

## HYPERSENSITIVITY DERMATITIS INDUCED BY *ONCHOCERCA CERVICALIS* IN A HORSE. CASE REPORT

### DERMATITA DE HIPERSENSIBILIZARE INDUSĂ DE *ONCHOCERCA CERVICALIS* LA CAL. RAPORTARE DE CAZ

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#### ABSTRACT | REZUMAT

*Onchocerca* spp. includes a group of filamentous nematodes that can be transmitted by hematophagous insects: *Culicoides* spp. and *Simulium* spp. Infestation with adult worms evolves asymptotically, and prevalence increases with aging. *O. cervicalis* is located in the nuchal ligament of the horse. Microfilaria can cause hypersensitivity dermatitis frequently located on the ventral abdomen, extending in severe forms between the limbs and on the lateral abdomen. Rarely is it located on the face, neck and chest.

This year, during the spring season, at the Internal Medicine Clinic of our Faculty, a horse was presented with chronic pruritic dermatitis (2 years old), located on the face, neck, shoulders and at the base of the tail.

The direct microscopic examination of the skin scraping revealed very rare fragments of microfilariae. Biopsy was performed and histological examination revealed small areas of dermis necrosis, edema and subepidermal eosinophilic infiltrates, suggestive for the hypersensitivity reaction, and the hair follicles had lymphocyte infiltrate with macrophages. Some fragments of *O. cervicalis* larvae in the dermis as well as the presence of lymph-eosinophilic parasitic tracts have also been observed. Treatment with ivermectin (Ivomec® 0,2 mg/kg s.c.), given in two divided doses, resulted in a favorable response (pruritus disappearance) in about 12 hours, and after 3 weeks the lesions almost entirely disappeared.

**Keywords:** horse, hypersensitivity dermatitis, *Onchocerca* spp.

*Onchocerca* spp. cuprinde un grup de nematozi filamentoși care pot fi transmiși de insecte hematofage: *Culicoides* spp. și *Simulium* spp. Infestația cu viermi adulți evoluează asimptomatic, iar prevalența crește odată cu înaintarea în vârstă. *O. cervicalis* se localizează la cal în ligamentul cervical. Microfiliariile pot determina dermatită de hipersensibilizare, localizată frecvent pe fața ventrală a abdomenului, cu extindere în formele grave, între membre și pe laturile abdomenului. Mai rar se localizează pe față, gât și torace.

În primăvara acestui an, la Clinica Medicală a Facultății a fost prezentat un cal cu dermatită cronică pruriginoasă, veche de cca. 2 ani, localizată pe față, gât, spete și la baza cozii. Examenul microscopic direct al raclatului cutanat a evidențiat foarte rare fragmente de microfilarii. S-a efectuat biopsie, iar la examinarea preparatelor histologice s-au observat mici zone de necroză la nivelul dermului, edeme și infiltrate eozinoflice subepidermice, sugestive pentru reacția de hipersensibilizare, iar foliculii piloși prezentau infiltrat limfocitar cu macrofage. S-au mai observat unele resturi de larve de *O. cervicalis* la nivelul dermului cât și prezenta unor traiecte parazitare limfoeozinoflice.

Tratamentul cu ivermectină (Ivomec 0,2 mg/kg s.c.), administrat fracționat în două reprize, a determinat răspuns favorabil (dispariția pruritului) în cca. 12 ore, iar după 3 săptămâni leziunile au dispărut aproape în totalitate.

**Cuvinte cheie:** cal, dermatita de hipersensibilizare, *Onchocerca* spp.

*Onchocerca* spp. are filamentous viviparous thread like nematodes located in conjunctive tissues in many mammals species including horses, donkeys, bovines, humans. In horses there are two species: *O. cervicalis*, located in nuchal ligament and *O. reticulata* around the flexor tendons (3), but after some authors (Dunn, 1975, cited by 4) both belong to a single species, *O. reticulata*. Each *Onchocerca* species uses a particular biting fly, usually a species of *Culicoides* which act as an

intermediate host. The larvae are ingested by the vector and undergo development into the third-stage larvae (L3 in approximately 2 weeks. The L3 larvae enter the animal host through lesions created by the feeding vector (10). Infestation with adults worms is often symptomless and increase with age (3).

*O. reticulata* may cause tendinitis swelling of the suspensory ligament and acute, then chronic inflammation of posterior part of the cannon and lameness (3, 8). After the swelling subsides, the suspensory ligament remains thickened, and small caseous or calcified nodules may be palpated. Affected animals recover when the swelling disappears.

