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Group B Streptococcus Meningitis Associated with Acute Otitis Media in an Adult Patient

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Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
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Patient: Female, 55-year-old
Final Diagnosis: *Streptococcus agalactiae* meningitis
Symptoms: Altered mental status • seizures
Medication: —
Clinical Procedure: —
Specialty: Infectious Diseases

Objective: Unusual clinical course

Background: We present a case of Group B Streptococcus (*Streptococcus agalactiae* or GBS) meningitis in a non-pregnant woman that likely originated from acute otitis media. Although invasive Group B Streptococcal infections are increasing in the United States, GBS meningitis is still rare in non-pregnant adults. At the end, we discuss risk factors for this disease and data that suggest that invasive GBS infection is increasing in the adult and elderly populations of the United States.

Case Report: Our patient was a 55-year-old woman with a history of juvenile rheumatoid arthritis who presented with altered mental status after failure of outpatient treatment of otitis media with oral doxycycline and steroids. Upon admission, she was initially afebrile and hemodynamically stable, but she had a rapid decline and required emergent intubation. Blood cultures grew GBS. CSF PCR analysis performed by BioFire® FilmArray® Meningitis/Encephalitis Panel revealed GBS. Middle-ear fluid and CSF cultures drawn after 1 day of antibiotic therapy did not grow any organisms. Treatment was achieved with high-dose intravenous ceftriaxone for 14 days, and tympanoplasty. At the end of 14 days of antibiotic therapy, the patient had full neurological recovery, without any residual neurological deficits.

Conclusions: GBS meningitis is classically associated with neonatal disease, but invasive GBS infection is fairly common in adults and appears to be increasing in incidence secondary to increasing populations living with diabetes, immunosuppressed conditions, and advanced age. Central nervous system infection with this organism is still rare. In this case report we describe a non-pregnant woman who presented with GBS meningitis.

Keywords: Critical Care • Infectious Disease Medicine • Meningitis, Bacterial • Streptococcal Infections

Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/933093

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Background

Group B Streptococcus is one of the most common causes of sepsis and meningitis in neonates and is a major cause of concern during the postpartum period. However, the incidence of invasive GBS infection in non-pregnant adults is also increasing in the United States. The incidence of GBS meningitis in adults is still rare. Invasive GBS infection in adults is commonly associated with other comorbidities or concurrent infections elsewhere in the body [1]. Here, we present the case of a non-pregnant woman who developed a GBS meningitis preceded by several days of ear infection, leading to bacteremia.

Case Report

Our patient was a 55-year-old obese woman with a history of juvenile rheumatoid arthritis who presented to the hospital with acute metabolic encephalopathy. Before admission, she had been undergoing treatment for right-sided acute otitis media and right middle-ear effusion through her primary care provider and ENT specialist for the past 3 weeks. Her treatment included a trial of doxycycline and steroids. There was a tentative plan for a tympanoplasty if her tympanic effusion remained. Despite treatment, her effusion remained. About 2 days before presentation, the patient started developing severe right-sided headaches with associated nausea and emesis. While these symptoms persisted, her mentation worsened and she became increasingly confused, prompting her husband to bring her to the hospital.

At presentation to the hospital Emergency Department (ED), the patient appeared acutely ill, with altered mental status. She was unable to coherently provide a history. On examination, she had a significant amount of right-ear tympanic bulging and effusion but she did not have any meningismus. She was otherwise afebrile, without leukocytosis on laboratory testing and with an unremarkable CT head scan. She rapidly deteriorated, with acute respiratory failure and required emergent intubation.

The patient was started on empiric antibiotics (vancomycin 1.5 g Q8h and ceftriaxone 1g q12h.) She became febrile with marked leukocytosis. A maxillofacial MRI revealed significant fluid in the right mastoid and right middle ear, which was suggestive of acute otitis media and mastoiditis. An ear, nose, and throat (ENT) specialist performed emergent tympanoplasty with tube placement and the patient was then started on systemic steroids. A lumbar puncture was done and revealed profound leukocytosis with a WBC count of 12 815/cmm. CSF glucose was low at 39 mg/dl and CSF protein was elevated at 564 mg/dl. Blood cultures grew GBS but no other pathogens. Cultures from the CSF and the middle-ear fluid drawn during the tympanoplasty did not have any growth, as the patient had been on 1 day of antibiotics by then. However, CSF PCR performed with a BioFire® FilmArray® Meningitis/Encephalitis Panel kit confirmed the presence of GBS.

