Anaesthesia of...

individual agents on CPP, and therefore on blood pressure and vasomotor tone, need to be considered.

Maintenance of perfusion in head trauma patients is essential for several reasons, one of which is to support the brain, by maintaining adequate cerebral perfusion and oxygenation, as well as maintaining control of blood glucose. Another reason for maintaining perfusion and normoglycaemia is to reduce local cytokine production secondary to stress oxidation, which is present if there is hyperglycaemia.

Nurses and technicians need to have an understanding of how anaesthetic agents are likely to affect intracranial pressure (ICP) and CPP. A number of anaesthetic agents alter vascular tone. The inhalation agents are known to result in a dose-dependent vasodilation. In humans sevoflurane is known to cause the least vasodilation when compared with other inhalation agents in normocapnic patients, whilst maintaining intact autoregulation, making it more suitable as the maintenance agent for neuroanaesthesia.

It is also thought that some anaesthetic agents may have neuroprotective properties as a result of various mechanisms, such as reduced synaptic transmission, reduced calcium influx, membrane stabilisation, improved regional cerebral blood flow (CBF) and improved glutamate uptake. The main anaesthetic agents thought to provide neuroprotection include the barbiturates, but ketamine is also thought to have some effect.

Appropriate analgesia needs to be provided postoperatively and this is commonly achieved using opioids, again avoiding drugs that are likely to result in vomiting, as well as non-steroidal anti-inflammatory drugs (NSAIDs) and paracetamol. Local anaesthetic (lidocaine) patches have also been used to provide postoperative analgesia in human patients.

Patients with TBI are commonly encountered in a variety of veterinary clinics, whether in a general practice or referral setting. A successful outcome in these patients very much depends on close monitoring and excellent nursing care, along with a good understanding of both

the normal brain as well as the injured brain, and the physiological changes that can occur. Good anaesthesia protocols are also essential in these patients, in order to identify which drugs may be suitable, or unsuitable, for anaesthesia, and what effects these agents may have on physiology in the injured brain.

KEY LEARNING OBJECTIVES

- Understand the pathophysiology of traumatic brain injury and how this can impact on anaesthesia
- Understand the importance of preoperative assessment and stabilisation of the head trauma patient
- Identify the issues associated with the use of different anaesthetic agents and how to select the best options

MULTIPLE CHOICE QUESTIONS

1. Which ONE of the following vascular access sites should be avoided in a patient with a brain injury?
(A) Cephalic vein
(B) Jugular vein
(C) Lateral saphenous vein
(D) Medial saphenous vein
2. What is a Small Animal Coma Score (SACS) in a normal patient?
(A) 18 (C) 10
(B) 14 (D) 6
3. What angle is it suggested that patients with traumatic brain injury be placed at in order in order to encourage venous return?
(A) 10° (C) 30°
(B) 20° (D) 40°

The endocrine patient

Claire Roberts

The term endocrine disease encompasses a whole range of different hormone imbalances that can affect our patients' health in a number of ways and increase the risks associated with anaesthesia. Endocrine diseases stem from imbalances in hormone levels. Hormones are special chemical messengers in the body that are created in the endocrine glands. These messengers control most major bodily functions, from simple basic needs like hunger to complex systems like reproduction, and even the emotions and mood.

Endocrine diseases can develop because an endocrine gland itself is faulty or because the control of that gland is faulty. Disorders develop when the body produces too much hormone (hyper- diseases) or too little hormone

(hypo- diseases). There are several common diseases associated with the endocrine system that we see in our patients, including diabetes mellitus, insulinoma, hyperadrenocorticism (Cushings), hypoadrenocorticism (Addison's), hyperthyroidism and hypothyroidism.

During anaesthesia and surgical stimulation, a normal endocrine system will produce a 'stress response' which is designed to preserve homeostasis in response to stimuli that are a serious threat to life. In patients suffering with disorders of the endocrine system, their altered response to anaesthesia may cause additional perioperative concerns to the anaesthesia, surgical and recovery teams.

