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Nursing the feline polyneuropathy patient

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ABSTRACT: Feline polyneuropathies are complex diseases which are poorly documented. The affected cats can live functional lives with the appropriate supportive care. Veterinary nurses have a crucial role to play in in the management of the polyneuropathy cat. Care of the patient is varied and includes management of stress, nutrition, physiotherapy and supportive care. Recognition and understanding of the potential problems can allow a holistic nursing care plan to be created.

Keywords: polyneuropathy; feline; physiotherapy; nutrition

Introduction

Feline polyneuropathies are a group of diseases that are complex yet poorly understood (Bensfield et al., 2011). A polyneuropathy occurs when there is damage or dysfunction of the motor, sensory and autonomic neurons in the peripheral nervous system (Chrisman, 2008). Involvement of the sensory nerves results in ataxia, proprioceptive deficits and hyperaesthesia whilst involvement of motor fibres results in muscle tremors, weakness and muscle atrophy (Chrisman, 2008). Except for neuropathy associated with diabetes mellitus (Estrella et al., 2008) and primary hyperchylomicronaemia (Jones et al., 1986), feline polyneuropathies are poorly documented in veterinary literature. Other polyneuropathies can be inherited or acquired due to immunological, metabolic or toxic causes and some may be idiopathic (Chrisman, 2008).

Other reported cases have included central nervous system involvement with exaggerated spinal reflexes and concurrent anaemia and myositis (Flecknell & Lucke, 1978). The majority of case reports have identified and focused on single pedigree breeds, whereas Aleman et al. (2014) retrospectively evaluated five cats of different breeds. The study showed heterogenous motor polyneuropathies should be considered in young cats of any breeds and sex that are presented with relapsing or progressive generalised neuromuscular disease (Aleman et al., 2014). Bensfield et al. (2011) suggested the mean age of onset of clinical signs was three to forty four months. The study identified a chronic-relapsing form of polyneuropathy associated primarily with episodes of demyelination and remyelination and was identified as having a good prognosis in which affected cats live a functional life (Bensfield et al., 2011). When presented with an acute neurological deterioration, the supportive care that the veterinary nurse provides can be crucial in maximising patient welfare and facilitating successful discharge. This article reports on the nursing decision making and care provided to support a young cat presented to the author's clinic with idiopathic polyneuropathy.

Case presentation

Teddy, a 6-month old British Shorthair presented with a two-day history of flaccid paraparesis. The owners reported him to be quiet and hiding. Teddy was kept indoors and had no pre-existing conditions. On presentation, Teddy had reduced patellar reflex bilaterally and no spinal reflexes. He had deep pain perception and anal tone. Neurolocalisation was peripheral neuromuscular. Within two days, Teddy's neurological condition progressed to tetraparesis.

Blood sampling and muscle biopsies were performed to identify an underlying cause. There was no serological evidence of exposure to *Toxoplasma gondii, Neospora Canium, FeLV, FIP or FIV.* However, the *Feline Coronavirus* result was consistent with exposure. Biopsies of the cranial tibialis muscle were examined at the University of Edinburgh and there was no evidence of inflammation, myofibre necrosis or angular atrophy of myofibres. In a study looking at recurrent demyelination and remyelination in Bengal cats, angular atrophy of myofibres were a common feature (Bensfield et al., 2011). However, it is possible that the

sample submitted was not fully representative as it was small and from a single site. In-house electrophysiologic examination was not possible. Based on the clinical findings and lack of concurrent diseases Teddy was diagnosed with idiopathic polyneuropathy (Figure 1).

Bensfield et al. (2011) failed to identify a single effective treatment protocol due to the retrospective and multicentre analysis approach. Given the low prevalence of the disease and the lack of available literature, the patient was assessed holistically by the ward nursing team, internal medic and neurologist daily to allow nursing and veterinary treatments to be prescribed together. A formal nursing care plan was not used, and instead the nursing process was guided by a combination of admission questionnaires; hospital sheets; care bundles and standardised protocols. Detailed and structured hospital sheets facilitated care planning to address each need, whilst comprehensive notes allowed evaluation. Care bundles, which have been shown to improve the reliability and consistency of care (Goodstone et al., 2015), were used and tailored to the individual patient.

