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ORIGINAL RESEARCH

Dermoscopy improves diagnosis of tinea nigra: A study of 50 cases

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ABSTRACT

Background/Objectives: Tinea nigra is a relatively uncommon dematiaceous fungal infection of the palms and soles, which clinically may mimic a melanocytic lesion. We sought to ascertain how frequently misdiagnosis of this infection occurred and whether the use of dermoscopy helped in its diagnosis.

Methods: Fifty consecutive cases of tinea nigra diagnosed at a dermatopathology laboratory were examined with regard to the clinical diagnosis, use of dermoscopy and the mode of management.

Results: Of the 50 cases, 21 (42.0%) were treated by shave or surgical excision. The clinical diagnosis of tinea nigra was made in five cases (10.0%) and suggested along with other diagnoses in a further two cases (4.0%). The dermatologists ($n = 9$) gave the correct diagnosis in four patients (44.4%), the general practitioners ($n = 38$) gave the correct diagnosis in one patient (2.6%) and the three surgeons involved did not give the correct diagnosis. When dermoscopy was used, in seven of 13 (53.8%) cases tinea nigra was suggested as a probable diagnosis but when dermoscopy was not used ($n = 37$) tinea nigra was not clinically diagnosed ($P < 0.001$).

Conclusions: The diagnosis of tinea nigra is significantly improved by dermoscopy, the disease should be considered as a cause of palmar or plantar pigmentation.

Key words: dematiaceous fungal infection, dermoscopy, palmar and plantar pigmentation, tinea nigra.

INTRODUCTION

Tinea nigra is an asymptomatic fungal infection of the palms and soles caused by the dematiaceous fungus *Hortaea werneckii* (formerly ascribed to the genera *Exophiala, Phaeoannellomyces,* and *Cladosporium*).[1–5] Rarely, other fungal genera have been implicated.[2] Tinea nigra was first described in 1891 by Alexandre Cerqueira in Salvador (Bahia), Brazil, when he named it keratomycosis nigra palmaris.[4]

It usually presents with asymptomatic, pigmented, macular patches on the palms or soles. Rarely, both sites are involved simultaneously.[2] The involvement of bilateral sites concurrently is also rare.[5] It is seen mainly in tropical and subtropical regions, but isolated cases have been reported worldwide in travellers returning from endemic areas.[6] The incubation period based on experimental infection and known exposures to the fungus is usually several weeks, but it has been reported after experimental inoculation of the fungus 20 years earlier.[7]

Tinea nigra can be mistaken clinically for an acral naevus or melanoma.[8–15] Current teaching that small punch biopsies often lead to an 'undercall' of melanocytic lesions and

Abbreviations:

CI	confidence interval
KOH	potassium hydroxide
SD	standard deviation

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should be avoided may potentially lead to the over treatment of mimics, such as tinea nigra.[8]

Dermoscopy is a useful adjunctive technique that assists in the differentiation of tinea nigra from a melanocytic lesion in which the field of entomodermoscopy can be a valuable application.[9,15,14] It is more readily available in primary care clinics than potassium hydroxide (KOH) and conventional microscopy, which is also used in the identification of tinea nigra. The dermoscopic appearances are characteristic pigmented spicules, as first described by Gupta *et al.* in 1997.[14] These changes represent superficial fine, wispy, light brown strands which form a reticular-like patch usually with a uniform brown colour.[9,15] These reticular-like line patterns do not follow the anatomy of the skin (Fig. 1), whereas acral melanomas and acral melanocytic naevi correspond to a parallel ridge pattern with pigmentation on the ridges and a parallel furrow pattern with pigmentation on the furrows, respectively.[9,15,14]

In the study period, 50 cases of tinea nigra were diagnosed in a dermatopathology laboratory. As this is currently the largest series of such cases in the literature, we decided to examine other features of these cases, including mode of investigation, site of the infection, patient demographics, the specialty of the clinician making the diagnosis and whether dermoscopy was used and if it improved diagnosis.

MATERIALS AND METHODS

A computer-generated search of the records of Sullivan and Nicolaides Pathology (Brisbane, Australia) for the period May 2003 to November 2010 (inclusive) found 50 cases with a histopathological diagnosis of tinea nigra. Cases not reported by the senior author (DW) were retrieved from the files and the diagnosis confirmed.

The clinical diagnoses, where given, and the mode of investigation and/or treatment (punch biopsy, shave or complete surgical excision) were recorded, as was the site of the lesion. The sex and age of the patients were also noted. The specialty of the medical practitioner performing the procedure was recorded, as was the use or not of dermoscopy. Dermoscopy details were obtained by a combination of telephone calls, e-mail correspondence and information from pathology request forms of medical practitioners.

Age of patients was described using the mean value and standard deviation (SD). Overall sensitivity of the clinical diagnosis for tinea nigra was calculated with 95% confidence interval (95% CI). The association between use of dermoscopy and clinical diagnosis of tinea nigra was assessed using Fisher's exact test. The analysis was not adjusted for cluster sampling as 49 different doctors treated the 50 cases of tinea nigra.

