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Case report: Discussion of the nurse's role in a case of radiographically diagnosed nutritional secondary hyperparathyroidism

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ABSTRACT: Veterinary nurses are often involved in diagnostic imaging procedures. In the quest to obtain images which the veterinary surgeon may use to further a diagnosis, it must be remembered that the patient in question requires dedicated care throughout the process. Discussion of the case with the attending veterinary surgeon (VS) allows for an understanding of the suspected disease process and enables the nurse to tailor the care to the individual patient. It is also essential to be aware of the health and safety requirements involved and a brief refresher is included in this article.

Introduction

This report describes the radiographic diagnosis of nutritional secondary hyperparathyroidism (NSH) in a one-year-old Bengal cat called Monty. This condition is caused by the feeding of a diet containing the incorrect calcium/phosphorous ratio. The report also discusses the treatment he received, including placement of an oesophagostomy tube and the excellent recovery he made, despite having a fractured spine and ghost-like skeleton.

History

Monty, a one-year-old Bengal cat weighing 2.98 kg, was admitted for investigation of presenting symptoms of lethargy and pain. He was reluctant to play, jump and climb and was lame on his right hind limb. He walked stiffly, wouldn't look up and shuffled uncomfortably, on flexed limbs, close to the ground. Monty was fed exclusively on raw and cooked chicken, therefore nutritional secondary hyperparathyroidism (NSH) and metabolic bone disease were suspected and radiographs were recommended. One differential diagnosis for Monty's inappetence, lethargy and ill thrift was a portosystemic shunt; a fasting bile acid blood test was performed which ruled this out.

Radiographic investigation

Monty was sedated with an intramuscular injection of 0.1 ml medetomidine and 0.1 ml butorphanol; 0.05 ml of atipamezole was drawn up and kept with the patient throughout. Once the sedation had taken effect he was moved to the digital radiography suite.

A 20 × 30 cm radiographic plate was placed in the drawer of the table below the Bucky grid. Monty was placed in left lateral recumbency and care was taken not to extend his limbs or straighten his spine due to the potential fragility of his bones. Oxygen was provided via an Ayres T-piece and mask at a flow rate of 1.5 l per minute, lubrication was applied to both eyes and his temperature, pulse and respiration rate were closely monitored.

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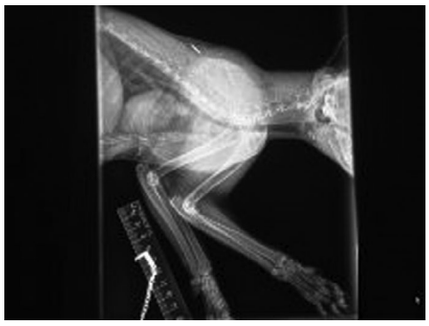

Figure 1. Lateral cranial radiograph (author's own).

Figure 2. Lateral caudal radiograph (author's own).

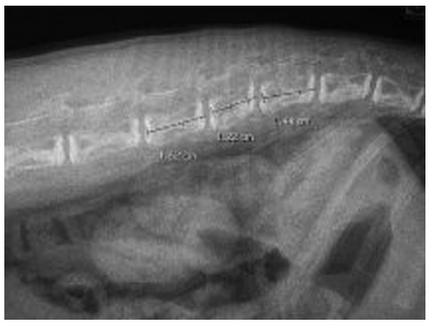

Figure 3. Fractured lumbar vertebra (author's own).

The primary beam was centred over the cranial half of the patient and a radiograph was taken at an exposure of 48 kV and 5 mA and developed in the digital processor (**Figure 1**). A view of the caudal half of the cat was also taken (**Figure 2**). These are unusual views of large areas of the cat rather than specific single areas, but it was necessary in this case to allow for a broad skeletal view.

A diagnosis of NSH was confirmed by the presence of severe osteopenia (reduction of the protein and mineral content of bone tissue). There was a healing left fibular fracture and a pathological fracture of the second lumbar vertebra, which was 3 mm shorter than it should have been (**Figure 3**). Monty was given 0.3 ml meloxicam (0.2 mg/ml) subcutaneously on recovery.

Tomsa et al. (1999) have described the diagnosis of NSH in six cats over a three-year period based on clinical, laboratory and radiographic findings. Cage rest and a balanced diet resulted in a quick recovery in four cases; the remaining two cats were euthanised due to progressive neurological deficits secondary to spinal fractures. At the time of that report, many commercial balanced diets had become widely available and diseases secondary to diet deficits were becoming rare. Monty presented in 2016 and nowadays a case such as his may only be seen once in a career!

