A case report of GBS meningitis in healthy adolescent

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Abstract

Streptococcus agalactiae (Group B, β-hemolytic Streptococcus: GBS) is a common causative agent of infection in pregnant women, newborns, and children less than three-year-old. GBS has naturally colonized bacteria in the gastrointestinal and genitourinary tract of adults. Invasive GBS infection cases in non-pregnant adults had been a two to four-fold increase in two decades. Commonly, those were underlying individuals; diabetes mellitus, cancer, immunocompromised, and immunosuppressive drug use. Primary bloodstream infection (bacteremia without a localized source) is the most common manifestation of invasive GBS infection. While localized GBS infection, skin-soft tissue infection (subcutaneous abscess) is the most frequent form. GBS meningitis is a rare condition in adults (incidence is approximately 0.15 cases in 100,000 persons), the additional reported risk factors are craniotomy, cerebrospinal fluid leakage, infective endocarditis, and sexual intercourse.

This case report described GBS meningitis in the uncommon aged group; a male adolescent with no underlying disease and risk factor. He presented with high-grade fever and severe headache with photophobia and nuchal rigidity on physical examination. GBS was identified from cerebrospinal fluid and blood from culture (CSF latex agglutination of GBS was negative) leading to confirmed diagnosis of GBS meningitis and bacteremia. The appropriate antibiotic and supportive treatment were given to this patient. He was in complete recovery without sequelae.

Key words: GBS meningitis, Group B streptococcus infection, Streptococcus agalactiae infection

Introduction

Group B streptococcus (GBS) or *Streptococcus agalactiae* is a common causative agent in newborn and early childhood infections related to childbirth contamination[1]. Invasive GBS infection in a non-pregnant adult is commonly found in elderly, immunocompromised, or severe underlying patients. There are wide-range manifestations of invasive GBS infection; mild to severe diseases such as urinary tract infection, skin and soft tissue infections, pneumonia, bone and joint infections, and bloodstream infection including a rare form of disease-meningitis[2]. This case report described GBS meningitis in the uncommon aged group; a male adolescent with no underlying disease.

Case History

A 14-year-old male patient presented with severe headache and high-grade fever for three days associated with retrobulbar pain, neck pain, myalgia, and poor appetite**.** His past history was unremarkable. He went to the waterfall for swimming one day prior to illness. Physical examination revealed that he looked sick. His vital signs were body temperature of 39.2°C, blood pressure of 122/59 mmHg, pulse rate of 100 bpm, and respiratory rate of 22/min. Neurological

examination showed stiffness of the neck and photophobia**.** There was no abnormality detection on other systems examination. Laboratory results showed a white blood cell count of 16,900 cells/uL (78.8% of neutrophils, 12% of lymphocytes, and 8.7% of monocytes), hemoglobin 12.6 g/dL, hematocrit 38%, platelet count 378,000 cells/uL. Urine analysis and electrolyte results were unremarkable. Lumbar puncture was done on the first day of admission and revealed clear and colorless cerebrospinal fluid (CSF), open pressure of 32 mmH_2O/closed pressure of 30 mmH_2O, few red blood cells, white blood cell 688 cells/uL (polymorphic cells 81%, mononuclear cells 19%), protein 66 mg/dL, sugar 55 mg/dL (DTX 121 mg/dL, ratio 0.45), negative gram stain, fresh smear (for exclusion of *Naegleria fowleri*), and latex agglutination (Wellcogen™ bacterial Antigen Kit) of *Streptococcus* group B, *Hemophilus influenza* type B, *Streptococcus pneumoniae*, and *Neisseria meningitidis*. Blood culture was collected. The other laboratory results were BUN/Cr 8.3/0.79 mg/dl, LFT: TP/Alb 7.49/4.08 gm/dl, AST/ALT 13/24 U/L, TB/DB 0.56/0.17 mg/dl. The empirical antimicrobial agent was ceftriaxone for coverage common causative agents of bacterial meningitis such as *Streptococcus pneumoniae* or *Streptococcus* spp., *Neisseria meningitidis*, *Salmonella* spp. After blood culture reported gram-positive cocci in the cluster, vancomycin was added to the patient. CT brain with contrast imaging and chest radiography showed no abnormality detection. Forty-eight hours later, hemoculture and CSF culture identified *Streptococcus agalactiae* (Streptococcus group B) as sensitive to penicillin, ampicillin, ceftriaxone, clindamycin, and vancomycin. Ceftriaxone and vancomycin were discontinued for de-escalation, while penicillin G: the drug of choice against GBS was started due to susceptibility testing results for a full course of 21 days. An echocardiogram was done to exclude infective endocarditis; the result was normal. The clinical of this patient was improved correlated with the fever declining and totally disappeared after day 6th of antibiotics treatment. Additional history-taking regarding the risk of invasive GBS infection was done, and he refuse to have a sexual experience.

