Human and animal dermatophilosis. An unusual case report and review of the literature

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ABSTRACT

Dermatophilosis is an acute, subacute or chronic skin disease affecting a wide range of species of animals and man. It is caused by a Gram (+) bacteria of the order of the Actinomycetales named Dermatophilus congolensis. Presenting as an acute, subacute or chronic dermatosis affecting primarily cattle, but a wide variety of domestic and wild animals, and humans, as well. It is distributed worldwide but more prevalent in the humid tropical and subtropic areas. It is essential to emphasize the importance of this disease in livestock industry and leather production. The disease is reviewed and an unusual case is reported (Dermatol Argent 2010;16(5):349-353).

Keywords:

Dermatophilus congolensis, dermatophilosis.

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Introduction

The disease was first described in 1910 by Van Saceghem1 in the Belgian Congo as "contagious dermatitis" (*dermatose contagieuse*) in cattle. In 1926 the term nodular disease estreptotricosis or lumpy wool disease to refer to the disorder observed in sheep, a name that was later abandoned to avoid etiological confusion.[2] Since then, there have been numerous reports on a wide range of animals, including terrestrial and aquatic mammals and repiles as well. The most affected animals are cows, sheep and horses, but it is also observed in goats and pigs. The disease is rarely found in dogs and cats.[3] In humans very few cases have been reported.[4-9]

The disease has worldwide distribution but is prevalent in tropical and subtropical regions with high levels of humidity.

The morbidity and mortality rates vary greatly across countries and are higher during the rainy season, seriously affecting the livestock industry and leather and wool production.[3]

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Etiologic agent

The Dermatophilus congolensis is a Gram-positive, pleomorphic bacteria. It belongs to the order of Actinomycetales, family of Dermatophilaceae. The family has a single genus Dermatophilus. The members of this family are very special for presenting filamentous structures, which by means of perpendicular branching, transverse septation and longitudinal segmentation in two planes, form packets of coccoid cells.[10]

Pathogenesis and clinical presentation

The infection is generally confined to the skin and appears as a proliferative and exudative dermatitis with subsequent formation of scabs. The evolution may be acute, subacute or chronic.[3-7]
D. congolensis is usually limited to the epidermis, attacking the keratin of the stratum corneum of skin, hair and wool of infected animals. It is considered that the entry of the microorganism is facilitated by minor trauma, bites of ectoparasites and excessive sweating[11]. It rarely affects the dermis, although there have been reports of invasion of deeper tissues such as subcutaneous tissue, muscle and lymph nodes.[6]
Clinically, it manifests as clusters of scabs under which the hair tends to break and the wool is matted togheter. Upon the removal of scabs, it comes off with wool and hair, leaving behind an eroded hairless surface. In certain areas, such as the perineum of ruminants or joints of horses and cows, moist lesions of thickened skin can be observed with thin folds of scabs covering it.
The disease is acquired by direct contact between sick animals, but It can also be spread indirectly through the bite of flies and ticks or from of infected animals, as it has been proven that the bacteria can remain viable in scabs for long periods of time.[3]
Dermatophilosis in humans is rare and there have been few cases reported, most of them concerning people with activities related to the handling of cattle in which it is consider as an occupational disease. However, it has been suggested that there must be both environmental and intrinsic factors of the host that would trigger a predisposition of the host to develop an infection as many individuals handle sick animals every day without becoming infected.[3,8]
The clinical appearance is protean and includes cases of abscesses, furunculosis, eczematoid exudative lesions, cracked intertrigo and folliculitis.[4-9]
D. congolensis has also been recognized as one of the etiologic agents of pitted keratolysis.[12-14]
We present an unusual case of exclusive nail involvement in a patient living in an urban area with no history of relevant contacts. To our knowledge this is the first case reported with this clinical aspect.

