Case Report

Neurobrucellosis in Children, a Report of 2 Cases

Mohammed S. Al Ayed, MD
Assistant Professor of Pediatrics
Pediatric Infectious Diseases Consultant,
College of Medicine, Najran University,
Najran, Saudi Arabia

Abstract

Objective: To report on two cases of neurobrucellosis with different presentations.

Method: Retrospective report of the data on 2 cases of neurobrucellosis: the first case presented with acute meningo-encephalitis and the second case presented with acute meningitis.

Result: Both cases had indolent fever for more than a month. The first case presented acutely with a diffuse maculopapular rash all over the body for 1 day prior to admission and a sudden deterioration of the level of consciousness, weakness, and generalized tonic-clonic convulsions lasting for 2 minutes. The history of the presenting illness indicated a strong history of contact with animals and animal products. The second case was presented to our hospital with history of fever on and off for 2 months and 1-day history of headache and neck pain, but no history of vomiting, convulsion, or loss of consciousness. Both cases were diagnosed by the serum agglutination test and cerebrospinal fluid *Brucella* culture. Both cases were treated for 6 months with combination therapy of anti-*Brucella* drugs with excellent outcome.

Conclusion: These are rare and serious presentations of this common public health problem, unless the physician has a high index of suspicion, morbidity and mortality will not be prevented. So, the description of both cases and a brief review of the current pediatric literature are provided to familiarize pediatricians with the relatively rare presentations of this common worldwide disease.

Correspondence:

Mohammed S. Al Ayed, MD
Assistant Professor of Pediatrics
Pediatric Infectious Diseases Consultant,
College of Medicine, Najran University,
Najran, Saudi Arabia
Fax +96675442419
Email: drmzayed2000@yahoo.com

Introduction

Brucellosis is a multisystem disease that may present with a broad spectrum of clinical manifestations and complications, including neurobrucellosis. Patients with brucellosis occasionally manifest central nervous system involvement. Neurobrucellosis is uncommon but considered as a serious complication of this endemic disease. It has diverse clinical picture from meningoencephalitis, myelitis, rediculitis, cranial nerve involvement, brain abscess and subarachnoid hemorrhage to Guillain Barre Syndrome. [1] Pediatricians, especially those serving in endemic areas or serving patients coming from endemic areas, should consider neurobrucellosis in patients with unexplained neurological symptoms. [2]

Case Reports

Patient 1, a 7-year-old boy, presented with a history of fever on and off for 6 weeks, associated with acute deterioration of the level of consciousness, weakness, and generalized tonic-clonic convulsions lasting 2 minutes that aborted spontaneously without medical intervention, and a diffuse maculopapular rash all over the body for 1 day prior to admission. There was a positive history of contact with animals, mainly sheep and goats, but his parents denied the intake of any raw milk or other dairy product. There was no previous hospital admission, fully vaccinated and with irrelevant family history.

Clinically, the patient was drowsy but arousable with positive neck stiffness and, Kerning's sign, with a Glasgow Coma Scale of 10/15. He was moderately dehydrated, with a temperature of 38.5°C, but neither pale nor jaundiced and no signs of lymphadenopathy. Blood pressure was 85/47 mm Hg, heart rate 130/minute, respiratory rate 19/minute, and oxygen saturation 90% in room air. Abdominal examination revealed no organomegaly; neurologically, his power was with grade 1/5 in the upper and lower limbs, with increased reflexes. There was a diffuse maculopapular rash all over the body with no specific pattern of distribution. The patient was stabilized in the emergency department and then transferred to the intensive care unit where his management was continued.

Early laboratory investigation results were as follows: complete blood count showed WBC count of 3000 per cumm, hemoglobin concentration of 12 gm/dL, and platelet count of 603000 per cumm. Renal function tests were normal and serum electrolytes initially were normal, although he subsequently developed indicators for the syndrome of inappropriate antidiuretic hormone secretion on day 3 of admission (serum sodium of 125 mEg/L and concentrated urine (U_{Osm} >300 mOsm)). His C-reactive protein was 265mg/L. Blood culture reported negative result; *Brucella* serum agglutination test was 1:5120.

