

## Histopathological Changes Of Dermatophytosis In Cattle Of Diyala Government

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Received: 25 -11-2023

Accepted: 25-1-2024

Published: 1-3-2024

### Abstract:

Dermatophytosis is common contagious and infectious and contagious cutaneous diseases, the present study describes the etiological significant of *T. verrucosum* in bovine dermatitis, One hundred samples were collected from cows (male and female, with age ranged between six month to four years) in Diyala Governorate . The skin lesion carefully dissect and used for history, pathological change study, the results showed irregular keratin without keratinocytes, dead neutrophils inflammatory layer, hyperkeratosis & acanthosis, necrotic hair follicle, debris of damage keratin due to the hyphae and vascularity, also showed nodular keratin, vacuolation, apoptotic bodies, neutrophil with septated hyphae, appear aggregation of dermatophytes clustered, and finally showed severe aggregation of neutrophils, hemorrhage with necrotic areas in epidermis layer.

**Keywords:** Skin, histopathological changes, ring worm, cattle

## Introduction

Dermatophytosis occurs in animals and humans, and is characterized by keratinization in the skin and hair loss at stratum corneum layer. Dermatophytosis is disease which causes great economic loss because highly contagious, high cost of treatment, and difficult control<sup>[1,2]</sup>. It is caused by three species in the animals *Trichophyton*, *Epidermophyton*, and *Microsporum* <sup>[3]</sup>. *T. verrucosum* causes the disease in cows <sup>[4]</sup>, some factors such as enzymes, humidity, pH, immune response, fatty acids, and hormones have great effect in the disease occurrence <sup>[5]</sup>

## Materials and methods:

**Sample collection:** The current study was conducted at Veterinary Medicine College at Diyala University between October 2022 to May 2023. Samples were collected from infected cows (head, neck, and back) that they were infected with a fungus.

## Study Area :

Current study was conducted at districts of Diyala governorate <sup>[6,7]</sup>

## Ethical Agreement:

was approved by scientific committee of medicine department, college of veterinary medicine, university of Diyala, Iraq

**Tissue preparation:** Samples of tissue were taken from the location of infestation in various bodily parts. Tissue samples (4–6 mm thick) were then processed after being left at room temperature for 72 hours in a 10% formalin-fixed solution. The samples were dehydrated at room graded alcohol (70%, 80%, 90%, and 100% for two fir each one) then submerged in xylene for two hours and melted paraffin wax for three hours. After that, the samples were placed in an orientation and embedded in newly made paraffin

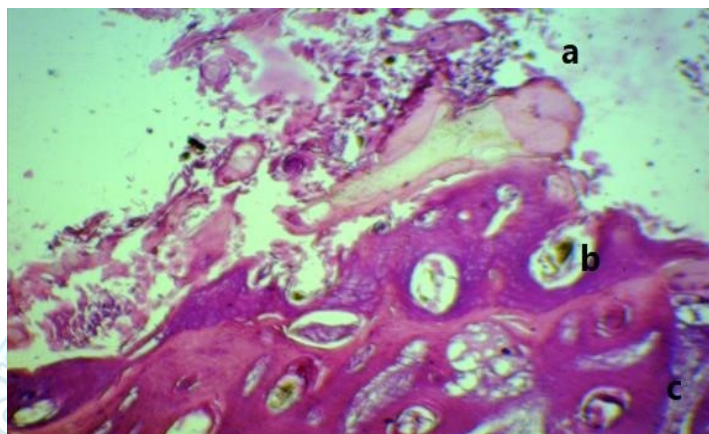
blocks. Using a 5-μm microtome, blocks were sectioned and inspected on microscope slides. The sections underwent standard methods for (H&E) staining <sup>[8]</sup>

## Histopathological Examination:

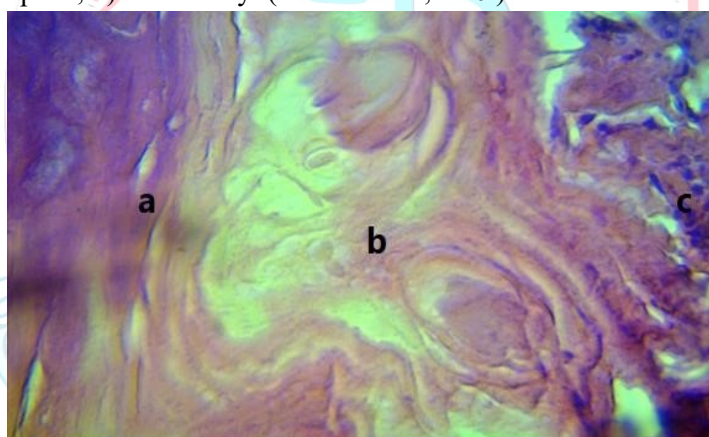
The skin lesion in cattle showed irregular keratin without keratinocytes, dead neutrophils inflammatory layer, hyperkeratosis & acanthosis, necrotic hair follicle, debris of damage keratin due to the hyphae and vascularity (fig. 1 & 2), other samples showed nodular dead keratin, vacuolation, apoptotic bodies, dead neutrophils with septated hyphae, appear aggregation of dermatophytes clustered ( pseudogranules ) (fig. 3 & 4).

