https://doi.org/10.17221/118/2020-VETMED

Food hypersensitivity and feline hyperaesthesia syndrome (FHS): A case report

Norberto Ruiz-Suarez[1], Sofie Fatima Mareyam Bhatti[2], Michelle Hermans[2], Camila Baptista da Silva[1], Myriam Hesta[1]*

[1]Department of Veterinary Medical Imaging and Small Animal Orthopaedics, Faculty of Veterinary Medicine, Ghent University, Merelbeke, Belgium
[2]Small Animal Department, Faculty of Veterinary Medicine, Ghent University, Merelbeke, Belgium

**Corresponding author: norberto.ruizsuarez@ugent.be*

Citation: Ruiz-Suarez N, Bhatti SFM, Hermans M, Silva CB, Hesta M (2021): Food hypersensitivity and feline hyperaesthesia syndrome (FHS): A case report. Vet Med-Czech 66, 363–367.

Abstract: A 2-year-11-month-old female spayed cat was at the Small Animal Teaching Hospital of Ghent University presenting with hyperactivity, scratching and licking all over her body and an abnormal urination behaviour. Nothing remarkable was found on the dermatology and neurological examination. Based on the owner's history and video material, the presence of feline hyperaesthesia syndrome (FHS) was hypothesised. A symptomatic treatment with gabapentin was established for a month without any significant improvement. An elimination diet with hydrolysed protein sources was started and, as a result, the dose of gabapentin was reduced after three days and completely stopped after one week. With the exception of two non-intentional exposures to non-hypoallergenic diets and the challenge with new protein sources by the owner, the cat has been free of symptoms, with the exception of a slight reaction in the lumbar area (significantly reduced in comparison before starting the diet), and without the use of medication. In conclusion, an elimination diet should be considered as part of the diagnostic plan for FHS and should not be delegated to the last step if the patient's condition allows it.

Keywords: elimination diet; hypoallergenic diet; rolling skin

Feline hyperaesthesia syndrome (FHS) is an unusual disorder with an unknown aetiology (Amengual Batle et al. 2019). It can involve clinical signs related to dermatological, neurological and behavioural diseases (Ciribassi 2009), and has received several names, such as apparent neuritis, atypical neurodermatitis, rolling skin syndrome or twitchy disease (Tuttle 1980). Patients can show pain after palpation of the lumbar musculature, rolling skin, can attack the tail and/or flanks, bite the tail base or forelegs, run wildly, vocalise and even show aggression (Ciribassi 2009). It seems to mainly affect cats from 1 to 5 years old without sex differences and some specific breeds including Siamese, Burmese, Persian and Abyssinian are predisposed (Horwitz and Neilson 2007).

Case description

A 2-year-11-month-old, client-owned Selkirk Rex longhair (female spayed) was presented at the Small Animal Teaching Hospital of Ghent University. The patient was adopted in April 2019 from Russia, where it lived with other cats (number unknown) and a dog. At her new home, the cat shared the house

https://doi.org/10.17221/118/2020-VETMED

with another four cats. Before adoption, the history of complaints or medication is unknown. In May 2019, after one month, the symptoms started. The main clinical signs were hyperactivity without any apparent reason, scratching and licking all over her body, especially the lower back, together with an abnormal urination behaviour. On the dermatological examination, no abnormality was found, except for a small amount of follicular casting dorsally oriented. The neurological examination was normal and based on the owner's history and video material, the first presumption of FHS was established. During palpation, the patient reacted painfully in the lumbar region, but it was difficult to evaluate due to the cat's low cooperation. In order to complete the general check-up, a blood examination was performed, but no abnormalities were found, except for leucocytosis (18 800/µl, range 5 000–15 000/µl) and an increased total protein concentration (83 g/l, range 55–77 g/l) (Table 1).

A computed tomography (CT) scan of the entire spine, a magnetic resonance imaging (MRI) of the brain combined with a cerebrospinal fluid (CSF) analysis, extra flea control to decrease the likelihood of flea allergy as low as possible (although the cat was treated with Stronghold®), a visit to internal medicine to exclude urinary infection, and a behaviour consult were the other diagnostic tests advised to the owner. Prior to any other consult or test, a symptomatic treatment with gabapentin 5 mg/kg b.i.d. was performed for 2 weeks and the symptoms were reduced based on owner's report. The third week, the patient relapsed, and the dose was increased to t.i.d.

