URINARY TRACT INFECTION BY TRICHOSPORON ASAHII

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Abstract

Trichosporon asahii is a basidiomycetous yeast which causes white piedra and onychomycosis in immunocompetent hosts as well as various localized and disseminated invasive infections in immunodeficient hosts. Urinary tract infection caused by Trichosporon asahii is rare. One month after posterior urethral valve surgery a seven-month-old male child presented with fever, severe vomiting and crying on micturition for five- to six days. Yeast-like fungus was isolated in pure cultures from three consecutive urine samples. It was identified as Trichosporon asahii using standard techniques. The response to antifungal therapy was dramatic. To the best of our knowledge this is the first report of a urinary tract infection caused by Trichosporon asahii from Western India.

Key words: Trichosporon asahii, urinary tract infection

Trichosporon Behrend is a genus of anamorphic yeasts (Basidiomycota, Hymenomycetes, Trichosporonales) with distinct morphological characters of budding cells and true mycelium that disarticulates to form arthroconidia. It is present in the external environment and is isolated mainly from the soil. It may also be present in water, air and organic substrata.

In the past, a sole species T. beigelli (T. cutaneum) was correlated to human pathology. It was recognized as the cause of superficial infections such as white piedra, tinea cruris and infected nails. Genus Trichosporon has recently undergone extensive taxonomic re-evaluation. Several morphological and biochemical patterns were recognized amongst clinical and environmental isolates of Trichosporon beigelli. Ultra structural and DNA studies have confirmed these findings and T. beigelli has been divided into a number of distinct species. There are seven species that are pathogenic for humans: Trichosporon asahii, Trichosporon asteroides, Trichosporon cutaneum, Trichosporon inkin, Trichosporon mucoides, Trichosporon ovoides and Trichosporon loubieri.

Disseminated trichosporonosis is an uncommon but increasingly reported and frequently a fatal fungal infection in immunocompromised patients. It is believed that most cases of trichosporonosis attributed previously to T. beigelli and T. cutaneum were probably caused by T. asahii which is now emerging as an important life-threatening opportunistic systemic pathogen, especially in granulocytopenic and immunocompromised hosts.

Clinically, trichosporonosis appears with fever, pulmonary infiltrates, azotemia, renal dysfunction and skin lesions. The yeast can be isolated from the sputum, the urine, the skin and the blood. Trichosporon spp. were also indicated as the cause of sepsis in immature infants and summer-type hypersensitivity pneumonitis (SHP) in Japan.

Case Report

A seven-month-old male child (weight 6.5 Kgs) was admitted in Sir Padampat Maternal and Child Health Institute, Jaipur in August 2005. He was diagnosed as a treated case of posterior urethral valve infection. As per his medical records he had undergone cystoscopy with valve fulguration for valvular obstruction of posterior urethra in July 2005. The surgery was performed under cover of antibiotics such as ampicillin and gentamicin starting a day prior to the surgery and continued for five days post operatively. These were then followed by co-trimoxazole for three weeks. The patient was also catheterized for five days to aid free flow of urine. The patient recovered following surgery and was discharged. One month later he presented with complaints of fever, severe vomiting and crying on micturition for five to six days, which necessitated his re-admission in pediatric surgical ward in August 2005. Upon physical examination his general condition was found satisfactory but he had pyrexia of 10°F. His blood parameters were as follows: Hb 13.2 g/dL, TLC 9200/mL (N52%, L44%, M1%, E0.3%), Serum urea 38 mg/dL, Serum creatinine 0.7 mg/dL and Serum electrolytes (Na+ 136 mmol/L, K+ 4.1 mmol/L and Cl− 95 mmol/L).

The patient’s urine sample was sent for routine culture and sensitivity testing. The sample was inoculated on blood agar and MacConkey’s agar plates and incubated overnight at 37°C. Tiny, creamy- white, dry, wrinkled colonies were seen on blood agar. The Gram stain of the colony revealed the presence of septate hyaline hyphae with arthrospores and few budding yeast cells (Fig. 1). The colony was sub cultured on sets of Sabouraud dextrose agar (SDA) slants (with and without supplementation of antibiotics). These
were incubated at 28°C and 37°C. At both these temperatures numerous colonies of yeast like fungus were obtained in pure cultures, within 24 hours. Two more consecutive urine samples of the patient were obtained and analyzed. The diagnosis was established by demonstration of yeast forms in the urinary precipitate and budding yeast cells and arthroconidia in the cultures.

The yeast was identified with corn meal agar morphology (Fig. 2), hydrolysis of urea, carbohydrate fermentation assimilation tests and nitrate assimilation tests.5,6 Depending upon morphology, cultural and biochemical characteristics, the isolate was identified as T. asahii.

On the basis of our preliminary report, antifungal therapy with hamycin was initiated and the condition of the child improved dramatically. After four weeks of antifungal treatment this urine sample was sent for repeat fungal culture and it was found to be negative for the fungus.

Discussion

The increase in profoundly immunocompromized patients has been accompanied by an increase not only in frequency of opportunistic fungal infections but also in the variety of species involved.

Trichosporon spp. is one of the emerging mycoses in neutropenic patients, usually in the setting of a haematological malignancy. Trichosporon asahii causes white piedra, a superficial infection of hair shafts mainly restricted to tropical regions and less commonly onychomycosis in immunocompetent humans. In immunodeficient hosts it has been isolated from blood, skin and viscera causing various localized or disseminated deep infections.7 To the best of our knowledge this is the first report from Western India implicating T. asahii as an agent of urinary tract infection.

Isolation of the same yeast in three consecutive urine samples and the fact that no bacteria were isolated, establishes Trichosporon asahii as an etiologial agent of urinary tract infection in the patient. The fact that there was clearance of organisms from the urinary tract with recovery of the patient following antifungal treatment strongly associates the yeast as a cause of UTI.

Factors that enhance mucosal colonization and subsequent invasion of Trichosporon spp. include broad spectrum antibiotic treatment and breaks in mucosal barriers.8 Our patient exhibited risk factors such as trauma during surgery, presence of indwelling catheter and use of broad spectrum antibiotics.

Trichosporon spp. are occasionally a part of normal flora of human skin. In fact this yeast has been documented on intact perigenital skin in 12.4% of the population in one study.2 Therefore, it is possible that the organism colonized the catheter from the human flora during catheterization and subsequently progressed towards invasive trichosporonosis.

Nosocomial urinary tract infection due to T. asahii has been reported from Chile.9

Trichosporonosis is usually an insidious disease but it can present as an acute opportunistic infection in susceptible persons. Its diagnosis is likely to be missed particularly in developing countries, because of a general lack of awareness and lack of acquaintance with the salient diagnostic features of the etiologic agent.

References


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Announcement

IX National Conference of Hospital Infection Society of India (IX HISICON-2007)
Organized by: Department of Microbiology, Government Medical College Hospital, Sector 32, Chandigarh (February 16-18, 2007)

February 15, 2007: CME on "Nosocomial Fungal Infections"
February 16-18, 2007: Conference Theme "Infection Control: The Challenge Ahead"

Conference highlights are as follows:
There will be symposia and free paper sessions. (Oral and Poster Presentations)

Likely topics to be covered during symposia are:

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- Infection in NICU
- Device related infections
- Environmental Disinfection
- Drug resistance
- Surgical site infections
- Nosocomial viral infections
- Unsafe injection practices
- Role of hospitals in community outbreaks
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- Hospital infection surveillance
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- Surgical chemoprophylaxis
- Hospital waste management
- Importance of Hand Washing
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