

Onycho-mycosis may herald grotesque diabetic foot

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Abstract

Background: Fungal infection of nails is a very common complication of diabetes mellitus. This study is not only focused on the cosmetic aspect, it also emphasize that Onycho-mycosis may herald morbid diabetic foot and also associated with other morbidity and mortality. **Material and Methods:** The patients recruited for this study are all known case of diabetes mellitus and they are admitted in tertiary care center for short-term and long-term complications of diabetes. A structured questionnaire was used to collect demographic and clinical data. Those patients who are on chemotherapy, radiotherapy, immuno-suppressant drugs and corticosteroids were not considered. **Results:** High incidence of infection found in all long term complication of diabetes mellitus. **Conclusion:** Onycho-mycosis feeble, but significant indicator of impending catastrophe of various complication in diabetes mellitus especially of diabetic foot.

Keywords: Onycho-mycosis, Fungal infection of nails, diabetes mellitus, diabetic foot

Introduction:

Various types of fungal infections tend to affect nails either the plate, nail matrix, nail bed or the whole nail of diabetic patient.¹ These are often intractable infection are disfiguring and also have potential significant economic impact.² These infections are often an omen of impending complications of diabetes mellitus.³

Epidemiology: Fungal infection of nails (Onychomycosis) is a common skin infection with frequency ranging from 3-26% around the world.⁴ Onychomycosis more common in diabetics and in the elderly.⁵

Risk factors: These include old age, immuno-suppressive drugs and conditions like Diabetes mellitus, Human Immune-deficiency (HIV) infection are important risk factors. There is also association with other skin infections, which are non dermatophyte infections such as candida albicans can also occur in immuno-suppressive patients especially those with HIV infection. Pa-

tients can present clinically in several ways⁶:

- Distal Lateral Subungual Onychomycosis (DLSO).
- Superficial White Onychomycosis (SWO).
- Proximal Subungual Onychomycosis (PSO).
- Total Dystrophic Onychomycosis (TCO).

Deformed nails are not synonymous with onychomycosis. They may be responsible for 50% cases.

Other causes include⁷:

- Onychogryphosis (Trauma induced tight shoes, nail biting)
- Eczema (contact or allergic dermatitis)
- Bacterial Paronychia such as Pseudomonas infection.

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- Systemic diseases like thyroid gland disorders, diabetes, peripheral vascular disease etc.

Sign and Symptoms: Studies shows that a large number of patients who are diagnosed with onychomycosis (OM) are symptom free and pain occurs in only around 40% notably while wearing shoes.¹⁰

Investigation: Diagnosis is mostly clinical by microscopic examination of nail material. Culture may also help, but diagnosis is delayed for several weeks. Treatment is mostly surgical, but medical treatment is also available with variable response. Recently laser therapy is emerged as an effective treatment option.⁸

Main complications is cosmetic, like grotesque nail. Its progress mainly depends on age and underlying disease such as diabetes mellitus. The infection generally worsens with time regardless of optimum treatment is provided.⁹

Treatment: Fungal infections are more common in diabetes mellitus as well as severe bacterial infection, which often lead to foot ulceration. A large number of patients usually undergo amputation of foot or leg, which can be prevented if initial signs of onychomycosis are addressed appropriately.¹¹

Onychomycosis is an under-diagnosed condition and its oral treatment option is prolonged and unpredictable in which poor patient compliance is an important factor. Generally onychomycosis is considered a cosmetic problem.¹

Different treatment like surgical debridement, avulsion, laser therapy and medical therapy shows variable response.¹¹

Onychomycosis also known as tinea arguim are fungal infection of nails especially involving toe nails. The nails are thickened, brittle, crumbly and ragged with yellow hue.⁶

Diabetes is one of the predisposing factors for onychomycosis. Dermatophyte such as *Trichophyton rubrum*, *T. interdigitale*, and yeasts as

Candida albicans, molds especially *Scopulariopsis Bravicaulis* and *Fusarium* spp. causes these infections. The condition can lead to the explosive and complex diabetic foot.³

Diabetic foot is a very scary condition with often gruesome results. It is a part and parcel of Diabetes mellitus and is generally one of the manifestations of diabetic complications such as diabetic neuropathy, vasculopathy and ophthalmopathy with decreased vision.¹² It starts with skin and nail changes. There is loss of hair on leg and foot, with dry lusterless skin. Nails are brittle and thickened with discoloration.¹³

There is always need of strict vigilance for anticipation and if possible appropriate care and treatment of any fluctuations from normal on day to day basis is required to prevent long term complications.

