DERMATOPHILOSIS IN A HORSE – A CASE REPORT

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Abstract

A case of dermatophilosis in a horse was described. The disease was diagnosed in a three-year-old mare. Physical examination, cytology, bacterial culture, and histopathological examination were performed. Cytology revealed numerous filamentous chains of bacteria formed into 2 to 4 rows of cells. *D. congolensis* was grown in a culture. Histopathological examination revealed, pyoderma accompanied by mixed cell infiltrate, consisting primarily of neutrophils, and perifolliculitis as well as exocytosis of neutrophils and hyperkeratosis. Penicillin and streptomycin were administered, and the lesions were washed out with a water solution composed of chlorhexidine. Complete recovery was observed after 6-weeks of treatment.

Key words: horse, *Dermatophilus congolensis*, dermatophilosis, pathology, therapy.

Dermatophilosis (cutaneous streptothrichosis) is an exudative, acute, or chronic, skin condition (3, 22). The disease was reported to affect many animal species: horses (15, 19), cattle, sheep, and goats (12, 24), and sporadically it was reported in cats and dogs (8) as well as in humans (5). *Dermatophilus congolensis* is the etiological factor (3). The infection is favoured by any kind of mechanical irritation or trauma to the integument, and by a high environmental humidity. The arthropods (ticks) contribute to the transmission of the disease (3, 16). The disease occurs primarily in countries of a warm climate, and presents a major problem in cattle. Numerous cases of dermatophilosis were reported in Zimbabwe (3), Tanzania (12), Ethiopia (22), Zaire (7), and in Australia (11). The cases reported in horses were noted in the USA (9, 12), New Zealand (18), and Israel (23), but also in Iceland (13). The disease tends to occur seasonally during periods of high humidity (3), which provoke the excessive motility of the zoospores. After penetration to the lower layers of the epidermis (the basal membrane), the zoospores form fragmented filamentous structures. While penetrating the dermis they cause an inflammatory reaction.

In horses two clinical types of the disease are distinguished: a winter form and a summer one. The winter form is characterized by a more severe course. Clinical symptoms include scabs formation and unkempt and ruffled hairs, due to a purulent exudate present on the skin surface. After removal of the crusts, erosions or ulcerations sometimes bleeding, and covered with purulent exudate become visible. The removed hair is matted together with the exudate in their proximal part, which makes them look like tufts. In the summer form, the lesions are less severe. The crusts present on the skin surface are 1–2 mm in diameter, and the coat is frequently thinned (14, 15). The eruptions such as crusts and scales that occur in this type of the disease, are often found on the distal parts of the limbs. Sometimes only these areas may be affected, particularly in animals kept in poor environmental conditions (14).

In cattle the lesions on the skin are primarily distributed on the lumbar area of the trunk and on the lower part of the neck (3); whereas rarely on the surfaces of the limbs (17). Frequently the whole skin surface of the body is affected (3). In goats the lesions occur on the head (usually near the ears and lip margins), scrotum, and distal parts of the limbs (12). In cats, dermatophilosis may be seen as deep purulent and granulomatous lesions with the formation of fistulas; the lesions are most frequently distributed on the surface of the knee (8). In general, deaths are not reported (3).

The diagnosis depends on the demonstration of the bacteria in impression smears, and in culture. The material should be sampled from acute lesions covered with exudate. In cytology, the bacteria are seen as branching filaments (hyphae) that are 1 µm in diameter. They are transversely fragmented into cocci-like spores; and hence form chains of 2 to 8 rows of round cells. The filaments are 3.5 µm wide (4). The slides may be stained with methylene blue, and Wright–Giemsa (Diff–Quick), Giemsa or Gram stains (15). The plates are incubated at 37°C on agar with blood and after 48 h the medium is entirely haemolysed (2, 4, 11). The incubation under aerobic and anaerobic conditions is equally feasible (12). *D. congolensis* also grows on Sabouraud medium (4). Under the microscope, having stained the colonies
according to the above-mentioned methods, the typical longitudinal and transverse fragmentation may be seen. Histopathological examinations of samples reveal hyperkeratosis, parakeratosis, orthokeratosis, acanthosis, and folliculitis (12, 24). During the initial period (from day 4 to 14) the inflammatory infiltration in the epidermis is composed mostly of neutrophils and subsequently (in chronic cases) of mononuclear cells (1, 12, 24). In acute cases, microabscesses also occur (24). Necrotic areas within the granular layer of the epidermis may be noted. Sometimes the typical forms of *D. congolensis* (filamentous hyphae) may be seen within the epidermis and hair follicles (12, 24). Dermatophilosis may also affect humans though such cases are reported to occur quite rarely. In humans, the lesions (scales and scabs) are found primarily on hands. Veterinary surgeons in particular are at high risk of infection (8).

### Material and Methods

In March 2006, a 3-year-old chestnut mare was presented to the Department of Clinical Diagnostics and Veterinary Dermatology, Faculty of Veterinary Medicine in Lublin. A week earlier the breeder noticed the following lesions on the skin surface: alopecia, scabs, and severe pruritus. The history did not reveal previous skin conditions. Before the presentation no treatment was prescribed or administered. The mare was kept in very humid, non-ventilated stable with high litter.

Physical examination and additional diagnostic tests were performed. In order to exclude the diseases of parasitic and fungal origin, microscopic examination of skin scrapings fixed in chlorolactophenol and hair plucks was carried out. The impression smears sampled from the exudative lesions were submitted to cytological examination. The slides were stained with Diff-Quick method. The smear samples were obtained from the exudative eruptions for bacterial culture. The material was inoculated into plain agar, agar with blood, and Sabouraud medium. The plates were incubated at 37°C under aerobic condition and with 5% CO₂ for 48 h. With the use of 8 mm-diameter trepan, having injected a local anaesthetic (i.e. lignocaine), a skin specimen was sampled from the lesion and submitted for histopathological examination. The biopsy samples were obtained from the exudative lesions on the left side of the chest. The specimens were fixed in buffered formalin solution and stained with haematoxylin and eosin (H-E).

