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Case Report

Candida guilliermondii Onychomycosis Involving Fingernails in a Breast Cancer Patient under Docetaxel Chemotherapy

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Keywords
Docetaxel · Onychomycosis · *Candida guilliermondii* · Purulent discharge

Abstract
Onychomycosis has been shown to have a higher incidence in cancer patients. Nail toxicity is a quite common side effect of anticancer agents. Taxotere© is a chemotherapeutic known to cause great incidence of nail change and has a role in subungual suppuration. We report on a 52-year-old woman with breast cancer admitted in our institution for onycholysis. Because of the stage and histology of breast cancer, neoadjuvant chemotherapy was initiated. The patient received 8 cycles of Taxotere and Adriamycin (AT), and she underwent a modified radical mastectomy. Three months later, the patient developed evidence of onycholysis, involving all the fingernails. We observed the following changes in nails of all the digits in both hands: onycholysis, dystrophy, oedema, and exudate. Nail scraping and purulent discharge were collected and cultured on Sabouraud medium. Physical features of the colonies and biochemical tests (Auxacolor©) revealed *Candida guilliermondii* as the sole etiologic agent of onychomycosis. This case details an onycholysis in a breast cancer case successfully managed solely with amorolfine lacquer. This clinical and mycological presentation should alert the clinician to the possibility of onychomycosis induced by docetaxel chemotherapy.

The work was conducted in "Hassani Abdelkader" University Hospital.

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Introduction

Dermatophytes and yeasts generally cause onychomycosis of the fingernails and toenails. The strain most commonly isolated worldwide with regard to this disease is *Candida albicans* [1].

In the recent years, opportunistic fungal infections are gaining greater importance in human medicine as a result of possibly a huge number of immunocompromised patients [2]. In general, it is accepted that patients with nail candidiasis must have an intercurrent disease able to cause immunosuppression [1].

Most fungal infections are caused by the commonly recognized opportunistic fungi *Candida* sp, *Aspergillus* sp, and *Cryptococcus neoformans*, and the pathogenic fungi *Histoplasma capsulatum*, *Coccidioides immitis*, and less often by *Blastomyces dermatitidis* [3]. Moreover, *C. albicans*, *Candida parapsilosis*, *Candida tropicalis*, and *Candida glabrata* species are potential pathogens that can cause local or systemic infections in immunocompromised patients with cancer [4].

Both yeasts *C. parapsilosis* and *Candida guilliermondii* appear as emerging pathogens that would be taking the place of *C. albicans* as the most commonly isolated pathogens in patients with candida onychomycosis [1].

Furthermore, breast cancer patients receiving chemotherapy or radiotherapy might develop superficial mycosis such as otomycosis and onychomycosis [2, 5, 6].

Nail toxicity is a quite common side effect of anticancer agents. Onychomycosis is described in immunosuppressed children receiving chemotherapy [7]. This superficial mycosis has been shown to have a higher incidence in cancer patients [8].

Data in superficial mycosis patients with underlying comorbidities are limited. In some cases because of the exclusion criteria within clinical trial programmes [8], taxanes such as docetaxel and paclitaxel are reported to cause nail changes [9].

Some authors recommend topical antiseptic treatment after taxane chemotherapy [10]. Severe paronychia is treated with systemic antibiotics [11]. In this case, antifungal therapy was the treatment of choice in response to onychomycosis induced by taxane chemotherapy.

Onycholysis is a frequently reported chemotherapy-induced pathology involving the separation of the nail plate from the underlying nail bed.

The side effects of chemotherapeutic drugs have increased in recent years, and some side effects can lead to onychomycosis, as described in this report.

Case Report

We report on a 52-year-old woman with breast cancer admitted in our institution for onycholysis. She was diagnosed with breast cancer in 2018; because of the stage and histology of breast cancer, neoadjuvant chemotherapy was initiated. The patient received 8 cycles of combined therapy of Taxotere and Adriamycin, and she underwent a modified radical mastectomy in April 2019. Radiotherapy was not indicated; 3 months later, the patient developed evidence of onycholysis, involving all the fingernails. We observed the following changes in nails of all the digits in both hands: onycholysis, dystrophy, oedema, and exudate, and the proximal nail plate shows a yellow-white discoloration (Fig. 1).

