

Cutaneous disseminated sporotrichosis in an immunocompetent farmer

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ABSTRACT

Sporotrichosis is an implantation mycosis due to the genus *Sporothrix*. Cutaneous disseminated sporotrichosis is an unusual clinical form that often affects immunocompromised patients. We report a case of cutaneous disseminated sporotrichosis in an immunocompetent farmer from a rural region of Madagascar, treated successfully with Itraconazole 200mg twice a day. This case highlights the role of multiple inoculation affecting different parts of the body as a risk factor of cutaneous disseminated sporotrichosis in an immunocompetent individually.

1. Introduction

Sporotrichosis is a sub-acute to chronic subcutaneous mycosis caused by the thermophilic fungus of the genus *Sporothrix* which is a saprophyte of soil and plant [1]. Sporotrichosis is a saprozoontic fungal infection characterized by two routes of transmission. It can be due to skin inoculation by contaminated soil, plants and organic matter, or to inhalation of conidia in its saprozoontic form. The principal agents responsible of the saprozoontic form are *Sporothrix schenckii*, *Sporothrix globosa*, *Sporothrix luriei*. The disease is known as “rose gardener’s disease”. On the other hand, another type of transmission which is the zoonotic transmission route due to *Sporothrix brasiliensis* was described since 1999 in Brazil. This form is due to traumatic skin injury from scratches, bites or contact with the secretion of infected cats [2]. Sporotrichosis is a cosmopolitan disease with a worldwide distribution. Per year, around 40000 new cases of sporotrichosis were reported in the world [3,4]. However, it remains frequent in subtropical and tropical areas like Madagascar where the infection is concentrated in the highlands. Regarding the clinical aspects, sporotrichosis can be classified into cutaneous and extracutaneous forms [5]. The main clinical manifestation is cutaneous, the most common forms are lymphocutaneous (95 %) and fixed cutaneous (30 %). Cutaneous disseminated sporotrichosis is rare (1,75-8 %) and mostly affects immunocompromised patient [6]. Herein, we are reporting a case of cutaneous disseminated sporotrichosis

in an immunocompetent Malagasy.

2. Case presentation

A 35-years-old Malagasy man who worked as a farmer, from the rural region of Moramanga came to a dermatological consultation in 2017 for multiple nodules and ulcerated lesions (day 0). He had no medical history and he denied alcohol intake. The initial lesion appeared a year before his consultation and was described as a nodulopustular lesion on the palm where a traumatic skin injury occurred. His daily activities consist of thatching a roof with dried wild grass harvested from the neighborhood. He reported traumatic skin injuries on several parts of his body when he was working on the thatched roof as he did not wear any protective gear. Clinical examination on day 0 found multiple aspect of cutaneous lesions. Nodules were found on the palms, the eyelid, the face, and the upper limbs with a bilateral lymphatic distribution in this area (Fig. 1a). He also presented ulcerated plaque on the legs (5 × 7 cm diameter) and the arms (Fig. 1b). No mucosal lesions were highlighted. The pulmonary examination was normal. The patient did not present a fever and was in a good general condition. HIV-testing came back negative. Other investigations for underlying immunosuppression and internal organ involvement including chest X-ray were normal. Macroscopic examination of skin tissue culture revealed dark colonies on Sabouraud dextrose agar (Fig. 2a). Filamentous states with thin hyphae

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and denticle microconidia like “daisy flowers” was found on microscopic examination (Fig. 2b). Both macroscopic and microscopic examination revealed morphologic features which are consistent with *Sporothrix* spp. Polymerase chain reaction (PCR) and sequencing allowed the species recognition which was *S. schenckii*. Histopathology of skin biopsy showed granulomatous inflammation in the dermis and budding yeast was present on periodic acid-Schiff (PAS) stain (Fig. 3). Therefore, the diagnosis of disseminated cutaneous sporotrichosis in an immunocompetent was established and he was treated with itraconazole 200mg twice a day. Complete remission was obtained after seven months of treatment and no relapse occurred after 5 years of follow up (Fig. 4).