### Results

Apart from the lesions within the integument, no other clinical symptoms were not observed. The following diffuse eruptions were noted: hair thinning, alopecia, erythema, papules, nodules, erosions, scabs, and scales. The eruptions covered a major area of the skin on the head, on the dorsal nasal planum in particular, as well as on the skin on the neck and chest.

Less numerous lesions were found on the abdomen, medial surface of the upper hind limbs, axillae, and groin. The scabs were easily removed making the erosions covered with purulent exudate visible. The hairs were matted with the exudate, and looked like “paint brushes”.

The microscopic examination of the skin scrapings and hair plucks did not demonstrate ectoparasites and dermatophytes. The impression slides stained with Diff-Quick method revealed violet-staining filamentous structures formed from parallel 2 to 4 rows of cells, which were characteristic of *D. congolensis*. Apart from the above-mentioned bacterial forms, numerous neutrophils, single macrophages, and Gram-positive cocci were seen.

After 48 h, grey and yellow colonies grew in the culture on agar with blood. Under microscope, branching filaments (app. 1 μm in diameter) were observed. On the glass slides sampled from older colonies the filaments were thickened up to app. 5μm in diameter and consisted of 2 to 8 rows of cells. The bacteria were catalase-positive and non-acid-fast.

Histopathologically, diffuse pyoderma accompanied by a mixed cellular infiltrate, composed primarily of neutrophils, and perifolliculitis was noted. Exocytosis of neutrophils and hyperkeratosis were also seen.

![Fig.1. Dermatophilosis in horse. Erythema, papules, erosions, and crusting are noted on the dorsal nasal planum.](image-url)
Fig. 2. Dermatophilosis in horse. Annular skin lesion on the neck and chest. Alopecia, erythema, papules, erosions and scales are seen.

Fig. 3. The impression slides from exudative lesion revealed violet-staining filamentous structures formed from parallel 4 rows of cells (arrow). Numerous neutrophils and Gram-positive cocci are also seen. (Diff-Quick stain, x 1000).

Fig. 4. Histopathological examination. Exocytosis of neutrophils, hyperkeratosis and diffuse pyoderma accompanied by mixed cellular infiltration, and perifolliculitis are seen. H-E, x 100.

Penicillin-streptomycin combination was administered intramuscularly (Pen-Strep, at a dose of 20 ml given once daily) throughout the period of 14 d and the affected area of skin was being washed out for 28 d with 0.5% water solution of chlorhexidine. After 7 d, new eruptions stopped to appear. After subsequent 21 d, the lesions ceased and hair regrowth was noted.

Discussion

Dermatophilosis is more prevalent in the countries with warm climatic conditions, and until recently cases in horses have not been reported in Poland. Individual cases in cattle diagnosed in Poland were reported by Stec et al. (20).

Differential diagnoses in cases, in which clinical symptoms are seen as described above and are compatible with dermatophilosis, should include dermatophytosis, invasion with *Chorioptes bovis*, food allergy, pemphigus foliaceous, contact dermatitis, sarcoidosis, folliculitis and vasculitis on the skin of the hock, while in cases when the lesions are distributed on the area covered with white hair, also liver diseases and photosallergy (15). A definite diagnosis demands a number of ancillary tests, including an isolation of a pathogen.

Cytological examination may stand for a suitable basis for a definite diagnosis only if it demonstrates typical filamentous “chain-like” forms of bacteria. In the presented case characteristic forms of *D. congolensis* were seen; which enabled the diagnosis subsequently confirmed by bacterial culture results. The histopathological findings are not typical unless the filamentous forms of *D. congolensis* are observed. The results of the histopathological examination of the skin specimen sampled from the affected animal were similar to the lesions reported by Yeruham et al. (23), in goats with acute dermatophilosis, i.e. pyoderma with microabscesses formation, neutrophilic infiltration within the epidermis, and hyperkeratosis. No eosinophils were found as it was reported by Stec et al. in cattle (20).

The therapy of dermatophilosis includes systemic antibiotic, as well as topical treatment. Tetracyclines, penicillins, streptomycin, erythromycin, chloramphenicol, lincomycin–spectinomycin mixture, oxytetracycline, ampicillin, and ceftiofur are all effective (5, 7, 10, 15, 17). Topical treatment of dermatophilosis may include the application of preparations that contain 0.5% chlorhexidine, 0.15% chloramine, 5% potassium permanganate, 4% iodine tincture or other iodine compounds. Desiccant preparations containing zinc sulphate or copper sulphate may be applied on lesions covered with abundance of exudate (7, 15). In animals with lesions distributed only on limbs, a gel containing *Aloe vera* is effective (6). Due to a possible risk of transmission to humans, all therapeutic procedures should be performed with extra precautions. In the case presented, the systemic antibiotic treatment combined with the adjuvant therapy with the antiseptic solution proved to be effective.
However, the recovery was noted only after a long 6-week course of the treatment. During the treatment period it is essential to provide animals with proper hygienic conditions. They should be neither exposed to rain nor kept in very humid housing facilities. In the case reported such requirements were not fulfilled and it was probably a cause of the prolonged treatment. It should be remembered that during the treatment and afterwards all riding and management equipment as well as housing facilities, in which affected animals are kept should be thoroughly disinfected.

References