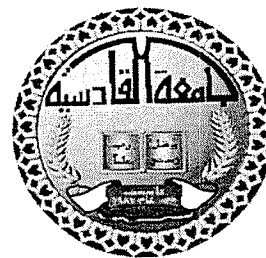


**Ministry of Higher Education and Scientific Research
University of Al-Qadisiyah
College of Veterinary Medicine**



Diagnosis and treatment of Dermatophytosis in cow

A Research

**Submitted to the Council of the college of Veterinary Medicine
College/University of Al-Qadisiyah in partial fulfillment of the
requirements for the degree of Bachelor of Veterinary Medicine and
surgery**

By

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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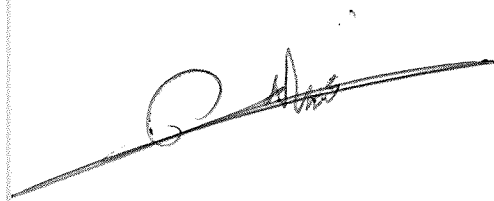
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سورة طه ايه 114

Certificate of Supervisor

I certify that the research entitled (Diagnosis and treatment of Dermatophytosis in cow) was prepared under my supervision at the college of veterinary medicine / University of Al-Qadissiya .



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graduation project of Bachelor degree in science in
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Dedicate

***Every challenging word needs self-effort as well as
guidance of elders especially who were very close
our heart .***

***My humble effort I dedicated to my sweet and
loving***

Father and Mother

***Whose affection , love , engorgement and prays of
day and night make me able to get such success and
honor .***

Along with all hard working and respect

Dr. Ghassan h.Jsmael. Al-Khuzaay

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CHAPTER
ONE

Introduction

Introduction

Dermatomycosis are fungal infections that are widespread throughout the world, and they are an important cause of morbidity.(*Borgers M et al,2005,Garber G,2001*) Dermatophytosis, caused by different species of dermatophytes, is one of the more common infections. However, commensal yeasts such as *Malassezia furfur* and *Candida spp.*, are also important causative agents of dermatomycosis.(*Gupta AK et al,1998*) Diagnosis depends on a combination of clinical and laboratory data, including physical examination of the lesions and microscopic visualization of microorganisms in potassium hydroxide and their growth in culture. Treatment consists of the use of topical or oral antifungals or a combination of these, depending on the site, extent of infection and the causative organism.(*Gupta AK, Cooper EA,2008, Severo LC, Londero AT,2002*) In most episodes of infection, management with topical antifungals is effective; these are available over the counter in most places and are divided in two main classes: azoles and allylamines. These are cheaper than oral formulations and cause minimal adverse effects.(*Crawford F,Hollis S,2007, Hainer BL,2003*) Only two quantitative systematic reviews relating to the treatment of dermatomycosis with topical antifungals have been published to date, both limited to the management of tinea pedis.(*Crawford F, Hollis S,2007, Hart R et al,1999*) For this reason, we performed a comprehensive systematic review and meta-analysis to determine the efficacy and safety of topical antifungals in the treatment of any dermatomycosis(*British Association of dermatologists,2012*).

Dermatophytes are keratinophilic and keratinolytic fungi.They are characterized by high affinity to keratin-containing tissues,what make

them responsible for superficial mycosis of skin(tinea faciei,tinea barbae,tinea corporis,tinea cruris,tinea manuum or tinea pedis) ,nails (onychomycosis,tinea unguium) and hair(tinea capitis)(*kalinowska et al,2009a*). Infections caused by dermatophyte fungi are very serious problem,not only clinical,but also epidemiological and therapeutic.the incidence of skin,hair and nail diseases does not depend on sex,age or social status.(*Kalinowska et al 2009*).



