Paraneoplastic exfoliative erythroderma in a cat with thymoma

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ABSTRACT. A 14-year-old domestic shorthair cat was admitted with a 2-month history of excessive body weight loss and generalized exfoliative dermatitis with erythroderma. Radiographic and ultrasonographic examination revealed a cranioventral cavitary mass within the anterior mediastinum. An ultrasound-guided fine needle aspiration cytology from the mass revealed numerous small mature lymphocytes intermingled with much fewer inflammatory mast cells. These findings, along with a cell-poor interface and mixed cell dermatitis demonstrated on skin histopathology, made the diagnosis of paraneoplastic exfoliative dermatitis straightforward. This uncommon case illustrates the relative value of keratoseborheic skin disease as a useful indicator of an internal malignancy in the cat.

Keywords: cat, exfoliative dermatitis, thymoma

Παρανεοπλασματική αποφολιδωτική ερυθροδερμία σε γάτα με θύμωμα

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ΠΕΡΙΛΗΨΗ. Γάτα 14 χρονών, κοινής ευρωπαϊκής φυλής, προσκομίστηκε με ιστορικό σημαντικής απώλειας σωματικού βάρους και γενικατικές αποφολιδωτικές δερματίτιδες με ερυθροδερμία που εμφανίστηκε στους τελευταίους δύο μήνες. Στην ακτινογραφία και υπερχοτομογραφία διερεύνηση του θύμωμα παρατηρήθηκε εμφανής μάζα που εντοπίστηκαν στον πρόσθιο μεσοπεπτικό χώρο. Η κυτταρολογική εικόνα του επιχρυσώματος, η οποία παρήλθε ύστερα από διαθωρακητική παρακάταρτη με λεπτή βελόνα, ήταν συμβολή με το θύμωμα, αφού παρατηρήθηκαν πολύμορφα άρμα λεμφοκύτταρα κανόνιστα με σεφός λεγόμενα σαρκοκάλαμα και βελόνες. Η ελαχιστοποιημένη δερμοεπιδερμική δερματίτιδα, της οποίας το κυτταρικό φλεγμονικό διάτημα ήταν μικρό, ήταν ο κυρίαρχος ιστοπαθολογικός μοριόλογος στις αιτίες που πάρθηκαν από το δέρμα, γεγονός που επιβεβαίωσε τη διάγνωση της παρανεοπλασματικής αποφολιδωτικής δερματίτιδας από θύμωμα. Με βάση αυτό το σχετικά σπάνιο περιστατικό, επαναλαμβάνεται η αξία των κερασμοσυμμαχητικών αλλώσωσεων ως κλασικού δείκτη για υποκείμενα νεολαύματα στη γάτα.

Απεικόνιση: γάτα, αποφολιδωτική δερματίτιδα, θύμωμα
CASE HISTORY

A 14-year-old, intact female, Domestic shorthaired cat was admitted (Companion Animal Clinic, Faculty of Veterinary Medicine, Aristotle University of Thessaloniki, Greece) with a 2-month history of significant weight loss, mild anorexia and a generalized non-pruritic dermatitis. Although there was no information of recent drug exposure, the cat had experienced a severe dyspeptic episode one year prior to admission, possibly associated with the presence of a cranioventral mediastinal mass detected on thoracic radiographs. However, no further diagnostic investigation was undertaken at that time, since the respiratory problem spontaneously resolved. Apart from the poor body condition of the animal, physical examination revealed a non-compliant cranial thorax and a severe exfoliative and erythematous dermatitis extending over both pinnae, lateral thorax, abdomen, limbs, perineum and tail (Figure 1a). At closer examination, a waxy and brownish keratosebaceous debris was found to fill the ear canals and a multifocal to diffuse but non-pruritic hypotrichosis-alopecia accompanied by a moderate to severe scaling and erythema (Figure 1b) extended all over the body (generalized disease). The hair shafts and psoriasiform scales were easily epilated and peeled-off, respectively, and there was blanching of the erythematous skin upon diascopy (Figure 1b). Skin scrapings, tape stripplings and ear canal mineral oil wash-outs failed to harvest any ectoparasites. Wood’s light examination, direct microscopy of plucked hairs and fungal cultures (DTM and Sabouraud’s) were, also, negative for dermatophytes. Diff Quick-stained cytology smears did not yield Malassezia spp. yeasts. Complete blood count and serum biochemistry revealed neutrophilic leucocytosis, lymphopenia and mildly increased alkaline phosphatase and alanine aminotransferase activities (Table 1). Urinalysis was unremarkable and the cat was tested negative for feline leukemia virus (FeLV) antigen and feline immunodeficiency virus (FIV) antibodies by applying an in-office enzyme linked immunosorbent assay (Snap FIV/FeLV, Idexx, USA). Survey thoracic radiography disclosed a soft tissue opacity located at the cranioventral mediastinum, displacing the trachea dorsally and cranial lung lobes caudolaterally (Figure 2). On thoracic ultrasonography, the mediastinal mass was found to be of mixed echogenicity with hypoechoic zones; abdominal ultrasonography was unremarkable.

