معهد بحوث صحة الحيـوان.
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# تأثير مرض القراع على الحالة الاكلينيكية وبعض خلايا ومكونات الدم في الابقار

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تم دراسة الأعراض الاكلينيكية لمرض القراع في عدد ١٥ من عجول الابقار التـــي تتراوح أعمارها مابين ٩ و ١٢ شهرا وتم عزل فطر يترايكوفايتون فيرموزم، تيرايكوفايتون مينتاجروفيتس وتيرايكوفايتون شوينليني من الحيوانات المصابة.

لدراسة مدى تأثير هذه الفطريات على مكونات الدم والمصلتم أخذ عينات أخـرى من دم الحيوانات المصابة بالاضافة الى أخذ عينات أخرى من عدد ٩ حيوانات ســليمة لضوابط البحـث.

ولقد أوضحت هذه الدراسة حدوث فروق معنوية في بعض خلايا الدم ومصـــــل الحيوانات المصابة مقارنة بالحيوانات السليمة اكلينيكيـا.

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# *EFFECT OF DERMATIOMYCOSIS ON CLINICAL, SOME HAEMATOLOGICAL AND BIOCHEMICAL CONSTITUENTS OF INFECTED YOUNG CATTLE*

*(With Two Tables)*

*By*

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## *SUMMARY*

In an outbreak of ringworm 15 young cattle under 12 months of age were examined. 7 of them were infected by Trichophyon Verrucosum, five by Trichophyton mentagrophytes and three by Trichophyton schonleni. Corrlation between the causative agent, blood picture and blood biochemical analysis were carried between infected group of animals and healthy ones. Analysis of variance indicated that there was significant differences in red blood corpuscles, mean corpuscular volume, mean corpuscular haemoglobin concentration, erythrocyte sedimenation rate and monocytes. Regarding the biochemical constituents, there was significant differences in albumin, albumin/globulin ratio, glucose, serum glutamic pyruvic transaminase and sodium. The biochemical changes were clearly manifested in those animals infected with Trichophyton verrucosum.

## *INTRODUCTION*

Mycotic skin diseases in animals known as ringworm are caused by various species of the genera Trichophyton and Microsporum. In cattle, the usual cause is Trichophyton verrucosum (JUNGERMAN and SCHWARTZMAN, 1972; AINSWORTH and AUSTWICK, 1973). The disease is one of the most commonly diagnosed skin conditions in Egyptian cattle.

Ringworm is normally considered to be a condition of housed cattle, possibly due to more frequent contact among animals (AINSWORTH and AUSTWICK, 1973). Spread of animal ningworm to human in contacts has repeatedly been studied (AINSWORTH & AUSTWICK, 1973; SARKAR et al., 1985). Clinically the disease is manifest as circumscribed plaques which are generally developed on the neck, head and perineum, but a general distribution over the entire body may occur (FORD, 1956; STOYLS and SUMNER-SMITH, 1969).

There are few reports concerning the effect of ringworm on the haematological values of cattle's blood, however, WRONSKA et al. (1984) found that such disease had no effect except an increase in the proportion of gamma globulin and lymphocytes.

The present study was intended to evaluate the relation between clinical, mycological findings and the haematological and blood biochemical findings of naturally infected young cattle.

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## MATERIAL and METHODS

**Clinical manifestations :**

Clinical evaluation was onducted on fifteen young cattle at El-Awamer governmental farm, Assiut Province where clinical ringworm was observed. The animals were 10 males and 5 females and their average age was 9-12 months. The clinical signs were recorded. The lesions varied in size and distribution. Lesions were found most frequently on head, neck, around eyes and ears.

**Mycological evaluation :**

Hair and crust samples were ftaken from the periphery of active lesions of the affected animals to determine the presence or absence of the causative agent by microscopic and cultural examination. Isolation of the causative agent was effected using Sabouraud's dextrose agar incorporated with chloramphenical and cycloheximide.

On the other hand, the blood parameters investigation of 24 cattle of the same age (9-12 months old) of them 15 with clinical ringworm and the remainder selected 9 proved to be clinically healthy was carried out in the following manner :-

a) Haematological examination :

Blood for haematological examination was collected from the Jugular vein in MacCarteny bottles containing the dipotassium salt of EDTA.