*CHAPTER
TWO*

*Literatures of
Review*

Review of Literatures

2-1 Taxonomy of the Dermatophytes:

Kingdom: Fungi

Phylum: Ascomycota

Class: Euascomycetes

Order: Onygenales

Family: Anthrodermataceae

Genus: Epidermophyton

Species: Dermatophytes

2-2 Synonyms:-

Ringworm, Tinea pedis, tinea corporis, Tinea cryris, Tinea, fungal infect ion, Roundworm, Kerion,, Mycosis, eczema marginatum, Tinea unguium, Barber's itch, Tinea capitis, Gock itch, Tinea barbae

2-3 Definition:

Dermatophytes are a group of morphologically and physiologically related molds some of which cause welldefined infections: Dermatophytoses (tineas or ringworm) (*De Vroey C, 1985*). They possess two important properties: they are keratinophilic and keratinolytic. This means they have the ability to digest keratin in vitro in their saprophytic state and utilize it as a substrate and some may invade tissues in vivo and provoke tineas. However, their morphology in the parasitic growth phase is different from the morphology exhibited in culture or in vitro

2-4 History of disease:-

Historically medical mycology began with the discovery of the fungal etiology of favus and centered around three European physicians in the mid-19th century are Robert Remak, Johann L. Schönlein, and David Gruby. The real founder of Dermatophycology was David Gruby on the basis of his discoveries during 1841 to 1844, his communications to the French Academy of Science, and his publications during this period (86–89). Raimond Sabouraud, one of the best known and most influential of the early medical mycologists, began his scientific studies of the Dermatophytes around 1890, culminating in the publication of his classic volume, *Les Teignes*, in 1910 (*Sabouraud's, R, 1910*). Sabouraud's contributions included his studies on the taxonomy, morphology, and methods of culturing the Dermatophytes and the therapy of the Dermatophytoses. In 1934, Chester Emmons (*Emmons, C.W. 1934*) modernized the taxonomic scheme of Sabouraud and others and established the current classification of the Dermatophytes on the bases of spore morphology and accessory organs.

Dermatophytosis has been prevalent since before 1906 at which time Dermatophytosis was treated with compounds of mercury or sometimes sulfur or iodine. Hairy areas of skin were considered too difficult to treat, so the scalp was treated with x-rays and followed up with antiparasitic medication. (*Sequeira, J.H, 1906*) Another treatment from around the same time was application of Araroba powder. (*Jagdish, C, 1995*).

Anthropophilic Dermatophytes dominance was observed in almost all regions of the country, but particularly clearly in the central eastern region(75.9%), Midwestern region(75.5%), southwestern region(72.1%), and southeastern region(70.4%). only in the northern region of the country, this

advantage was small anthropophilic fungi accounted for only 54.6% of the total number Dermatophytes .

2-5 Etiology:-

1. Trichophyton: The genus Trichophyton includes 24 species. The colonies on agar media are powdery, velvety or waxy. The predominant spore type is micro conidia with sparse macro conidia (*Jagdish. C1995*)., Reverse side pigmentation is characteristic of the species and is used for the identification of the species within the genus (*Wagner and sohnle, 1995. Larone, 1995*). The macro conidia are thin walled with smooth surface and variable shape (*Philpot, 1977*). Some of the Trichophyton species are fastidious in their requirement for amino acid as nitrogen source. Trichophyton tonsurans requires ornithine, citrulline and Arginine whereas Trichophyton mentagrophytes requires methionine. This nutritional specificity has been used by many authors in the identification of the Trichophyton species (*Philpot, 1977*).

2. Microsporum: The genus Microsporum includes 16 species. The colony morphology of Microsporum species on agar surface is either velvety or powdery with white to brown pigmentation (*Jagdish. C,1995*). Both macro and micro conidia are produced but the predominant conidial structures are macro conidia. Micro conidia are less abundant. The macro conidia are multi septate with thick wall and rough surface (*Emmons,1934*). Rarely some species produce neither micro nor macro conidia (*St-Getmain,1996*) They do not have any special nutritional requirements.

