Dermoscopy: an auxiliary tool in distinction between the main causative agents of tinea capitis

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Background
Tinea capitis (TC) is the fungal infection of scalp skin and hairs by dermatophyte fungi. In Egypt, Trichophyton violaceum and Microsporum canis were the most commonly detected dermatophytes in TC. Etiological diagnosis is confirmed by fungal culture. However, lack of availability and delayed results of this confirmatory procedure may postpone the treatment increasing the chance of contagion. Dermoscopic examination is a fast and inexpensive technique that is recommended as a complementary tool to diagnose TC. The aim of our study is to spot dermoscopic features that may help dermatologists to differentiate between TC caused by T. violaceum and TC caused by M. canis.

Patients and methods
Our study describes 87 child patients clinically diagnosed with TC, comprising 61 patients with TC by M. canis and 26 patients by T. violaceum, who were mycologically confirmed by direct KOH test and fungal growth on Sabouraud's agar media. Dermoscopic examination was performed by DermLite II PRO HR.

Results
The observed dermoscopic features among 61 patients infected with M. canis were comma hairs in 48 (78.7%) cases, broken hairs in 52 (85.2%) cases, diffuse scaling in 48 (78.7%) cases, corkscrew hairs in 38 (62.3%) cases, and proximal sheath in 33 (54.1%) cases. Dermoscopic features among 26 patients infected with T. violaceum were comma hairs in 24 (92.3%) cases, broken hairs in 18 (69.2%) cases, diffuse scaling in eight (30.8%) cases, corkscrew hairs in 19 (73.1%) cases, and proximal sheath in six (23.1%) cases.

Conclusion
Dermoscopy can be used as an auxiliary tool in predicting the possible causative agent in suspected TC cases.

Keywords:
dermoscopy, Microsporum canis, tinea capitis, Trichophyton violaceum

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Introduction

Tinea capitis (TC) is a superficial mycosis with a predilection for invading both follicles and shafts of scalp hair [1]. The clinical presentation of TC varies extremely, although in the majority of cases, it does not enable the right identification of the dermatophyte [2]. In Egypt, Trichophyton violaceum and Microsporum canis were the most commonly detected dermatophytes in TC [3]. Regarding diagnosis of TC, mycological examination is recommended to confirm the diagnosis [4]. However, fungal culture may consume up to 6 weeks, procrastinating treatment initiation. This postponement may be associated with an epidemiological influence because of the correlating risk of contagion [5]. The significance of identifying the causative pathogen is additionally linked to treatment options, as M. canis infection may require higher dosages of antifungals and/or more prolonged treatment [6]. Dermoscopic examination is recommended as a quick and inexpensive technique for TC diagnosis. However, distinct dermoscopic features need further establishment [5].

Patients and methods

This observational study involved 87 child patients clinically diagnosed to have TC from the attendants of Dermatology Outpatient Clinic, Assiut University Hospital, during a period of 18 months from the beginning of December 2016 to the end of May 2018.

All patients were subjected to the following after providing an informed consent:
(1) Full history taking.
(2) General and dermatological examination.

(3) Photography of the lesions for clinical assessment, using digital canon camera (DSCW830, 20.1 megapixel).
(4) Mycological examination:
(a)Direct KOH:

Hair roots and skin scrapings are mounted in 10% KOH solution. The slide is gently heated and microscopically examined for hyphae and spores.
(5) Fungal culture:
(a) Each scraping was cultured on Sabouraud's dextrose agar. All cultures were done in the Mycology Unit of Department of Microbiology, Faculty of Science, Assiut University.
(6) Dermoscopic examination of the most recently developed lesions by DermLite II PRO HR, which is a pocket epiluminescence microscopy using 28 mm lens with ×10 magnification. The images were photographed and analyzed later.

Exclusion criteria

Patients who received topical or systemic treatment in the last 1 or 3 months, respectively were excluded from the study.

Statistical analysis

The statistical analysis was performed with the statistical package for the social science (SPSS), version 22.0 software (released 2013; IBM Corp.; Armonk, New York, USA).

Data were presented as number, percentage, mean, median, and SD.

Ethics committee approval

This study was approved by the Institutional Ethics and Research Committee of the Faculty of Medicine, Assiut University, Assiut, Egypt (IRB no: 17100003).

Results

Demographic and clinical data of the studied patients were as follows: the age of the patients ranged from 2 to 13 years. The duration of illness ranged from 1 to 10 weeks, with a mean ± SD of 4.5 ± 2.64. The number of male patients was 59 (67.8%), whereas 28 (32.2%) were females. A positive family history of TC was reported in 51 (58.6%) patients. Past history of TC was found in 21 (24.1%) patients. Approximately 52 (59.8%) patients had history of animal contact. Regarding the residence, 65 (74.7%) of patients were found to live in rural areas. Scaly ring worm was the predominant type of TC (81.6%) among the studied patients (Table 1).

