An unexpected pathogen in neonatal intensive care unit: Herbaspirillum huttiense

Melda Tas1; Canan Turkyilmaz1; Gulendam Bozdayi2; Hasan Tezer1; Munevver Bas1; Elif Keles1; Aytaç Kenar1; Melis Deniz2; Ibrahim Murathirfanoglu1; Esra Onal1; Ebru Ergenekon1; Esin Koc1

1Neonatology, Department of Pediatrics, Gazi University Medical Faculty, Ankara, Turkey.
2Department of Medical Microbiology, Gazi University Medical Faculty, Ankara, Turkey.
3Department of Pediatrics Infectious Diseases, Gazi University Medical Faculty, Ankara, Turkey.

Abstract

**Background:** Herbaspirillum huttiense is a gram-negative bacteria found in plants and has been isolated from groundwater. It previously identified as an opportunistic pathogen in patients and can cause bacteremia and sepsis rarely. We present a case of H. huttiense bacteremia in a neonate.

**Case:** Our case was hospitalized in the neonatal intensive care unit because of thrombocytopenia developing in the baby of a mother with chronic idiopathic-thrombocytopenic purpura. A high-dose methylprednisolone regimen was administrated for one week. Herbaspirillum huttiense growth was detected in blood culture and treated successfully.

**Conclusions:** Neonates are susceptible to opportunistic infections in the presence of predisposing factors. Molecular identification use in the microbiology laboratories is beneficial in the NICU.

**Keywords:** Bacteremia; Neonate; Herbaspirillum; Immunocompromised host.

Introduction

Herbaspirillum species was first described 25 years ago [1]. as a gram-negative, rod-shaped, motile with polar flagella, and urease, oxidase, and catalase-positive member of the Beta-proteobacteria class. It is a class of bacteria that includes Burkholderia, Ralstonia, and other plant-associated bacteria, and found in the roots and stems of maize, rice, beans, bananas, sugar cane, pineapple, and other plants and they have been isolated from groundwater [2]. And drinking water distribution systems as well [1]. It is a nitrogen-fixing soil and plant bacterium previously not considered a human pathogen [1,3].

H. huttiense has close phylogenetic and phenotypic similarity with the Burkholderia cepacia complex, previously leading to frequent misidentifications and under-recognition of infections [4]. Molecular identification use is becoming more widespread in diagnostic microbiology laboratories. Matrix-assisted laser desorption/ionization time-of-flight, mass spectrometry (MALDI-TOF MS, Bruker Daltonics, Bremen, Germany) is a spectroscopic method that requires a dependable and complete database. MALDI-TOF has provided better identification of infections that are rarely reported as human pathogens compared to conventional molecular identification [5,6].

Infections caused by Herbaspirillum have been previously identified as an opportunistic pathogen in patients with cystic fibrosis and cancer [7,8]. It can cause bacteremia and sepsis in
immunocompromised patients. Herein, we present a case of H. Huttiense bacteremia in a thrombocytopenic newborn born to a mother with idiopathic Thrombocytopenic Purpura (ITP) during high dose steroid therapy.

Case report

A male patient, born at 37 weeks 4 days gestation, was the first child of non-consanguineous parents. He was born to a 28-year-old mother who was followed up for eight years with the diagnosis of chronic ITP. The mother was given methylprednisolone 24 mg/day after the first trimester and Intravenous Immune Globulin (IVIG) three times during her pregnancy. He was born with cesarean delivery, and Apgar scores were 5/8. His heart rate was 70/min, and he was administered two minutes of positive pressure ventilation. After birth, his physical examination was unremarkable. A complete blood cell analysis was obtained because of maternal history. The baby was admitted to the neonatal intensive care unit after Platelet (PLT) cell count was detected 70 x 10^9/l in complete blood count.

A total of 3 gr/kg IVIG transfusion was given to the infant. During the follow-up, platelet cell counts were not elevated, and 2 mg/kg/day methylprednisolone was initiated. The transfontanelle ultrasound showed a 3.5 x 1.5 cm intracranial hematoma in the parietooccipital area. On the second day of steroid treatment, the platelet value was 27 x 10^9/l and high dose steroid treatment was recommended by pediatric hematology. Methylprednisolone was initiated at 30 mg/kg/day for three days and then 20 mg/kg/day for four days. On the third day of high-dose steroids, his rectal temperature was 38.2°C. Acute phase reactants and blood culture were studied. Laboratory results revealed CRP: 44.2 mg/L, PCT: 2.57 ng/mL, IL-6: 4878 pg/mL, Plt: 19 x 10^9/l WBC: 3260/µL, Leu: 1550/µL. Lumbar puncture could not be performed due to thrombocytopenia and intracranial hematoma. Vancomycin and piperacillin-tazobactam antibiotherapy were initiated. High-dose steroid treatment was continued.

The next day in the gram staining, Gram-negative bacilli were observed. The microorganism was identified as Herbaspirillum huttiensein blood culture and confirmed with repeated blood culture by MALDI-TOF-MS method. The sensitivity study was carried out using the WIDER I automated system (Francisco Soria Melguizo, S.A., Madrid, Spain). The Micro Scan panel for non-fermenting Gram-negative bacilli type 71 was used (Beckman Coulter®) and then incubated at 37°C for 24 h. The cut-off points for the interpretation of the MIC obtained were in line with the CLSI (Clinical and Laboratory Standards Institute) recommendations for Gram-negative non-fermenters (M100-S24). The susceptibility test showed no resistance to any antibiotics and the current treatment was continued. After high-dose steroids, platelet values increased to 126 x 10^9/l. Control assays showed regression in acute phases. Antibiotic regimen completed in ten days. In transfontanelle ultrasound, hematoma regressed to 23 x 1.5 cm. The control of blood culture was sterile. The patient was discharged from NICU to follow up to the outpatient clinic.

Discussion

Herbaspirillum spp. is an opportunistic pathogen that colonizes the airways of patients with lung disease, such as cystic fibrosis, and are capable of causing bacteremia and sepsis in immuno-compromised patients, particularly people with cancer or undergoing hematopoietic stem cell transplantation [9,10].

Taking a high dose of steroid therapy can suppress the patient’s immune system and lead to the development of opportunistic infections. Our patient had to take steroid treatment due to persistent thrombocytopenia and intracranial hematoma. Also, early neonatal sepsis from maternal origin was not considered in the baby because the patient was in good clinical condition and the initial acute phase reactants were not elevated.

In our case, it is important to highlight the high dose of steroids as a predisposing factor contributing to the patient’s susceptibility to developing this infection. When we examined the literature, we found two cases have central-line associated bloodstream infection in the pediatric population. One is a premature baby and the other one was a 2-year-old oncology patient who underwent a matched, unrelated donor hematopoietic stem cell transplant [8,11]. We did not perform central catherization when he was admitted to our unit. Lastly, Gun gor et al. reported a pediatric oncology patient with infective endocarditis due to H. huttiense [12].

The newborn with H. Huttiense infection due to high dose steroids was the first case in the literature. It should be remembered that babies observe in neonatal intensive care units are susceptible to opportunistic infections and concern should be taken in the presence of predisposing factors.

Declarations

Statement of ethics: The parents of patient have given their written informed consent to publish this case.

Conflict of interest: The authors whose names are listed immediately below certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers’ bureaus; membership, employment, consultancy, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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