3. Discussion

Sporotrichosis is the most common implantation mycosis that are now recognized as fungal neglected tropical diseases (NTDs) [3,4,7]. The worldwide epidemiology of sporotrichosis has changed since 1990s with the increase cases of zoonosis in Brazil [7]. In Madagascar, according to a study published in 2019, the incidence of sporotrichosis was 42,5 % and the average of annual prevalence was estimated to 0.21 cases/100000 inhabitants and consist of occupational disease as it affects mostly the farmer (52,4 %). A high prevalence of sporotrichosis was reported in the highlands of Madagascar (98 %). Only *S. schenckii* was identified and no case of zoonosis was reported [8].

Cutaneous disseminated sporotrichosis also named hematogenous sporotrichosis is an uncommon clinical subtype of cutaneous sporotrichosis [9–11]. This clinical form is even rarer in immunocompetent patient [2]. Among the 63 sporotrichosis cases collected in Madagascar from 2013 to 2017, cutaneous disseminated sporotrichosis only occurred in the current case (1,53 % of incidence). This clinical form is characterized by the coexistence of three or more skin lesions which can associate fixed cutaneous or lymphocutaneous lesions, located in at least two non-contiguous sites, without extracutaneous involvement [12–16]. In our patient, three different anatomical sites were affected, the face, the upper limbs (the lesions were symmetric) and the lower limbs.

Sporotrichosis is a polymorphic disease that can affect cutaneous, subcutaneous and extracutaneous structure (pulmonary, osteoarticular, meningeal form). These clinical forms depend partly on the immune status of the host [17]. Risk factors of cutaneous disseminated sporotrichosis include immunodepression by HIV, chronic alcoholism, diabetes mellitus, steroid treatment, hematologic cancer, malnutrition, transplantation, and pregnancy [9,12]. In this group, causative agent has a role as an opportunist [9]. On the other hand, some characteristics of the fungus may play a role in the clinical aspect of sporotrichosis such as the virulence of the strains, the quantity and the depth of the traumatic inoculum [9,12,13]. Moreover, dissemination in an immunocompetent patient may occur after a multi-site repeated traumatic skin injuries related to occupational injury like in our patient. Multiple inoculation of the skin occurring in different part of the body was the risk factor of the atypical form of sporotrichosis in the current case. The site of primary lesions were hands, eyes, face, forearms, and legs. The hypothesis was reinforced by the chronicity and the distribution of the



Fig. 1b. Ulcerated plaque on the leg.

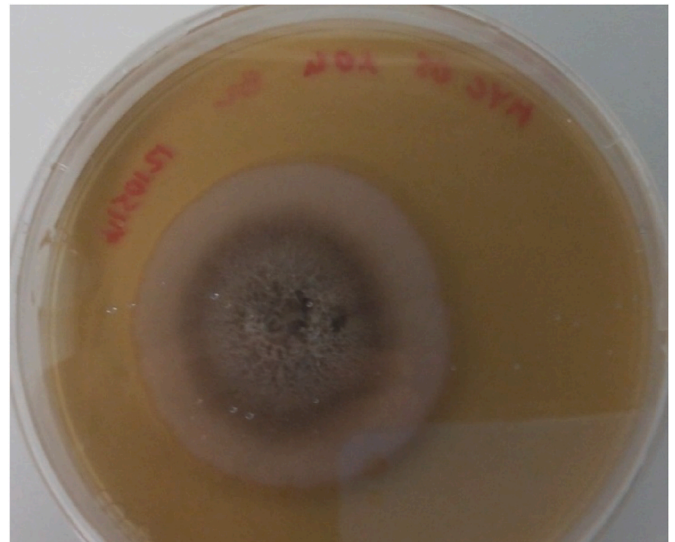


Fig. 2a. Dark colonies on Sabouraud dextrose agar were found on macroscopic examination.

lesions which were bilateral and located in exposed body areas. Rueda et al. reported that in the absence of immunodepression, these clinical characteristics are suggestive of a multi-site inoculation [14]. Queiroz-Telles et al. reported a similar case of cutaneous disseminated sporotrichosis induced by a minor occupational injury [2].



Fig. 1a. Nodules on the face, the eyelid, the palms, the upper limbs (with a bilateral lymphatic distribution).

