

Sheep strawberry foot rot in AL-Diwania province-Iraq

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Abstract

The study was conducted to confirm the registration of strawberry foot rot in sheep in AL-Diwania Province in Iraq. A flock composed of fifty sheep of various ages was observed lesions like warts in five lambs; three samples were collected from each lesion. Samples of crusts and scabs were collected into sterile tubes. Swaps were taken deeply from lesions for direct smear and bacteria culture. 1 cm³ lesion tissue samples had been taken and fixed in 10% formalin for histopathological examination. Results were revealed that the five animals exhibited clinical signs of presence of obvious warts like lesions in distal limb with grey or brown color covered with grey crusts between coronet and knee joint with 1- 4 cm in diameter and raised about 0.5 from surface of skin, the lesion is very painful when touched. Some lesions are showed bleeding this gave the appearance looks like a strawberry fruit. All the smears from the animal species demonstrated Gram positive, filamentous branching arrangement enclosing 2-4 rows of coccoid cells (like tree) indicating the characteristic microscopic morphology of *Dermatophilus congolensis*. A granular growth at the bottom like cotton with clear supernatant liquid colonies was observed on liquid media. The histopathological study revealed that there were hyperkeratosis, Para keratosis, thickening in the stratum spinosum layer of epidermis, as well as, deposition of huge melanin pigment in the stratum spinosum cells and acanthosis nigricans, while the histopathological changes in the dermis layer showed edema, deposition of granulation tissue and presence of vesicles that may contain coccoidal cells, also there were infiltration of inflammatory cells in the dermis and in between the sebaceous glands of skin .

Key words: Strawberry foot rot, sheep, AL-Diwania Province, Iraq.

مرض تعفن القدم نوع شكل الفراولة في الأغنام في محافظة الديوانية في العراق

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الخلاصة

أجريت الدراسة الحالية لتأكيد التسجيل الأول للإصابة بمرض تعفن القدم الفراولي في الأغنام في محافظة الديوانية في العراق. وشملت الدراسة قطيع يتكون من خمسين رأس من الأغنام في أعمار مختلفة ، حيث لوحظ وجود آفات مثل الجلدية فيمسة من الحملان؛ تم جمع ثلاثة عينات من كل آفة من الحملان المتضررة في أنابيب معقمة و تضمنت عينات من القشور، كذلك أخذت مسحات بعد عمل جروح نازفة في منطقة الآفة لغرض الفحص المجهري المباشر وكذلك عمل الزرع الجرثومي ، كما أخذت حوالي عينة بقطر (1 سم) من الأنسجة من منطقة ووضعت في مادة الفورمالين بتركيز 10% لغرض الفحص النسيجي. وكشفت نتائج الدراسة أن الحيوانات الخمسة أظهرت علامات سريريته واضحة تضمنت وجود البثور والآفات الجلدية في الجزء القاصي من الأطراف الأطراف مغطاة بقشور رمادية بين التاج ومفصل الركبة قطرها 1-4 سم و ترتفع عن سطح الجلد حوالي 0.5 سم، كما إن الآفة مؤلمة جدا عند لمسها. وأظهرت بعض الآفات نزيف مما أعطى الآفة مظهر يشبه فاكهة الفراولة. أظهرت جميع المسحات من جراثيم متفرعة خيطية موجبة لصبغة الجرام ، وترتيب بشكل سلاسل خيطية مكونة من 2-4 صفوف من الخلايا المكورة (شكل شجرة) مما يدل على المظهر المميز لجرثومة *Dermatophilus congolensis* ولوحظ وجود نمو حبيبي مثل القطن على الوسط السائل

المغذي. وكشفت الدراسة النسجية المرضية وجود فرط القرن ، نظير القرن ، سماكة في الطبقة الشائكة للبشرة ، وكذلك وجود ترسبات بنسب كبيرة لصبغة الميلانين في خلايا الطبقة الشائكة ، بينما أظهرت التغيرات النسجية المرضية في طبقة الأدمة وجود وذمة ، مع وجود حويصلات التي قد تحتوي على خلايا المكورات ، وكذلك وجود ارتشاح للخلايا الالتهابية في الأدمة وبين الغدد الدهنية للجلد.
الكلمات المفتاحية: تعفن القدم الفراولي في الأغنام ، محافظة الديوانية ، العراق.