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*O. cervicalis* causes fibrotic, caseous and calcified nodules in ligamentum nuchae (3, 4, 8, 9) but their involvement in fistulous withers is controversial (3). Hestvik et al., (2006) showed that *O. cervicalis* can also cause recurrent fluid-filled masses over the withers that lead to mild bone lysis of the dorsal spinous processes and mineralization within the soft tissue swelling, and consequent cervical stenotic myelopathy. Viviparous females of *O. cervicalis* may live for up to 5 years and produce large numbers of microfilariae that migrate through connective tissues to the superficial layers of the dermis (11) and may produce hypersensitivity dermatitis. *O. cervicalis* are occasionally observed in the cornea of horses, but the proposed causal relationship with periodic ophthalmitis is no longer thought to be valid (3). We describe a case of chronic hypersensitivity dermatitis, lasting about 2 years, produced by microfilariae of *O. cervicalis*.

### MATERIALS AND METHODS

In Internal Medicine Clinic of our Faculty, during the spring season (april, 2017) was presented a horse with chronic pruritic dermatitis lasting from about 2 years. Previous treatment with antimycotic solutions (Imaverol®) made by another veterinarian gave an apparent clinical improvement during cold season.

After skin scraping and direct smears were examined microscopically, a biopsy of the skin was taken for histological exam and prepared by paraffin embedding, cut in sections of 5 µm and stained by hematoxylin-eosin (HE).

### RESULTS AND DISCUSSIONS

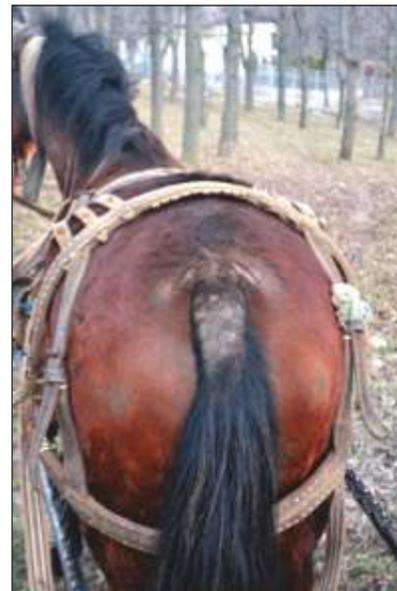
Clinically, the dermatitis was characterized by alopecia, scaliness and pruritus located on the face, neck, anterior-lateral third of the thorax (Fig. 1) and on the tail basis (Fig. 2).

On direct smears from the skin we have found very few *Oncocerca* fragments. Microfilariae are not detectable in the bloodstream (3, 8).

Some authors showed that lesions produced by *O. cervicalis* are located mainly along ventral abdomen and may extend between the forelegs and backlegs to include the tail and in severe cases they may extend up to lower abdominal wall (3). The location is determined by the place of feeding of the intermediate host, haematophagous insects from *Culicoides* genus. *O. cervicalis* is transmitted by *C. nubeculosus* and *C. variipennis* and can also develop in *C. obsoletus* and *C. parroti* (2).



**Fig. 1.** Horse. Chronic pruriginous dermatitis located on the face, neck, anterior-lateral third of the thorax



**Fig. 2.** Chronic pruriginous dermatitis located on the tail basis

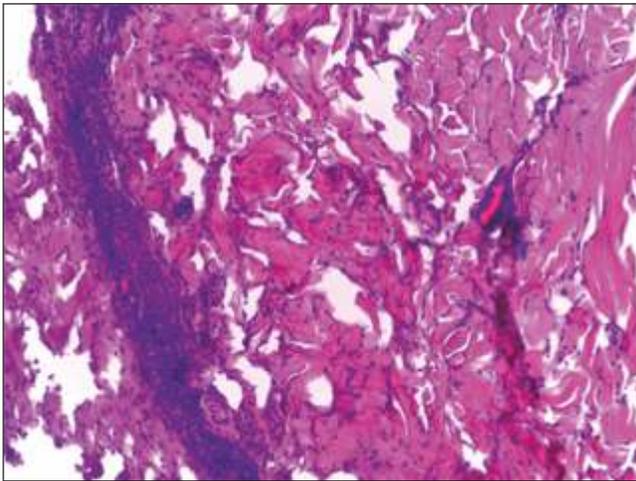
Differential diagnoses should include ventral mid-line dermatitis caused by the horn fly *Haematobia irritans*, hypersensitivity reaction to *Culicoides*, dermatophytosis, and infestation with mange mites (10).