Table 1. Blood analysis

Parameter	Value	Reference
Haemoglobin	6.48 mmol/l	4.98–9.34
Haematocrit	0.32 l/l	0.24–0.45
Erythrocytes	7.05×10^{12}/l	5–10
Leukocytes	+ 18.80×10^{9}/l	5–15
Sodium	152 mmol/l	146–155
Potassium	4.6 mmol/l	3.5–5.3
Calcium	2.40 mmol/l	2.16–2.62
Urea	7.83 mmol/l	6.16–10.82
Creatinine	89.3 µmol/l	44.2–141.4
Total proteins	+ 83 g/l	55–77
Albumin	37 g/l	25.0–45.0
Cholesterol	4.24 mmol/l	1.44–5.74
Triglycerides	0.44 mmol/l	< 1.11
AST	0.42 µkat/l	< 0.70
ALT	0.58 µkat/l	< 1.22
Phosphatase alkaline	0.92 µkat/l	< 2.87
Total bile acids	1 µmol/l	< 10
Creatinine	89.3 µmol/l	44.2–141.4
Glucose (sober)	5.44 mmol/l	3.05–5.55
Toxoplasma	negative	

ALT = alanine transaminase; AST = aspartate aminotransferase

One month after administering the gabapentin three times daily, the owner, after a small amount of research on the internet, contacted the nutritional service and an elimination diet based on hydrolysed protein (feather/chicken liver) was started. The symptoms improved significantly and the gabapentin was reduced to s.i.d. for 3 days, and completely stopped after 1 week. Eleven and 18 days after starting the hypoallergenic diet, the cat suffered from two acute episodes of hyperactivity after accidentally eating a non-hypoallergenic diet belonging to the other cat at home. The patient is a picky eater, so the owner had been feeding the cat different diets, all of them based on hydrolysed protein. The dry diets, for the current patient and the other cats, were given in a device controlled by a microchip called a SureFeed© to ensure that the cat only ate the appropriate diets. The consumption of wet diets was directly supervised by the owner. The cat was kept indoors and had access to an outdoor cat proof garden. No other episodes were noticed. One month after starting the elimination diet, the owner performed a provocation test by feeding several non-hypoallergenic maintenance diets. All the symptoms reoccurred and extra symptoms like abdominal bloating and softer faeces occurred as well. When the cat was strictly on the hypoallergenic diet, the cat was free of symptoms, except for a slight reaction that remains in the lumbar area, and without need for medication.

DISCUSSION AND CONCLUSIONS

FHS is an unusual and intricate disorder not completely understood yet. Its complexity relies not only in the treatment, but mainly in its cause in order to select the appropriate therapy. The current patient showed some, but not all, of the clinical signs described by the literature. Cats affected by FHS can be in a consult without evidence of alopecia or other dermatological lesions (Virga 2003).

https://doi.org/10.17221/118/2020-VETMED

For that reason, the absence of some of the symptoms at the moment of the consult is not sufficient reason to exclude FHS as a possible diagnosis. The increased reaction to lumbar palpation, also present in the current patient, can be defined as allodynia and/or alloknesis. Allodynia, described by the Encyclopedia of Pain, is a term to describe pain induced by stimuli that are normally not painful; while allokinesis, refers to a sensation or scratching behaviour evoked by a stimulus that is normally non-pruriceptive (LaMotte 2007). Other diagnostic tests such as CT, MRI and CSF also mentioned by Amengual Batle et al. (2019) were suggested, but not performed in the current case. The reason why these examinations were proposed, was to perform a diagnosis by exclusion and not because the neurologists had a strong conviction that a lesion, like those describe by Ciribassi (epilepsy, brain tumours, disk disease, neoplasia, infectious myelitis), was implicated (Ciribassi 2009). In patients where no solid suspicion that a neurologic disease is present, these more hazardous tests should be relegated to the last step. Of course, in this syndrome, with such variations in the clinical signs and their possible interactions, it is nearly impossible to have strong confidence in a plausible diagnosis. The final decision relies on the patient, the owner (financial possibilities) and the severity of the clinical signs (Ciribassi 2009). If none of the previous attempts to find a diagnosis has succeeded, the presence of a behavioural disorder and the use of specific medication should be considered (Virga 2003; Mandigers and Bergknut 2016).