Introduction

Dermatophilosis is one of the bacterial skin diseases of animals and man caused by *Dermatophilus congolensis* and it was first reported in cattle by Van Saceghem (1915) in the Belgian Congo (1). Dermatophilosis is primarily an acute or chronic local, or progressive epidermal infectious disease of animals, sometimes classify as fatal exudative dermatitis. In sheep, the disease is often referred to as strawberry foot rot or mycotic dermatitis or lumpy wool (2). Strawberry foot rot is a proliferative dermatitis of the lower limbs of sheep cause by Gram-positive pleomorphic bacterium called *Dermatophilus congolensis* (*D. pedis*) (3), produces motile zoospore which invades the skin and cause an acute, sub-acute or chronic skin disease (4). It is recorded in UK and occurs extensively in some parts of Scotland and in Australia. It is not fatal but severely affected animals do not make normal weight gains (5). All ages and breeds appear susceptible to the disease but under natural conditions lambs are more commonly affected. Most outbreaks occur during the summer months and lesions tend to disappear in cold weather (3). It is first recorded in Iran by (6). The study aimed to insight the recording of sheep strawberry foot rot in Al-Diwania province-Iraq.

Materials and methods

Herd of sheep (50 animals) of various ages in march 2012 were exhibited a warts like lesions in five lambs. Three specimens

Results

The five animals exhibited clinical signs were more obvious formation lesions in distal limb, the lesion like warts was granular with grey or brown color covered with grey crusts between coronet and knee joint and were 1- 4 cm in diameter which raised from

from each lesion were collected and prepared according to (6). A-Crusts and scabs were collected in sterile tubes, and direct impression smears were taken from the underside of the crusts and the site of bleeding and stained with Gram stain for direct microscopic examination. B-Swaps were taken deeply from the lesion for bacteriological examination. C-Tissue samples 1 cm³ were taken and fixed in 10% formalin for histopathological examination. All samples immediately transported to the clinical pathology laboratory, college of veterinary medicine in Al-Qadisiyah University. The crusts and scabs were emulsified with Ringer's solution and via swaps were inoculated into brain heart infusion broth. The broths were cultivated aerobically and anaerobically (under 10% CO₂ incubator) at 37°C for 24-48 hours. A full loop from each cultivated broth was aerobically plated on 10% sheep blood agar and cultivated at 37°C for 24 hours (8). Colonial morphology and growth characteristics of the organism were examined. The sugar fermentation test was done with five basic sugars (dextrose, maltose, sucrose, lactose and mannitol). Catalase and oxidase test also were performed as described by (9). Tissue samples were processed routinely in Al-Nasiriya teaching hospital, and 5µ sections were obtained and stained with Haematoxyline and Eosin (H&E) stain for light microscope examination.

surface of skin about 0.5 cm, the lesion was very painful when touched. Some lesions were showed bleeding this gave the appearance looks like a strawberry fruit (Fig. 1, 2). Animals showed decrease of appetite, decrease of body weight, and restricted



Fig. (1): Foot of sheep suffering from strawberry foot rot, there is hemorrhage in the coronary band and extends out to the hoof region and inters digital space.

movement without lameness. All the smears demonstrated Gram positive, filamentous branching arrangement enclosing 2-4 rows of coccoid cells (like tree) indicating the characteristic microscopic morphology of *D. congolensis* (Fig. 3). In liquid media was presented a granular growth at the bottom like cotton with clear supernatant liquid. Also growth of bacteria was showed heavy in anaerobic conditions in comparison with aerobic condition. On agar medium, all isolates were gram positive, catalase negative and the stain more concentrated in the capsule, the cells were oval or spherical, pairs, short chains of 4- 8 cells and singles, and on blood agar medium all isolates were gave tiny irregular rise colonies after 24 hours for culturing but at 48 hours showed yellowish green colony with β hemolysis. All



Fig. (2): Foot rot with more severe hemorrhage and sloughing.

