Subclinical Onychomycosis in Patients with Type II Diabetes

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ABSTRACT

Background: Onychomycosis is a common cause of nail dystrophy and may be associated with tinea pedis. Its prevalence among diabetic patients is three times that in healthy individuals. The presence of fungal infection in clinically normal nails in patients with type II diabetes is unknown.

Objective: Assessment of the efficacy of nail clipping in diagnosing both clinical and subclinical onychomycosis, besides, the assessment of possibility of presence of subclinical onychomycosis in patients with type II diabetes that might suggest early therapeutic intervention in such patients.

Patients and methods: 106 patients with type II diabetes with and without vasculopathy, neuropathy, and clinical tinea pedis with normal big toe nail are included, in addition to control groups that include 30 non diabetic subjects with normal toe nails and 10 non diabetic patients with apparent onychomycosis. All were subjected to nail clipping of the big toe nail followed by staining with H&E and PAS stains.

Results: Fungal infection (PAS +ve) were identified in eight specimens of the diabetic group. All patients were uncontrolled diabetes, six patients had neuropathy, five patients had clinically diagnosed tinea pedis, and no one had vasculopathy.

Conclusions: Nail clipping could be a useful diagnostic tool for onychomycosis in addition that subclinical onychomycosis is an existing real condition that can be associated with tinea pedis and it was found in patients with type II diabetes especially the uncontrolled ones.

Key words: nail disease, diabetes mellitus type II, onychomycosis, subclinical disease, tinea pedis, nail clipping.

LIST OF ABBREVIATIONS

CYP	Cytochrome P450
DSLO	Distal and lateral subungual onychomycosis
E.	Epidermophyton
H&E	Hematoxyline and Eosine
HbA1c	HeamoglobineA1c
HIV	Human Immunodeficiency Virus
KOH	Potassium Hydroxide
MALDI-TOF MS	Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry
NPV	Negative predictive value
OCT	Optical coherence tomography
OM	Onychomycosis
OSI	Onychomycosis Severity Index
PAS	Periodic acid-Schiff
PCR	Polymerase chain reaction
PPV	Positive predictive value
RFLP	Restriction fragment length polymorphism
spp	Species pluralis
SWO	Superficial white onychomycosis
TDO	Total dystrophic onychomycosis
T.	Trichophyton
TP	Tinea pedis
WHO	World health organization

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INTRODUCTION

Onychomycosis (OM) is a common problem, accounting for up to half of all diseases of the nail, with an estimated prevalence of 10% of the general population and approaching 60% in the elderly ***(Elewski, 1998).***

Among diabetic patients, onychomycosis is 2.8 times more prevalent than it is in patients without diabetes ***(Gupta et al., 1998)***. Nails that are thickened with fungus can develop serious bacterial infections and ulcerations. Patients with diabetes related disorders are at increased risk for morbidity in onychomycosis. Diabetic patients suffering from decreased foot sensation are more prone to trauma which damages the nail and the nail matrix, opening portals of entry for the fungus to infect the nails, and the presence of this infection increases the risk of other infections of the foot and leg ***(Boyko et al., 1999).***

Approach to diagnose onychomycosis can be painful and it may also be prolonged and complicated. Nail clipping is an easy doing exam, free from pain, cheap and sensible, examining the histopathology of the nail keratin. In dermatology, clippings are fragments cut from the distal portion of nail plate used for histopathological assessment ***(Fillus Neto., 2009).***

Clippings appeared from the need to have a quick, low cost and non-painful histological response to identify nail plate abnormalities that could express any nail system pathology. One of the most frequent indications is observed when there are clinical abnormalities compatible with onychomycosis, but with repetitive negative mycological tests. Other situations may also be assessed by histological analysis of ungueal keratin, such as psoriasis, lichen planus, trauma, dyschromia, melanonychia and even tumors ***(Lawry et al., 2000)***.

It is a non-painful test to the patient, has no sequels and high sensitivity **(*Lawry et al., 2000)***.

While onychomycosis is a common problem among patients with diabetes, there are no clear, hard and fast solutions as to how to treat it. It affects quality of life and it can lead to more serious conditions such as ulcers and subsequent amputations. The presence of fungal infection in clinically normal nails in these diabetic patients is not known, and knowing about it will give us much benefit as regard early diagnosis and treatment and early prevention of serious complications.

Review

Of

Literature

CHAPTER 1

OVERVIEW OF NAIL DISORDERS AND ONYCHOMYCOSIS

OVERVIEW OF NAIL DISORDERS

INTRODUCTION:

The human nail shields the distal digit from harm, assists in the picking-up of small objects, improves fine touch, and enhances the aesthetic appearance of the hand. Aesthetically displeasing nails and nail-associated symptoms such as pain or throbbing are common factors that contribute to a patient's decision to seek medical attention ***(Baran et al., 2006)***.

ANATOMY AND PHYSIOLOGY OF THE NAIL UNIT:

The nail unit is composed of the nail matrix, the nail bed, the proximal and lateral nail folds, and the hyponychium (**figure 1**).

The nail matrix is the germinative epithelium from which nail matrix keratinocytes differentiate to ultimately form the nail plate. Most of the nail matrix is hidden beneath the proximal nail fold, but the distal third is sometimes visible through the proximal portion of the nail plate as a half-moon shaped structure called the lunula ***(Haneke, 2006)***.

Maturation and differentiation of the nail matrix occurs along a diagonal axis oriented distally. Thus, the keratinization of the distal matrix cells forms the ventral portion of the nail plate whereas the keratinization of the proximal matrix cells forms the dorsal portion of the nail plate ***(De berker et al., 1996)***

Nail plate abnormalities typically result from pathological processes involving the nail matrix or space-occupying lesions involving the overlying nail fold **(*Rich, 2006)***.