RESULTS

Of the 50 patients, 33 were female (66.0%) and 17 were male (34.0%). The mean age of the patients was 40.1 years (range, 7–83 years, SD = 19). The lesion was on the feet (most commonly the sole with some on the instep region) in 27 patients (54.0%) and on the palms in 21 patients (42.0%). In one (2.0%), the ventral wrist was involved and in another (2.0%) the upper arm.

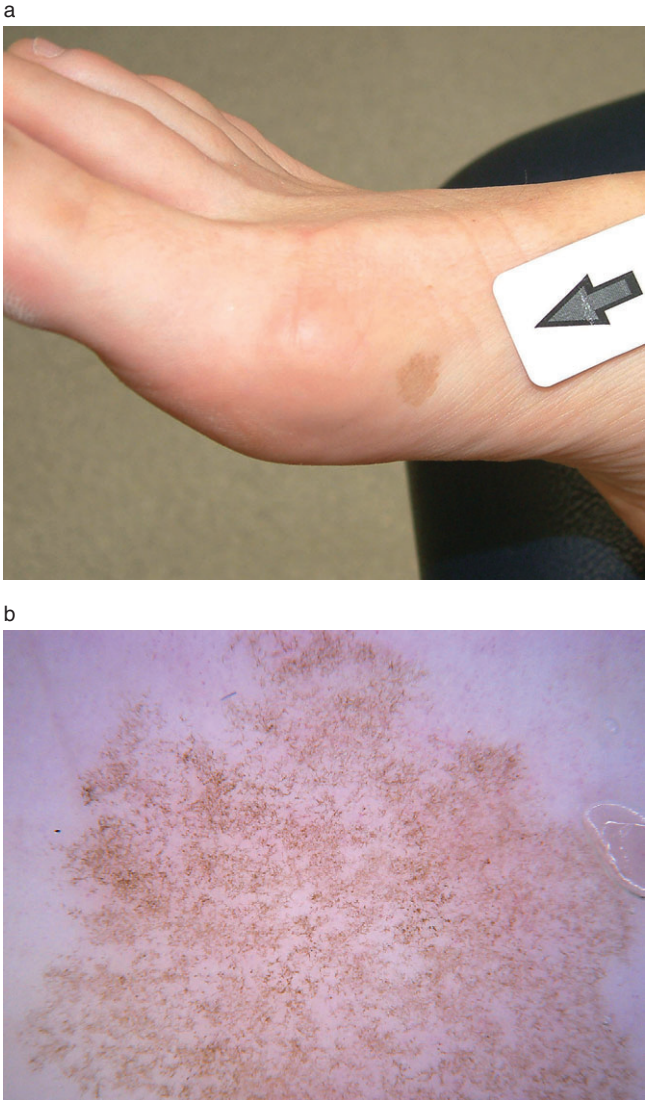

Figure 1 (a) Clinical image of tinea nigra (one of our cases) located on the right instep/sole of the foot in a 42-year-old woman. (b) Dermoscopically, diagnostic features of superficial fine, wispy, light brown strands which form a reticular-like patch usually with a uniform brown colour are evident, these do not follow the furrows and ridges normally in this skin. (Original magnification ×10).

Most cases were submitted with a clinical diagnosis of 'pigmented lesion' ($n = 22$, 44.0%) and in a small group a more specific diagnosis of 'naevus', 'lentigo' or 'exclude melanoma' ($n = 10$, 20.0%) was suggested. A diagnosis of 'tinea nigra' was made in five cases (10.0%) and in a further two (4.0%) it was mentioned in the differential diagnosis. Thus, the overall sensitivity of the clinical diagnosis was 14.0% (95% CI = 5.8, 26.7). 'Fungus' and 'mycosis' were mentioned in the differential diagnosis of one case each

(4.0% total). No clinical diagnosis was given in 12 cases (24.0%). One clinician (2%) did not mention any of the previously listed diagnoses.

Of the 50 cases, 28 (56.0%) were submitted as punch biopsies, one (2.0%) of which was 6 mm in diameter, which completely removed the lesion. Another one (2.0%) of the cases included two 3 mm punch biopsies for histopathological interpretation. Of the remaining 22 cases (44.0%), 14 (28.0%) were investigated or treated by shave biopsy, seven (14.0%) were treated by formal surgical excision, and one was treated by curettage.

In 38 patients (76.0%), the referring practitioner was a general practitioner, in nine (18.0%) a dermatologist, and for the remaining three patients (6.0%) it was a surgeon. Out of all dermatologists, four (44.4%) gave a correct diagnosis of tinea nigra and one other (12.5%) suggested 'fungus' in the differential diagnosis. All dermatologists used dermoscopy ($n = 9$). The one general practitioner (2.56%) who made the correct clinical diagnosis of tinea nigra used dermoscopy. Another general practitioner (2.6%) had tinea nigra in the differential diagnosis and dermoscopy was also used. The differential diagnosis of mycosis was made by another general practitioner who did not use dermoscopy. The three surgeons did not use dermoscopy and did not make the diagnosis of tinea nigra, with one (2.0%) giving the history of a pigmented lesion. Of the 12 clinicians (24.0%) that gave no diagnosis, 10 (20%) were general practitioners and two (4.0%) were surgeons.