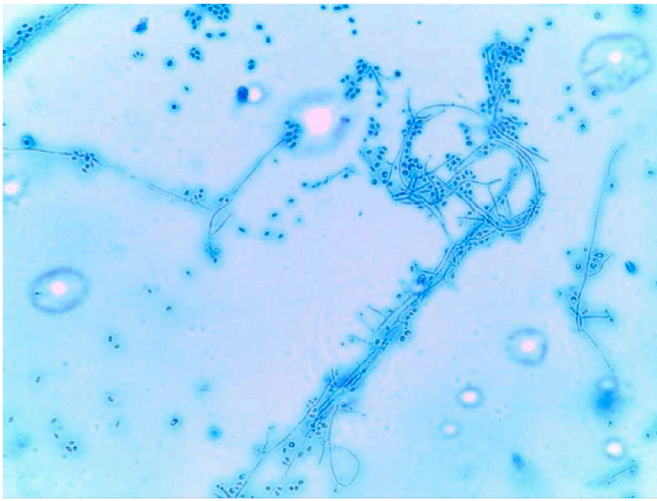


Fig. 2b. Filamentous states with thin hyphae and denticle microconidia like “daisy flowers”.

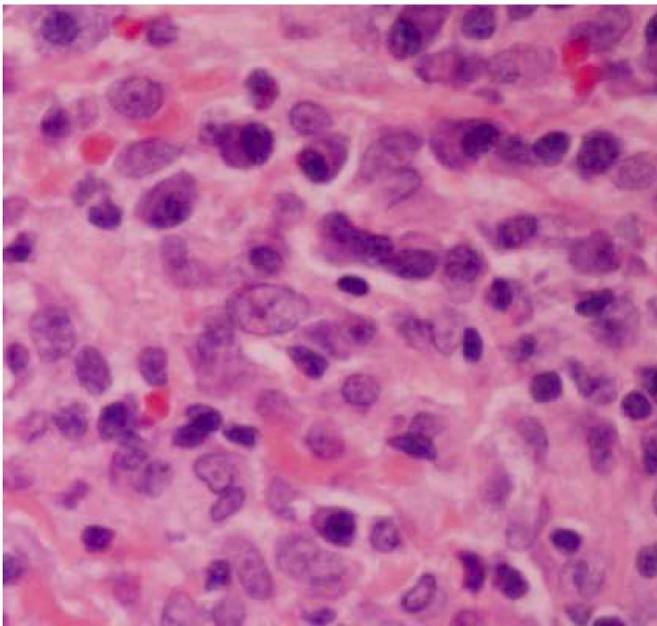


Fig. 3. Periodic Acid-Schiff stain (400× magnification) highlighting the presence of budding yeast.

In terms of diagnosing a cutaneous disseminated sporotrichosis, the identification of *Sporothrix* spp from culture is the gold standard [18]. Sabouraud dextrose agar, incubated at 25–30 °C is a standard technique applied in most cases [13]. In the current case, PCR amplification was performed in two steps. The two panfungal PCRs includes ITS PCR and D1D2 PCR in the first step. The second step was the specific *S. schenckii* topoisomerase II PCR [8]. Panfungal PCR products was sequenced by LGC Genomics GmbH by using the same primers and the isolated sequences were aligned with the reference sequences in the International Society of Human and Animal Mycology (ISHAM) barcoding database for the ITS region and the National Center for Biotechnology Information database for the D1D2 and ITS regions [8]. Molecular analyses identified *S. schenckii* which was confirmed by MALDI-TOF mass spectrometry. Histological patterns are not specific and reveal a non-specific epithelioid and giant cells granulomatous inflammation associated rarely with cigar shaped organisms, asteroid bodies or Splendore-Hoeppli reaction [7,19].

