Occurrence of *Rodotorula Mucilaginosa* among Immunocompromised Patients with Different Infections

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Abstract

Rhodotorula genus contains 37 species, only three species have been caused human infections. These three species are *R. glutinis, R. minuta* and *R. mucilaginosa*. Infection with *Rhodotorula* is much less common than other yeast causes. Nevertheless, the number of infections has clearly increased during the last few years**.** The objective was to occur of *Rodotorula mucilaginosa* Among Immunocompromised Patients with Different Infections

One hundred five specimens were collected from immunocompromised patients with (Oculomycosis, Onychomycosis and Otomycosis) who attended Baquba teaching hospital for a period of 14 months. The yeast cultures were monitored using Sabouraud´s dextrose agar (SDA) and identified depended on macroscopic and microscopic examinations.

Cultured Colonies of *R. mucilaginosa* on Sabouraud´s dextrose agar showed orange to pink in color and are smooth to mucoid colonies. The percentage of *R. mucilaginosa* was 19.3% (92 out of 150) specimens.

According to the findings, it can be concluded that males are most suffering from *Rodotorula mucilaginosa* infection among Oculomycosis and onychomycosis. Also, it is more prevalent in age group (41-60) years.

Keywords: *Oculomycosis, Onychomycosis, Otomycosis, Immunocompromised patients, Rodotorula mucilaginosa*

Introduction

Rhodotorula genus is a yeast, it classified as Basidiomycetes belong to family Sporidiobolaceae [(1)]. Species of *Rhodoturla* produce pinked, orange or red colonies on Sabouraud´s agar, the varying in its color due to the presence of carotenoid pigments. Morphological descriptions of *Rhodoturla* yeasts have been characterized with softy, smooth, moist to mucoid[(2)]

Rhodotorula genus contains 37 species, out of all, only three species have been caused human infections. These three species are *R. glutinis, R. minuta* and *R. mucilaginosa* [(3)].

In nature, *Rhodotorula* yeasts are widespread. Therefore, the researcher can be isolated from different environmental sources [(4)]. Pathogenic human *Rhodotorula* species have been associated with different problems including dermatological, respiratory, and urinary tracts infections [(5)].

Infection with *Rhodotorula* is much less common than other yeast causes such as *Candida* and *Cryptococcus*. Nevertheless, the number of infections has clearly increased during the last few years [(6)]. Brazilian epidemiological study at a teaching hospital, about 2.3% of fungal blood causes were *Rhodotorula* species, compared to other yeasts of *Candida* and *Cryptococcus*, with a percentage (83.4% and 6.6%) respectively [(7)].

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Almost patients infected with *Rhodotorula* fungemia infection have suppression in immune system including (Acquired Immunodeficiency Syndrome (AIDS), malignancy tumors, organs transplant, long spectrum of corticosteroid use, or diabetes) [8,9]. Another study estimated the mortality of *Rhodotorula* infections about 12.6%. In fact, some cases of these infections have evolved without antifungal drug [9].

Fungal Mycotic keratitis also known as Oculomycosis is an important ocular infection caused by fungi, especially in workers. The most common genera causes of fungi are: *Fusarium*, *Aspergillus*, and *Candida* and *rare causes by Curvularia* and *Rhodotorula* [10].

Onychomycosis fungal infections caused by *Rhodotorula mucilaginosa* have been reported in immunocompromised hosts. Therefore, *Rhodotorula* species are uncommon agents in etiology of onychomycosis [11].

Complication rate is higher in immunocompromised patients with Otomycosis which etiologically due to *Aspergillus* and *Candida* and rarely by *Fusarium*, *Rhodotorula* and *Cryptococcus* [12].

Materials and Methods

This study took place at Baquba teaching Hospital, located in Diyala governorate, Iraq. A medical questionnaire form was used of each patient. One hundred five specimens were collected from immunocompromised patients with (Oculomycosis, Onychomycosis and Otomycosis) under the advising of consultant physicians for a period of 14 months. The yeast cultures were monitored using different culture media including (Sabouraud´s dextrose agar (SDA), Cornmeal-Tween 80 agar and Potato dextrose agar).

All isolates of *R. mucilaginosa* were initially plated on Sabouraud´s dextrose agar and incubated at 35°C for 48 hrs to ensure the purity and viability of studied yeast. Isolates were stored frozen in 20% glycerol at either −20°C until the study was performed.

Rodoturella mucilaginosa identified according to the routine method including (colonial morphology, absence of pseudohyphae, urease production and growth at 37°C) which used in the mycology laboratory(13). All isolates of yeast characterized with spheroidal to oval budding cells and pink to red in color because its ability to produce carotenoid [14].

Results

Macroscopic and microscopic examinations:

Cultured colonies of *R. mucilaginosa* on Sabouraud´s dextrose agar showed orange to pink in color and are smooth to mucoid colonies. Microscopy of India ink stained smear of the SDA cultured showed budding yeast cells without pseudohyphae (Figure 1).

