Straelensiosis in dogs: a newly described nodular dermatitis induced by *Straelensia cynotis*

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A distinctive nodular dermatitis induced by *Straelensia cynotis*, a newly described trombiculoid larval mite which resides in hair follicles, was identified in 12 dogs living in France. They all had scattered, small (1 to 3 mm in diameter), pale, firm skin nodules, variable in distribution but always affecting the dorsal regions of the head and trunk; they were distributed over the whole body of seven of the dogs. The animals were otherwise healthy except for three severely infested fox terriers which had a decreased appetite, were lethargic, and whose skin nodules were painful to the touch. The nodules did not induce pruritus. The lesions usually began as erythematous papules which developed into firm pale nodules. The dermatitis resolved within two to 12 months. Topical acaricides were ineffective but the skin nodules regressed after treatments with systemic avermectins. Histologically, each nodule was composed of a dilated follicular ostium containing a well-preserved larval mite, and showed a pseudopapillomatous follicular hyperplasia and an abundant perifollicular mucinosis. The larvae were identified as belonging to the genus *Straelensia* (Acari: Leeuwenhoekiidae). It was clearly established that the three fox terriers had become infested within a fox’s den. The nymphs and adults of this species of mite are believed to live in foxes’ dens; foxes are considered to be the natural host for the larval stage, and dogs a permissive but occasional host.

MATERIALS AND METHODS

Straelensiosis was diagnosed on skin biopsies taken from 10 dogs between 1991 and 2000. The same diagnosis was established clinically on two fox terriers which were from the same kennel as one of the 10 dogs. Full-thickness biopsies were fixed in 10 per cent neutral buffered formalin, processed in an automatic tissue processor, embedded in paraffin, sectioned at 4 to 6 μm and stained with haematoxylin and eosin. A few days after the initial histological diagnosis, additional biopsies were taken from two dogs, immersed in alcohol, and used to identify the parasite; approximately 12 nodules were dissected. The larvae were mounted in Hoyer’s medium and examined under a microscope (Fain and Le Net 2000). Clinical data and the history of each dog were obtained from the referring veterinarian and the owner.

RESULTS

**Clinical history**

There were no apparent sex or age predispositions to the condition (Table 1). Various breeds were affected, with a strong predisposition for hunting dogs. Eleven of the 12 lived in south or south-west France, and the other lived in central France but frequently stayed near Bordeaux. They were all outdoor dogs, lived in rural areas, and regularly visited woodland; nine were actively used for hunting. The date when the disease was first noticed (usually one to two months before the biopsies) was evenly distributed among the seasons.

**Clinical signs**

All the dogs had a nodular dermatitis with multiple, small (1 to 3 mm in diameter), pale skin nodules on the dorsal regions of the head (muzzle and scalp) and dorsum (Figs 1, 2). The dorsal aspect of the front legs and tail were also involved in most cases. In seven of the dogs, the nodules were distributed more generally (Fig 3). The nodules were discrete, slightly raised and firm. They were often described by the owners as implanted cutaneous ‘hunting leads’. They did not induce a pruritic reaction. Pruritus was observed only in dog 4 and was attributed to flea and lice infestations.

Skin scrapings or pressure applied to the firm nodules did not release any causative organism. However, in dog 4, the nodules were purulent and the clinician saw an ‘atypical’ mite species within the suppurative exudate.

The dermatitis was not contagious for the owners or for animals living in the vicinity, for example, the pups of one affected bitch did not become infected.

| Table 1: Breed, age, sex and date of infestation of 12 dogs with straelensiosis. |
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| Dog | Breed | Age (years) | Sex | Date of infestation |
| 1 | Dachshund | 1-5 | M | May 1991 |
| 2 | Boxer | 7 | F | November 1991 |
| 3 | Jack Russell terrier | 4 | F | December 1995 |
| 4 | Brittany spaniel | 3 | M | April 1997 |
| 5 | Cross beagle | 1-5 | F | August 1997 |
| 6 | Cross spaniel | 1-5 | F | April 1999 |
| 7 | Caim terrier | 6 | M | October 1999 |
| 8 | Fox terrier* | 5 | M | May 2000 |
| 9 | Fox terrier* | 5 | M | May 2000 |
| 10 | Fox terrier* | 8 | F | May 2000 |
| 11 | Siberian husky | 1-5 | F | July 2000 |
| 12 | Brittany spaniel | 2 | F | December 2000 |

* Dogs from the same kennel
Apart from the nodular dermatitis, the dogs were otherwise healthy except for the three fox terriers which were the most severely infested animals; their appetites were reduced, they were lethargic and their skin nodules were painful to the touch.