The hyphae showed invade stratum corenum & hair follicle, variable acanthosis, mild spongiosis, rupture of hair follicle to release fungal elements into dermis (fig. 5), The hyphae presented in large amounts, septated hyphae, hyperkeratosis without keratinocyte ( dead layer ) and irregular eosinophilic layer (fig. 6).

Other section of skin showed severe dermatophyte clustered, infiltration of neutrophils with necrotic areas of epidermal layer, also showed severe aggregation of neutrophils, hemorrhage with necrotic areas in epidermis layer (fig. 7).

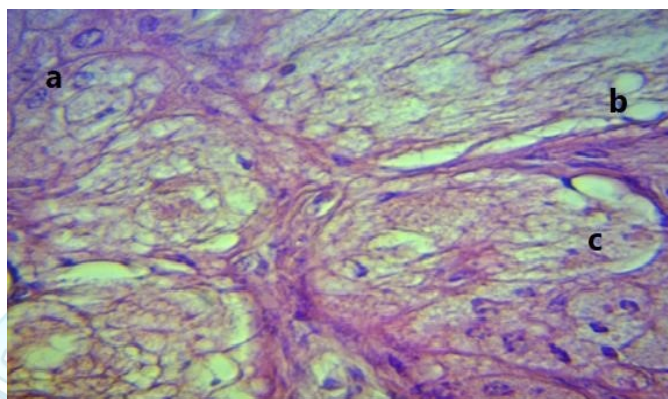


**Figure 1:** Histopathological section of skin in cattle showed: a) dead keratin, b) necrotic hair follicle, c) dead neutrophils, d) vascularity. ( H & E stain; X20 ).

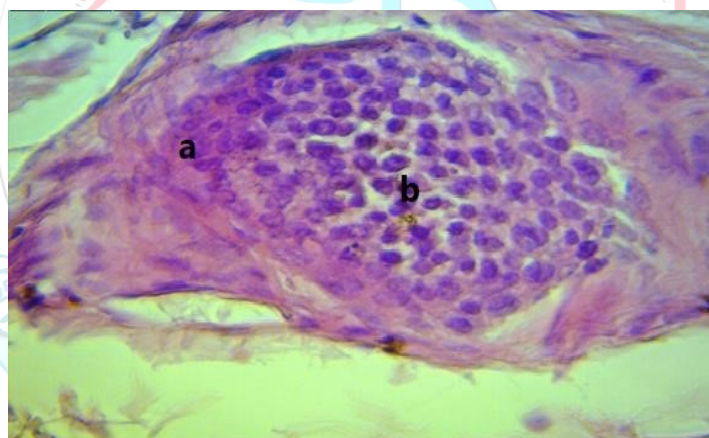


**Figure 2:** Histopathological section of skin in cattle showed: a) septated hyphae b) dead keratohyaline without keratinocyte c) dead neutrophils. ( H & E stain; X20 ).

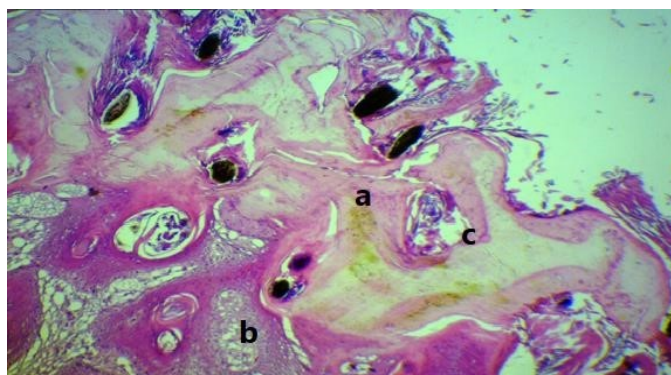




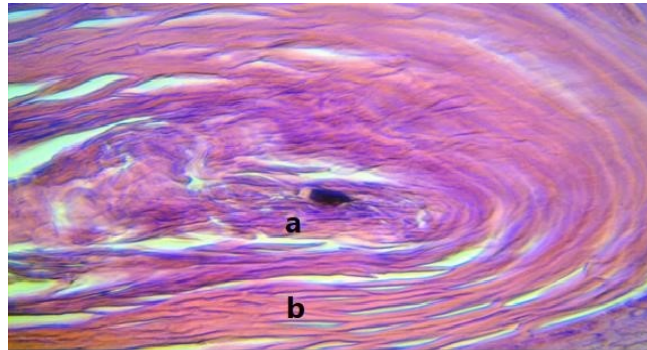
**Figure 3:** Histopathological section of skin in cattle showed: a) apoptotic bodies b) vacuolation c) nodular dead keratin d) neutrophils ( H & E stain; X20 ).



