presented evidence supporting surgical intervention in AAAs $\geq$5.5 cm. Screening is currently offered to all men aged 65 in the UK. These men are screened by ultrasound and managed according to a nationally agreed clinical pathway. It is recommended that patients identified via the NAAASP should undergo intervention within 8 weeks of diagnosis, with those diagnosed incidentally, following a similar timeframe. In the elective setting, the decision regarding when to operate is guided by the size and rate of growth of the aneurysm. Current evidence supports intervention when AAAs $\geq$5.5 cm. Aneurysms $\leq$5.5 cm have a relatively low annual rupture rate ($\leq$1%).

Data from the National Vascular Registry reports an increased length of hospital stay (8 days) for patients undergoing elective open AAA repair compared to those undergoing EVAR (2 days). The overall mortality rate for open aneurysm repair was 3.2% compared to 0.7% with EVAR.

Statins are protective both in the long term (reducing cardiovascular risk) but also in the perioperative period. There is also evidence that they slow the progression of aneurysm growth. There has been much discussion surrounding the risk-benefit analysis of preoperative β-blockers in patients undergoing non-cardiac vascular surgery. Original recommendations suggested that β-blockers be commenced in all those undergoing vascular surgeries that are at a higher perioperative cardiac risk. It could be argued that all patients undergoing aneurysm repair should be considered to be part of this high-risk group due to their associated increased incidence of coronary artery disease. Despite this assumption, the current recommendations state that initiation of β-blockers should not be considered routine in those undergoing vascular surgery and should be only started if indicated on a case-by-case basis.

6. Correct Answer: A. This patient is diagnosed with Category III acute limb ischaemia. Patients presenting with irreversible ischaemia may require urgent amputation. This procedure should not be unduly delayed for medical optimisation in order to minimise the life-threatening systemic effects of extensive muscle necrosis in the affected limb. Terminal care is sometimes the most appropriate option in patients with extensive tissue involvement and significant co-morbidities.

Approximately 5000 patients present each year with acute limb ischaemia in England and Wales. Associated mortality at 1 year is significant (about 20%) as is subsequent limb loss (about 35%).

An *embolus* is the cause of acute limb ischemia in about 30%. The majority of emboli are cardiac in origin (e.g. atrial fibrillation or acute myocardial infarction). Patients rarely have a history of previous IC. Atherosclerotic plaques form in the medium and large sized arteries – the lower limb being affected more frequently than the upper limb.

Diabetes – Diabetics are twice as likely to have PAD. Amputations are 5–10 times more frequent in diabetics than non-diabetics. Good glycaemic control is paramount; a meta-analysis found that a 1% increase in glycosylated haemoglobin is associated with a 26% increase in the chance of developing PAD. *Black ethnicity* doubles the likelihood of developing PAD.

Phantom limb pain (PLP) is a significant complication of lower limb amputation with up to 70% of patients experiencing PLP at some stage. Pre-emptive analgesia with epidural infusions, intrathecal and intravenous ketamine have not consistently reduced the incidence of PLP. Central neuraxial blockade, balanced general anaesthesia or a combination are suitable techniques. Spinal or epidural blockade have theoretical advantages as they enhance peripheral blood flow and reduce postoperative cognitive dysfunction but do not affect overall outcome.

Patients requiring major amputation need careful assessment by a multidisciplinary team and optimisation of controllable risk factors. Operative interventions should be performed promptly by a senior anaesthetist and surgeon, on a routine operating list during normal working hours. (Unpublished data suggests a threefold increase in mortality of patients operated on "out of hours" when compared to "in hours".)