

Incidental Isolation of *Trichophyton rubrum* from Five Inpatients' Urine

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= Abstract =

Trichophyton (T.) rubrum is the dermatophyte most frequently isolated from humans. It has the ability to form molecular attachments to keratin, resulting in dermatophytic infections on the keratinized tissues, including the stratum corneum of the skin. Uncommon dermatophytic infection, such as granulomatous disease or extensive and severe diseases, can be also developed. However, reports about the isolation of *T. rubrum* from urine are not expected in the literature. We report incidental isolation of *T. rubrum* from inpatients' urine. [Korean J Med Mycol 2013; 18(3): 66-69]

Key Words: *Trichophyton rubrum*, Urine

INTRODUCTION

Trichophyton (T.) rubrum is an anthropophilic fungus that causes a chronic disease with remissions and relapses. It is the dermatophyte most frequently isolated from humans¹. The transmission of *T. rubrum* occurs most often from person to person, such as within families^{2,3}. Infection with *T. rubrum* is more common in adults and in males than in children and in women. The organism may remain viable in the environment, such as in clothing, furniture, and hair, for over six months, thus accounting for widespread infections^{2,4}. Arthroconidia and mycelia fragments of *T. rubrum* are the infectious agents. The organism has the ability to form molecular attachments to keratin and use it as a source of nutrients, colonizing keratinized

tissues, including the stratum corneum of the skin, developing tinea pedis, tinea corporis, tinea barbae, tinea manuum, tinea cruris, and tinea capitis⁵⁻⁷. Uncommon dermatophytic infection, such as granulomatous disease or extensive and severe diseases, can be also seen⁸⁻¹¹. However, reports about the isolation of *T. rubrum* from urine are not expected in the literature.

CASES

Patients: Five inpatients with underlying diseases. The ratio of male to female patients was 5:0 (Table 1). Their ages were ranged from 20 to 80 years old (with an average age of 45.6 years) (Table 1).

Chief complaints: Isolation of *T. rubrum* from their urine.

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Table 1. Demographics, isolation date and underlying disease of patients with *Trichophyton rubrum*-positive urine culture. All of the patients were male. They were ranged from 20 to 80 years. *Trichophyton rubrum* was isolated from urine 2 to 30 days after admission. They had severe underlying diseases such as cerebral tumor, aortic aneurysm, hepatocellular carcinoma, HIV infection, and common bile duct stone.

Number	Sex	Age	Isolation date after admission	Underlying disease
1	M	51	8 Days	Cerebral tumor
2	M	29	2 Days	Aortic aneurysm
3	M	20	30 Days	Hepatocellular carcinoma
4	M	47	4 Days	HIV infection
5	M	80	16 Days	Common bile duct stone

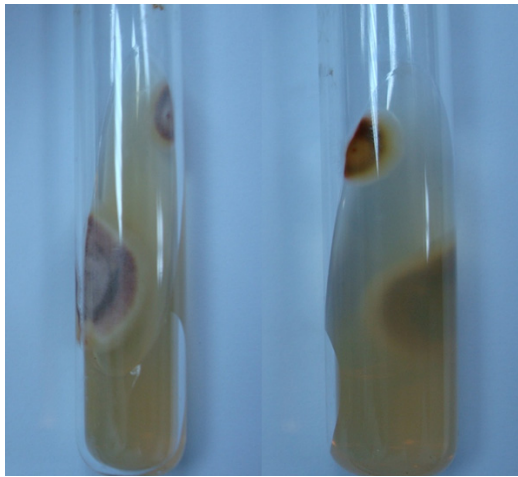


Fig. 1. *Trichophyton rubrum* showing white and fluffy colonies on Sabouraud dextrose agar with reddish reverse side.

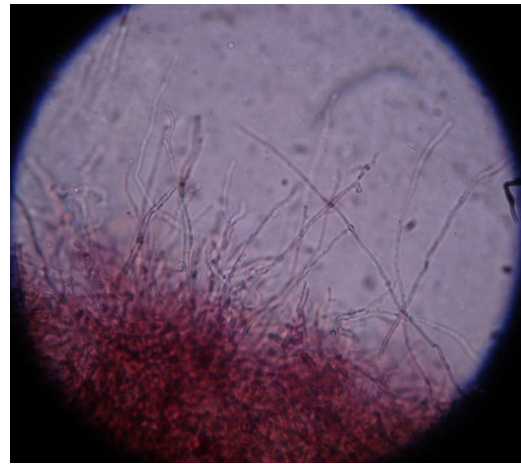


Fig. 2. Microscopic figure of *Trichophyton rubrum* showing teardrop-shaped microconidia and long hyphae stained with lactophenol cotton blue.