Although a nursing care plan was not used, the ten abilities outlined by Orpet and Jeffery (2007) were addressed. The nursing interventions aimed to prevent potential problems of muscle contracture, aspiration pneumonia, stress, dehydration, malnutrition, and pressure ulcers. Prior to discharge, the veterinary nurse's focus was to establish conscious urination and defaecation and to determine a physiotherapy regime.

Stress management

Feline patients are known to exhibit stress during hospitalisation. This can lead to difficulty handling and examining the patients and a delayed recovery (Rodan et al., 2011). Teddy's stress levels were assessed by observing his behaviour, eating habits and facial expressions. The author's practice is ISFM Gold Standard Cat Friendly Clinic and has nominated cat friendly advocates who promote respectful handling. Teddy was handled gently, with minimal restraint throughout procedures.

Teddy was housed in a large kennel in a calm and quiet feline only ward to reduce the noise from other species (Figure 2). Teddy was housed in the same kennel for the duration of his hospitalisation to reduce the transfer of odours from other patients. The kennel contained a plastic, easy to clean hide as they have been shown to reduce physiological and behavioural indices of stress (Buckley & Arrandale, 2017). The cattery had plug-in and spray pheromonal products, as Lloyd (2017) states they can alleviate stress.

Cat-specific music created with cat vocalisations, preferred tempos and normal vocal frequencies can lower stress levels and increase the quality of care in hospital (Hampton et al., 2020). To enrich the environment, the music was played through a screen alongside videos of various wildlife. The music was played in the cattery, but the volume was decreased throughout the night to allow a rest period. Similarly, the lights were dimmed and entry into the cattery limited during this time.

Supportive care

The hospital facility allowed for twenty-four hour care to be provided to Teddy. Throughout the day and night, a veterinary nurse on each shift was assigned to nursing Teddy to allow a bond to be created and to enable the nursing interventions to be carried out effectively. The supportive care prescribed to the patient was outlined on the hospital sheet at specific times to reduce errors and maximise care. Handovers were conducted between shifts where the treatment plan and observations were discussed in detail.

Teddy was turned from left, sternal and then to right recumbency every four hours to prevent decubital ulcer formation and atelectasis of the lungs. The cat's bony prominences were assessed daily for erythema, contusions and skin necrosis and detailed notes were written on the hospital sheet. Sores can develop rapidly and increase the risk of infection. To prevent this, Teddy was placed on thick, padded bedding which drew fluid away from the cat to aid comfort and reduce the risk of urine scalding.

Recumbent patients are at a higher risk of pneumonia. Aspiration can occur when gastrointestinal contents are inhaled into the lungs causing inflammation and infection. This can result in significant morbidity and mortality. The potential problem was mitigated by feeding Teddy in an upright

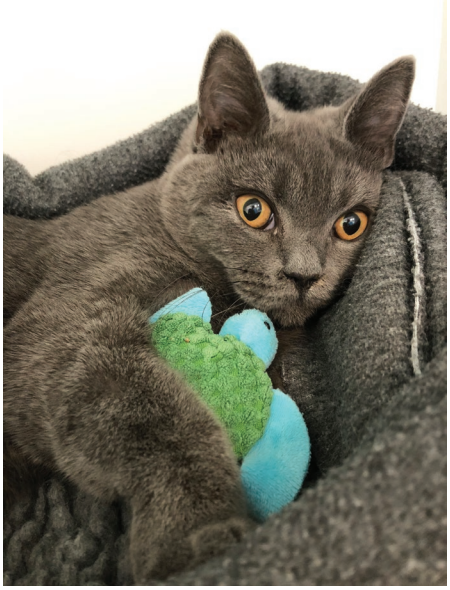

Figure 1. Teddy on day 3 of hospitalisation.