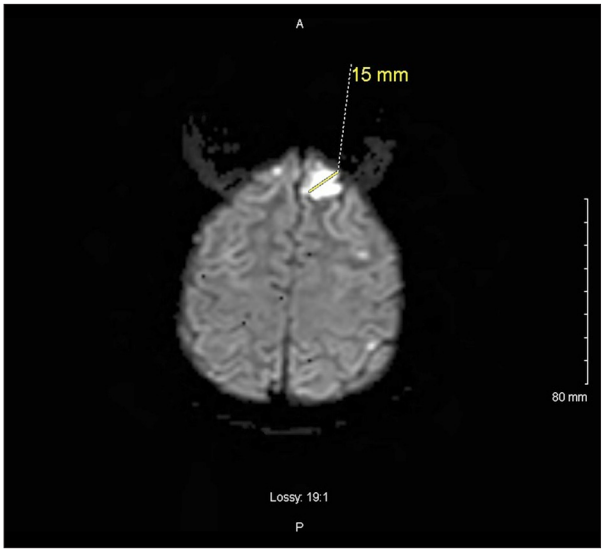

Figure 1. 1.5-cm ovoid foci of diffusion restriction with increased FLAIR, raising suspicion of cerebritis.

In response, her antibiotics were adjusted to a high dose (ceftriaxone 2 g i.v. q12). On day 4 of her ICU stay, she was noted to have myoclonic activity in her right arm. A follow-up MRI brain revealed a 1.5-cm foci of diffusion restriction with increased FLAIR signal in the parasagittal left frontal lobe on axial DWI (**Figure 1**) along with multiple additional small foci of diffusion restriction (<5 mm) scattered throughout the cortex, raising concerns for cerebritis. She completed 2 weeks of high-dose intravenous ceftriaxone, with full neurological recovery. The infectious disease physician signed off at that point. However, without the knowledge of the infectious disease consultant, ENT started the patient again on doxycycline before discharge. This highlights the importance of educating other specialities in appropriate antibiotic selection.

Discussion

Group B Streptococcus (*Streptococcus agalactiae*) is an encapsulated gram-positive, beta hemolytic, catalase negative, facultative anaerobe that is commensal with humans. This bacterium has a tendency to colonize tissues such as the gastrointestinal, respiratory, and vaginal tracts and it is believed that about 15-40% of all women have vaginal colonization [2]. Despite its widespread presence, it most commonly presents as a less serious non-invasive disease such as asymptomatic bacteriuria. However, GBS is a major pathogen causing neonatal sepsis meningitis and peripartum infection [3].

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Studies suggest the incidence of invasive GBS infection in non-pregnant adults is rising in the USA. From 2008 to 2016, Watkins et al performed an epidemiologic study evaluating invasive GBS infection in the USA, finding an increasing incidence, from 8.1% in 2008 to 10.9% in 2016 (*P*=0.002 for trend). What was particularly striking is that many positive cases in 2016 also were associated with either obesity or diabetes [4]. An epidemiological study by Schwartz et al also found a nearly 10-fold higher risk of invasive GBS in diabetics [1]. It appears that more investigation in defining individuals at risk of invasive GBS may be important in the future as the obesity and diabetes epidemics continue to progress in the United States. There is already a suggestion that African American communities may be at higher risk [1,5].

In regards to CNS infection, the incidence of Group B Streptococcus meningitis in adults appears to be exceptionally low and incidence data are very limited in the USA. Van Kessel et al calculated an incidence rate of about 0.16 per 1 million adults based on 33 cohort studies done in the Netherlands [6]. Previous epidemiological studies in the USA have suggested that CNS involvement occurs in around 1.6% of all cases of invasive GBS infection for both children (non-neonatal) and adults [7]. In their population study, Farley et al reported that out of 137 non-pregnant adult patients with invasive GBS infection detected in Atlanta GA, only 5 presented with meningitis (3.7%) [5]. Jackson et al reported 8 cases of GBS meningitis out of a total of 219 observed invasive GBS infections (8%) [8]. These studies suggest that patients who are immunocompromised, elderly, diabetic, or with endocarditis are at particular risk of GBS meningitis [6,9,10]. A large outbreak of GBS meningitis in Asia was reported after consumption of raw fish [11].

Presentation of GBS meningitis is clinically very similar to other forms of bacterial meningitides. Empiric antibiotics for the coverage of more common bacterial pathogens such as *Neisseria meningitidis* and *Streptococcus pneumoniae* include third-generation cephalosporins, which typically are used to treat GBS infection. Mortality rates based on previous literature reviews suggest the fatality rate may be as high as 30% [9,10]. Risk of mortality has been correlated with advanced age and immunocompromised state [7].

Conclusions

Incidence of Invasive Group B Streptococcus (*Streptococcus agalactiae*) infection in non-pregnant adults may be increasing in the United States with the growing elderly and diabetic populations. Fortunately, GBS meningitis in non-pregnant adults is still rare.

Statement

This manuscript for submission is original research, conducted by the authors above. All authors above participated in creating the manuscript and had the opportunity to edit and revise as they saw fit. There are no conflicts of interest, affiliations, or involvement with any other third-party entities that may benefit from the discussion of the material in this manuscript to declare. This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities. Informed consent was obtained from the patient and is available upon request. There are no other funding or supporting sources to declare.

Declaration of Figures Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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