Discussion

GBS is the leading cause of illness and death in young infant[3] naturally colonized in the genitourinary tract and GI tract of adult[4]. The global incidence of GBS in young infants is 0.49 cases/1,000 lives births[5]. The clinical manifestation of invasive GBS disease is bacteremia and localized infection. Primary bacteremia (bacteriemia without focal infection) is the most common form of invasive GBS infection. Bacteremia can occur secondary to the localized source of infection[6-10]. Bacterial meningitis can be results from the invasion of bacteria into the meninges from bacteremia or direct extension from local infection. However, the risk of meningitis after GBS bacteremia is low in adolescences and adults. It has been reported that GBS does not readily penetrate the blood-brain barrier, except in young infants[11]. The risk factors of invasive GBS infection in the adult are pregnancy, elderly, and comorbidities such as diabetes mellitus, malignancy, cirrhosis, HIV infection, steroid intake[12], neurological disorders, heart disease, kidney disease, liver disease, smoking, alcohol abuse, and immunosuppressive conditions[4, 6, 13]. For GBS meningitis in non-pregnant adults, the reported additional predisposing factors are craniotomy[14], cerebrospinal fluid leakage, infective endocarditis[15], and post-sexual intercourse[16]. Although the increase of invasive forms of *Streptococcus agalactiae* infection in non-pregnant hosts worldwide (from 3.6 cases/100,000 persons in 1990 to 7.3 cases/100,000 persons in 2007)[6], GBS meningitis is still rare in previously healthy young adult with no comorbidity or immunosuppressive condition. The estimated incidence of GBS meningitis in adults is 0.15 per 100,000[17]. This patient diagnosed with GBS meningitis with bacteremia is a male adolescent with no underlying disease and identified risk factors (negative echocardiogram and history taking such as previous sexual activity or illness except he went swimming in a waterfall

one day before the illness. The fresh smear of CSF was done to exclude *Naegleria fowleri*: a common ameba found in freshwater leading to primary amebic meningoencephalitis. Although there is no association between GBS infection and swimming in a waterfall from the literature review, an outbreak was reported in 2017 related to raw consumption of improper preparation of fish in Singapore[18]. The clinical manifestation and CSF profile of GBS meningitis are not different from the other bacterial meningitis[19]. In this case, the definite diagnosis came from culture confirmation of both blood and CSF (latex agglutination negative). The sensitivity of latex agglutination was 66.66% when compared with conventional culture for detecting bacterial meningitis[20]. Penicillin G is the first-line antibiotic for GBS treatment. In the sense of GBS meningitis, the minimum duration of antibiotics is 14 days (range 14-21 days) [2]. The antibiotic of this patient was de-escalated to penicillin G when GBS was identified from the CSF culture. Penicillin G was continued to complete a 21-day course of treatment.

Conclusion

Streptococcus agalactiae can be a causative agent of invasive disease not only in newborns but also in adults. Although invasive GBS infection in non-pregnant adults is commonly found in hosts with chronic medical conditions or decreased immune function, it still appears in healthy persons without risk factors by unclear mechanisms. GBS is an uncommon pathogen of meningitis in adults, but it should not be overlooked. When GBS is identified, treatment with appropriate antimicrobial agents and duration leads to a good outcome.