Development of the disease
The disease lasted for two to 12 months, with a median duration of three months. The duration of the feeding period of *S. cynotis* was determined to be at least three months in the three fox terriers which were kept indoors after the onset of the dermatitis. In the other dogs, it could not be determined whether the duration of the disease corresponded to the natural life cycle of the larval mite or to continual reinfestation. In a few of the dogs, the dermatitis appeared to wax and wane, possibly indicating a continual reinfestation. After a complete remission, none of the dogs has so far been reported to have been reinfested.

In most of the dogs the disease began with multiple erythematous papules which developed into firm pale nodules, crusts and progressive dissipation. In dog 4, the generalised bacterial contamination of the nodules was followed quickly by the termination of the disease.

Topical acaricides, including fipronil sprays, were ineffective. Nine of the 12 dogs received systemic treatment with avermectins, and although not all of them could be investigated thoroughly, most were reported to have a significant reduction in the number of skin nodules. In three of the dogs, the disease was reported to clear up spontaneously.

Histopathology
Microscopically, the nodules were composed of a dilated follicular ostium which contained a well-preserved larval arthropod, and showed a marked pseudoepitheliomatous follicular hyperplasia and a perifollicular mucinosis (Fig 4). The pseudoepitheliomatous follicular hyperplasia and the abundant perifollicular mucinosis which expanded the dermis locally were typical and can be considered pathognomonic of this condition (Fig 5). Additional step sections were often needed to visualise the larval mites. Neovascularisation was prominent around the follicle, but the infiltration of inflammatory cells was variable and usually slight, with an absence of eosinophils or mast cells. In dog 4, the nodules were almost completely effaced by a severe suppurative follicular and peri-
**FIG 5:** Pathognomonic histological changes of pseudoepitheliomatous follicular hyperplasia and abundant perifollicular mucinosis in dog 3. Haematoxylin and eosin. × 63

follicular inflammation (furunculosis): foci of dermal mucinosis were the only distinctive feature from the commonly observed bacterial furunculosis.

The larva was surrounded by an incomplete deep eosinophilic, sometimes mineralised, amorphous tube which opened at the epidermal surface and communicated with the underlying dermis through a fine aperture which was rarely visible in histological sections. There was no clear demarcation between the eosinophilic tube and the keratinised follicular epithelium. The larvae were always in the same position within the tube, the mouthparts placed towards the dermis, the posterior end towards the superficial opening and covered with chigger excrement (Fig 6). Striated muscles, jointed appendages and striated cuticle covered with thin barbs could also be identified (Fig 7).

**Parasitological evaluation**
The parasite was identified as a larval mite of the genus *Straelensia*, family Leeuwenhoekiidae. The larvae were approximately 700 x 425 μm in size, with six legs, typical che-licereae and a body covered with thin barbs (Fig 8). A full description has been published by Fain and Le Net (2000).

**Origin of the infestation**
The origin of the infestation could be clearly established in the three fox terriers. On May 14, 2000, they were the only three of seven hunting dogs which had visited a fox’s den. Ten days later, a myriad of erythematous papules appeared on their heads, ears, dorsum and dorsal aspect of the tails, and developed progressively into raised firm pale nodules. Although these areas remained the most severely affected, the papules extended progressively to cover their whole bodies.

**DISCUSSION**
The trombidioid mite *S. cynotis* induces a typical nodular dermatitis in dogs living in south and south-west France. Until now, only four species have been described in the genus *Straelensia*, the first specimen being *Straelensia eurpea* found attached to the eyelid of a young wolf in Bulgaria (Vercammen-Grandjean and Kolebinova 1968). The other species are *Straelensia tiani* (Wen and others 1966), *Straelensia taurica* (Gushcha 1975), both collected from hares, and *Straelensia africana* found on an African mongoose (Vercammen-Grandjean 1971).