Subsequently, the patient experienced pain, discomfort, and minimal nail thickening.

Clinical assessment corroborated the initial assumption that the patient was possibly infected with a fungal pathogen. There was some exudation from the hyponychia but no associated inflammation of the skin of the fingertip (Fig. 2).

Further identification was undertaken at the Department of Parasitology-Mycology for phenotypic identification of the discharge isolate and nail scraping.

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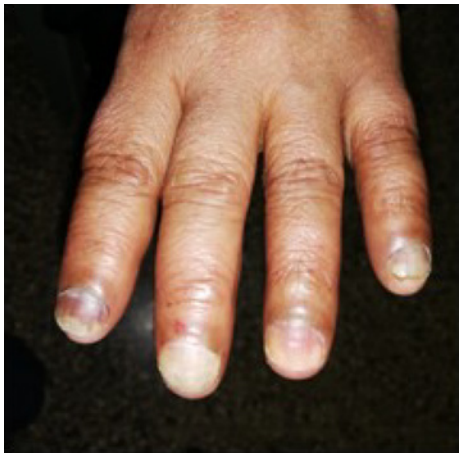

Fig. 1. Fingernail dystrophy and discoloration.

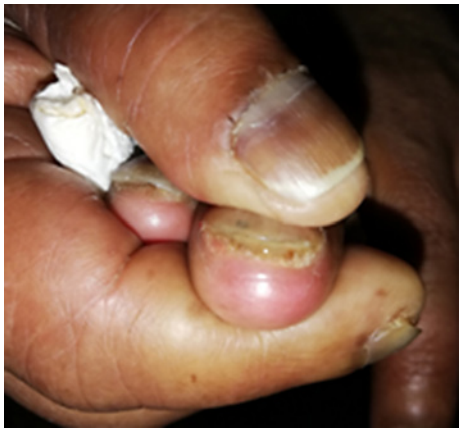

Fig. 2. Advanced fingernail changes in the patient. The patient had clipped some of the distal nails because they were nearly perpendicular to the hyponychium. Onycholysis, exudate, and oedema are apparent.

The samples collected from each nail scraping and purulent discharge were examined under a microscope, showing budding yeasts which were inoculated into Sabouraud's dextrose agar tube media and incubated at 25°C for a minimum of 6 weeks. Culture tubes were examined for the presence of growth. Physical features of the colonies (Fig. 3) and biochemical tests (Auxacolor©) revealed *C. guilliermondii* as the sole etiologic agent of onychomycosis.

The patient was treated with 5% amorolfine lacquer, applied to the affected fingers twice a week, for a minimal duration of 3 months. Absence of pain along with improvement following drainage was observed after few weeks, and the patient was lost to follow-up.

Discussion

Mycosis remains a significant cause of morbidity, as the number of immunosuppressed individuals increases worldwide. Moreover, major advances in anticancer treatment have contributed to an increased frequency of severe fungal infections in patients with neoplastic diseases [3].

Fungal infections in cancer patients can be divided into 5 groups: superficial dermatophyte infections with little potential for dissemination; superficial candidiasis; opportunistic