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รายงานผู้ป่วยเยื่อหุ้มสมองอักเสบจากเชื้อ Group B Streptococcus 1 ราย ในวัยรุ่นแข็งแรงดี

สุวดี จิระศักดิ์พิศาล

บทคัดย่อ

Streptococcus agalactiae (Group B, β-hemolytic Streptococcus: GBS) เป็นเชื้อแบคทีเรียก่อโรคที่พบบ่อยในการติดเชื้อที่สัมพันธ์กับการตั้งครรภ์ การคลอด หลังคลอด และการติดเชื้อในเด็กทารกแรกเกิด รวมถึงเด็กอายุน้อยกว่า 3 ปี เชื้อนี้ตามธรรมชาติ (colonization) จะอยู่ในลำไส้และในระบบทางเดินปัสสาวะของผู้ใหญ่ และอวัยวะสืบพันธุ์สตรี จำนวนผู้ป่วยที่เกิดการติดเชื้อรุนแรงจากเชื้อ GBS ในผู้ใหญ่ที่ไม่ตั้งครรภ์มีแนวโน้มเพิ่มสูงขึ้น 2-4 เท่าในช่วง 2 ทศวรรษที่ผ่านมาโดยส่วนใหญ่ของผู้ป่วยเหล่านี้จะมีโรคประจำตัว เช่น เบาหวาน มะเร็ง ภูมิคุ้มกันบกพร่อง หรือใช้ยากดภูมิคุ้มกัน การติดเชื้อในกระแสเลือดโดยปราศจากตำแหน่งการติดเชื้อหลัก (primary blood stream infection) เป็นรูปแบบที่พบบ่อยที่สุดของการติดเชื้อในผู้ใหญ่ที่ไม่ตั้งครรภ์ ส่วนการติดเชื้อ GBS เฉพาะที่ (localized infection) ที่พบบ่อยคือเป็นฝีที่ผิวหนัง (subcutaneous abscess) ส่วนภาวะเยื่อหุ้มสมองอักเสบจากเชื้อ GBS (GBS meningitis) ในผู้ใหญ่พบน้อย (ความชุกอยู่ที่ประมาณ 0.15 ใน 100,000) โดยปัจจัยเสี่ยงของภาวะนี้ที่พบได้คือการผ่าตัดกะโหลกศีรษะ (craniotomy) การรั่วของน้ำไขสันหลัง (cerebrospinal fluid leakage) การติดเชื้อที่เนื้อเยื่อหัวใจ (infective endocarditis) และ การมีเพศสัมพันธ์ เป็นต้น

กรณีศึกษานี้เป็นการรายงานเคสผู้ป่วยเด็กวัยรุ่นชายไทยอายุ 14 ปี แข็งแรงดีไม่มีโรคประจำตัว ไม่มีปัจจัยเสี่ยง มาโรงพยาบาลด้วยไข้สูง ปวดศีรษะรุนแรง ร่วมกับตรวจร่างกายพบคอแข็งและสายตาสู้แสงไม่ได้ ผลเพาะเชื้อในน้ำไขสันหลังและในเลือดขึ้นเชื้อ GBS (CSF latex agglutination สำหรับเชื้อ GBS เป็นลบ) จึงได้รับการวินิจฉัยว่าเป็นเยื่อหุ้มสมองอักเสบจากเชื้อ GBS ร่วมกับมีการติดเชื้อในกระแสเลือด ผู้ป่วยได้รับยาปฏิชีวนะและการดูแลรักษาประคับประคองอย่างเหมาะสม จนหายเป็นปรกติ ปราศจากภาวะแทรกซ้อน

คำสำคัญ: เยื่อหุ้มสมองอักเสบจากเชื้อแบคทีเรีย, การติดเชื้อสเตร็บโตคอคคัสกรุ๊บบี

โรงพยาบาลพระนั่งเกล้า จ.นนทบุรี