A consult with a behaviour specialist was not considered as a possibility by the owner at the beginning. In this situation, a detailed history should be collected to identify any cause that can predispose the patient to anxiety, fear or overattachment to the owner (Amengual Batle et al. 2019). Patients diagnosed with compulsive behaviour associated with an excess of grooming include those suffering from FHS (Virga 2003). Control over the environment is essential to identify any stressor (Virga 2003; Amengual Batle et al. 2019). Increasing the three-dimensional space, scratching posts, regular play sessions, different types of toys and providing a regular feeding schedule are examples of the physical and social environment enrichment (Virga 2003; Ciribassi 2009). Psychoactive medication, such as selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants (TCAs) and benzodiazepines, are sometimes given, (Ciribassi 2009), although there are no double-blind studies to support their use in cats with FHS.

In the current patient, gabapentin at an initial dose of 5 mg/kg b.i.d. was started. This drug was originally designed as an antiepileptic drug for humans, but nowadays is more commonly used for the treatment of pain in humans, dogs and cats. (Backonja et al. 1998; Macpherson and Cousins 2007; Ruel and Steagall 2019). De Lorimier (2009) mantains that some patients improve after using gabapentin, not necessarily due to focal epileptic episodes, but to the true neuropathic pain. This author also suggests that cats can experience attacks of neuropathic pain that end up in allodynia (de Lorimier 2009).

Regarding adverse food reactions, there is no cure or preventive treatment. In the case of a food allergy, the only option is to avoid the allergen through a hypoallergenic diet (Cummings et al. 2010; Mandigers and German 2010).

In humans, a food allergy or hypersensitivity has been related to trigger some neuropsychiatric conditions (Cummings et al. 2010; Ferro et al. 2016). Hidese et al. (2019) identifies a food allergy as a positive predictor for depression and psychological distress. It is interesting as some humans with psychiatric conditions have experienced an improvement after an elimination diet or plasmapheresis (Parker and Watkins 2002; Barzman et al. 2018). It is possible that something similar happens in animals. In the study conducted by Smith (2019) in mice, an association between a food allergy and stress and anxiety was established since the sensitised male mice showed a significant elevated grooming behaviour. This study also showed an inflammatory process mediated through astrocytes (that produce and secrete pro- and anti-inflammatory molecules) indicating that neuroinflammation can be associated with behavioural abnormalities (Smith et al. 2019). Cyclooxygenase-2 (Cox2) was upregulated and tumour necrosis factor-alpha (TNFα) was increased, but not associated with the reactive morphology in microglia, so it is possible that the TNFα comes from the intestines or the circulatory leukocytes (Smith et al. 2019).

Vice versa, humans and animals suffering from psychological distress can show an increased intestinal permeability and sensitisation to luminal antigens with a subsequent increase in the inflammatory pathways (Yang et al. 2006; Rudzki et al.

https://doi.org/10.17221/118/2020-VETMED

2017). Although the relationship between an allergy inflammation and neuropathic pain remains to be established (Yamasaki et al. 2016), microglia and astroglia play an important role in the induction and maintenance of persistent neuropathic pain in other models like peripheral nerve injuries (Tsuda et al. 2003).

As mentioned before, cats with FHS can experience some attacks of neuropathic pain that can end up suffering from allodynia (de Lorimier 2009). Mice with asthma, atopic dermatitis or atopic diathesis showed widespread and significant microglia and astroglia in the spinal cord and displayed tactile allodynia (Yamasaki et al. 2016). Although not completely understood, the relationship between inflammation (astroglia and microglia) stimulated by an allergy and neuropathic pain can be present.

The cat was adopted and consequently a detailed food history was not available. Without knowledge of the protein sources previously consumed by the patient, a list of hydrolysed protein diets was provided by the nutritional service. Although the compliance and adherence of the owner to the established therapy has been good, due to the use of SureFeed©, provocation with intact protein diets by the owner resulted in new episodes of hyperactivity, licking, biting, soft faeces and rolling skin for some protein sources. The food was immediately stopped after the appearance of the first symptoms. Chicken and salmon were identified as triggers, which are common causes of food hypersensitivity in cats (Roudebush 2013). In general, performing elimination trials in cats is a challenging task. Even in this case, where efforts were undertaken to strictly follow the feeding advice, we cannot exclude the possibility that small animals (prey) could be consumed by the patient in the cat proof garden.

