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Mini Review

Streptococcus agalactiae Urinary Tract Infection: Are we Aware of the True Prevalence of This Pathogen's Burden in Resource Limited Countries Like India?

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Abstract

Streptococcus agalactiae or Group B Streptococci (GBS) is a lesser-known pathogen of Urinary Tract Infection (UTI) especially in developing countries. There have been very few cases/series reported from India. This study over four years noted approximately 1% of positive cultures to be GBS at par with world literature. Out of a total of 10,508 positive cultures, 94 were GBS. Awareness of prevalence rate of the organism is foremost in the path to diagnose this pathogen that is easy to treat, but if undiagnosed can lead to long-term complications and morbidity.

Keywords: *Streptococcus agalactiae*, UTI: Urinary tract infection, GBS.

Introduction

Urine cultures account for the commonest specimens in any microbiology laboratory be they standalone or hospital associated. Gram negative bacteria such as Enterobacterales are the commonest pathogens encountered in Urinary Tract Infections (UTI). *Pseudomonas* spp, are uncommon pathogens in special situations such as elderly and catheterized patients. *Enterococcus* spp are seen in chronically ill, hospitalized debilitated patients with urinary tract obstruction, catheterization or instrumentation. There are very few reports of *Streptococcus agalactiae* UTI cases from India, most being individual case reports such as in pregnant females [1,2], diabetic patients [3] or small case series [4]. We analyzed data over the last four years to see the prevalence of *Streptococcus agalactiae* in urine samples.

Materials and Methods:

All urine samples received for culture in the microbiology department of this standalone diagnostic laboratory that caters to both outdoor and inpatients with patient profiles spanning across various strata of the society, age groups, and ethnicities during the period December 2020 to November 2024, were included in the study. Urine microscopy and routine examination were performed on all samples. Standard protocols were followed for bacterial identification using routine biochemical tests as well as automated identification on VITEK 2 Compact® instrument. When pure and heavy growth of minute translucent colonies on Cystine Lactose Electrolyte Deficient (CLED) agar was noted with *concomitant pyuria*, colonies were subjected to gram staining. Those that were gram positive cocci in pairs and chains, catalase negative, were followed up by Christie-Atkins-Munch-Peterson (CAMP) test (Figure1) and bile esculin test. Confirmation by VITEK GP card was done if the former was positive and the latter test result negative. A retrospective anonymized analysis of long-term data storage of

VITEK 2 Compact® was conducted for the number and pattern of pathogens isolated from urine samples. The purpose of the study was to evaluate the prevalence of *Streptococcal agalactiae* isolates in urine samples amongst all urinary isolates, specifically Gram-positive isolates during the four-year study period excluding *Staphylococcus* spp Figure 1.

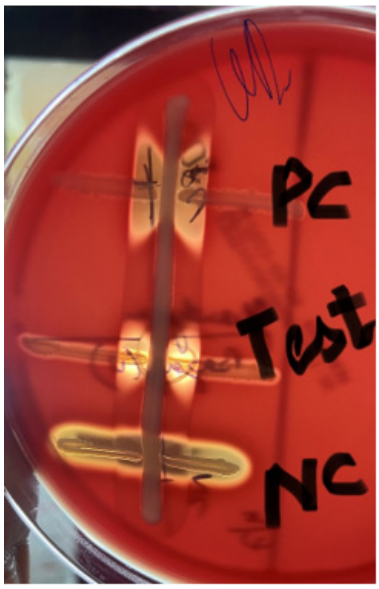

Figure 1: CAMP test with positive and negative controls.

Results

45,160 urine samples were cultured during this period. 10,508 (23.26%) of them were culture positive. *Escherichia coli* was the predominant isolate seen in 6478 patients, followed by *Klebsiella* spp in 2194, *Pseudomonas* spp in 643, *Citrobacter koseri* in 260, and *Proteus mirabilis* in 99.550 isolates were gram positive cocci in pairs and chains, catalase negative, that were subjected to CAMP and Bile esculin testing. 94 out of 550 (16.84%) were confirmed to be *Streptococcus agalactiae*. Their antimicrobial susceptibility results noted were: 100% of isolates were sensitive to Penicillin, Ampicillin, Cefotaxime, Ceftriaxone, Vancomycin, Linezolid, 70% to Chloramphenicol and Levofloxacin and 50% to Erythromycin. The patient demographics were as follows. Majority of the patients were females- 76/94, the ages ranged between 56 and 82 years, mean age being 68 years.

Discussion

Streptococcus agalactiae happens to be an unrecognized pathogen of UTI. The reasons could be lack of awareness about its prevalence, and resources such as unavailability of control strains for CAMP testing, followed by confirmation in automated instruments, in most laboratories. The agent has traditionally been associated with infections in pregnant females and neonates. Its epidemiology in non-pregnant adult patients has not been fully evaluated in developing countries like India. The rates of incidence have however been found to be ever increasing in the USA, from 3.6/100,000 people in 1990 to 7.3/100,000 in 2007 [5].

Streptococcus agalactiae colonizes the gut, genitourinary tract, and upper respiratory tract, with rates ranging from 12-22% in elderly patients [5]. Risk factors such as old age, diabetes, prolonged hospitalization, bed-ridden status, chronic pulmonary, cardiovascular or renal disease, urologic pathology/ obstruction, alcohol abuse, liver disease, smoking obesity, malignancy leads to invasive diseases like pneumonia, bacteremia, and urinary tract infections with high mortality rates. *Streptococcus agalactiae* isolation rates range between 1-2% of all monomicrobial positive urine cultures. In this study the rates were approximately 1% (0.89%). Of note was the fact that out of all gram-positive cocci suspected to be *Enterococcus* spp, approximately 17% turned out to be *S. agalactiae*. As per epidemiological data [5] if we consider 20% of these isolates to be colonizers, there would still be 75 patients with this pathogen as a cause of UTI.

The treatment options available for *Streptococcus agalactiae* UTI include Penicillin, extended spectrum cephalosporins, trimethoprim-sulfamethoxazole, beta lactam/beta lactam inhibitor combinations, clindamycin, macrolides, fluoroquinolones and vancomycin. If this organism is misidentified as *Enterococcus* spp, several options would be unavailable. Cephalosporins, trimethoprim-sulfamethoxazole and clindamycin cannot be used as Enterococci are intrinsically resistant to them. Also, GBS have a propensity to cause invasive infections such as bacteremia, osteomyelitis, septic arthritis [6], and pyelonephritis. Hence, proper identification and treatment as per sensitivity report is necessary to prevent long-term debilitating complications. As this was a retrospective

laboratory-based data analysis, there were many shortcomings. There was lack of history of predisposing risk factors, or correlation of symptoms to treatment outcomes. Although GBS isolates from urine samples alone were considered, the patients may have had concomitant infections of another site with the same pathogen or another pathogen and may have received antibiotic therapy for the same. An important finding in the study was that none of the patients were young pregnant or non-pregnant females.

Conclusion

We conclude that Group B *streptococcus* is not a rare isolate from urine samples. Its prevalence in the non-pregnant adult population, especially elderly patients, needs to be recognized with proper identification and susceptibility testing so that long term complications can be prevented.

Acknowledgements

None.

Conflict of Interest

None.

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