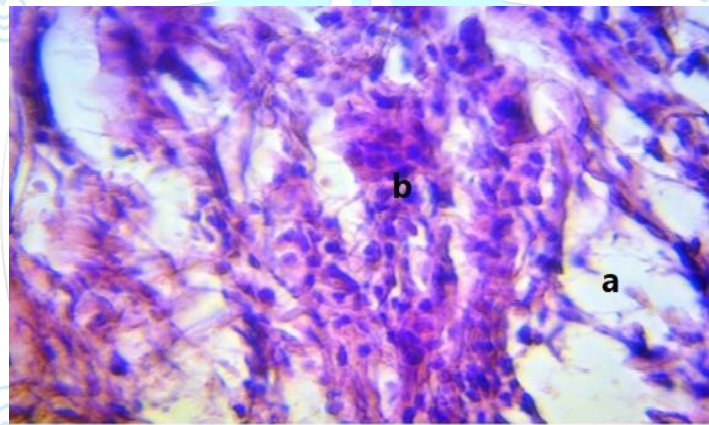
**Figure 4:** Histopathological section of skin in cattle showed: a) aggregation of dermatophyte clustered b) infiltration of inflammatory cells ( H & E stain; X20 ).



**Figure 5:** Histopathological section of skin in cattle showed: a) acanthosis b) mild spongiosis c) rupture of hair follicle d) hyphae invade stratum corneum & hair follicle ( H & E stain; X20 ).



**Figure 6:** Histopathological section of skin in cattle showed: a) hyperkeratosis without keratinocyte b) hyphae ( H & E stain; X10 ).



**Figure 7:** Histopathological section of skin in cattle showed: a) necrosis in epidermis layer b) infiltration of neutrophils (H & E stain; X20).

### Discussion:

Fungal infection of the skin's keratinized cells and hair fibers causes dermatophytosis, a common condition in young calves that causes hair loss in the affected area and the formation of a thick, raised, sharply outlined gray-white crusting plaque.

The results of our study showed dead irregular keratin without keratinocytes, dead neutrophils inflammatory layer, hyperkeratosis & acanthosis, necrotic hair follicle, debris of damage keratin due to the hyphae and vascularity with septated hyphae of dermatophytes, these results are agree with <sup>[9]</sup>who showed given that the dermatophyte

have infected the dermis, it may be helpful for severe dermatophyte infections, the parakeratosis, basket weave keratin layer, neutrophils in basal layers of the epidermis, spongiotic alterations, acanthosis or hyperkeratosis and visibility of hyphae are histopathological characteristics seen in active dermatophytosis.

In the current work, the diagnosis was done by direct microscopic examination of dermatophyte, these indicated that the animals in general can also be affected and the cattle is primarily caused by *T. verrucosum*.

These results agree with <sup>[10]</sup> and <sup>[11]</sup> *T. Verrucosum* is cause of ring worm in cattle. *T. Verrucosum* also causes disease in persons who come in contact with infected animals. The histopathological changes in this study were similar to <sup>[12]</sup> who showed histopathology of dermatomycosis in cattle and buffalo.

In the mice, the experimental dermatophyte has showed inflammation of the skin, neutrophils, dendritic cells are present, also showed over expression of cytokine such as transforming growth factor, IL-1 and IL-6 (Cambier *et al.*, 2014), lead to elevated of reactive oxygen species (ROS) produced by phagocyte cells during the inflammation the macrophages and neutrophils produce nitric oxide (NO) <sup>[13]</sup>

The presence of fungal hyphae in the follicles of hair has been proven in animals that have been infected by ringworm in the past. This was accomplished by using Gridley's

fungus stain in bovine calves <sup>[12]</sup> and the PAS technique in bucks <sup>[14]</sup>

Live vaccines administered to cattle for the purpose of providing monophylaxis against *T. Verrucosum* are thought to be successful in controlling the infection. According to <sup>[15]</sup> the vaccination of calves with the *T. Verrucosum* vaccine showed highly positive results, as it was able to protect 90 percent of the calves who were vaccinated against the illness caused by *T. Verrucosum*. This is an important fact to notice.

Due to the fact that all dermatophytes are infectious to humans, it is imperative that appropriate measures be taken in order to avoid the spread of illness. It is recommended that individuals who are occupationally exposed, such as veterinarians wear disposable gloves and thoroughly wash their hands with an alcohol-based hand sanitizer or an antiseptic solution such as dettol when they are examining a sick animal or collecting skin scrapings for the purpose of diagnosis <sup>[10]</sup>

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