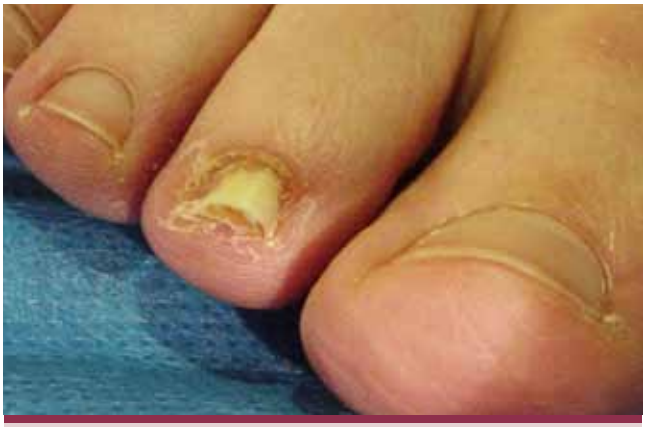

PHOTO 1. Subungual hyperkeratosis and distal onycholysis. Clinical appearance before treatment.

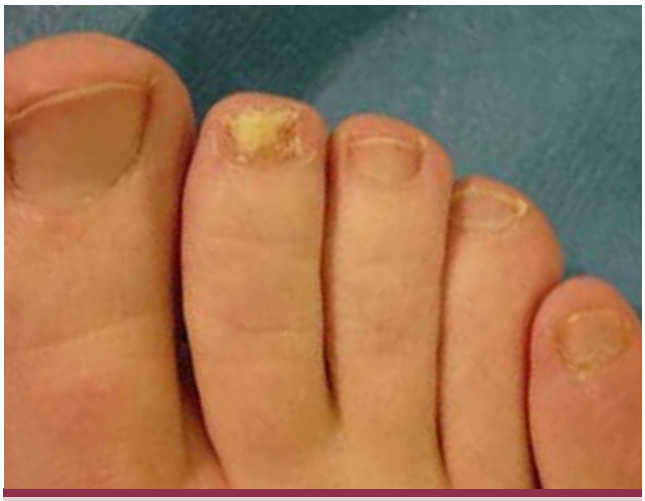

PHOTO 2. Subungual hyperkeratosis and distal onycholysis. Clinical appearance before treatment.

PHOTO 3. Macroculture. White colonies with net edeges and a rough-looking appearance. Medium: Sabouraud agar honey.

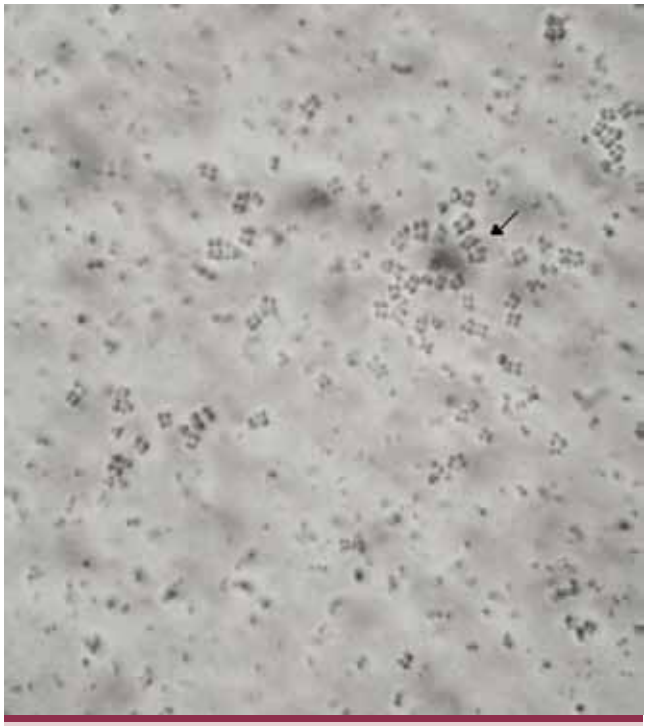

PHOTO 4. Direct microscopic observation of the culture. Coccoidal forms. Panoramic view (10X).

