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ANESTHESIA & PAIN MANAGEMENT

Morbidity and Mortality in Small Animals Related to Anesthesia

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Mortality

Most veterinarians are aware that anaesthesia carries a risk in small animals. Our appreciation of some of the causes of morbidities and mortalities has improved over the last 20 years. Also the type of surgeries and anaesthetic agents/ techniques we undertake has also changed over this period and these changes may directly and indirectly influence the prevalence and types of morbidities and mortalities.

One UK study¹ undertaken in the mid-late 1980's estimated the risk of anaesthetic-related death was ~ 1 in 870 in healthy dogs and ~ 1 in 552 in healthy cats and the risk worsened to ~ 1 in 30 if the dogs or cats were not healthy. More recent studies^{2,3} have estimated the risk of anaesthetic-related death in dogs and cats to nearer 1 in 1000. The most recent and most extensive epidemiological study into anaesthetic-related death in small animals⁴ estimated the risk to be ~1 in 1880 in healthy dogs, 1 in 895 in healthy cats and 1 in 137 in healthy rabbits; with the risk worsening to 1 in 73, 1 in 71 and 1 in 14 respectively if the animals were not healthy. On first examination, it would appear that small animal anaesthesia is becoming safer for our patients, but in comparison to human anaesthesia where the risk of anaesthetic-related death in healthy patients is estimated to be between 1 in 5000 and 1 in 20000⁵, it is clear that small animal anaesthesia is still a relatively risky undertaking. No anaesthetic agent/ protocol is safe, although some may be safer than others. All anaesthetics have effects on the cardiovascular and respiratory systems and have undesirable side effects. These studies remind us that you can still give a 'good' anaesthetic with the 'bad/ old' drugs and still give a 'bad' anaesthetic with the 'good/ new' drugs. Furthermore, careful reading and comparison of the published studies reveals some interesting facts that are worthy of highlighting to all of us whom practise small animal anaesthesia.

Firstly, in the most recent study it is worth noting that 50% of all anaesthetic related deaths occurred in healthy patients⁴ and as such it is important to inform owners of animals that anaesthesia carries a risk of death. One interesting comparison between studies is that 20 years ago, most anaesthetic-related deaths occurred during induction or the early maintenance phase¹, nowadays, it appears that the majority of deaths occur during the recovery period⁴. The reasons for this are not clear but this finding provides a compelling argument that our patients should receive some form of observation/ monitoring during the recovery period.

The CEPSTAF study⁴ also provided information as some of the reported causes of anaesthetic-related mortality and serves to remind us that careful consideration of some of the basic principles of anaesthesia, namely the importance of maintaining/ improving the airway, breathing and circulation (the ABC), are just as important today as they ever were. For example, the causes of anaesthetic-related death in small animals were reported⁴ as follows;

- Unknown 39% cats, 28% dogs
- Cardiac arrest 17% cats, 33% dogs
- Ventilatory failure 17% cats, 13% dogs
- Airway obstruction 9% cats, 5% dogs
- Circulatory failure 7% cats
- i.e. The ABC!!!!

Also, the procedures that most commonly resulted in death were reported as follows;

- Exploratory laparotomy (Dogs)
- Spay for pyometritis (Dogs)
- • Dental surgery (Dogs & Cats)
- Spay (Cats)
- Diaphragmatic hernia repair (Cats)
- Treatment for urethral obstruction (Cats)
- Repair of jaw fractures (Cats)

The procedures listed above can easily be allocated into a category where one of the ABC is at risk e.g. fractured jaw: airway, diaphragmatic hernia repair: breathing, pyometritis: circulation.

It is clear that in order to minimise the risk of anaesthetic-related death that careful consideration should be made to the patient's airway, breathing and circulation at all times in the peri-anaesthetic period and if necessary, anaesthesia should be postponed until the patient can be adequately stabilised.

The CEPSTAF study⁴ also provided some interesting information as to the influence the anaesthetic agents/ protocols may have on anaesthetic related mortality. The use of propofol and isoflurane was associated with an increased risk of death, as did the use of intra-operative fluid therapy in cats. The use of medetomidine had no effect on the risk of death (c.f. xylazine in an earlier study¹). ACP was the only agent that was associated with reducing the risk of anaesthetic-related death. The reasons for some of these findings will be discussed in the talk and are dealt with in the discussion of the published study.

Morbidities

To some extent anaesthetic-related morbidities may be considered in some cases to be manifestations of adverse events with consequences that were not fatal but did produce injury or disease, e.g. brief periods of hypoxia causing transient post-anaesthetic blindness in cats. As above, these types of morbidities may not be entirely prevented but the risk of their occurrence may be reduced if careful consideration is made to the patient's airway, breathing and circulation at all times in the peri-anaesthetic period.

Hay varios trastornos concretos relacionados con la anestesia que merecen ser mencionados individualmente.

Hypothermia: Probably the most common anaesthetic-related morbidity and can prolong recovery times dramatically. Animals begin to lose heat and/ or the ability to maintain their body temperature from the moment they receive pre-anaesthetic medication. Steps should be taken to reduce heat loss proactively rather than just attempting to warm patients in the recovery period.

Burns/ scalding due to warming devices: Mis-use of or malfunctioning warming apparatus may result in significant and severe burns to anaesthetised patients. Never allow direct contact between a heating device and an animal's skin. Always regularly check the animal's temperature and check to make sure the skin does not feel too hot.

Tracheal tear/ rupture in cats: The incidence of tracheal tears in cats has increased over the last decade in the UK. The Veterinary Defence Society believes that the increased incidence is largely related to the use of cuffed endotracheal tubes in cats and the over-inflation of the cuffs by veterinarians concerned to prevent aspiration of fluid e.g. during dental procedures. The author rarely uses cuffed tubes in cats. If aspiration of fluid is a real worry, pharyngeal packing will prevent aspiration of fluid originating in the oral region.

Gastric reflux/ regurgitation/ and aspiration: Gastric reflux into the oesophagus occurs in around

16% of dogs⁶ and cats⁷, although rarely is this recognised clinically. However, repeated anaesthetics over a short space of time are thought to increase the risk of oesophageal strictures forming⁸. If reflux is observed to occur steps should be taken to check the airway is secure and to neutralise the pH remove the regurgitated material as soon as possible. In dogs prolonged periods of fasting (>12 hours) are thought to increase the incidence of reflux.

References

1. Clarke KW, Hall LW (1990) A survey of anaesthesia in small animal practice: AVA/BSAVA report. *Journal of Veterinary Anaesthesia* 17, 4-10.
2. Dodman NH, Lamb LA (1992) SURVEY OF SMALL ANIMAL ANESTHETIC PRACTICE IN VERMONT. *Journal of the American Animal Hospital Association* 28, 439-445.
3. Dyson DH, Maxie MG (1998) Morbidity and mortality associated with anesthetic management in small animal veterinary practice in Ontario. *Journal of the American Animal Hospital Association* 34, 325-335.
4. Brodbelt DC (2006) The Confidential Enquiry into Perioperative Small Animal Fatalities. PhD thesis. Royal Veterinary College. London university, London UK
5. Galatos AD, Raptopoulos D (1995) GASTROESOPHAGEAL REFLUX DURING ANESTHESIA IN THE DOG - THE EFFECT OF PREOPERATIVE FASTING AND PREMEDICATION. *Veterinary Record* 137, 479-483.
6. Galatos AD, Savas I, Prassinis NN et al. (2001) Gastro-oesophageal reflux during thiopentone or propofol anaesthesia in the cat. *Journal of Veterinary Medicine Series a-Physiology Pathology Clinical Medicine* 48, 287-294.