Table (1): Represent biochemical feature of *D. congolensis*

Test	Result
Catalase	+
Methyl red	+
Voges-Proskauer	+
Indole	+
Urease	+
Carbohydrate fermentation(Glucose and fructose)	+
Carbohydrate fermentation(lactose, mannitol and sucrose)	-
Blood hemolysis	β

isolates of bacterium gave positive result for catalase, methyl red, voges-proskauer, indole and urease. It was fermented glucose and fructose but no fermentation was showed in lactose, mannitol and sucrose (Table 1).

The histopathological study revealed that there were hyperkeratosis, Para keratosis, thickening in the stratum spinosum layer of epidermis, as well as deposition of huge melanin pigment in the stratum spinosum cells and acanthosis nigricans (Fig. 4), while the histopathological changes in the dermis layer showed edema, deposition of granulation tissue and presence of vesicles that may contain coccoidal cells (Fig. 5) also there were infiltration of inflammatory cells in the dermis and in between the sebaceous glands of skin (Fig. 6), but some of normal architectures of skin is still present normal such as few hair follicles and secretory tubules (Fig. 7).

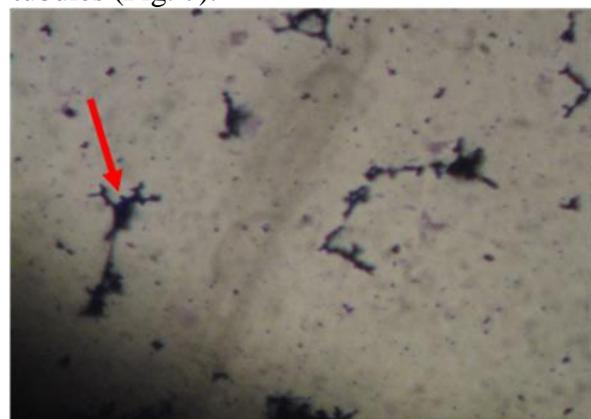


Fig. (3): Direct smear demonstrating gram positive *D. congolensis* coccoid cells.

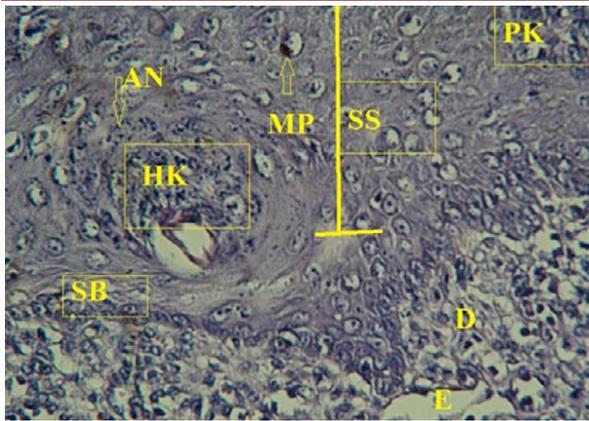


Fig. (4).

Fig. (4): Microscopic section of skin revealed epidermis (stratum spinosum layer (SS)) there are thickening of stratum spinosum layer, hyperkeratosis (HK), Para keratosis (PK), deposition of melanin pigment in the stratum spinosum and acanthosis nigricans (AN). In the dermis layer (D) there is edema (E). stratum basally layer (SB). (H&E X400).

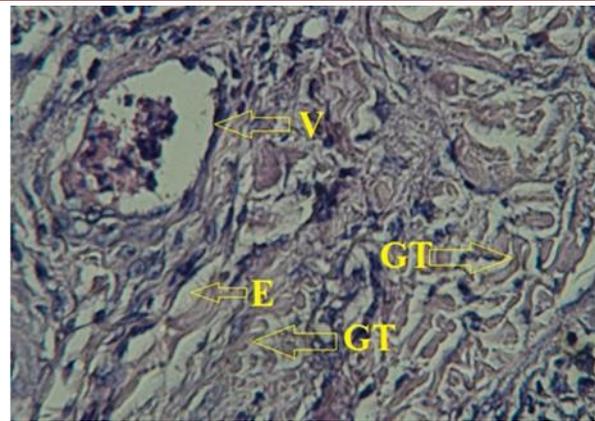


Fig. (5).