When dermoscopy was used, in seven of 13 (53.8%) cases tinea nigra was suggested as a probable diagnosis but when dermoscopy was not used (74%, $n = 37$) tinea nigra was not clinically diagnosed ($P < 0.001$), and only in one of 37 (2.7%) cases a mycosis was suggested.

DISCUSSION

Tinea nigra is rare, accounting for 0.085% of all mycoses recorded in a study from one hospital[1] and found in 0.1% of all patients seen in another centre over a period of 30 years.[2] These previous two large studies of tinea nigra involved 22 cases[1] and 12 cases,[2] respectively. Our 50 cases represent the largest series.

Tinea nigra can be diagnosed clinically with the naked eye, with histopathology, with dermoscopy, with the use of KOH microscopic examination, microbiological culture, scanning electron microscopic examination and polymerase chain reaction.[15,16] Clinical assessment and microscopic examination of a representative skin scraping with KOH have traditionally been used for the diagnosis of tinea nigra, however, availability and use of a microscope in modern day practice is diminishing. Clinically, tinea nigra and an acral naevus or acral melanoma can be confused.[8] Other differential diagnoses include talon noir (globules on ridges dermoscopically), post-inflammatory pigmentation, fixed drug eruptions or simple chemical stains,[15] such as silver nitrate impregnation. Dermoscopy is a non-invasive tool that can assist in formalizing a diagnosis of tinea nigra.[9–14] We believe that a clinician, supplementing a normal clinical assessment with the simple cost-effective and non-invasive procedure of dermoscopy, when interpreted accurately, can give a precise diagnosis circumventing an invasive procedure such as a shave or formal excision, thus, allowing treatment and cure to commence swiftly.

The treatment of tinea nigra includes the use of topical keratinolytic agents such as urea, salicylic acid and Whitfield's ointment (salicylic acid 3%, benzoic acid 2–6% in an appropriate base such as white soft paraffin), topical antifungal agents and topical tretinoin.[15,17] It has been stated that repeated vigorous scrubbing or topical application of keratinolytic agents can reduce pigmentation.[2,17] However, it has been reported that tinea nigra is subclinical and therefore only dead keratin cells on the skin can be colonized.[18,19] Anecdotally, one of the study patients was a surgeon who would surgically scrub many times a day with a topical antiseptic and yet his palmar tinea nigra remained; this questions the opinion that the organism colonizes only dead keratin cells. The hydrophobic character of the yeast cells is thought to allow adhesion to acral surfaces and no keratinolysis can be observed.[18,19]

Our study shows a female to male predominance of 2:1, which differs from two other studies[1,2] and another source.[20] The mean age of patients was 40.1 years, but other studies have had a mean age of 20.7,[1] and 14.3 years.[2] Tinea nigra occurred on the feet in 54.0% ($n = 27$) of patients and on the hands in 46.0% ($n = 21$). This varies from two other studies in which the majority of cases involved the hands (86.4% ($n = 22$)[1] and 75.0% ($n = 12$)[2]).

Sixty-four per cent ($n = 32$) of cases were thought not to be tinea nigra but rather a pigmented lesion, possibly of naevomelanocytic type, resulting sometimes in inappropriate management. The overall sensitivity of the clinical diagnosis of tinea nigra was 14.0% (95%-CI = 5.8, 26.7). When dermoscopy was used, in seven of 13 (53.8%) cases tinea nigra was suggested as a probable diagnosis but when dermoscopy was not used (74%, $n = 37$) tinea nigra was not clinically diagnosed ($P < 0.001$), and only in one of 37 (2.7%) cases a mycosis was suggested. This shows that the diagnosis of tinea nigra was significantly improved by dermoscopy ($P < 0.001$).

Four dermatologists (44.4%) gave tinea nigra as the only diagnosis. This result emphasizes the importance of the correct interpretation of dermoscopic findings for tinea nigra that have been previously listed and are illustrated in Figure 1. We feel this education should be implemented among practitioners treating pigmented skin conditions.

Two of the general practitioners (5.13%) used dermoscopy. One of these made the correct diagnosis and the other included tinea nigra in the differential diagnosis. This suggests that dermoscopy is helpful in diagnosing tinea nigra as the majority of general practitioners (94.87%) did not make the correct diagnosis and also did not use a dermatoscope.

There are limitations to this study. Firstly, this a retrospective study. Secondly, the sample size is small due to the rarity of tinea nigra. Despite these limitations, this study has a large number of histologically verified tinea nigra cases compared to previous published studies. It demonstrates that tinea nigra should be considered in patients with

palmar or plantar pigmentation. It also shows that the diagnosis of tinea nigra is significantly improved by dermoscopy ($P < 0.001$).

In summary, the use of dermoscopy in palmar or plantar pigmentation improves the diagnosis of tinea nigra and this in turn has the potential to prevent unnecessary invasive surgery and facilitate timely treatment and cure.

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