For us to be able to assist our patients in having a successful anaesthetic outcome we need to have a good knowledge and understanding of the presenting disease, as well as complications, so that we can be prepared. Each patient requires a full preanaesthetic evaluation to determine an individual protocol, using drugs that we are familiar with.

KEY LEARNING OBJECTIVES

- Look at some of the more common endocrine disorders
- Discuss how to perform a preoperative assessment in patients with an endocrine disorder
- Discuss some of the potential complications associated with the more common endocrine disorders seen in practice

MULTIPLE CHOICE QUESTIONS

1. What is the name of the response of the endocrine system following a noxious stimulus?
 - (A) Reflex response
 - (B) Stress response
 - (C) High output response
 - (D) Endocrine reflex response

2. During anaesthesia how often should blood glucose be monitored in a patient with diabetes mellitus?
 - (A) Every 4–6 hours
 - (B) Pre- and postoperatively
 - (C) Every 15 minutes
 - (D) Every 30–60 minutes
3. Patients with hyperadrenocorticism (Cushings) often experience abdominal enlargement. Why is this a concern during anaesthesia?
 - (A) The weight of the abdomen can compromise respiratory function
 - (B) The weight of the abdomen can compromise blood flow in the vena cava
 - (C) Both a and b
 - (D) A large abdomen will increase anaesthetic requirement

The Caesarean section

Claire Roberts

Anaesthesia for a patient undergoing a Caesarean section should not need to be stressful and hurried. With a well thought-out protocol in place and the use of check-lists, the team should be prepared for this type of surgical presentation at any time. Our goal is to keep the mother safe whilst saving the puppies or kittens.

Patient status will vary greatly, depending on how quick the owner has been at identifying a problem. Patients may present dehydrated, exhausted, hypotensive, hypothermic and/or hypocalcaemic. Clinical and biochemical abnormalities need to be addressed quickly before proceeding to induction of anaesthesia and surgery, any acid–base imbalances and/or hypotension should be addressed before surgery and continued postoperatively for as long as required.

There are many considerations that need to be addressed prior to induction of anaesthesia. Fluid therapy and temperature control should be actively implemented as soon as the patient arrives. Drug selection can be challenging as placental transfer occurs with every anaesthetic drug commonly used, which means puppies and kittens will be born affected by these drugs. For this reason, we need to select drugs that are short acting or reversible, using the lowest effective dose possible.

When selecting an analgesia protocol for these patients we should be aware of the drugs' impact on maternal and/or neonatal survival and decide what route, drug and at what stage of the procedure we are going to administer them.

The dam or queen is likely to experience a range of complications associated with being pregnant. Her distended abdomen pushing on her diaphragm will result in hypoventilation, she will have a higher oxygen requirement causing her to hyperventilate and in the

event of blood loss these patients are at risk of becoming hypotensive, showing a slower response to blood loss. A delay in gastric emptying increases the risk of regurgitation which will also require careful management during the induction phase until an endotracheal tube is placed.

KEY LEARNING OBJECTIVES

- Induction and maintenance of anaesthesia for a Caesarean section
- Analgesia options for a Caesarean section
- Postoperative anaesthesia considerations

MULTIPLE CHOICE QUESTIONS

1. Which of the following should be avoided when selecting an anaesthetic protocol for a Caesarean section?
 - (A) Choosing drugs with a short duration of action
 - (B) Using the lowest possible dose of injectable or inhaled anaesthetic agents
 - (C) Including an alpha-2 agonist in the premedication
 - (D) Use of local anaesthetic techniques where possible
2. These patients tend to experience a delay in gastric emptying with an increased risk of regurgitation and aspiration. Which of the following can help minimise this risk?
 - (A) Keep patient in lateral recumbency during intubation
 - (B) Avoid inflating the endotracheal tube cuff
 - (C) Rapid induction
 - (D) Pre-oxygenating prior to induction