Fig. (5): Microscopic section of skin showing dermis layer, there are deposition of granulation tissue (GT) with edema (E) and presence of vesicle in the dermis (V). (H&E stain, X400).

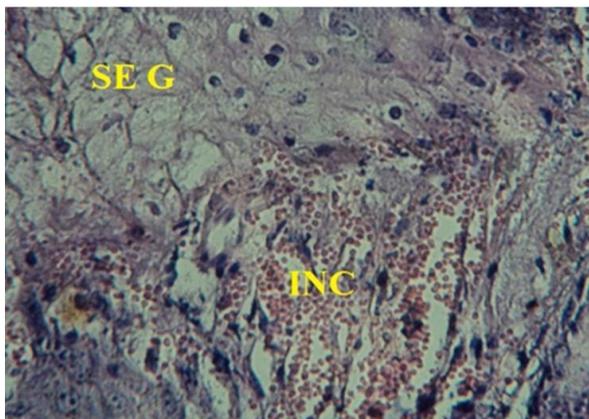


Fig. (6).

Fig. (6): Microscopic section of skin showing dermis layer, there are infiltrations of inflammatory cells (INF), sebaceous gland (SEG). (H&E stain X100).

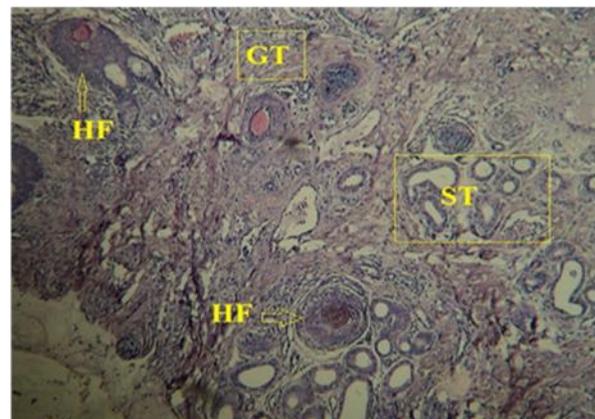


Fig. (7).

Fig. (7): Microscopic section of skin dermis, there is deposition of granulation tissue (GT). Hair follicles (HF) and secretory tubules (ST). (H&E stain, X400).

Discussion

The current results of clinical signs coincided with who mentioned (9,10) that infected animals with strawberry foot rot showing of clinical signs which include, large crust formation of the distal extremities around the carpus, tarsus and coronary band. The size of lesion has reached into 3-5 cm in diameter and become hard and gave shape wart-like. The bleeding occurs post removal of the scabs by hard or rough objects, mass

resembling a fresh strawberry. The characteristic of microscopic appearance of the organism was observed in the direct smears from all scabs examined and is in agreement with previous researchers (11,12,13) were mentioned that a direct Gram's stain was carried out on smears of the scrapings, revealing dense forms of Gram-positive branching filaments with a diameter of approximately 1 μ m. The results of grow

of bacteria in agar and broth media and biochemical characters which compatible with results of (10). Our results were in accordance with (14) that mentioned histopathologic examination reveals the characteristic coccoidal cells, and zoospores in the epidermis, also (15) indicate revealed that histopathology of *D. congolensis* infection were Congestion, hyperkeratosis with abundant keratinaceous debris. The epidermis was thickened, and the dermis diffusely infiltrated with polymorph nuclear

leucocytes. The keratinized layers were invaded by abundant *D. congolensis* filaments and coccoid forms featuring transverse and longitudinal divisions. (16) revealed that the epidermis composed of alternating layers of orthokeratotic and parakeratotic keratin, as well as, degenerating neutrophils, serous fluid, and bacterial filaments, while, dermal inflammation was mild with infiltration of mononuclear inflammatory cells, particularly lymphocytes, around superficial vessels.

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