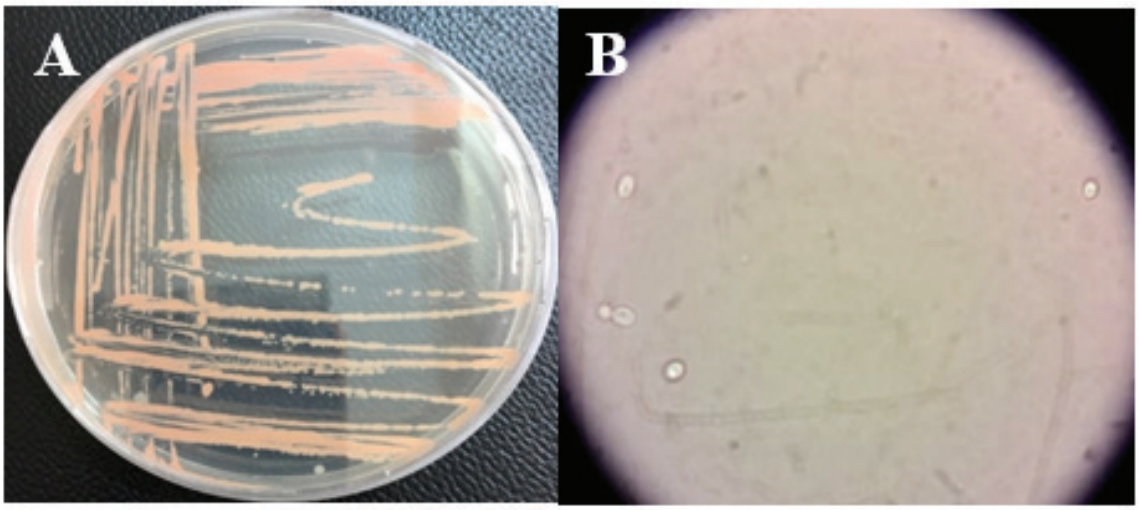

Figure 1: A: *Rodotorula mucilaginosa* colonies streaked on SDA

B: *Rodotorula mucilaginosa* stained with India ink (40X)

One hundred five specimens had been included in this survey concerning infection groups (Table 1).

Table 1: Percentage of culture results according to infection groups

Culture results	Infection groups						Total No. %	
	Oculomycosis No. %		Onychomycosis No. %		Otomycosis No. %			
Positive	7	14%	18	36%	4	8%	29	19.3%
Negative	43	86%	32	64%	46	92%	121	80.7%
Total	50	100%	50	100%	50	100%	150	100%

Upon stratification of age group, *R. mucilaginosa* was most isolated from age group (41-60) years among Oculomycosis and onychomycosis patients, with a percentage 42.8% and 33.3%, respectively. Whereas among Otomycosis, the age group (>60) years was most infected with studied yeast (50%) (Table 2).

Table 2: Percentage of *Rhodotorula mucilaginosa* in immunocompromised patients in comparison with different infections concerning age groups

Age groups	Infection groups						Total No. %	
	Oculomycosis No. %		Onychomycosis No. %		Otomycosis No. %			
<20 years	0	0%	3	16.7%	0	0%	3	10.4%
21-40 years	2	28.6%	4	22.2%	1	25%	7	24.1%
41-60 years	3	42.8%	6	33.3%	1	25%	10	34.5%
>60 years	2	28.6%	5	27.8%	2	50%	9	31%
Total	7	100%	18	100%	4	100%	29	100%

According to the patients´ gender, Males were more infected with *R. mucilagniosa* than females among Oculomycosis and onychomycosis, with percentage (57.1% and 61.1%), respectively (Table 3).

Table (3) Percentage of *Rhodotorula mucilaginosa* in immunocompromised patients in comparison with different infections concerning their gender

Patients´ Gender	Infection groups						Total No. %	
	Oculomycosis No. %		Onychomycosis No. %		Otomycosis No. %			
Male	4	57.1%	11	61.1%	2	50%	17	58.6%
Female	3	42.9%	7	38.9%	2	50%	12	41.4%
Total	7	100%	18	100%	4	100%	29	100%

Discussion

The use of steroids on long term may lead to development of fungal infections in particular Immunocompromised patients such as patients of diabetes, organs transplant, HIV, cancer. Treatment of studied infections should be initiated against eradicating *R. mucilaginosa* in order to prevent development of resistant strains [12]

Although, Infections caused by Rhodotorula are rarely incidence in recent years, but its more frequently isolated in Asia-pacific regions [15]. Rhodotorula species were revealed to be the fourth most frequently causative agent among other yeasts isolated from clinical specimens [16]. *Rodotorula* infection which were previously thought to be non-pathogenic but, are isolated from clinical specimens [17].

According to recent studies, Our results disagree with [18] who revealed that age group (20-40) most infected with *R. mucilaginosa*. There are no previous data regarding the correlation between *R. mucilaginosa* with patients´ gender. The genus of *Rhodotorula* is widely distributed in hospitals and could be critical as nosocomial fungal infections in particular in patients who undergo immune-suppression [19]. The recent results is affected by several factors; such as temperature, humidity, time of day and human activities.

Conclusion

From the finding results, it can be concluded that males are most suffering from *Rodotorula mucilaginosa* infection among Oculomycosis and onychomycosis. Also, it is more prevalent in age group (41-60) years.

Recommendation

Molecular study of *Rhodotorula species* to detect substitution mutations that related to the pathogenicity.

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