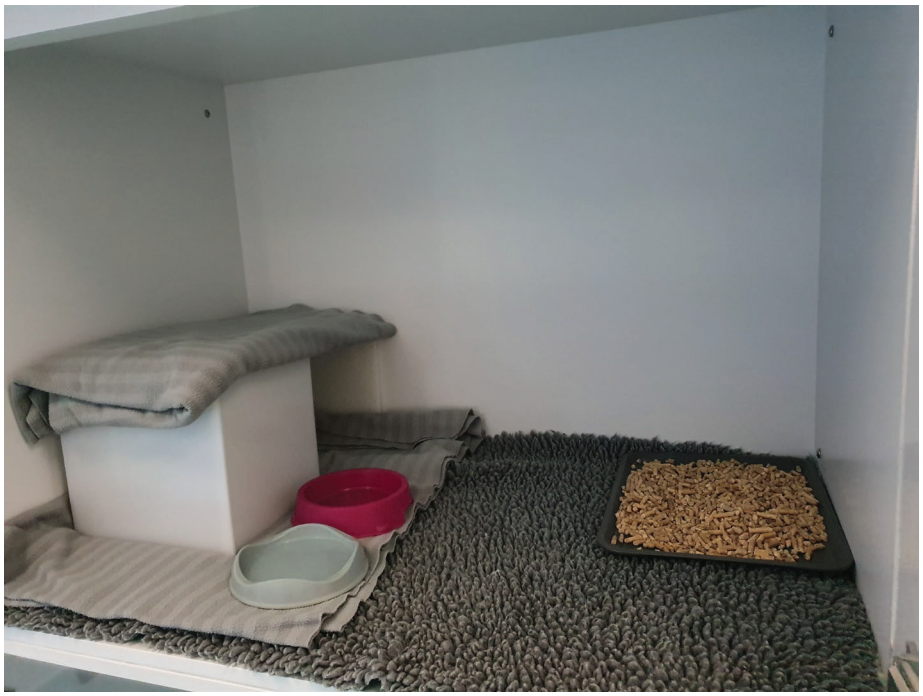

Figure 2. Large feline online kennel with hide, deep bedding and flat litter tray.

position with the head elevated by foam wedges and blankets. Elevation of the head forces the oesophagus into a vertical position, making food more likely to go into the stomach than the lungs (Khorzad et al., 2011). Teddy tolerated this well, provided tender loving care and stroking were provided simultaneously.

Teddy's respiratory rate, effort and the presence of coughing or harsh lung sounds were monitored regularly and recorded on the hospital sheet to identify trends in deterioration. Early recognition of dyspnoea would permit early intervention as during the progressive phase of the polyneuropathy, respiratory dysfunction is common and can be fatal.

Physiotherapy

Under the Veterinary Surgeons Act 1966, Order 1962, physiotherapy can be given by a qualified person under the direction of a veterinary surgeon (RCVS, 2018). The RVN can perform basic physiotherapy if they feel competent to do so.

Teddy received physiotherapy every four hours during the daytime allowing rest periods overnight. Teddy was at high risk of muscle contracture as well as adaptive shortening and inelasticity of the associated soft tissues. Physiotherapy focuses on the application of a range of techniques to restore movement, maximise and improve tissue quality and function and aid repair (Sharp, 2018).

Physiotherapy in cats is infrequently documented and often underutilised (Sharp, 2018). Cats are often less tolerant of the handling techniques associated with physiotherapy and their behaviour may be difficult to assess. The techniques must be modified and adapted on a case by case basis to ensure patient comfort, compliance and efficiency. Interpreting body postures and facial changes can help to assess how the patient is tolerating the exercises. Teddy tolerated the physiotherapy well, however, no neurological improvements were noted and muscle atrophy worsened.

Teddy's hindlimbs were massaged intensively using stroking, effleurage and petrissage techniques. See Table 1 for descriptions of massage techniques. Manipulation of the muscles assists relaxation, stimulates muscle and skin receptors, improves circulation and encourages lymphatic and venous return (Romano & Halkett, 2018). In humans, massage reduces stress, improves relaxation and provides positive tactile stimulation (Sharp, 2012a). Ideally in neurological cases, massage should be performed in a standing positioning with the aid of a Physio-roll, to maintain a natural muscle tone and encourage sensory feedback from the muscles to the paws to improve standing ability (Sharp, 2012b).

Table 1. Massage techniques.