3. Epidermophyton: The genus Epidermophyton includes only 2 species. The colonies are slow-growing, powdery and unique brownish yellow in colour. This genus is devoid of micro conidia. Macro conidia are abundant and

produced in clusters (*Jagdish. C1995*). These macro conidia are thin walled with smooth surface (*Emmons, 1934*)

4. PATHOGENESIS AND CLINICAL PRESENTATION

The possible route of entry for the dermatophytes into the host body is injured skin, scars and burns. Infection is caused by arthrospores. Resting hairs lack the essential nutrient required for the growth of the organism. Hence these hairs are not invaded during the process of infection (*Weirzman and Summerbell, 1995*) The pathogen invades the uppermost, non-living, keratinized layer of the skin namely the stratum corneum, produces exo-enzyme keratinase and induces inflammatory reaction at the site of infection (*Wawrzkievicz. et,al 1991. Muhsin. et,al 1997*). The customary signs of inflammatory reactions such as redness (ruber), swelling (induration), heat and alopecia (loss of hair) are seen at the infection site. Inflammation causes the pathogen to move away from the site of infection and take residence at a new site. This movement of the organism away from the infection site produces the classical ringed lesion (*Dahl, 1994*).

2-6 Epidemiology:-

Dermatophytosis is an infectious disease of animals caused by different species of keratinophilic fungi. It is a major public and veterinary health problem reported from different parts of the world and causes great economic loss (Calderone 1989). The disease appears to be more common in tropical than temperate climates particularly in countries having hot and humid climatic condition (Pascoe 1976). It has been reported that animals housed in close proximity to each other for long periods and the presence of infected debris in buildings account for both the higher incidence and the greater infection rate in winter (Radostits *et al.* 1997). *Trichophyton verrucosum*, *T. mentagrophytes* and *T. megninii* have been regarded as the main fungi causing ringworm in cattle (Quinn *et al.* 1994). However, very limited studies on ringworm infection in cattle have been published from Arab countries. *T. verrucosum*, *T. mentagrophytes* and *Microsporum* species were the most common fungi isolated from cases of animal dermatophytosis (Abou-Gabal *et al.* 1976; Al-Ani *et al.* 1995). Abdullah and Hassan (1995) isolated *T. verrucosum*, *M. fulvum* and *M. gypseum* from surface sediments of the Shatt Al-Arab River of Iraq. Also, *T. verrucosum* has been isolated from soil in a playground in the Nablus area, West Bank of Jordan (Ali-Shtayeh 1989). In horses, *Trichophyton* species and *Microsporum* species are the main causes of ringworm in Saudi Arabia (Bagy and Abdel-Mallek 1991). In Sudan, Abu-Samra and Ibrahim (1988) found that horses were successfully infected with human isolates. The aims of the present study were to isolate and identify the causative fungi of ringworm in cattle Jordan, to study the epidemiology of ringworm, and to describe the clinical signs.

2-7 Mode of transmission :

The fungus is most commonly transmitted from one animal to another by direct contact between animals. The disease can also be transferred by clippers, brushes, combs, blankets, fence posts, fence wire and the hands of handlers.

Once an infected animal comes in contact with equipment, the equipment can remain a source of infection for up to 4 years.

Certain factors make an animal more susceptible to ringworm infection.

1. Young animals are more easily infected.
2. Poor nutrition increases the likelihood of ringworm infection.
3. Animals that have not had ringworm before are more likely to catch it.
4. Animals kept in the same pen with infected animals are more likely to catch ringworm.
5. Animals kept in dark, damp, warm, and poorly ventilated places become infected more easily.
6. The use of clippers, brushes, and blankets on different animals without disinfection will spread this disease

2-8 Clinical Signs:-

There will be circular or irregular lesions (dependent on infectant organism) and these may coalesce. Scaly and crusty patches and alopecia will be seen in this area due to broken hair shaft and hair lost from inflamed regions of the skin. Follicular papules and pustules will be a peripheral red ring (Dermatophytes) due to dead fungi in area of inflammation at center of lesions and viable fungi peripherally. There is usually a varying degree of pruritus.

