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Case Report

An Unusual Case of Bacterial Meningitis Caused by *Streptococcus agalactiae* in a Young Male HIV Patient

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Abstract

Streptococcus agalactiae is a common bacteria of the human flora. Infection of the CNS is a common cause of morbidity in patients with HIV infection. Meningitis in neonates and pregnant women, mainly caused by *Streptococcus agalactiae*. It mainly occurs in patients with an immunocompromised state. Our case report deals with an unusual case of bacterial meningitis caused by *Streptococcus agalactiae* in a young male patient who is a known case of HIV infection with no recent source of bacterial infection/colonization and other known risk factors.

Keywords: *Streptococcus agalactiae; Meningitis; HIV Infection; Cryptococcus neoformans; Mycobacterium tuberculosis; Listeria monocytogenes*

Introduction

Streptococcus agalactiae, also referred as Lancefield group B *Streptococcus* (GBS), is a leading cause of bacterial meningitis and sepsis in neonates and an important cause of disease among pregnant women [1].

Significant number of people suffer from diabetes mellitus, cancer, cirrhosis, previous administration of glucocorticoids, immunological and neurological impairment [2].

Patients with systemic lupus erythematosus (SLE) are more prone to develop infections compared to the general population. The most common sites of infections are lungs, skin and genitourinary tract [3].

Bacterial meningitis is rare in patients with SLE and is most commonly caused by *Cryptococcus neoformans, Mycobacterium tuberculosis, Listeria monocytogenes* and *Streptococcus pneumoniae* [4,5].

Though pregnant women are at higher risk of invasive GBS infections; a significant increase has been reported among non-pregnant adults during the past two decades [6,7].

GBS clinical manifestations include bacteraemia, skin and soft tissue infection, pneumonia and osteomyelitis [8].

Among them, meningitis is uncommon accounting for about 4% of all cases of bacterial meningitis in adults. The majority of them had a serious underlying disease and the risk of meningitis was higher among the elderly ones. GBS meningitis is a severe infection with poor outcome [9].

Streptococcus agalactiae (group B *Streptococcus*) is a major cause of sepsis and meningitis in neonates and an important cause of invasive disease in adults [9].

Background

Meningitis caused by *Streptococcus agalactiae* (Group B *Streptococcus*) is rare in adults and usually affects patients with predisposing conditions.

Case Presentation

Our patient presented to the emergency department on the 7th of May 2023 with complaints of drowsiness, irrelevant speech, headache accompanied by 4 to 5 episodes of projectile vomiting starting around 6 hours prior to arrival at the hospital. On further questioning he gave history of fever which started 10 days ago, intermittent in nature, low grade (between 101-102^{0}F) and partially resolved with paracetamol. Other neurological examination findings were normal. The patient later described the speech as inability to express what he intended to, while the family described it as completely irrelevant speech. He was suspected to have meningitis and was empirically started ceftriaxone 2 grams intravenously and was shifted to the neurology ICU. Presence of speech abnormalities indicated a possible temporal lobe involvement and therefore acyclovir was added within 3 hours of admission to cover for Herpes temporal lobe encephalitis. The patient improved drastically within 6 hours of admission and regained normal sensorium and speech. He is a known case of HIV infection on medication. His recent viral load was undetectable, patient is compliant to retroviral medication. Lumbar puncture was done to find the cause of meningitis. Common causes like tuberculosis, virus and *Cryptococcus* were negative but the patient tested positive for *Streptococcus agalactiae* (Figure 1) through Multiplex-PCR. Culture was negative. Cell counts revealed 350 WBC/mm^3 with lymphocyte predominance (80%). CSF glucose was low (22 mg/dl) and protein was elevated at 148 mg/dl. MRI was normal with no temporal lobe changes. He had no history of recent skin and soft tissue infection or pneumonia with no previous episodes of similar complaints. He is not a diabetic with no previous history of stroke, malignancy or other chronic diseases other than HIV. He was diagnosed with HIV infection on 9th December 2021 after a history of chronic diarrhea for 6 months, intermittent fever and significant loss of weight. He is currently on combination therapy of tenofovir, lamivudine and dolutegravir. He had an episode of extrapulmonary tuberculosis of the lymph node diagnosed on April 25th 2022, which later ruptured to form a tracheoesophageal fistula. Multiple stenting, clipping procedures were done and it finally resolved two months prior to his current illness. On day 2 of illness, the patient has returned to normal sensorium with complete resolution of headache, speech abnormality and no further episodes of vomiting. Acyclovir was discontinued and the patient was shifted to the medicine ward. He has been scheduled for discharge in 2 days and will continue ceftriaxone for the total recommendation of 14 days.