Massage Technique	Benefits	Technique
Stroking	Accustoms animal to touch; reduces tension and anxiety; lowers muscle tone	Gliding movement of the hands over the skin. Starting at the proximal limb and working distally.
Effleurage	Reduces swelling and oedema; removes chemical byproducts of inflammation; stretches muscle	Move the hands proximally to distally. The palms of the hands should be passed continuously and rhythmically over the patient's skin, in long stroking motions to reduce chemical byproducts to the lymphatic system, stroke distal to proximal to the nearest superficial lymph node in the groin, axilla and caudal stifle..
Kneading	Increase circulation and lymphatic flow; mobilise soft tissue; remove byproducts of inflammation; sensory stimulation; relaxing and lower muscle tension	Both hands should be used to lift the skin up and then press the skin down. The muscles should be grasped and squeezed, rolled and released in a circular motion. Small areas can be treated with the tips of the thumbs and fingers

Passive movement is used to restore and maintain joint function, aid articular nutrition, increase muscle length and reinforce patterns of movement following neurological damage (Halkett and Romano, 2018). Range of motion exercises are used to maintain normal range. Each of Teddy's limb joints were gently flexed and extended 10–15 times individually and then synchronously as a group to replicate the bicycle riding action.

The patient tolerated stretching intermittently so was performed less frequently for shorter durations to minimise stress. Stretching can create permanent muscle deformation and increased length and range of the muscle (Sharp, 2012a). The patient preferred static stretching under a low force for thirty to forty seconds. This exercise does not cause tissue damage and can add sarcomeres to the muscle mass if performed long-term (Sharp, 2012a).

Nutrition

The nutritional assessment is a key part of the veterinary nurse's role. The World Small Animal Veterinary Association (WSAVA) regards nutrition as the fifth vital sign and aims to standardise the assessment in small animals (Chandler, 2014). Teddy was going to be hospitalised for a significant period, during which any nutritional deficits may have had a profound effect on recovery. To assist clinical decision making, an admit questionnaire was given to the owner to determine the patients dietary history and normal routine. Teddy's weight, body condition score and muscle condition score were assessed daily, as Teddy was at risk of muscle atrophy.

The patient's resting energy requirement (RER) was calculated and reassessed each day using the formula 70 x bodyweight $(kg)^{0.75}$. Teddy was weighed daily and his body condition score and hydration score was assessed. Teddy was hyporexic on presentation so voluntary eating was encouraged daily. This was done by grooming, providing tender loving care and hand feeding. The interventions were successful and within twenty-four hours the patient was eating his full energy requirement.

Junior cats who are still growing, require a high-energy density with high digestibility to prevent poor growth (Hemmings, 2016). The diet chosen in hospital was a commercial diet suitable for this age range. Kittens require specific levels and ratios of calcium and phosphorus to prevent hypercalcaemia and hypophosphataemia or hyperparathyroidism (Hemmings, 2019).

Conclusion

The nursing care provided to Teddy was holistic and achieved a successful outcome. Clinical decisions were made by a multi-disciplinary team, using available evidence, standard operating procedures, and personal experience. This case highlighted the value of nurse autonomy with regard to planning and implementing nursing care, but also demonstrated the importance of shared-decision making between the veterinary nurse and clinician. The complexity of the care was recorded and communicated to all team members efficiently.

The patient was by nature gentle and placid, which allowed the treatments to be given without many adjustments being made. The physiotherapy could be more difficult to perform in stressed patients and may require more time to be spent adapting techniques to each patient. Although it was disheartening that there was a lack of literature for nursing feline polyneuropathies, best practice and evidence for individual treatments and nursing interventions were extrapolated

and applied to the patient. This allowed the author to maintain the patient's welfare and provide a high standard of care using evidence-based knowledge. The author hopes that this article will contribute to the information available to help other practitioners care for feline polyneuropathy cases.

In conclusion, veterinary nurses can significantly improve the care provided to feline polyneuropathy cases. Having an awareness of the potential complications can allow proactive nursing interventions and the development of a holistic nursing care plan.

Disclosure statement

No potential conflict of interest was reported by the author.

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