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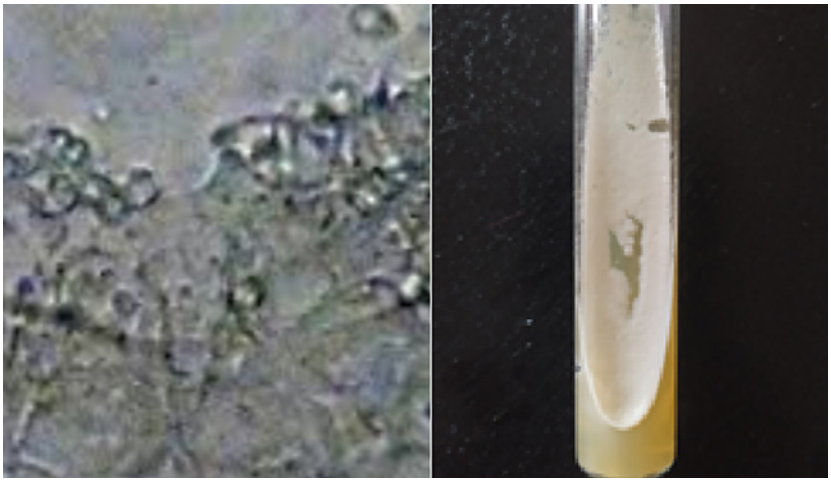

Fig. 3. Budding yeast on direct examination and creamy white colonies of *Candida guilliermondii* on SDA medium.

fungal skin infections with distinct potential for dissemination [5]. Underlying comorbidities, such as cancer [12, 13] and immunodeficiency [7], can increase susceptibility to onychomycosis. Patients who are human immunodeficiency virus positive are also predisposed to the development of infections including onychomycosis and tinea pedis [14].

Ageing is a common risk factor for onychomycosis [6], most likely due to poor peripheral circulation, longer exposure to pathogenic fungi, repeated nail trauma, suboptimal immune function, and slower nail growth [15]. In addition, various medical conditions more common in the elderly increase the risk of comorbid onychomycosis.

Nail changes are a relatively common side effect of systemic chemotherapy [9]. Taxanes such as docetaxel and paclitaxel appear to cause nail changes more frequently than other chemotherapeutic agents [9]. Dermatologists should recognize the symptoms of this disorder.

The adherence capacity of *Candida* and its ability to form biofilms may be important fungal virulence factors common to all *Candida* species [16]. *Candida* has the ability to invade the nail plate and cause nail disorders indistinguishable from those generated by dermatophytes [1].

There are no known abnormal clinical features of these infections in cancer patients [8]. Onychomycosis in our breast cancer patients had usual clinical features.

Previously regarded as contaminant, yeasts are now increasingly recognized as pathogens in fingernail infections [17].

Usually, the most common causes of fungal infections in cancer patients are *Candida* sp, *Aspergillus* sp, and *Fusarium* sp [5].

Cancer comorbidities and associated polypharmacy make some patients ineligible for oral antifungals [18]; hence, identification becomes relevant, in view of the resistance to conventional treatments readily reported in the literature [1].

Species other than *albicans* might be expected to have a role as a gateway to systemic candidiasis [1].

An oncology institute in Slovakia reported *C. krusei*, *C. parapsilosis*, *C. glabrata*, *C. tropicalis*, and *C. guilliermondii* fungaemia over 10 years. There were 45 non-*C. albicans* fungaemias as compared to 75 *C. albicans* fungaemias [19].

Currently, there are no known preventive measures for nail changes [20]. Contrary to our presentation, a fungal study revealed no evidence of onychomycosis after Taxotere treatment [9]. Usually, treatment of fungal infections of the fingernails takes around 6 months. Early

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recognition and treatment of the disease is essential to avoid complications and improve treatment outcomes.

Highlights

- Docetaxel-induced onycholysis and purulent discharge has already been reported in the literature, and this case illustrates fungal onycholysis.
- Candidiasis is one of the most common complications seen in immunosuppressed cancer patients, and *Candida guilliermondii* is frequently isolated in onychomycosis.
- Early recognition and treatment of yeast onychomycosis with purulent discharge is important, especially in immunocompromised patients.

Statement of Ethics

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interests to declare.

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Author Contributions

Y.M. and H.D. did the background research and contributed to each step of the publication. S.T. acquired and interpreted the clinical data. F.B.R. drafted and critically revised the manuscript.

Data Availability Statement

All data is included in the present manuscript.

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