Ultrasound-guided transthoracic fine needle aspiration cytology of the mass showed a large number of small mature lymphocytes intermingled with much fewer inflammatory mast cells (Figure 3). Multiple punch skin biopsies (6 mm) were, also, obtained, fixed immediately in 10% buffered formalin, routinely processed and stained with hematoxylin and eosin. The ensuing histopathology revealed a cell-poor interface dermatitis, characterized by a mixed-cell infiltrate and accompanied by orthokeratotic and segmental parakeratotic hyperkeratosis, epidermal acanthosis with neutrophilic exocytosis, sub-corneal neutrophilic pustulosis and lymphocytic mural folliculitis down to
Table 1. Hematological and biochemical findings on admission in a cat with thymoma-associated exfoliative dermatitis

<table>
<thead>
<tr>
<th>Hematology</th>
<th>Reference interval</th>
<th>Diseased cat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematocrit (%)</td>
<td>25-45</td>
<td>38.8</td>
</tr>
<tr>
<td>White blood cells (/μl)</td>
<td>5,500-19,000</td>
<td>24,500</td>
</tr>
<tr>
<td>Segmented neutrophils (/μl)</td>
<td>2,500-12,500</td>
<td>23,520</td>
</tr>
<tr>
<td>Lymphocytes (/μl)</td>
<td>1,500-7,000</td>
<td>980</td>
</tr>
<tr>
<td>Monocytes (/μl)</td>
<td>0-850</td>
<td>0</td>
</tr>
<tr>
<td>Eosinophils (/μl)</td>
<td>0-700</td>
<td>0</td>
</tr>
<tr>
<td>Platelets (/μl)</td>
<td>200,000-700,000</td>
<td>200,000</td>
</tr>
</tbody>
</table>

Serum biochemistry

<table>
<thead>
<tr>
<th>Test</th>
<th>Reference interval</th>
<th>Diseased cat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total proteins (g/dL)</td>
<td>6-7.8</td>
<td>6</td>
</tr>
<tr>
<td>Albumins (g/dL)</td>
<td>2.7-4.3</td>
<td>3.2</td>
</tr>
<tr>
<td>Creatinine (mg/dL)</td>
<td>0.5-1.6</td>
<td>1.3</td>
</tr>
<tr>
<td>Blood urea nitrogen (mg/dL)</td>
<td>14-40</td>
<td>25</td>
</tr>
<tr>
<td>Glucose (mg/dL)</td>
<td>75-140</td>
<td>110</td>
</tr>
<tr>
<td>Alkaline phosphatase (U/L)</td>
<td>28-157</td>
<td>237</td>
</tr>
<tr>
<td>Alanine aminotransferase (U/L)</td>
<td>12-60</td>
<td>88</td>
</tr>
<tr>
<td>γ-Glutamyltransferase (U/L)</td>
<td>1-7</td>
<td>1</td>
</tr>
<tr>
<td>Creatine kinase (U/L)</td>
<td>49-580</td>
<td>497</td>
</tr>
<tr>
<td>Phosphorus (mg/dL)</td>
<td>2.2-6</td>
<td>5.3</td>
</tr>
<tr>
<td>Calcium (mg/dL)</td>
<td>8-11</td>
<td>8</td>
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<tr>
<td>Potassium (mEq/L)</td>
<td>3-4.3</td>
<td>4.1</td>
</tr>
<tr>
<td>Sodium (mEq/L)</td>
<td>133-154</td>
<td>148</td>
</tr>
</tbody>
</table>

Figure 2. Lateral thoracic radiograph of the cat with thymoma demonstrating a soft tissue mass located cranial to the heart and displacing the trachea dorsally.

Figure 3. Transthoracic ultrasound-guided fine needle aspiration in a cat with thymoma. In a slightly bloody background, the majority of the cells are small lymphocytes. Occasional mast cells are also seen (Giemsa, 1000x).

Figure 4. Skin histopathology of a cat with thymoma-associated exfoliative dermatitis, demonstrating cell-poor interface dermatitis and epidermal hyperplasia (Haematoxylin and Eosin, x100). Inset: Closer view of the same histo slide showing the mixed-cell inflammatory infiltrate and the vacuolated basal keratinocytes (Haematoxylin and Eosin, x 400).

the level of isthmus. No apoptotic keratinocytes could be found where the sebaceous glands looked normal (Figure 4).