Treatment

Treatment of NSH includes rest and dietary modification; the prognosis is good if the condition is treated early (Barber, 2014). Monty was prescribed meloxicam oral solution for continued analgesia. However, he was reluctant to eat any food offered to him in the hospital and this persisted despite the administration of an appetite stimulant. He was given 2 mg of mirtazapine, which is a medication used to treat depression in human patients; clinically it is an effective appetite stimulant in cats (Merck Manuals, 2015).

Three days after the diagnosis was made, and following unrewarding efforts to tempt him to eat, Monty was anaesthetised and an oesophagostomy tube was placed. This allowed the provision of nutrition to build his strength and maintain hydration while efforts continued to entice him to eat other foods. His resting energy requirement (RER) was calculated using the following formula:

$$RER = 70 \times (\text{bodyweight})^{0.75}$$

For the first day, only 50% of the RER was given, split into five meals given every four hours; 100% of the RER was given thereafter (Lumbis & Chan, 2008).

Initially, Monty continued to adopt a hunched posture and move tentatively around the kennel. His daily clinical status was stable and on day eight Monty ate some wet cat food and passed normal faeces. Tube feeding continued, and on day 11, Monty appeared bright and his mobility had improved dramatically, having eaten well voluntarily. By day 15, the oesophagostomy tube was removed and he was able to go home.

One week later the owner gave us a progress report and informed us that Monty was like a different cat, eating and affectionate. A final progress report was given 6 weeks after diagnosis, by which time Monty was eating a complete dry diet and was reported as being very active and playful.

Health and safety

It is imperative that all members of staff are adequately trained in the use of radiography equipment and are aware of the risks involved. The dangers of radiation are often underestimated because it is invisible, painless and the effects are latent, but they are cumulative. Living tissue and DNA can both be affected; latent disorders include cancer, cataracts, infertility and leukaemia and genetic mutations can also occur (Orpet & Welsh, 2011). When the radiography suite is in use, a red warning light and international radiation symbol must be visible above the door.

The Ionising Radiations Regulations (Revised), 1999, is a legal document which covers all uses of radiation and radioactive materials, including veterinary radiography, and is lengthy and complex. Guidance notes explaining the law with reference to veterinary radiography were published by the British Veterinary Association in 2002 (Veterinary Guidance Notes for the *The Ionising Radiations Regulations* 1999) and cover premises, equipment, personnel and procedures. Its primary aim is to minimise the radiation dose received by staff (Caine & Dennis, 2013).

The regulations specify (Orpet & Welsh, 2011):

- 15 cm concrete or double-bricked walls around the controlled area (2 m around the primary beam)
- lead ply or barium plaster
- lead screens and lead-backed table
- regular servicing of all X-ray equipment
- limited access to the controlled area including restriction to pregnant women and persons under 16
- use of dosimeters

Conclusion

This was a very rare case and one that may not be seen by the author again. Unusual cases pose a challenge to RVNs, but allow them the chance to adapt their clinical practice and seek additional information regarding the condition, the treatment that is necessary and be involved in the care of the patient. Monty was a poorly cat with a spinal fracture, but with simple treatment made a full recovery and went home to live a normal life.

References

Barber, P. (2014). *Nutritional secondary hyperparathyroidism.* Vetstream. Retrieved January 22, 2016, from https://www.vetstream.com/felis/Content/Disease/dis02629

Caine, A., & Dennis, R. (2013). Principles of radiography. In A. Holloway & J. Fraser McConnell (Eds.), *BSAVA manual of canine and feline radiography and radiology: A foundation manual* (pp. 40–41). Gloucester: BSAVA Publications.

The Ionising Radiations Regulations. (1999). Retrieved January 22, 2016, from http://www.legislation.gov.uk/uksi/1999/3232/pdfs/uksi_19993232_en.pdf

Lumbis, L., & Chan, D. L. (2008). Clinical nutrition. In A. H. Moore & S. Rudd (Eds.), *BSAVA manual of canine and feline advanced veterinary nursing* (2nd ed., p. 66). Gloucester: BSAVA Publications.

Merck Manuals. (2015). Drugs affecting appetite (Monogastric). *The Merck veterinary manuals.* Retrieved January 22, 2016, from http://www.merckvetmanual.com/mvm/pharmacology/systemic_pharmacotherapeutics_of_the_digestive_system/drugs_affecting_appetite_monogastric.html

Orpet, H., & Welsh, P. (2011). *Handbook of veterinary nursing* (2nd ed., pp. 123–303). West Sussex: Wiley-Blackwell.

Tomsa, K., Glaus, T., Hauser, B., Flückiger, M., Arnold, P., Wess, G., & Reusch, C. (1999). Nutritional secondary hyperparathyroidism in six cats. *Journal of Small Animal Practice, 40*, 533–539. Retrieved January 22, 2016, from http://www.ncbi.nlm.nih.gov/pubmed/10649598