Present illness: A fungal culture with urine was performed as a routine laboratory test for the hospitalized patients. *T. rubrum* was isolated from urine of the patients. It was isolated from the urine on post-admission dates ranging from 2 to 30 days (with an average of 12 days) (Table 1). Out of 5 patients, 1 patient was positive twice in a fungal culture study with urine. They did not have any discomforts supporting urinary fungal infection. They did not have any evidence of tinea pedis, tinea cruris, tinea manuum or tinea unguium.

Past and family history: They did not have

any documented infection or treatment history of dermatophytosis. They had underlying diseases such as cerebral tumor, aortic aneurysm, hepatocellular carcinoma, HIV infection, and common bile duct stone (Table 1).

Mycological findings: Colonies of *T. rubrum* cultured on the Sabouraud dextrose agar were white and fluffy showing red color on the reverse side (Fig. 1). Microscopic examination of *T. rubrum* cultured on the Sabouraud dextrose agar revealed teardrop-shaped microconidia and long hyphae (Fig. 2). KOH examinations with the scale of

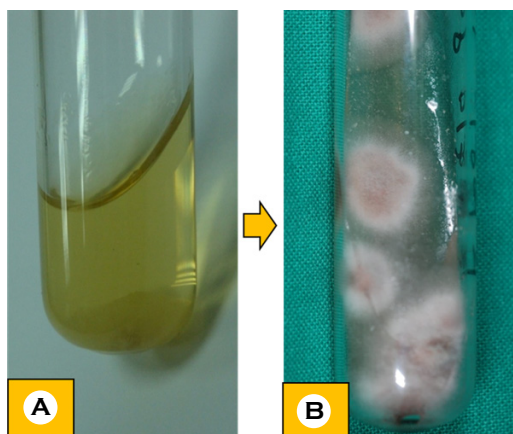


Fig. 3. *Trichophyton rubrum* preserved in urine for 4 days (A) grew after inoculation on Sabouraud dextrose agar (B).

groin and blood cultures for fungus were negative.

Further mycological examinations with culture and DNA amplification: *T. rubrum* was experimentally cultured in tubes containing purified urine to evaluate the duration of survival. It survived in urine for 4 days (Fig. 3). Amplification of tandemly repeated subelements TRS-1 and TRS-2 of ribosomal DNA by using RFLP (Restriction Fragment Length Polymorphism) method was additionally performed on 2 strains of *T. rubrum* to determine whether they are identical or not. The 2 strains were isolated from urine of the same patient with an interval of 3 days. They turned out completely identical as TRS-1 type 1 and TRS-2 type III.

Treatment: No treatment was done for fungal infection.

DISCUSSION

Without the involvement of internal organs, *T. rubrum* has been described as an invasive pathogen in immune-compromised hosts¹²⁻¹⁴. However, internal organs may be involved in the generalized invasive disseminated infection of *T. rubrum*. This

report brings us new insight in that *T. rubrum* can be cultured from urine to determine infectious colonizations. Usually, it has not been agreed that *T. rubrum* causes infection in urogenital tract. Nonetheless, it may be possible for *T. rubrum* to infect the urogenital tract. To the best of knowledge, mycotic infections of the urogenital tract can be caused by primary fungal pathogens, opportunistic fungi, hematogenous spreading, break of tissue integrity, retrograde ascension, and wound contamination¹⁵. Risk factors for mycotic urogenital infections include extremes of age, long lasting and broad spectrum antimicrobial therapy, diabetes mellitus, immunosuppression, malignancy, X-ray therapy, contaminated IV catheters, oral contraceptives, pregnancy, surgery, obstructive uropathy and indwelling urethral catheters¹⁵. The patients included in this report had severe underlying diseases, and thus have the possibility of developing mycotic urogenital infection due to *T. rubrum*.

Because urine is usually *T. rubrum*-free, we can imagine that *T. rubrum* was isolated by contamination. However, it is not easy to accept that there is frequent contamination by *T. rubrum* in the laboratory of a well controlled Joint Commission International (JCI) approved university hospital. The test for the survival of *T. rubrum* in urine leads us to confusion, the possibility of both contamination and infection. Amplification of tandemly repeated subelements TRS-1 and TRS-2 of ribosomal DNA by using RFLP method adds evidence supporting urinary infection by *T. rubrum*. However, they all did not take antifungal medications for urinary fungal infection. In addition, they did not have discomforts from urinary fungal infection. Moreover, except for one patient, we did not obtain positive results in repetitive fungal cultures despite the lack of antifungal treatment. Therefore, we carefully suggest that isolation of *T. rubrum* from the inpatients' urine be incidental and extend current one-week routine urine culture

period to more than two weeks considering average isolation period of *T. rubrum*.

In conclusion, further evaluation is needed to reveal the causes for *T. rubrum* isolation from the inpatients' urine. We report incidental isolation of *T. rubrum* from urine.

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