2-9 Post mortem lesion

Animal that die from Dermatophilosis exhibit extended and generalized dermatitis and sometimes pneumonia and signs of intercurrent disease

2-10 Diagnosis:

Clinical signs are characteristic of the disease. Wood's Lamp can be used to shine UV light onto the lesion and it will fluoresce in 50% of cases (if *Microsporum* fungi are present). Therefore it is a good diagnostic tool in small animals but is not incredibly reliable. If there is no fluorescence, it does not mean there are no dermatophytes or no *Microsporum*.

Samples can be taken and examined in 10-20% KOH for the presence of hyphae or arthrospores. Lactophenol Cotton Blue enhances visualisation. One may see, septate hyphae or spores in the stratum corneum, keratin layers and in hair follicles. Perifolliculitis, folliculitis or furunculosis, epidermal hyperplasia and intracorneal microabscesses may also be seen.

Sabouraud's Dextrose agar containing cyclohexamide and chloramphenicol can be used to culture the dermatophyte at room temperature for a month.

A biopsy can also be taken and examined histologically. Signs will include epidermal hyperplasia (hyperkeratosis, parakeratosis, acanthosis) and inflammation.

(<https://en.wikivet.net/Dermatophytosis>)

2-11 Consequences of infection

In most cases, ringworm is self-limiting. The period between infection and the appearance of lesions is 1 to 4 weeks and the duration of disease ranges from 1 to 4 months. Scarring and collagen deposits damages hides even after lesions have healed.

2-12 Treatment:-

There are many antifungal drugs, allowing for treatment Dermatomycoses effectively.

These drugs can be divided to several groups :

A- Antifungal antiseptics:

1. Iodine compounds
2. Phenol derivatives
3. Sulphur and its derivatives
4. Alcohol
5. Inorganic acids
6. Organic acids and their derivatives
7. Derivatives of unsaturated fatty acids
8. Aniline dyes
9. Quaternary ammonium hydroxides
10. Quaternary ammonium hydroxides
11. Quinoline derivatives

B-Antifungal antibiotics:

1. Polyene antibiotics (Natamycin)
2. Non-polyene antibiotics (Gryzeofulvin)

C-Antifungal chemioterapeutics :

1. Fluoropyrimidine derivatives – flucytosine
2. Imidazole derivatives: a. Azole drugs of the 1st generation - Chlorimidazole, Clotrimazole, Miconazole, Econazole, Izoconazole, Tioconazole, Bifonazole b. Azole drugs of the 2nd generation - Ketoconazole c. Azole drugs of the 3rd generation – Itraconazole, Fluconazole, Voriconazole, Posaconazole
3. Allyloamin

derrivates - Naftifine, Terbinafine 4. Morpholine derrivates – Amorpoline
5. Pyridone derrivates – Cyclopirox.

The mechanism of action of antifungal drugs is based on disruption of a fungal cell membrane or inhibition or disruption of DNA or RNA synthesis or inhibition of ergosterole synthesis in fungal cells.

Antifungal therapy should be selected to the type of dermatomycosis, some of them can be treated topically others require systemically. (*Katarzyna Kalinowska Wroclaw Medical University Poland*)

2 -13 Control:

- 1-Hand washing and cleaning under the nails is very important.
- 2-Soiled bandages should be placed in a plastic bag for proper disposal.
- 3-Combs, brushes, towels, hats, coats, bedding and other personal articles should not be shared.
- 4-Recommend to parent/guardian examination of household contacts, pets and farm animals for evidence of infection and seek effective treatment if found.
- 5-Classrooms, showers and dressing rooms of gymnasiums should be routinely cleaned with school approved cleaning agents.
- 6-Launder towels and clothing in hot water and laundry detergent. Management Options for Ringworm.

2-14 Differential diagnosis :

- Nodular dermatitis
- Contagious ecthyma of small ruminants,
- Mange (demodectic and chorioptic),
- Staphylococci,
- Ringworm, chorioptic mange,
- Besnoitosis,
- Photosensitivity.