Discussion

Infection with *Streptococcus agalactiae* is much more common in neonatal, pregnant and elderly population groups. The most common infections caused by *Streptococcus agalactiae* in non-pregnant adults are skin and soft tissue infection, bacteriemia without focus and pneumonia. Infections such as meningitis, endocarditis, though shown to have worse prognosis, are much rarer [10].

Chronic diseases have been implied as risk factors for Group B streptococcal infection. Diseases such as cirrhosis, diabetes, stroke, cancer, decubitus ulcer and neurogenic bladder have been associated with increased risk [1]. In one study, 30% of community acquired

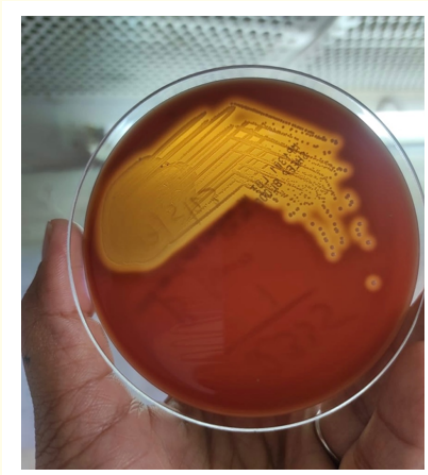

Figure 1: *Streptococcal agalactiae showing beta hemolysis (Image taken with permission from microbiology department, Apollo hospitals Jubilee hills. Used for representation only as culture was negative).*

cases group B streptococcal meningitis in adults were associated with an immunocompromised state (diabetes, alcoholism) but HIV by itself was not found to be a risk factor [11].

Central nervous system infections remain one of the major causes of morbidity and mortality among HIV infected people. The leading opportunistic infections contributing to this are tubercular meningitis and cryptococcal meningitis [12].

Streptococcus agalactiae meningitis has not shown any association with isolated HIV infection. Only a total of 4 cases of *Streptococcus agalactiae* meningitis were reported in HIV patients until the year 2000 [13].

Current treatment guidelines recommend high dose penicillin G as the first line of treatment. Ceftriaxone is an acceptable alternative and is more widely used. Vancomycin or ceftriaxone can be given in patients with penicillin allergy. Since the patient showed rapid response to the administered ceftriaxone, the rare possibility of a Penicillin-Non-susceptible group B *Streptococcus* (PRGBS) which was recently reported in a non-HIV immunocompromised adult in Japan, can be effectively ruled out [14].

Summary

Common central nervous infections in HIV infected individuals are tubercular and cryptococcal in nature. These infections are a major source of morbidity and mortality in these patients. *Streptococcus agalactiae* is common cause of meningitis in pregnant women and neonates. Chronic diseases liver disease, certain immunocompromised states, diabetes, stroke, decubitus ulcer and neurogenic bladder have all been shown to be risk factors for this infection in adults but HIV infection by itself is not a risk factor. Most risk factors mentioned are based old studies and a more recent evaluation of risk factors is needed to rule the possible presence confounding factors in our patient may have predisposed him to such a rare cause of morbidity in HIV infection.

Conclusion

Association of *Streptococcal agalactiae* meningitis with HIV infection though not established, is based on data from older literature. Recent evaluation of risk factors for Group B streptococcal infection is not an active area of research. Through our case report we want to

bring to attention the need for re-evaluation of these risk factors to rule out any confounding factors which may have contributed separately as risk factors for development of an otherwise rare cause of meningitis in a HIV positive individual.

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