The total red blood corpsucles per $mm^3$ ($TRBCs/mm^3$), total white blood corpuscles per $mm^3$ ($TWBCs/mm^3$) and the haemoglobin (Hb) content were estimated using electonic blood cell counter (CX 310 Sweeden). The packed cell volume (PCV) was determined by microbhaematocrit centrifugation (COLES, 1980). The mean corpuscular volume ($MCV/u^3$), mean corpuscular haemoglobin (MCH/ug) and mean corpuscular haemoglobin concentration (MCHC %) were calculated mathematically. The erythrocyte sedimentation rate (ESR) was recorded usin Westergren tubes. The leucocytes were differentiated by 4-field meander method (COLES, 1980).

b) Biochemical examination :

Blood samples were collected from the Jugular vein of both infected and healthy animals in sterile centrifuge tubes. Non haemolysed sera were obtained after centrifugation at 3000 r.p.m. for 15 minutes for measuring the level of various biochemical constituents as follows :

The total serum protein (gm%), albumin (gm%), glucose (mg%), serum alkaline phosphatase (SAP u/100 ml), serum glutamic oxaloacetic transaminase (SGOT u/L), serum glutamic pyruvic transaminase (SGPT u/L) were determined according to the methods adopted by WEICHSELBAUM (1946), ORUPTF (1974), TINDER (1969), KING and KING (1954) and REITMAN and FRANKEL (1957) respectively by using test kits supplied by BioMeriex (Bain, France).

Serum globulin and albumin/globulin ratio were determined mathematically. The concentraion of sodium and potassium were estimated by flame photometer (Corning 400), while chloride levels were measured by chloride analyser (MODEL, 925).

Statistical analysis of the obtained data were done according to SNEDECOR and COSHRAN (1974).

## RESULTS

The clinical signs of ringworm infected animals were recorded. Characteristic ringworm lesions were observed around eyes, forehead, neck and shoulder and in a few cases lesions were also noted over the body and sides of the abdomen. Most of the lesions were circular and scaly with only few showing signs of encrustation.

Different dermatophytes were isolated from the affected animals where T. verrucosum (56.67%) was the commonest cause, followed by T. memtagrophytes (33.33%) and T. schonleni (20%).

The obtained haematological and biochemical results from all animals are given in tables 1 and 2 which were classified according to th causative agent.

## DISCUSSION

Animals under 12 months of age appear to be more senstitive to the infection than older animals (McPHERSON, 1959). In this respect all the 15 mycologically positive animals were 9-12 months old.

The characteristic circular, scaly hairless lesions in caused by the infection of the hairs, hair follicles, and epidermis with the fungus T. verrucosum, although there are records of infection with T. mentagrophytes ( FORD, 1956; STOYLS and SUMNER-SMITH, 1969; AINSWORTH and AUSTWICK, 1973; KELLY, 1984; SARKAR et al., 1985 ).

In the present work T. verrucosum was the commonly isolated dermatophyte from ringworm cases in Egyptian cattle and T. mentagrophytes was recovered from 5 cases. The three cases of T. schonleni reported in this work might have been contracted from infected human beings.

With regard to the effect of the causative agent of dermatophytosis on the blood parameters of infected cattle there is scarce information covering this point, therefore the results obtained in this work are important as there are some biochemical changes of the blood sera and general characters of the blood of these infected animals.

The statistical analysis of the obtained data is achieved in table (1). Concerning the haematological values of the blood of infected animals as compared with healthy ones showed the following observations. Regarding T. verrucosum, the summarized results given in Table (1) revelaed that there was a sinificant decreased in total erythrocytic count which may be due to the decreased level of blood serum iron and copper of infected animals (GEORG, 1954). On the other hand a highly significant increase in the mean corpuscular volume and the erythrocytic sedimentation rate. WRONSKA et al. (1986) reported that mild and severe T. verrucosum infection in cattle had no effect on haemoglobin content, haematocrit and total protein. These findings run parallel to our results.

T. mentagrophytes infection resulted in a significant increase in the mean corpuscular volume and a significant decrease in the mean corpuscular haemoglobin concentration. BUSH (1975) stated that increase in the MCV and MCH, usually combined with a normal or decreased MCHC, idicates the presence of macrocytes (macrocytic RBCs). Furthermore ahighly significant increase in the erythrocytic sedimentation rate was observed.

As for T. schonleni, no apparent changes were noticed in the haematological values except highly significant increase in the ESR as well as a significant increase in monocytes.

Monocytosis may occur as a transient feature, at the begining of recovery from acute infection (KELLY, 1984). BUSH (1975) pointed out that increase in the number of monocytes usually occurs in chronic diseases.

The highly increased erythrocyte sedimentation rate recorded in all dermatophytic infections is associated with changes in the plasma proteins, particularly an increase in the level of plasma fibrinogen, with an increase to the total RBCs count (BUSH, 1975).

No apparent changes were observed in the total WBCs count or differential leucocytic cout.

Concerning the biochemical constituents of the blood sera of infected animals as recorded in Table (2), there was a significant increase in the blood serum albumin in all cases of dermatophytes infections which was reflected on the A/G ratio. While, the significant decrease in glucose level in T. verrucosum and T. schonleni infections may be due to anorexia of the diseased animals (KIOKKE, 1961).

