



PREVALENCE OF SUPERFICIAL FUNGAL INFECTION IN RENAL TRANSPLANTED PATIENTS

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Abstract

Background: Kidney transplantation is the treatment of choice for end-stage renal disease. However, patients require close follow-up after transplantation since they are on complex immunosuppressive regimens that render susceptible to infection, malignancy, and cardiovascular disease. Immunosuppressive dose also tends to be high in the first 1- 6 months post transplantation and patients continue to be at risk of developing opportunistic fungal infection.

Aim: To determine prevalence and variant of superficial fungal infection in renal transplant recipient, to determine duration of immunosuppressive drugs used before appearance of superficial fungal infection and prevalence and to find out the relationship between types of immunosuppressive drugs used and prevalence of superficial fungal infection.

Methods: This cross-sectional descriptive hospital-based study was carried out on 80 patients with renal transplant recipients attended, admitted at hospital as well as referral clinics.

Results: Sixteen Patients (20%) had superficial fungal infections at the time of the study and 64 Patients (80.0%) had no superficial fungal infection. Regarding dermatological examination Skin involved in 13 Patients (16.2%), mucous membrane involved in 1 Patients (1.2%), nail Involved in 1 Patient (1.2%), Finger toe involved in 1 Patients (1.2%).

Conclusions: Pityriasis versicolor was the commonest superficial fungal infection in renal transplant recipients. Superficial fungal infection was more common in first 6 months of treatment of immunosuppressive drugs and was more common in patient used combination of Azathioprine + prednisolone + prograf.

Keywords: Superficial Fungal Infection, Renal Transplanted Patients, Antibiotics, Cell Mediated Immunity

Introduction:

Fungi are eukaryotic organism whose cell walls are different from mammalian cell in that they contain ergosterol which is the target for the antifungal agent ^[1].

Fungal infections of the skin are also known as ‘mycoses. They are common and generally mild. However, in very sick or otherwise immune suppressed people, fungi can sometimes cause serious disease [2].

Numerous ways of classifying superficial fungi exist, including habitat and pattern of infection. Geophilic organisms originate in the soil and only sporadically infect humans, usually by direct contact with the soil. These infections are usually spread by spores [3].

Zoophilic species are usually found on animals but are also transmitted to humans. (e.g., *M. canis* in cats and dogs) [4]. Inflammatory dermatophytoses are most produced by zoophilic dermatophytes. Anthropophilic species have adapted to humans as hosts [5].

Antibiotics are a risk factor for fungal infections [5]. Individuals with weakened immune systems are also at risk of developing fungal infections. This is the case of people with human immunodeficiency virus / acquired immunodeficiency syndrome, people under steroid treatments, and people taking chemotherapy. People with diabetes also tend to develop fungal infections [6].

Classification: Superficial fungal infections, subcutaneous fungal infections, systemic fungal infections and opportunistic infection.

Superficial fungal infections, including dermatophytoses, candidacies, and pityriasis versicolor, are most often restricted to the epidermis [7].

Cutaneous Fungal infection also occur more frequently due to suppression of cell mediated immunity and possibly due to reduction of concentration of APC in the epidermis and can vary greatly in presentation [8].

Kidney transplantation is the treatment of choice for end-stage renal disease. However, patients require close follow-up after transplantation since they are on complex immunosuppressive regimens that render them susceptible to infection, malignancy, and cardiovascular disease [9].

Immunosuppressive dose also tend to be high in first 1- 6 months post transplantation and patient continue to be at risk of developing opportunistic fungal infection [10].

The aim of this work was to determine prevalence and variant of superficial fungal infection in renal transplant recipient, to determine duration of immunosuppressive drugs used before appearance of superficial fungal infection and prevalence and to find out the relationship between types of immunosuppressive drugs used and prevalence of superficial fungal infection.

Material and Method:

This cross-sectional descriptive hospital-based study was carried out on 80 patients of any age, both sexes, with renal transplant recipient attended, admitted at Ahmed Gasim hospital as well as referral clinics.

The study was done at Ahmed Gasim hospital for Cardiac Surgery and renal transplantation from May 2021 to May 2022 and was done in renal department which consist of a big theatre, room of recovery, ICU, center files of renal dialysis, outpatient clinics and tow refer clinics every week. The Ethics Review Committee of Sudan Medical Specialization board council of dermatology and venerology for approval of the study. After approval permission to conduct the survey was taken from the authorities of health care in the study area. I tried in gentle and respectful ways to assure all patients that all their obtained information will be treated in a confidential atmosphere, and it will not affect their life after taking verbal or written consent.