The most common trombidioid larval mites infesting domestic animals are attached to the epidermis (‘exophytic’ localisation) and are identified macroscopically as tiny (0.2 to 0.4 mm), bright red, orange or yellow larvae clustered on small, erythematous papules. These mites include *N. autumnalis*, the European harvest mite, which infests most species, *Trombicula sarcina*, an important parasite of sheep in
Australia, Eutrombicula alfredugesi, Euschoengastia latchmani and Walchia americana, which infest cats, dogs and horses (Yager and Scott 1993). A few larval trombiculid mites have been reported to be localised within the thickness of the skin ('endophytic localisation') inducing a nodular dermatitis in rodents (Brennan and Yunker 1966, Brennan and Reed 1974). They were described at the base of the hair tufts, within a crater-like structure with raised borders and an external opening, which was sometimes occluded by chigger excrement. All these features are also observed in S cynotis infestation in dogs.

The examination of the larvae in Hoyer's medium has shown that their mouthparts, in contact with the base of the modified follicle, communicate with the host tissue through a narrow feeding tube or 'stylostome' (Pain and Le Net 2000). The secretion of saliva rich in proteolytic enzymes, the digestion of the larval mite within the hair follicle, its protection by a concentric tube and the absence of direct contact with the underlying dermis may play a role in this apparent lack of hypersensitivity. The fact that none of the dogs became re-infested after a complete remission suggests that the recent use of skin biopsies in dogs. The authors would like to acknowledge the contributions of Dr Crochelet (Byrne), Dr Wolff (Pithiviers), Dr Garbay (Narbonne), Dr Oudart (Beaumont de Lomagne), Dr Gérard (Les Mages) and Dr Dupin and Dr Roux (Auch). They are also grateful to Dr Ferly-Therizol, and to Mr Delzers, the owner of the three fox terriers, for invaluable information.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the contributions of the referring veterinarians: Dr Crochelet (Byrne), Dr Wolff (Pithiviers), Dr Garbay (Narbonne), Dr Oudart (Beaumont de Lomagne), Dr Gérard (Les Mages) and Dr Dupin and Dr Roux (Auch). They are also grateful to Dr Ferly-Therizol, and to Mr Delzers, the owner of the three fox terriers, for invaluable information.

References

Diagnosis by ultrasonography of congestion of the caudal vena cava secondary to thrombosis in 12 cows

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This paper describes the clinical, ultrasonographic, radiographic and postmortem findings in 12 cows with thrombosis of the caudal vena cava. The principal clinical signs were chronic bronchopneumonia and fever in 11 cows; one cow had epistaxis and one cow bled from the mouth; eight cows had anaemia and leucocytosis, and the clotting time for the glutaraldehyde test was markedly decreased in all the cows; in nine of the cows the activity of γ-glutamyltransferase was high, suggesting chronic hepatic congestion. The most important ultrasonographic finding was congestion of the caudal vena cava attributable to thrombosis of the vein. In all the cows the caudal vena cava was round to oval on cross-section, rather than the normal triangular shape. The hepatic, splenic and portal veins were dilated in five, three and one cow, respectively. The results of radiography and endoscopy supported a diagnosis of bronchopneumonia, but there were radiographic changes in the diaphragmatic lung lobes that supported a diagnosis of vena caval disease in only four cows. Postmortem there was a thrombosis of the caudal vena cava in all the cows, and the thrombi were located in the thoracic, subphrenic and abdominal part of the caudal vena cava at the level of the liver in four, one and seven cows, respectively. In three cows, the thrombus was situated where a hepatic abscess had broken into the caudal vena cava, and in one cow it was at the site of a diaphragmatic abscess. In another cow, there was a fistula between the major bronchus of the right diaphragmatic lung lobe and the caudal vena cava where the thrombus was situated. Three cows had liver abscesses that had not broken into the caudal vena cava. There was severe bronchopneumonia in 11 of the cows, some of which also had multiple pulmonary abscesses.