Blood serum glutamic trasaminases showed significant decrease, whereas a significant increase in sodium level was observed with different causative agents. However, the amount of sodium in the body is influenced by dietary intake and excretion mainly through urine, sweat gastrointestinal secretions and milk (KELLY, 1984).

On the other hand no significant differences could be noticed on the total blood serum proteins, globulin, alkaline phosphatase, potassium and chloride levels.

In spite of the existence of many active preparations for treating ringworm in cattle, the need still remains for a non toxic antimycotic drugs, which will eliminate the risk of human infection and which is easily applicable on a large scale to correct any remarkable alteration in the blood parameters of infected animals.

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Table (1): Blood picture of young cattle infected and non infected with ringworm.

| Animals | Dermatophyte | Frequency No. | Frequency % | Blood picture: RBCs | Hb | PCV | MCV | MCH | MCHC | ESR | WBCs | Lymphocytes | Neutrophiles | Band Neutrophiles | Monocytes | Eosinophiles | Basophiles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Infected | T.mentagrophytes & T.verrucosum | 7 | 46.67 | 9.3± 9.8* | 10.4± 2.3 | 33.4± 5.9 | 35.9± 6.6** | 11.2± 1.8 | 31.3± 4.3 | 4.9± 1.6** | 10.8± 2.9 | 72.3± 12.3 | 19.4± 9.4 | 3.9± 0.7 | 2.7± 1.7 | 1.4± 2.1 | 0.43± 0.54 |
| | T.mentagrophytes | 5 | 33.33 | 10.4± 1.6 | 10.04± 0.6 | 33.8± 2.7 | 32.9± 3.7* | 9.8± 1.2 | 29.7± 2.5* | 4.4± 2.2** | 11.5± 2.6 | 68.8± 5.6 | 23.6± 2.9 | 3.6± 2.6 | 2.4± 2.1 | 1.8± 1.6 | 0.4± 0.4 |
| | T.schonleni | 3 | 20.00 | 10.15± 0.06 | 10.6± 4.0 | 33± 3.0 | 32.5± 3.1 | 10.5± 2.1 | 30.9± 4.1 | 8.0± 4.0** | 9.8± 2.3 | 73.5± 1.5 | 18.0± 2.0 | 2.0± 0 | 4.5± 1.5* | 1.5± 0.5 | 0.5± 0.7 |
| | Total | 15 | 100.00 | | | | | | | | | | | | | | |
| Non infected | | 9 | 100 | 11.04± 1.4 | 10.3± 0.9 | 33.5± 1.0 | 28.01± 2.9 | 9.4± 2.1 | 32.8± 0.7 | 1.7± 2.9 | 10.6± 7.8 | 73.0± | 20.2± 7.5 | 3.2± 0.9 | 2.9± 0.9 | 9.8± 0.8 | 0.8± 0.3 |

* = Significant at P < 0.05 ** = Highly significant at P < 0.01

Table (2): Serum biochemical changes in young cattle infected and non infected with ringworm.

| Animals | Dermatophyte | Frequency No. | Frequency % | Biochemical/constituents: Total protein | Globulin | Albumin | A/G ratio | Alkaline phosphatase | Glucose | SGOT | SGPT | Sodium | Potassium | Chloride |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Infected | T.verrucosum | 7 | 46.67 | 6.6± 0.6 | 2.5± 0.5 | 4.1± 0.4** | 1.7± 0.4** | 8.1± 1.6 | 34.1± 8.1* | 90.2± 15.5 | 28.1± 0.03** | 139.8± 9.4** | 7.01± 0.6 | 95± 11.4 |
| | T.mentagrophytes | 5 | 33.33 | 5.9± 0.7 | 3.1± 1.4 | 4.04± 0.5* | 1.5± 0.7* | 7.5± 0.6 | 35.3± 9.8 | 71.8± 16.6 | 34.2± 4.3* | 138.9± 11.2* | 6.7± 0.6 | 106.2± 24.1 |
| | T.schonleni | 3 | 20.0 | 6.9± 0.2 | 2.5± 0.3 | 4.4± 0.1* | 1.8± 0.3** | 8.9± 2.4 | 29.5± 7.1* | 85.3± 1.5 | 32.8± 2.3* | 147.5± 6.4** | 7.3± 0.9 | 98.3± 13.5 |
| | Total | 15 | 100.00 | | | | | | | | | | | |
| Non infected | — | 9 | 100 | 6.8± 1.6 | 2.1± 1.6 | 3.03± 0.7 | 0.8± 0.4 | 8.2± 1.03 | 39.9± 6.3 | 106.5± 8.1 | 41.3± 5.6 | 127.6± 4.7 | 6.9± 0.4 | 113.4± 27.1 |

* = Significant at P < 0.05 ** = Highly significant at P < 0.01