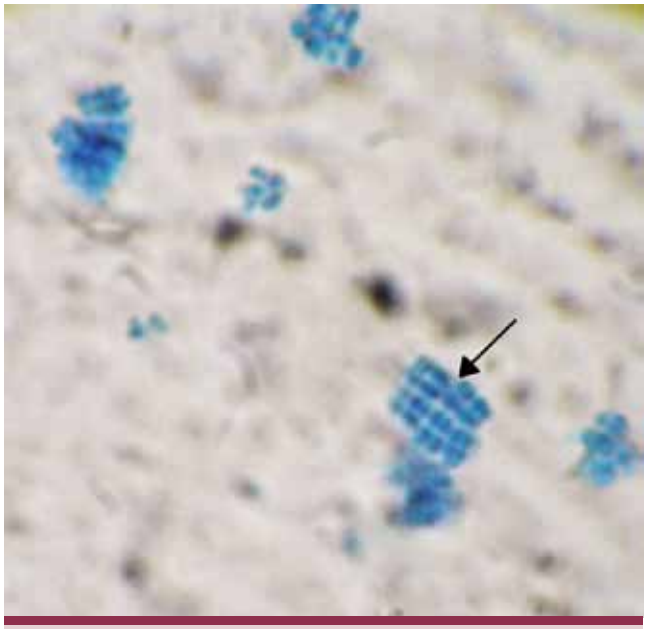

PHOTO 5. Direct microscopic observation of the culture. Coccoidal forms (40X).

Case report

40 years old female patien presented with a 3 year history who of subungual hyperkeratosis and distal onycholysis on the second toe of the right foot. She complained of mild pain. Physical examination of the rest of the nails and skin was normal **(Photos 1 and 2)**.

She had been treated with local antifungal drugs and oand systemic therapy with terbinafine and fluconazole, without any improvement. Given the lack of response to the referred treatments, a mycological test was requested.

Diagnosis

The patient is pretreated for the extraction of the sample material which is removed by scraping the inner surface of the nail. The direct microscopic examination, prior clearance of the material with a mixture 1:1 of 20% KOH and permanent Parker blue ink, revealed the presence of thin filaments with a sharp-pointed end, some of whom had a fine fragmentation giving round elements. Stains for Gram and Giemsa were applied.

Culture: the sample was cultured in 4 tubes, 2 with Sabouraud honey agar medium (90.0 ml honey, 10 g peptone, yeast extract 5 g, agar 20 g and distilled water to a total volume of 1,000 ml) and 2 with Lactrimel medium (honey Bee 10 ml, 10 g wheat flour, milk 200 ml, agar 20 g and distilled water to a total volume of 1000 ml). A pair of tubes was incubated at 28 °C and the other two at 37 °C. After 10 days of incubation the 4 tubes showed a growth of yellowish white colonies characterized with net round shiny edges and a raised central area of 2 to 4 mm of a matte and slightly rough appearance **(Photo 3)**. Microscopic examination of cultures showed the presence of coccoid elements grouped in packages, where parallel lines with longitudinal and transversal septa *tram car-like* could be observed **(Photos 4 and 5)**. On the edges of colonies, fine filaments that fragmented in coccoidal elements along its length were observed **(Photo 6)**.

Given this finding the patient was again quoted in order to take a second sample. This time the samples were seeded in different culture media: sheep blood agar incubated at 35 °C with and without CO_2 atmosphere at 5-10%, trypticase soy agar and trypticase soy soup incubated at 35 °C and with Sabouraud honey agar and Lactrimel medium at 28 °C. In all crops the microorganism was recovered, although growth in sheep blood agar with an atmosphere of CO_2 was the one most rapidly developing.

The colonies were small. After 24 hours of incubation they did not reach 1 mm in diameter and gradually increase in size, reaching an average size of between 6-8 mm in diameter after 7 days. In the other culture media a slower development was observed, especially on the media generally used for isolation of fungi. It is an interesting finding that this strain is able to develop in these media as some authors advise against the use of it. With the isolated strain the following biochemical reactions were performed: Catalase: +, Urease: +, Casein hydrolysis: +, Starch hydrolysis: +, Xanthine hydrolysis: -, Tyrosine hydrolysis: -, Voges-Proskauer reaction: - , Methyl red stain: -, indole: -.

On the basis of the performed biochemical reactions, and mainly due to the characteristic appearance observed under the microscope that reveals micrococcoidal filaments with coccoids arranged in parallel rows arranged in packages with longitudinal and transverse septa or with irregularly arranged cocci resembling Sarcina we conclude that the isolated strain was D. *congolensis*.