Exclusion criteria were patients refused to participate in the study and their autoimmune disease.

Data will be collected using specifically designed questionnaires which will include history, examination and investigation (nail clipping, skin scrapping).

The research team will include patients, researchers, dermatologists and statisticians.

Statistical analysis

Statistical analysis was performed using statistical package for social science (SPSS). A descriptive analysis was done for all questionnaire parameters.

Results:

Thirty-one (38.7%) of patients were from Khartoum state patients while 14 patients (17.5%) from Aljazeera state, the rest of patients from other states. Table 2 showed the duration of renal transplantation, less than 6-month duration were 18 patients (22.5 %), 6 month - 2 years 8 patients (22.5 %), 2 - 4 years 15 patients (18.8 %), 4-6 years 12 patients (15.0 %), 8-- 10 year 5 patients (6.2 %), More than 10 years 4 patients (5.0 %). Immunosuppressive Drugs used In Renal Transplant Patients as follow.

Table 1

Azathioprine + 1052rednisolone + prograf "tacrolimus 51 Patients (63.7 %), Cyclosporine + 1052rednisolone + cellcept (mycophenolate) 9 Patients (11.2 %), Azithropine + Cyclosporine + prednisolon 6 Patients (7.5 %), 1052rednisolone + prograf + cellcept (mycophenolate) 14 Patients (17.4 %). **Table 1**

Table 1: Resident s of renal transplant patients in Ahmed Gasim hospital time between May2021 _ May 2022, duration since renal transplantation and immunosuppressive drugs used in renal transplant patients

State	
Khartoum State	31 (38.7%)
Darfoor	1 (1.2%)
Kordofan	5 (6.2%)
North State	5 (6.2%)
White Nile State	7 (8.8%)
Aljazeera	14 (17.5%)
Blue Nile State	3 (3.8%)
Red Sea State	3 (3.8%)
River Nile State	7 (8.8%)
Kassala	4 (5.0%)
Total	80 (100%)
Duration Since Renal Transplantation	
Less than 6 months	18 (22.5%)
6 months - 2 Years	18 (22.5%)
2 - 4 years	15 (18.8%)
4 - 6 years	12 (15%)
6 - 8 years	8 (10%)
8 - 10 Years	5 (6.2%)
More than 10 Years	4 (5.0%)
Total	80 (100%)
Immunosuppressive Drugs	
Azathioprine + Prednisolone + Prograf (Tacrolimus)	51 (63.7%)
Cyclosporine + Prednisolone + Cellcept	9 (11.2%)
Azathioprine + Cyclosporine + Prednisolone	6 (7.5%)
Prednisolone + Prograf + Cellcept	14 (17.4%)
Total	80 (100.0%)

Data was presented as frequency %.

Regarding dermatological examination Skin involved in 13 Patients (16.2%), mucous membrane involved in 1 Patients (1.2%), nail Involved in 1 Patient (1.2%), Finger toe involved in 1 Patients (1.2%). Skin scraping done for 12. Patients and was positive Nail clipping done for 3 Patients and was positive in 1 Patient. **Table 2**

Table 2: Dermatological examination in renal transplant patients in Ahmed Gasim hospital time between May 2021 - May 2022

Site	Yes (Count, %)	No (Count, %)
Skin	13 (16.2%)	67 (83.8%)
Mucous membrane	1 (1.2%)	79 (98.8%)
Nail	1 (1.2%)	79 (98.8%)
Scalp	0 (0%)	80 (100%)
Finger toe	1 (1.2%)	79 (98.8%)

Data was presented as frequency %.

Skin scraping done for 12 patients and was positive Nail clipping done for three patients and was positive in one patient. **Table 3**

Table 3: Investigation in renal transplant patients in Ahmed Gasim hospital May 2021 _ May 2022

Sample Type	Total (Count)	Positive (Count)	Negative (Count)
Skin scraping	12	12	0
Nail clipping	1	1	0

Superficial fungal infection more common in first 6month of treatment of immunosuppressive drug 5 Patients (31.20 %), 6 month - 2 years 2 Patients (12.50 %), 2 - 4 years 2 Patients (12.50 %), 4- 6 years 4 Patients (25 %), 6- 8 years 1 Patient (6.20 %), more than 10 years (12.50) 2 Patients. **Table 4**

