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## Microbiology of Kerion

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### Abstract

*Thirty four cases of kerion and 10 healthy controls were examined in the present work. 19 cases were positive mycologically, 12 cases of which were culture positive for dermatophytes namely 9 cases *Microsporum canis*, 2 *Tricophyton mentagrophytes* and one case *Tricophyton tonsurans*. 7 out of the 19 cases were positive both microscopically and by culture.*

*Almost the same bacteria namely *Staph. aureus*, *Staph. albus*, *Strept. haemolyticus* and *Diphtheroids* were recovered from diseased and healthy controls.*

*However, the role of bacteria as secondary invaders may aggravate the reaction with subsequent brisk inflammatory response.*

### Introduction

From the ecological point of view, dermatophytes are most probably geophilic fungi, ie. soil inhabitants. However, during the course of time some of these dermatophytes have adapted themselves to animal

skin and others to human skin. Accordingly, the dermatophytes can be classified to geophilic (soil), zoophilic (animal) and anthropophilic (human) species.

The dermatophytosis of the scalp (tinea capitis) may be classified into scaly, black dot, favus and kerion. The latter is the inflammatory form of tinea capitis.

The present work was aimed to determine the dermatophyte and bacterial spectrum in cases of kerion attending Al-Hussein Dermatology Outpatient Clinic.

### **Material and Methods**

Thirty four patients with kerion and ten healthy controls attending the Dermatology Outpatient Clinic of Al-Hussein University Hospital were studied. They were 15 females and 19 males, 1-20 years old.

Hair stumps were pulled out from the lesion by a sterile forceps. Part of which was used for KOH preparation and the other part was inoculated onto Sabouraud dextrose agar culture with actidione and chloramphenicol and incubated at 30°C for up to 3 weeks. A sterile cotton swab was soaked into the pus of the lesion and cultured on blood agar plates which were then incubated at 37°C for 18-24 hours. The growing fungi or bacteria were identified on the basis of their macro and microscopic morphology.

### **Results**

#### ***I. Clinical Examination:***

Typical lesion of kerion in the form of boggy nodular swelling discharging pus was observed in all cases. 50% of the cases had the lesion on the occipital area, 14.7% on the temporal area, 14.7% on the frontal area and the remaining 20.6% of the cases had scattered locations. The duration of the disease varied from 1-12 weeks. In 30 patients there was only one lesion and in 4 cases more than one lesion were observed.

## 2. *Mycological Examination:*

From Table 1 it is clear that 19 cases were positive mycologically either by direct microscopy or culture alone (7 and 3 cases, respectively) or by both (9 cases). The 12 recovered cultures were identified as *Microsporum canis* (9 cases), *Tricophyton mentagrophytes* (2 cases) and *Tricophyton tonsurans* (1 case) (table 2).

**Table 1: Results of mycological examination of 34 cases of kerion**

Examination	+	-	+	-	Total	positive
Direct microscopic examination	+	-	+	-		
Cultural examination	+	+	-	-	No.	%
No. of cases	9	3	7	15	19	55.9

**Table 2: Dermatophytes isolated from cases of kerion**

<i>Microsporum canis</i>	9
<i>Tricophyton mentagrophytes</i>	2
<i>Tricophyton tonsurans</i>	1

## 3. *Bacteriological examination*

Table 3 demonstrates the results of bacterial examination of mycologically positive and negative cases as well as the 10 healthy control cases. It is evident that *Staphylococcus aureus* was the most common bacteria isolated from mycologically positive cases, followed by *Staph. albus* and *Strep. haemolyticus*. In mycologically negative cases of kerion *Staph. albus* and anaerobic gram negative bacilli were equally isolated each from 4 cases.

Diphtheroids were isolated in association with Staph. from 10 cases of kerion (29%) and in association with Staph. or Strept. from 7 cases (70%) of the control cases.

Table (3): Bacterial examination of kerion and control cases.

Bacteria isolated	No. of bacteriologically +ve cases		
	Mycologically		Control (10 cases)
	+ve (19 cases)	-ve (15 cases)	
Staph. aureus	3	-	-
Staph. aureus + Diphtheroids	6	-	4
Staph. aureus + Strep. haem.	2	2	-
Staph. albus	4	-	3
Staph. albus + Diphtheroids	-	4	-
Strept. haemolyticus	3	3	-
Strept. haem. + Diphtheroids	-	-	3
Anaerobic gram -ve bacilli	-	4	-
Bacteriologically -ve	1	2	-
<b>Total</b>	<b>19</b>	<b>15</b>	<b>10</b>

## Discussion

The dermatophytes existence on the skin, hairs or nails depend to a large degree on not evoking an inflammatory reaction since a dermatophyte usually is not capable of surviving an inflammatory reaction. Therefore, dermatophytes usually adapt themselves through a long period to survive on a particular host. Accordingly, those adapted to man are anthropophilic and those adapted to animals are zoophilic. Both cause usually minimal inflammatory reaction on their particular host. However, when the fungus changes its host, it usually causes a violent skin eruption. This is the case when zoophilic dermatophytes infect man or when anthropophilic dermatophytes infect animals. This

explains the frequent recovery of zoophilic dermatophytes from the deep inflammatory form of tinea capitis known as kerion. The most commonly recovered dermatophyte from kerion was reported to be *Tricophyton verrucosum* (Davidson *et al.*, 1934; Birt and Wilt, 1954, and Rippon, 1974). This dermatophyte could not be recovered from our cases although it is the most predominant cause of ringworm in cattle in Egypt. On the other hand, *Microsporum canis* was recovered from 9 out of 12 culturally positive cases of kerion in the present work. This finding is not surprising because its recovery from human cases in Egypt is increasing (Abdel-Fattah *et al.*, 1967; Selim *et al.*, 1987; and Refai, 1983 & 1988).

It is interesting to note the isolation of *Tricophyton tonsurans* which is anthropophilic species from one case of kerion in this study. This dermatophyte has been recovered from cases of kerion by Moore and Wooldridge (1950) and Krempf-Lamprech *et al.* (1982).

In this study, the bacteria isolated from cases of kerion could not substantiate its role in the aetiology of kerion. This is because almost the same bacteria were recovered from mycological positive and negative cases of kerion as well as from the scalp of clinically healthy controls. Such bacteria may however aggravate the reaction probably as secondary invaders capable of destroying the dermatophytes in some lesions. This may explain the mycologically negative 15 cases of kerion in our results. Therefore, bacterial elimination should be considered in the treatment of kerion.

### Summary and Conclusion

This work was conducted to study the microbiology of kerion and the role of bacteria in its pathogenesis.

Thirty four cases of kerion and ten healthy controls were included and investigated mycologically and bacteriologically in this study. Mycological investigation was done by direct microscopy and culture, while the bacteriological investigation was done by direct Gram smear and culture. The results of mycological examination showed that *M. canis* was the causative organism in most of the positive cases. The results of bacteriological examination in kerion cases showed many types of bacteria which were isolated from the control group. Thus, it can be concluded that these bacteria are normal inhabitants of the scalp which in the presence of favourable invaders or as copathogens.

It is our feeling that only antifungal therapy is quite effective in treating early inflammatory kerion, whereas late kerion with brisk inflammation, steroid therapy together with antibacterial chemotherapy might be needed to prevent further hypersensitivity and tissue damage.

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