In practice, pet owners often struggle when reading food labels. In this case, the owner received a list (due to the picky eating pattern of the patient) with adequate diets to start the elimination diet to properly exclude a food hypersensitivity. Joshi et al. (2002) showed that only 54% of parents who have children with a peanut allergy correctly identify the allergen in the label. This percentage decreases in the case of a milk allergy (7%) (Joshi et al. 2002). The important fact is that those who scored almost perfect (9/10) received advice from the Food Allergy and Anaphylaxis Network (Joshi et al. 2002). To our knowledge, no similar official veterinary organisation exists. Only the World Small Animal Veterinary Association (WSAVA) provides some help through their nutrition guidelines (WSAVA 2020).

The treatment including elimination diets, medication and behavioural modification, is not always effective and can lead to the frustration of both the owner and veterinarian (Mandigers and Bergknut 2016). In the current case, the prognosis improved as the patient responded positively to the hypoallergenic diet, although a slight reaction at the lumbar area is still present. A detailed diagnostic plan is recommended (Mandigers and Bergknut 2016), but no specific disease related with FHS has shown a higher prevalence over the others, so the order of the diagnostic tests can be adapted depending on the situation. If no clear neurological, dermatologic or even behavioural disorder is present, an elimination trial should be considered as a non-expensive and relatively easy diagnostic test, before going to more expensive or complicated tests. Some limitations regarding the current case have to be mentioned. The diagnostic workup was not extensive, and considering the possible multifactorial aetiology of this syndrome and the fact that the lumbar reaction is still present, our patient could benefit from it. Also, a consult with a behavioural specialist was not carried out, and all the information on the history and follow up that was collected from the owner is based on self-reports. The recent adoption and entering into a new multicat household could have played a role (Virga 2003), although the cat was at the new facility one month before the first symptoms appeared and actions for the social and environmental enrichment were taken. Also, the patient was treated with gabapentin without any significant improvement for one month. The assumption that a food allergy was involved was made on the positive response to the hypoallergenic diet. Actually, other causes of adverse food reactions (non-immune related), other allergies (flea, environmental etc.), or dermatology disorders like atopic dermatitis cannot be firmly excluded.

In conclusion, FHS is a complex syndrome that is not yet completely understood. Multiple interactions between adverse food reactions including allergies, epilepsy, neuropathic pain and behavioural disorders make it really difficult to elucidate the original cause and, hence, a final diagnosis. An elimination diet is an affordable and easy method to exclude one of the possible differential diagnoses.

Because of that, it should not be ignored and relegated to the last step when a diagnostic protocol is started if the patient's condition allows it.

https://doi.org/10.17221/118/2020-VETMED

Conflict of interest

The authors declare no conflict of interest.

REFERENCES

Amengual Batle P, Rusbridge C, Nuttall T, Heath S, Marioni-Henry K. Feline hyperaesthesia syndrome with self-trauma to the tail: Retrospective study of seven cases and proposal for an integrated multidisciplinary diagnostic approach. J Feline Med Surg. 2019 Feb;21(2):178-85.

Backonja M, Beydoun A, Edwards K, Schwartz SL, Fonseca V, Hes M, LaMoreaux L, Garofalo E. Gabapentin for the symptomatic treatment of painful neuropathy in patients with diabetes mellitus. A randomized controlled trial. JAMA. 1998 Dec 2;280(21):1831-6.

Barzman DH, Jackson H, Singh U, Griffey M, Sorter M, Bernstein JA. An atypical presentation of pediatric acute neuropsychiatric syndrome responding to plasmapheresis treatment. Case Rep Psychiatry. 2018 Jun 28;2018: 8189067.

Ciribassi J. Understanding behavior: Feline hyperesthesia syndrome. Compend Contin Educ Vet. 2009 Mar;31(3): 116-32.

Cummings AJ, Knibb RC, King RM, Lucas JS. The psychosocial impact of food allergy and food hypersensitivity in children, adolescents and their families: A review. Allergy. 2010 Aug;65(8):933-45.