Treatment

In acute cases, the course of infection is usually short and animals recover spontaneously. The dry weather favors the recovery. The application of topical antiseptics is of questionable value because the drug has no action on the *hyphae* found inside woolly and hairy follicles, nevertheless they do contribute to reduce the spread of the infection through the destruction of the organisms present in the crusts. If a large number of animals are affected, it is useful yo apply zinc sulfate 0.2-0.5% in immersion baths or aspersion.[15]

Different treatments were tested by injection. Persistent infections can be cured with injections of penicillin and streptomycin. In cattle and sheep, a single injection of 20 mg/kg of oxytetracycline of long action (PA) has given good results.[3] In the published human cases, several treatments have been reported including parenteral injections treatments with gentamicin and streptomycin, oral treatments using ampicillin, amikacin and norfloxacin and local therapy using sulfate gentamicin 0.1% with diverse results. Spontaneous remissions have also been reported.[4-9]

Our patient has gone through a 4-month treatment with a gentamicin cream and so far shows remarkable improvement. **(Photo 7)**

Conclusion

We emphasize the importance of awareness of this entity because our country has an important livestock industry. Likewise, it raises a differential diagnosis of onychomycosis.

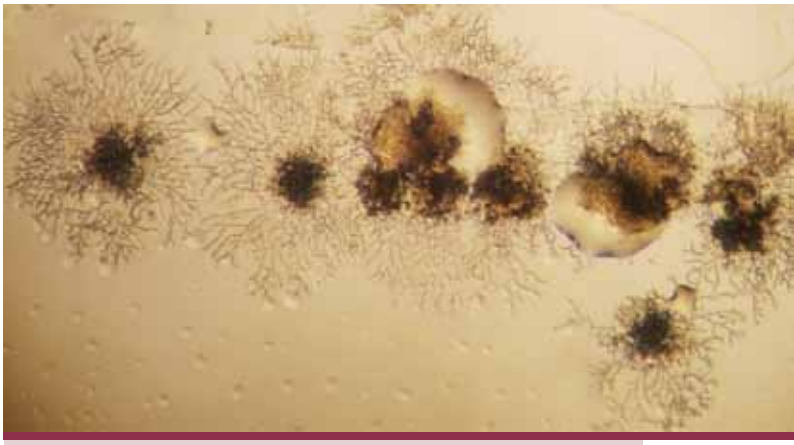

PHOTO 6. Direct microscopic observation of the culture. Filamentous forms (40X).

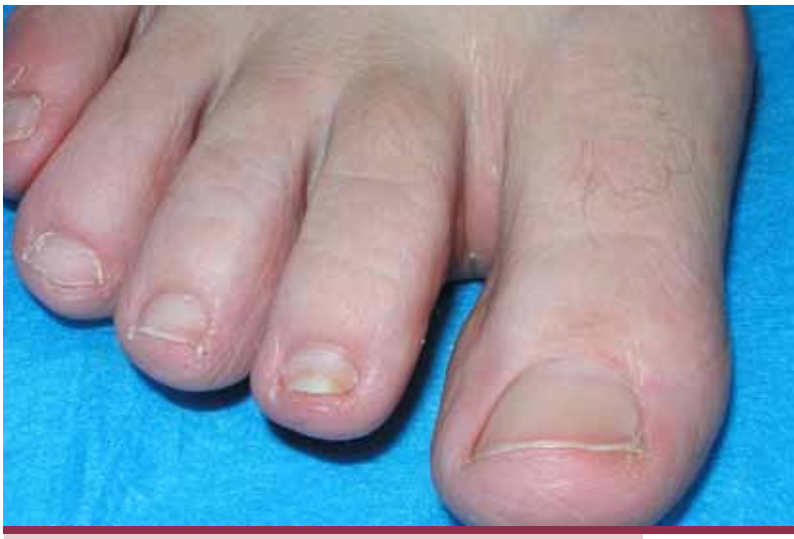

PHOTO 7. Clinical course after four months of treatment.

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