Amy Thornley RVN Dip CVN

Following her VN training, Amy worked in a referral practice for two years. She then took a year out to travel and work in Australia and Namibia. Amy is currently working for the PDSA in a busy charity practice environment.

To cite this article use either DOI: 10.1111/vnj.12111 or Veterinary Nursing Journal VOL 29 pp52–53

Anaesthesia in the geriatric patient – a case study

Amy Thornley RVN Dip CVN
PDSA, 7, Warwick Road South, Old Trafford, Manchester M16 0JW UK

ABSTRACT: Anaesthetic monitoring in veterinary practice can easily become routine; however, specific requirements are needed for certain cases highlighting that each patient should be assessed as an individual. The following is a case report for a geriatric anaesthetic. The case was performed within a charity practice; so monitoring equipment, drugs and blood testing facilities were all limited. The case highlights the areas of most importance with regards to geriatric anaesthesia to aid direction for similar situations.

The patient

Gypsey, a 10-year and seven-month-old, female, canine crossbreed was admitted for mammary tumour surgery. She weighed 15kg with a body score of 3 and no known concurrent disease. No history of coughing or exercise intolerance was obtained from the owner thus ruling out any obvious signs of cardiac disease, and on auscultation her lungs sounded clear with no cardiac arrhythmias detected.

Pre-anaesthetic checks

A series of blood tests was performed to elucidate any abnormalities **(Figure 1)**.

Blood total protein (TP) was measured because protein plasma levels can be reduced in elderly patients as a consequence of concurrent renal disease (Seymour and Gleed, 1999). This results in unbound drugs in the circulation causing a peak in activity with a prolonged anaesthetic duration and recovery, along with an increased risk of drug overdose (Hall and Clarke 1991, Seymour and Gleed, 1999). The results in this case were normal.

Geriatric patients are also likely to have kidney function deterioration (Lane and Cooper, 2003) so blood urea nitrogen (BUN) was measured, with no abnormality detected.

Renal function is decreased in anaesthetised geriatric patients even when pre-anaesthetic blood tests show normal parameters; therefore intravenous fluid therapy (IVFT) was administered to encourage drug elimination (Seymour and Gleed, 1999, Welsh, 2003).

Blood glucose and packed cell volume (PCV) were normal, giving Gypsey an anaesthetic risk Category 1 **(Table 1)**.

Lateral and dorsal radiographs revealed no abnormalities and blood pressure was within normal parameters **(Figure 2)**.

Table 1. Pre-anaesthetic risk categories

Category 1	Normal, healthy, no detectable disease	Elective neutering
Category 2	Slight/moderate systemic disease showing no obvious incapacity	Localised infection, fractures, skin tumours
Category 3	Mild to moderate systemic disease causing mild symptoms	Anaemia, fever, dehydration, cachexia
Category 4	Extreme systemic disease causing a threat to life	Toxemia, emaciation, uraemia, decompensated CHF
Category 5	Moribund/dying patients unlikely to survive 24hrs	Severe trauma, shock, terminal malignancy

Orpet and Welsh (2011)

Anaesthetic agents

A pre-medication of acepromazine (ACP 2mg/ml, Novartis Animal Health UK) and buprenorphine (Vetergesic 0.3mg/ml, Alstoe Animal Health) was administered. This is considered to be a safe combination to use in geriatric patients if no cardiac disease or hypotension are detected (Seymour and Gleed 1999).

A propofol (Vetofol 1.0%w/v, Norbrook Laboratories) induction was administered requiring a small amount for effect, likely to be the consequence of reduced activity of the central nervous system owing to ageing (Seymour and Gleed 1999).

Anaesthesia was maintained using isoflurane (Isoflo 100%w/w, Abbott Laboratories) and non-steroidal, anti-inflammatory drugs were avoided because of the effects on renal function with opioids relied upon for analgesia (Welsh 2003).

Anaesthetic monitoring

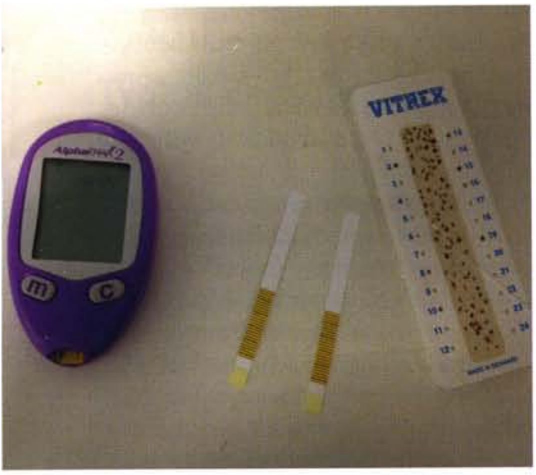
Cardiac function in geriatric patients can decrease as organ and skeletal muscle demands are reduced; therefore any further decreases in intra-operative hypotension caused by haemorrhage or vasodilation can be critical (Seymour and Gleed 1999, Welsh 2003).