The clinical manifestations along with the radiographic, ultrasonographic and cytological features of the anterior mediastinal mass and skin histopathology were strongly suggestive of a thymoma-associated exfoliative dermatitis. A few days later, and pending the surgical excision of the mass, the still clinically stabilized cat died unexpectedly, but unfortunately no permission for necropsy was granted by the owner.

DISCUSSION

Exfoliative dermatitis in the cat has mainly been associated with thymoma (Rottenberg et al. 2004). However, of as many as 100 feline thymomas retrieved by the authors in a literature review, only 16 had exfoliative dermatitis (Loveday 1959, Dubielzig and...
from the affected thymus that subsequently attack leading to the production of cytotoxic T-lymphocytes this cat, are suggestive of an immune-mediated process along with the lymphocytic infiltrate, also observed in is a common occurrence (Scott et al. 1995). to this case, a heavy accumulation of scales and crusts eventually all over the body (Scott et al. 1995, Forster-van Hijfte et al. 1997, Riviere and Olivry 1999), as it was the case in this cat. Typically, it is a progressive and non-pruritic dermatitis, the lesions of which start from the head and ear pinnae, to spread eventually all over the body (Scott et al. 1995, Forster-van Hijfte et al. 1997, Rottenberg et al. 2004). In our cat, lymphocytic infiltrate was, also, demonstrated in the infundibulum and isthmus of some hair follicles, in contrast to the normally appearing sebaceous glands. Other clinical differentials could be drug eruption, superficial demodicosis, cheyletiellosis, dermatophytosis and some viral (feline leukemia and feline immunodeficiency virus dermatitis), immune-mediated (systemic lupus erythematosus, erythema multiforme or graft-versus-host disease, although in the two latter diseases the transepidermal apoptosis is more pronounced (Affolter et al. 1998, Rottengerg et al. 2004).

Although the temporal association between the appearances of skin lesions and thymoma is not always straightforward (Godfrey 1999), there have been observed a few cases with a very similar exfoliative dermatitis that was not secondary to thymoma (Gross et al. 2005). Indeed, a similar exfoliative dermatitis may, also, be seen in primary sebaceous adenitis or in idiopathic mural folliculitis of the cat (Gross et al. 2005), the histopathologic features of which could be demonstrated in every skin biopsies of feline thymoma cases (Rottenberg et al. 2004). In our cat, lymphocytic mural folliculitis was, also, demonstrated in the infundibulum and isthmus of some hair follicles, in contrast to the normally appearing sebaceous glands. Other clinical differentials could be drug eruption, superficial demodicosis, cheyletiellosis, dermatophytosis and some viral (feline leukemia and feline immunodeficiency virus dermatitis), immune-mediated (systemic lupus erythematosus, erythema multiforme) or neoplastic (epitheliotropic T-cell lymphoma) dermatoses (Forster-van Hijfte et al. 1997, Scott et al. 2001), which were primarily ruled out with the aid of historical clues, physical examination and cutaneous histopathology.

Since thymoma is not commonly accompanied by clinicopathological abnormalities (Young 2000), the
hematological abnormalities detected (mature neutrophilia, lymphopenia, eosinopenia and monocytopenia) in this cat would be attributed to the stress imposed by the chronic disease (Stockham and Scott 2002). In addition, the explanation of the mild elevation of liver enzyme activities could be the hepatocellular fatty vacuolation that may appear secondarily to a systemic illness (Scherk and Center 2010). Metastatic hepatopathy was ruled out due to the lack of relevant ultrasonographic findings within the hepatic parenchyma and the very low metastatic potential of thymoma (Moore and Ogilvie 2001).

The confirmation of thymoma in this case was actually based on the aspiration cytology of the mass. Although no thymic epithelial cells could be detected in the FNA smears, the predominance of small mature lymphocytes intermingled with fewer inflammatory mast cells was highly suggestive of thymoma and, particularly, of its lymphocyte-predominant form (Day 1997, Raskin 2001). Thymic lymphoma in the cat is usually of the lymphoblastic or histiocytic morphologic type and it does not feature a mast cell infiltrate (Day 1997). However, differentiating a lymphocyte-predominant thymoma in the absence of epithelial or mast cells from a small-cell lymphoma on a cytological basis may be challenging, warranting histopathological examination to evaluate the tissue architecture (Day 1997, Rogers 2001). In the current case, the old age of the cat, the negative FeLV status, the cavitary ultrasonographic appearance of the mass and the exfoliative erythroderma were strongly in favour of a thymoma as opposed to a mediastinal lymphoma (Foster-van Hjifte et al. 1997, Young 2000, Moore and Ogilvie 2001).

The fatal outcome of this cat still remains unresolved because no permission for necropsy was granted; nevertheless, a severe dyspneic crisis of the intermittently attended cat could be a reasonable explanation for this (Moore and Ogilvie 2001).

REFERENCES