Ferro MA, Van Lieshout RJ, Ohayon J, Scott JG. Emotional and behavioral problems in adolescents and young adults with food allergy. Allergy. 2016 Apr;71(4):532-40.

Hidese S, Nogawa S, Saito K, Kunugi H. Food allergy is associated with depression and psychological distress: A web-based study in 11,876 Japanese. J Affect Disord. 2019 Feb 15;245:213-8.

Horwitz D, Neilson J. Psychogenic alopecia/overgrooming: Feline. In: Horwitz D, Neilson J, editors. Blackwell's five-minute veterinary consult clinical companion: Canine and feline behavior. Oxford, UK: Wiley-Blackwell; 2007. p. 425-31.

Joshi P, Mofidi S, Sicherer SH. Interpretation of commercial food ingredient labels by parents of food-allergic children. J Allergy Clin Immunol. 2002 Jan;109(6):1019-21.

LaMotte RH. Allodynia and alloknesis. In: Schmidt RF, Willis WD, editors. Encyclopedia of pain. Berlin, Germany: Springer-Verlag; 2007. p. 52-5.

de Lorimier LP. Feline hyperesthesia syndrome. Compendium. 2009 Jun;31(6):254.

Macpherson R, Cousins MJ. Acute pain. In: Schmidt RF, Willis WD, editors. Encyclopedia of pain. Berlin, Germany: Springer-Verlag; 2007. p. 17-24.

Mandigers P, German AJ. Dietary hypersensitivity in cats and dogs. Tijdschrift Diergeneeskunde. 2010 Oct 1;135 (19):706-10.

Mandigers P, Bergknut N. Feline hyperesthesia syndroom [Feline hyperaesthesia syndrome]. Tijdschrift Diergeneeskunde. 2016 Jul;141(7):30-1. Dutch.

Parker G, Watkins T. Treatment-resistant depression: When antidepressant drug intolerance may indicate food intolerance. Aust N Z J Psych. 2002 Apr;36(2):263-5.

Roudebush P. Ingredients and foods associated with adverse reactions in dogs and cats. Vet Dermatol. 2013 Apr;24(2): 293-4.

Rudzki L, Pawlak D, Pawlak K, Waszkiewicz N, Malus A, Konarzewska B, Galecka M, Bartnicka A, Ostrowska L, Szulc A. Immune suppression of IgG response against dairy proteins in major depression. BMC Psychiatry. 2017 Jul 24;17(1):268.

Ruel HLM, Steagall PV. Adjuvant analgesics in acute pain management. Vet Clin North Am Small Anim Pract. 2019 Nov;49(6):1127-41.

Smith NA, Germundson DL, Combs CK, Vendsel LP, Nagamoto-Combs K. Astrogliosis associated with behavioral abnormality in a non-anaphylactic mouse model of cow's milk allergy. Front Cell Neurosci. 2019 Jul 16;13:320.

Tsuda M, Shigemoto-Mogami Y, Koizumi S, Mizokoshi A, Kohsaka S, Salter MW, Inoue K. P2X4 receptors induced in spinal microglia gate tactile allodynia after nerve injury. Nature. 2003 Aug 14;424(6950):778-83.

Tuttle J. Feline hyperesthesia syndrome. J Am Vet Med Assoc. 1980 Jan 1;176(1):47.

Virga V. Behavioral dermatology. Vet Clin North Am Small Anim Pract. 2003 Mar;33(2):231-51.

WSAVA – World Small Animal Veterinary Association. Global nutrition guidelines [Internet]. Ontario, Canada: World Small Animal Veterinary Association. 2020 [cited 2020 Feb 6]. Available from: https://wsava.org/global-guidelines/global-nutrition-guidelines/.

Yamasaki R, Fujii T, Wang B, Masaki K, Kido MA, Yoshida M, Matsushita T, Kira JI. Allergic inflammation leads to neuropathic pain via glial cell activation. J Neurosci. 2016 Nov 23;36(47):11929-45.

Yang PC, Jury J, Soderholm JD, Sherman PM, McKay DM, Perdue MH. Chronic psychological stress in rats induces intestinal sensitization to luminal antigens. Am J Pathol. 2006 Jan;168(1):104-14.

Received: May 27, 2020
Accepted: March 17, 2021