The lesions caused by horn fly feeding, are more likely to include crusting and ulcerating dermatitis (Foil et al, cited by 3). *Culicoides spp.* hypersensitivity dermatitis has a seasonal (estival) evolution, but is not surprisingly for hypersensitivity to be a combined result of microfilaria and *Culicoides* (4).

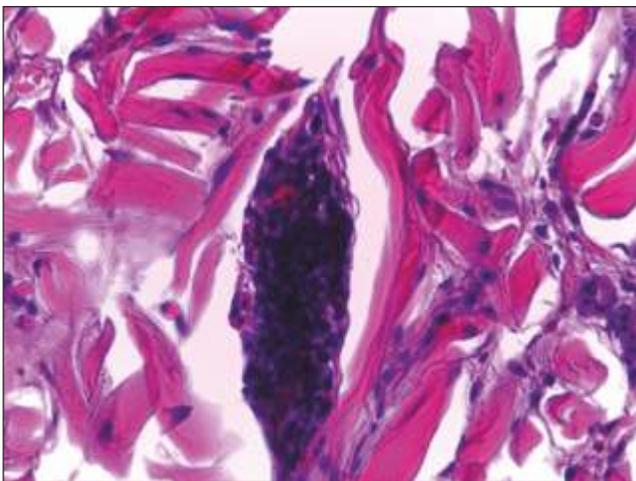
Skin biopsy revealed small areas of dermis necrosis, edema and subepidermal eosinophilic infiltrates on the trajet of microfilariae in dermis or around it (Fig. 3, 4, 5) suggestive for hypersensitivity reaction.

The absence of microfilariae makes cutaneous onchocerciasis unlikely, it does not definitively exclude

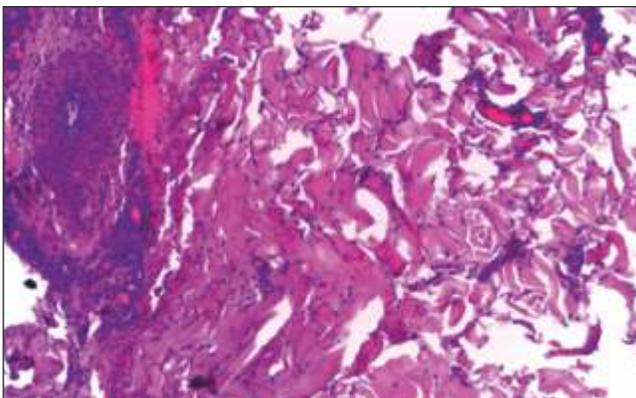
it as a diagnosis (11). Aggregations of microfilariae may be found in the superficial dermis or perifollicular region (10).



**Fig. 3.** Horse skin. Lympho-eosinophilic tract of microfilaria in dermis. HE stainx100



**Fig. 4.** Horse skin. Lympho-eosinophilic agglomerations around microfilaria in dermis. HE stainx400



**Fig. 5.** Horse skin. Vasculitis, periarterial hemorrhagiae, dermic necrosis and fragments of microfilariae in dermis. HE stainx100

Studying the delayed cutaneous hypersensitivity against *Oncocerca volvulus* in humans, Arango et al. (1996) found that only 10% of the patients with circulating antigens gave positive delayed skin response. It seems no such studies were made in horses.

Treatment was done with a dose of ivermectin (0.2 mg/kg, inj. s.c.) to eliminate microfilariae given in two divided doses, resulting a favorable response (pruritus disappearance) in about 12 hours, and after 3 weeks the lesions almost entirely disappeared (Fig. 6). A second dose of ivermectin was repeated after 3 weeks. Constable et al. (2017) mention that most horses improve within 2 to 3 weeks after ivermectin treatment. About 10% of treated horses develop an edematous reaction within 24 hours but some may develop a pruritic ventral edema. Most animals remain free of clinical signs for 6 to 12 months (5, 11).



**Fig. 6.** The same horse as in Fig. 1, three weeks after ivermectin treatment

Some authors observed recurrence of microfilariae and lesions even after repeated treatment with ivermectin. Re-treatment is recommended at 4-month intervals (11). Control of intermediate host (*Culicoides spp.*) is recommended for horses expressing hypersensitivity to *Oncocerca microfilariae*, using insect repellents, avoidance of grazing areas where the insects are likely to be in large numbers and housing at night because most *Culicoides* species feed during night (3).

**CONCLUSIONS**

*Oncocerca cervicalis* hypersensitivity dermatitis in horse was diagnosed mainly by direct microscopical exam, histopathological suggestive lesions and response to treatment. Treatment with ivermectin was very effective.

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