Table 4: Relationship between Duration Immunosuppressive drugs & prevalence of superficial fungal infection in renal transplant patients

Variant of Superficial Fungal Infection	Less than 6 months	6 months - 2 years	2 - 4 years	4 - 6 years	6 - 8 years	More than 10 years	Total
Spityriasis Versicolor	3 (18.8%)	1 (6.2%)	2 (12.5%)	4 (25.0%)	0 (0.0%)	1 (6.2%)	11 (68.8%)
Tinea Pedis	0 (0.0%)	1 (6.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (6.2%)
Onychomycosis	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (6.2%)	1 (6.2%)
Tinea Cruris	1 (6.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (6.2%)
Oral Candidiasis	1 (6.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (6.2%)
Tinea Corporis	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (6.2%)	0 (0.0%)	1 (6.2%)
Total	5 (31.2%)	2 (12.5%)	2 (12.5%)	4 (25.0%)	1 (6.2%)	2 (12.5%)	16 (100%)

Data was presented as frequency%

Superficial fungal infection was more common in patients used combination of Azathioprine + prednisolone + prograf 9 Patients (56.20 %), while those who were using of Cyclosporine + prednisolone + cellcept 4 Patients is (25 %), Azathioprine + Cyclosporine+ predinsolon 2 Patients (12.5 %), and predinsolone + prograf + cellcept 1 patient (6.20 %). **Table 5**

Table 5: Relationship between duration immunosuppressive drugs & prevalence of superficial fungal infection in renal transplant patients

Superficial Fungal Infection	Azathioprine +	Cyclosporine +	Azathioprine + Cyclosporine	Prednisolone + Prograf + Cellcept	Total
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	Prednisolone + Prograf	Prednisolone + Cellcept	+ Prednisolone		
Pityriasis Versicolor	6 (37.5%)	3 (18.8%)	1 (6.2%)	1 (6.2%)	11(68.8%)
Tinea Pedis	0 (0.0%)	1 (6.2%)	0 (0.0%)	0 (0.0%)	1 (6.2%)
Onychomycosis	0 (0.0%)	0 (0.0%)	1 (6.2%)	0 (0.0%)	1 (6.2%)
Tinea Cruris	1 (6.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (6.2%)
Oral Candidiasis	1 (6.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (6.2%)
Tinea Corporis	1 (6.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (6.2%)
Total	9 (56.2%)	4 (25.0%)	2 (12.5%)	1 (6.2%)	16 (100%)

Data was presented as frequency %

Discussion

The key finding from this study is that 16 Patient (20.0 %), of our patients with renal transplant recipients had superficial fungal infection and 64 (80.0 %), of them had no superficial fungal infection, this similar result in the study of virgili A et al. ^[11] and disagree with study of Güleç AT¹ et al ^[3] and study of Imko-Walczyk et al. ^[12] and this explain by small sample in contrast by those studies.

Pityriasis versicolor was the commonest superficial fungal infection in renal transplant recipients found in 11 Patients (68.8%), This is agree with results from study conducted in northern Italy by virgili A et al. ^[11] and also agree with study of Güleç AT¹ et al. ^[11], and disagree with study of Imko-Walczyk et al. ^[11] which found oral candidiasis was the commonest

Superficial fungal infection more common in first six months of treatment of immunosuppressive drugs this result agree with result from study conducted in Poland by Imko-Walczyk et al. ^[12] and agree with result from study of Güleç AT¹ ^[11] and this explain by immunosuppressive dose also tend to be high in first 1- 6 months post transplantation

superficial fungal infection was more common in patient used combination of Azathioprine + prednisolone + prograf this disagree with results from study of virgili A et al ^[11] which found The prevalence of superficial fungal infection was higher in the group of patients treated with Azathioprine -cyclosporine-steroids and this explain by that most of our patients used combination of Azathioprine + prednisolone + prograf 51 patients (63.7%).

Recommendations: Dermatological clinic should be performed in renal transplant centre

Patient should be aware of the clinical course of fungal species in RTRs compared with the general population. Education of the patients how to care for their skin.

Further studies should be performed with focus in larger population in other renal transplant centre to find the most suitable regimen of treatment that give proper immunosuppression with less side effect.

Conclusions:

Pityriasis versicolor was the commonest superficial fungal infection in renal transplant recipients. Superficial fungal infection was more common in first 6 months of treatment of immunosuppressive drugs and was more common in patient used combination of Azathioprine + prednisolone + prograf.

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Conflict of Interest: Nil

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