The observed dermoscopic features among 61 patients infected with M. canis were comma hairs in 48 (78.7%) cases, broken hairs in 52 (85.2%) cases, diffuse scaling in 48 (78.7%) cases, corkscrew hairs in 38 (62.3%) cases, proximal sheath in 33 (54.1%) cases, barcode hairs in 28 (45.9%) cases, hyperemic background in 25 (40.9%) cases, zigzag hairs in 15 (24.6%) cases, translucent hair in six (9.8%) cases, white comma in seven (11.5%) cases, black dots in five (8.2%) cases, and pustule in four (6.5%) cases (Table 2 and Figs. 1–3).

Dermoscopic features among 26 patients infected with T. violaceum were comma hairs in 24 (92.3%) cases, broken hairs in 18 (69.2%) cases, diffuse scaling in eight (30.8%) cases, corkscrew hairs in 19 (73.1%) cases, proximal sheath in six (23.1%) cases, barcode hairs in two (7.7%) cases, hyperemic background in three (11.5%) cases, zigzag hairs in nine (34.6%) cases, translucent hair in four (15.4%) cases, white comma in two (7.7%) cases, black dots in three (11.5%) cases, and pustule in two (7.7%) cases (Table 1 and Figs. 4–6).

Discussion

A total of 87 children clinically diagnosed with TC were included in the present study. Their age ranged from two to 13 years. Similar results for age were reported by other authors, who found the majority of cases of TC in children below the age of 10 years [7,8].

In our study, 59 patients were males, whereas 28 were females. The preponderance of boys infected with TC agrees with many studies [5,7].

Table 1 The demographic and clinical data of the studied patients

Baseline characteristics	The study group (*n*=87)
Age range (years)	2-13
Duration of illness (range) (weeks)	1-10
Sex [*n* (%)]	
Male	59 (67.8)
Female	28 (32.2)
Family history [*n* (%)]	
Yes	51 (58.6)
No	36 (41.4)
Past history [*n* (%)]	
Yes	21 (24.1)
No	66 (75.9)
History of animal contact [*n* (%)]	
Yes	52 (59.8)
No	35 (40.2)
Residence [*n* (%)]	
Rural	65 (74.7)
Urban	22 (25.3)
Clinical type [*n* (%)]	
Scaly	71 (81.6)
Black dot	10 (11.5)
Kerion	6 (6.9)

Table 2 Dermoscopic features of different organisms in tinea capitis

Dermoscopic characteristics	*Microsporum canis* (*n*=61) [*n* (%)]	*Trichophyton violaceum* (*n*=26) [*n* (%)]
Comma hair	48 (78.7)	24 (92.3)
Broken hair	52 (85.2)	18 (69.2)
Scales	48 (78.7)	8 (30.8)
Corkscrew hair	38 (62.3)	19 (73.1)
Proximal sheath	33 (54.1)	6 (23.1)
Barcode	28 (45.9)	2 (7.7)
Hyperemic background	25 (40.9)	3 (11.5)
Zigzag	15 (24.6)	9 (34.6)
Translucent hair	6 (9.8)	4 (15.4)
White comma	7 (11.5)	2 (7.7)
Black dot	5 (8.2)	3 (11.5)
Pustule	4 (6.5)	2 (7.7)

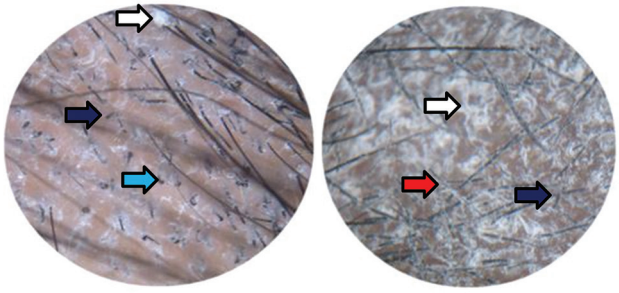
Figure 1

Clinical view of *Microsporum canis*.

Figure 2

Culture of *Microsporum canis*.

Figure 3



Dermoscopic views of *Microsporum canis*.

Figure 4

Clinical view of *Trichophyton violaceum*.

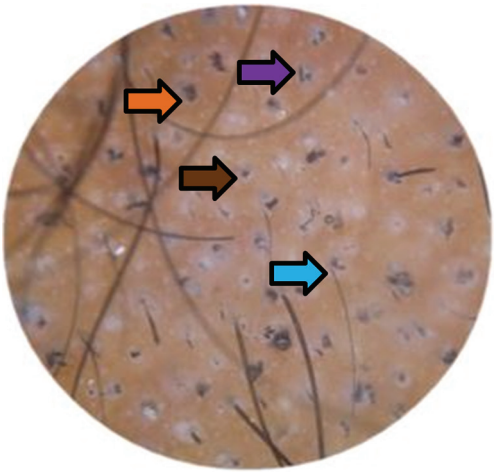
In the present study, children from rural areas (74.7%) were more commonly affected than those from urban areas (25.3%). This is in agreement with Hasan and Al-Shibli [9], where 57.94% of their patients were from rural area. This is in contrast to Hassan Younes *et al.*[7] and Ghannoum *et al.*[10] who found that TC was more prevalent in urban areas compared with rural areas (55 and 75.2% vs. 45 and 24.8%, respectively).

