

A Case of Streptococcus Mitis Urinary Tract Infection in an Infant**Mohanty A¹, Kundu R², Krishnamurthy S³, Mandal J⁴**¹Senior Resident, Department of Microbiology, Jawaharlal Institute of Postgraduate Medical Education & Research (JIPMER), Puducherry, India- 605006²Junior Resident, Department of Microbiology, Jawaharlal Institute of Postgraduate Medical Education & Research (JIPMER), Puducherry, India- 605006³Professor, Department of Paediatrics, Jawaharlal Institute of Postgraduate Medical Education & Research (JIPMER), Puducherry, India- 605006⁴Professor, Department of Microbiology, Jawaharlal Institute of Postgraduate Medical Education & Research (JIPMER), Puducherry, India- 605006

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Corresponding author: Jharna Mandal

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Abstract:

Streptococcus mitis has been rarely associated with urinary tract infections. It is one of the species included in the viridans group of streptococci, which is otherwise a normal commensal of the female genital tract. Herein, we discuss a case of urinary tract infection by a strain of *S. mitis* in a 2.5-month-old infant with multiple congenital anomalies.

Keywords: *Streptococcus mitis*, Urinary Tract Infection, infant

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Introduction

Most paediatric urinary tract infections (UTIs) are due to Gram-negative organisms [1]. *Escherichia coli* is the causative agent in > 80 to 90% of UTIs among all age groups [2]. Gram-positive cocci, such as *Enterococci*, group B *Streptococci*, and *Staphylococcus saprophyticus* are also known to cause UTI in children [3]. *S. mitis*, when isolated on culture from healthy children's urine samples, is mostly a contaminant but has been implicated as a causative agent for urinary tract infections in rare conditions [4]. We present the case of an infant with *S. mitis* urinary tract infection in the setting of multiple congenital anomalies and severe bilateral vesicoureteral reflux.

Case History

A 2.5-month-old male infant presented to the Paediatric outpatient department with excessive crying and a history of poor feeding.

The child had pre-auricular tags (two on the right ear and one on the left ear). Antenatally, the mother was diagnosed with Gestational Diabetes mellitus in the third month of pregnancy.

In the seventh month of pregnancy, the ultrasonogram findings revealed doubtful situs inverses totalis. In the most recent visit, the infant was diagnosed with Grade 5 vesicoureteral reflux, bilateral undescended testis, and patent ductus arteriosus. Urine routine microscopy showed <5 pus cells per high power field (hpf). The sample was inoculated on 5% Sheep Blood agar and CLED (Cystine Lactose Electrolyte Deficient) medium. After overnight incubation, significant growth (10^5 CFU/ml) of smooth, non-pigmented, convex colonies showing alpha hemolysis on 5% Sheep Blood Agar were noted, which failed to grow on CLED agar (Figure 1).

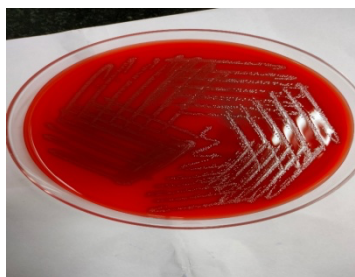


Figure 1: Blood agar showing alpha-hemolytic colonies

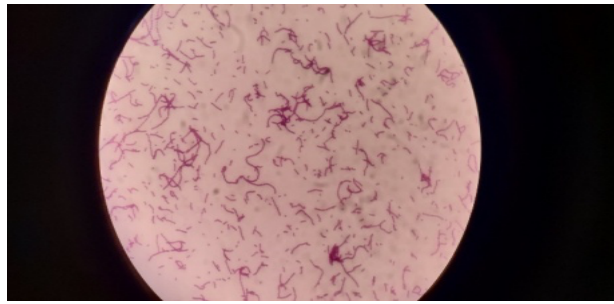


Figure 2: Gram stain from the colonies grown on blood agar showing Gram-positive cocci in chains

Gram-positive cocci in long chains were seen on Gram stain (Figure 2).

The colonies were identified as *Streptococcus mitis* by VITEK®MS (BioMerieux, France). The Antibiotic sensitivity by the Kirby Bauer disc diffusion method showed resistance to ampicillin, ciprofloxacin, and sensitivity to nitrofurantoin, and vancomycin (Clinical Laboratory Standards Institute guidelines). The VITEK® 2 AST (Bio Merieux, France) showed resistance to benzylpenicillin, cefotaxime, ceftriaxone, ciprofloxacin, and sensitivity to vancomycin, cotrimoxazole, and linezolid.

The white blood cell count (WBC) was 31,200/mm³ (72% neutrophils and 28% lymphocytes). The electrolytes and renal function tests were within normal limits. An ultrasonogram of the kidneys showed bilateral kidney lower lobe caliectasis, ambiguous genitalia, and a doubtful duplex collecting system. Grade 5 bilateral VUR was noted on the voiding cystourethrogram (VCUG).

The child was prescribed cephalixin syrup and a repeat urine culture after one week was sterile.

The child is being regularly followed up at the Paediatric nephrology services. The mother has been advised to continue the syrup cephalixin (antibiotic prophylaxis for vesicoureteral reflux) until the child turns 5 years of age.

Discussion

Streptococcus mitis has been a known cause of various infections in humans (such as bacteremia and infective endocarditis) and is also an opportunistic pathogen in immune-compromised individuals.

It is a member of the viridians group of streptococci and is the primary species of the mitis group, which also includes the pathogenic *S. pneumoniae*[5].

Functional or structural anomalies of the urinary tract predispose children to infections of the urinary system with organisms such as *-Streptococcus agalactiae*, viridians streptococci, *S. pneumoniae*, *Staphylococcus aureus*, *Haemophilus influenzae*, *S. epidermidis*, etc [6]. One of the most common urologic anomalies in children is VUR (Vesicoureteral reflux). In this, the urine refluxes

back to the kidneys from the bladder allowing the bacteria to ascend, leading to pyelonephritis. It is an important risk factor for recurrent UTIs in children. Repeated episodes of pyelonephritis lead to renal scarring[7]. VUR occurs in 25 to 30% of children who have had an episode of UTI [8]. Spontaneous resolution is often seen in primary VUR unlike in secondary VUR where improvement occurs after the removal of a blockage or treatment of the neurologic condition[9].

In the case of children <3 years of age with unexplained fever, urinalysis, and urine culture are warranted. Also, in the case of children ≥ 3 years of age with new-onset bed wetting or other urinary symptoms, this should be adopted as a standard practice.

Our patient was an infant with renal abnormalities who presented with persistent fever and elevated WBCs. Routine urine microscopy showed <5 WBC/hpf; and growth of *S.mitis* on urine culture. The infant improved after a week of treatment and the underlying vesicoureteral reflux was identified.

A review of the literature revealed numerous case reports of *S.mitis* causing UTIs. In a study by Ewa *et al* in Poland, *S.mitis* was a causative agent of UTI in 14.7% of the population[10]. In a study conducted by Oteo *et al* in Spain, a *Streptococcus mitis* strain resistant to penicillin was implicated as the etiologic agent of urinary tract infection in a child with vesicoureteral reflux[11].

To conclude, it is important to recognize this organism as a causative agent of UTI in children with underlying anatomical or functional renal anomalies.

Declaration of Consent

Informed consent was taken from the patient's legal guardian (parents). The patient party was explained that the names and initials will not be published and due efforts will be made to conceal the identity.

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