Material and Methods:

Detailed clinical history of 117 patients was taken, who were known case of diabetes mellitus and were admitted in Department of Medicine Unit-II of JPMC, during last two months. All of the patients were suffering from diabetic foot and most of them presented with cellulitis, non-healing ulcers (wounds) and gangrene.

Exclusion Criteria: Those who had received chemotherapy, immuno-suppressants, radiotherapy and corticosteroids were not considered in this study.

Result:

117 patients with diabetic foot also had onychomycosis. There are patients which are already undergone amputation and there opposite limb has onychomycosis.

Generally, patients had presenting features associated with complications such as anemia, peripheral neuropathy and heart diseases.

This was a hospital based study, conducted in a tertiary care hospital, where most of the patients were admitted with one or more short term and long term complications of DM. These patients

Table-1:

	No. of Patients	Percentage
Diabetic Foot	74	63.2%
Diabetic Neuropathy	19	16.2%
Stroke	13	11.1%
Congestive Cardiac Failure (CCF)	7	5.98%
Diabetic Ketoacidosis (DKA)	3	2.56%
Hypoglycemia	1	0.85%

*the complications are in combination but predominant are highlighted

Table-2: Associations & comorbid

	No of Patients	Percentage
Hypertension	88	75.2%
Ischemic Heart Disease	35	29.9%
CVA	21	17.9%
Amputation	15	12.8%
Retinopathy	98	83.7%
Structural deformity	108	98.23%
Family history	115	98.29%
Significant nail trauma	0	0

*the complications are in combination but predominant are highlighted

Table-3:

Duration of diabetic mellitus	No of Patients	Percentage
< 5	13	11%
> 5-10	79	67.5%
>10	78	66.6%

were classified as table-1. The associations & comorbid in our study are shown in table-2. The association with duration of diabetes mellitus with diabetic foot is shown in table-3.

Discussion:

Onychomycosis of toes is a neglected aspect of medicine. It is not just a cosmetic problem, but is an harbinger of the devastating diabetic foot with all its complications.²

The patients included in our study were having severe and complicated diabetes mellitus (DM). They had developed various complications of DM among which diabetic foot was the most common complication and all patients with diabetic foot had fungal nail infections.³

Patients having uncontrolled DM for a longer period leads to micro and macro vascular damage, which eventually develops a combination of long term complications of the disease, includ-

ing vasculopathy, neuropathy, ophthalmopathy, nephropathy and diabetic foot.¹⁴

Diabetic vasculopathy stands at the top as the primary major factor contributing to the development of serious long term complications of diabetes mellitus.¹

Onychomycosis however is not synonymous with Diabetes mellitus and even also be found in elderly and immune-compromised patients.

Vasculopathy in diabetes mellitus damages normal skin and its related integumentary structures by virtue of compromised blood supply and leading to hair loss, dry lusterless skin and nail changes.¹⁵

The nail changes in the form Onychomycosis are generally intractable and careful follow up is needed.¹⁶

Practically even patient with advanced diabetic foot has complicated nail and fungal infections, and there is a need for extra care and meticulous follow up of these patients.¹⁷

Conclusion:

The recent increase in diabetes mellitus is also associated with increased incidence of cases of diabetic foot. This calls for screening and interventional measures as onychomycosis is one of the signs of development of serious long term complication of diabetes mellitus and it is truly an omen of impending doom. It is seen very commonly among patients with advanced and uncontrolled DM in our tertiary care hospital.

Preventive and prophylactic measures may be helpful in preventing onychomycosis in diabetic patients, and these are:

- Nails would be kept trimmed, cautious cleanliness and strict hygiene are required.
- If clippers are used, neither should not be shared nor should be borrowed from someone else.
- One should wear flip-flops or swimming

shoes in public showers, gyms and pools.

- Shoes or socks should never be shared with others.
- Foot inspections should be carried out daily.
- Nails should be protected from damage by using diabetic shoes and socks.

Many of these prophylactic and preventive measures should also be used by non-diabetics in order to protect oneself development of fungal nail infections.

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Role and contribution of authors:

Dr. M. Rasheed Khan Durrani, conceive the idea, collected the data and wrote the initial write-up

Dr. Naeemullah Bullo, collected the data and references

Dr. Muhammad Inam Khan, collected the data and references, went through the article and made final changes in the article.

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