Scaly ring worm was the most common type of TC in our study, representing 81.6% of cases, followed by black dot, which was found in 11.5% of cases, and kerion in 6.9% of cases, a finding that coincides with Hassan Younes *et al.* [7], who reported scaly ring worm

Figure 5

Culture of *Trichophyton violaceum*.

Figure 6



Dermoscopic view of *Trichophyton violaceum*.

in 82.25% of patients in a study conducted in Al-Azhar University Hospital, Assiut.

Schechtman *et al.*[2] were the first to outline distinct characteristics between TC caused by M. canis and TC caused by Trichophyton tonsurans. They described six patients with TC, four of them were infected by M. canis and the other two by T. tonsurans. Comma hairs were observed only in one of the four patients infected by M. canis, whereas the two patients infected by T. tonsurans showed multiple comma hairs.

Dias *et al.*[6] reported the importance of the etiological distinction in TC treatment and also reported that in case of M. canis infection, higher dosages of antifungals and/or more prolonged treatment may be essential.

Our study demonstrated the differences between TC caused by M. canis and T. violaceum regarding dermoscopic features.

On studying the dermoscopic features in patients infected with M. canis, broken hairs were the most common feature, representing 85.2%, followed by comma hairs, scales, and corkscrew, representing 78.7, 78.7, and 62.3%, respectively.

However, in patients infected with T. violaceum, we found that comma hairs and corkscrew hairs were the most prominent features, representing 92.3 and 73.1%, respectively, followed by broken hairs, representing 69.2%.

In contrast to our findings, Mapelli *et al.*[11] reported absence of corkscrew hairs in dermoscopic findings in a study carried out on three black children infected with T. violaceum.

Conclusion

Dermoscopy can be used as an auxiliary tool in the differential diagnosis of the causative agent in suspected TC cases.

Dermoscopy can be placed parallel to clinical examination to confirm diagnosis and initiate an early appropriate treatment of TC.

Conflicts of interest

There are no conflicts of interest.

References

1 Seebacher C, Bouchara JP, Mignon B. Updates on the epidemiology of dermatophyte infections. Mycopathologia 2008; 166:335–352.

2 Schechtman RC, Silva ND, Quaresma MV, Bernardes Filho F, Buçard AM, Sodré CT. Dermatoscopic findings as a complementary tool in the differential diagnosis of the etiological agent of tinea capitis. An Bras Dermatol 2015; 90:13–15.

3 Zaki SM, Ibrahim N, Aoyama K, Shetaia YM, Abdel-Ghany K, Mikami Y. Dermatophyte infections in Cairo, Egypt. Mycopathologia 2009; 167:133.

4. Fuller LC, Barton RC, Mohd Mustapa MF, Proudfoot LE, Punjabi SP, Higgins EM, *et al.* British Association of Dermatologists' guidelines for the management of tinea capitis 2014. Br J Dermatol 2014; 171:454–463.

5 Brasileiro A, Campos S, Cabete J, Galhardas C, Lencastre A, Serrão V. Trichoscopy as an additional tool for the differential diagnosis of tinea capitis: a prospective clinical study. Br J Dermatol 2016; 175:208–209.

6 Dias MF, Quaresma-Santos MV, Bernardes-Filho F, Amorim AG, Schechtman RC, Azulay DR. Update on therapy for superficial mycoses: review article part I. An Bras Dermatol 2013; 88:764–774.

7 Hassan Younes AE, Mohamed EE, Tawfik KM, Ezzat AA. Tinea capitis in Assiut (Egypt). AAMJ 2012; 10:1.

8 Abd Elmegeed AS, Ouf SA, Moussa TA, Eltahlawi SM. Dermatophytes and other associated fungi in patients attending to some hospitals in Egypt. Braz J Microbiol 2015; 46:799–805.

9 Hasan KM, Al-Shibli MK. The effect of risk factors and etiology on the distribution of clinical cases with dermatomycoses. Int J Innovat Appl Stud 2016; 14:581.

10 Ghannoum MA, Wraith LA, Cai B, Nyirady J, Isham N. Susceptibility of dermatophyte isolates obtained from a large worldwide terbinafine tinea capitis clinical trial. Br J Dermatol 2008; 159:711–713.

11 Mapelli ET, Gualandri L, Cerri A, Menni S. Comma hairs in tinea capitis: a useful dermatoscopic sign for diagnosis of tinea capitis. Pediatr Dermatol 2012; 29:223–224.