Mean arterial blood pressure (MAP) was monitored throughout period of anaesthesia and IVFT helped to maintain a range of 60 - 120mmHg.

In geriatric patients, there is an increased risk of pulmonary oedema owing to over-infusion of fluids (Seymour and Gleed 1999); so regular thorax auscultations were performed monitoring for abnormal lung sounds. This also facilitated monitoring of cardiac mechanical function with electrocardiography used to monitor electrical activity and detect any cardiac arrhythmias (Kilner 2009a).

In geriatric patients, decreased elasticity of lungs and increased residual volume can develop, resulting in hypoxemia (Seymour and Gleed 1999).

Figure 1. Blood equipment – the essential blood tests recommended if full biochemistry, haematology and electrolyte tests are not available



Mean arterial oxygen saturation (SaO_2) was monitored maintaining normal values and avoiding ischemic damage to tissues (Welsh 2003). End tidal carbon dioxide ($ETCO_2$) was also measured maintaining safe levels, avoiding respiratory acidosis as a consequence of underlying respiratory disease predisposing to hypercapnia (Lane and Cooper 2003).

SaO_2 and $ETCO_2$ monitoring is considered to be the minimal standard of care in human anaesthetic monitoring, resulting in the detection of 60 to 93 per cent of complications before they become clinically apparent (Kilner 2009a).

Geriatric patients are more susceptible to hypothermia owing to decreases in central nervous system activity (Lane and Cooper 2003). During anaesthesia, this is further suppressed (Orpet and Welsh 2011), thereby risking development of cardiovascular and respiratory compromise (Kilner 2009b). A heated operating table was provided and temperature monitored. Although a decrease in CNS activity was noted, it was not a significant feature.

Conclusion

The protocol resulted in smooth and uneventful anaesthesia and recovery.

Studies show that pre-anaesthetic blood testing highlights underlying disease in 30 per cent of geriatric patients (Joubert 2007). When full biochemistry and haematology blood tests are not an option, the essential parameters recommended for measurement are TP, BUN and PCV (Kilner 2009a).

The monitoring equipment used throughout this anaesthetic procedure gave valuable information about the physiological effects of anaesthesia. However, it is still vital this information is not relied upon alone. Continuous heart rate, respiration rate and pulse strength monitoring were still critical in monitoring the level and depth of anaesthesia.

It is often very easy to become complacent about anaesthesia when practice protocols are being strictly applied, particularly in busy environments. With geriatric patients, however, an increased risk exists and it becomes even more important to think of each patient as an individual.

Figure 2. Both lateral and dorsoventral X-ray views are required for a full radiographical examination.

Only when concurrent diseases have been eliminated or identified, and careful monitoring implemented, can an anaesthetic procedure be claimed as being 'safe'.

References

HALL, L.W. & CLARKE, K.W. (1991). *Veterinary Anaesthesia. 9th Ed.* London. Bailliere Tindall.

JOUBERT, K. E. (2007). Pre-anaesthetic Screening of Geriatric Dogs. *Journal of the South African Veterinary Association* 78(1): 31-35.

KILNER, J. (2009a). The Ups and Downs of Anaesthesia Monitoring - Part 1. *Veterinary Nursing Journal.* 24(11): 25-27.

KILNER, J. (2009b). The Ups and Downs of Anaesthesia Monitoring - Part 2. *Veterinary Nursing Journal.* 24(12): 21-23.

LANE, D., R. & COOPER, B. Eds. (2003). *Veterinary Nursing.* 3rd Ed. Cheltenham. British Small Animal Veterinary Association.

ORPET, H. & WELSH, P. (2011). *Handbook of Veterinary Nursing.* 2nd Ed. Oxford. Blackwell Science.

SEYMOUR, C. & GLEED, R. Eds. (1999). *Manual of Small Animal Anaesthesia and Analgesia.* Cheltenham. British Small Animal Veterinary Association.

WELSH, E. (Ed) (2003). *Anaesthesia for the Veterinary Nurse.* West Sussex. Blackwell.