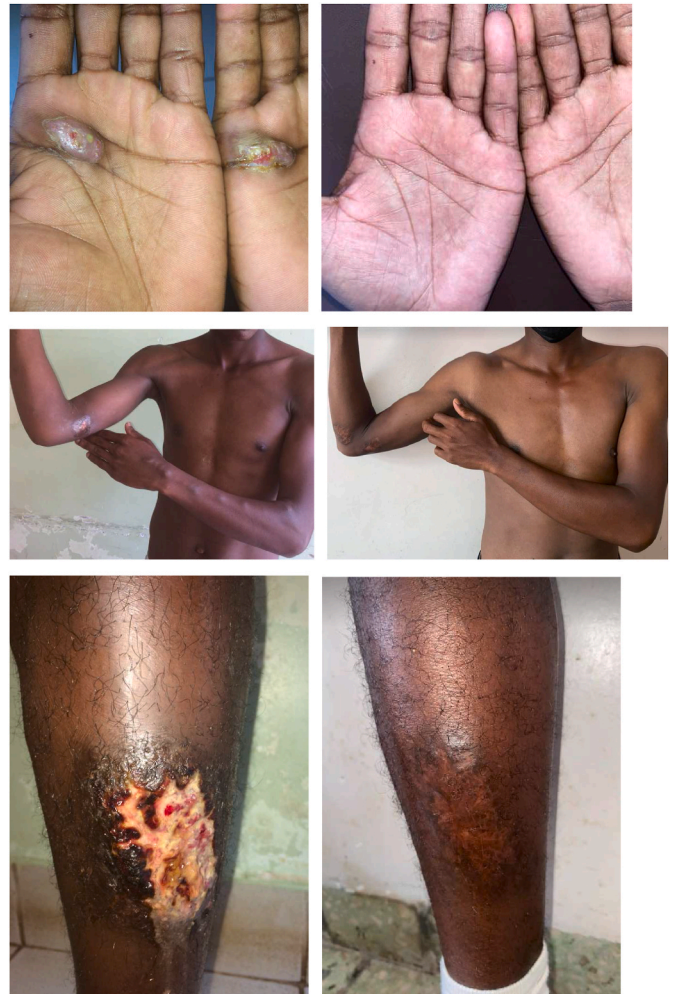


Fig. 4. Improvement of skin lesions with a complete remission after 7 months of treatment.

Cutaneous disseminated distribution is an unusual clinical form of sporotrichosis and can simulate other diseases which must be ruled out. It poses a differential diagnostic challenge with chromoblastomycosis, cutaneous leishmaniasis, verrucous tuberculosis cutis, sarcoidosis, Sweet’s syndrome and pyoderma gangrenosum [6,20].

The treatment of cutaneous disseminated sporotrichosis in an immunocompetent patient remains empirical including itraconazole, potassium iodide, liposomal amphotericin B and terbinafine. The use of amphotericin B until clinical improvement completed by itraconazole is the first line of treatment [5,20]. In the current case, itraconazole used in monotherapy allowed a complete remission. For immunocompromised patients, several studies reported the effectiveness of itraconazole or potassium iodide in a monotherapy. In refractory cases, therapies combination is revealing to be necessary. Valeriano et al. reported the combination of potassium iodide, itraconazole and thermotherapy as the first therapeutic option in cutaneous disseminated sporotrichosis [1].

In summary, hematogenous sporotrichosis or cutaneous-disseminated sporotrichosis is a rare entity, usually seen in immunocompromised patients where the fungus is considered as an opportunist. Our case highlights the role of multiple inoculation affecting different parts of the body as a risk factor of this uncommon sub-type of sporotrichosis in an immunocompetent individual. The diagnosis of this form relies mainly on the isolation of the fungus by culture.

Ethical form

Ethical approval was granted by Ethics Committee of the University Hospital Joseph Raseta Befelatanana, Antananarivo Madagascar. Written informed consent for publication of their clinical details was obtained from the patient.

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CRedit authorship contribution statement

Mendrika Fifaliana Rakotoarisaona: Conceptualization, Writing – original draft. **Malalaniaina Andrianarison:** Writing – original draft. **Fandresena Arilala Sendrasoa:** Writing – review & editing. **Tahina-mandranto Rasamoelina:** Involved in the mycological diagnosis. **Lala Soavina Ramarozatovo:** Validation. **Fahafahantsoa Rapelanoro Rabenja:** Validation.

Declaration of competing interest

No competing interests exist.

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