Cranial computed tomography scan and magnetic resonance imaging with contrast were unremarkable. Cerebrospinal fluid (CSF) studies showed the following: appearance was clear; WBC 58 x 10(6), 80% polys, RBC 13 x 10(6), protein 1.34 gm/L, glucose 2.2 mmol/L (serum glucose 6 mmol/L), and the gram stain was negative. The culture was positive for *Brucella* species (species not identified because of our laboratory limitations). The patient was managed in the intensive care unit for 1 week. He was started initially on ceftriaxone, vancomycin, and erythromycin for possibility of Mycoplasma pneumonia meningoencephalitis. After the *Brucella* serology and CSF *Brucella* culture results were obtained, acute *Brucella* meningoencephalitis was considered to be a more likely diagnosis, and the medications were changed to co-trimoxazole, rifampicin, and gentamicin. He improved and was transferred to the pediatric general ward and discharged after 2 weeks of intravenous gentamicin and continued on co-trimoxazole and rifampicin for a total of 6 months. He was followed up in the clinic for 1 year and showed no residual neurological deficit, excellent school performance, and normal development in respect to the speech, hearing, vision, and gross motor.

Patient 2, a 10-year old boy, presented to our hospital with history of fever on and off for 2 months and 1-day history of headache and neck pain, but no history of vomiting, convulsion, or loss of consciousness. He gave a history of animal contacts, mainly goats and occasionally with camels, and raw milk ingestion. His older brother had been treated for *Brucella* bacteremia one year ago as an outpatient. On physical examination, he was awake and oriented, but in pain, and febrile with a temperature of 39 °C, and had a pulse

rate of 120/minute, respiratory rate of 16/minute, and oxygen saturation of 94% in room air. Although the patient was in pain, he had no signs of meningeal irritation or increased intracranial pressure, and his neurological examination was normal. The rest of the examination was also unremarkable. His initial laboratory tests and neroradiological studies with contrast (computed tomography and magnetic resonance imaging) were unremarkable. Because of the prolonged fever and the acute symptoms of headache and neck pain with a strong history of contact with animals, ingestion of dairy products, (as mentioned above) and the family history of brucellosis, CSF study was done on admission and was under normal pressure but cloudy with WBC count of 441 x 10(6), lymph 88%, RBC 16 x 10(6), protein 1.5 gm/L, and glucose 3.1 mmol/L (serum glucose 6.5 mmol/L). The culture grew *Brucella* species on day 7 of incubation. The *Brucella* serology was 1:1280.

The patient was managed in the high-dependency unit and started on doxycycline, rifampicin, and gentamicin as treatment for acute *Brucella* meningitis. He improved and was discharged after 2 weeks of intravenous gentamicin and continued on doxycycline and rifampicin for 6 months. He was followed up in the outpatient clinic for 1 year and displayed excellent school performance and normal development with no recurrence or relapse of the disease.

Discussion

Neurobrucellosis is an uncommon but serious complication and generally tends to be chronic. Its presentation is usually non-specific and may mimic various pathologies, which make diagnosis difficult and necessitate a high index of suspicion. For this reason, a thorough evaluation of the patient and probable disease is crucial for an accurate diagnosis and early proper management. The most common symptoms are fever, malaise, arthralgia, myalgia, weight loss, headache, abdominal pain, and night sweats. [3] Clinical signs include fever, lymphadenopathy, hepatomegaly, splenomegaly, and orchido-epididymitis. [1, 4] Almost all body tissues are susceptible to the organism, including peritoneum, [5] liver, [5, 6] spleen, [6] kidney, [7] lung, [8] heart, [9] and joints. [10] Brucellosis accounts for a reasonable proportion of central nervous system infections in countries where the disease is endemic. [11] The nervous system is directly involved in 2% to 5% of cases, mainly by *Brucella melitensis* but at times with other species. [12] However, the incidence is <1% in children. [13] Meningitis is the most common neurological manifestation of brucellosis, but it has a diverse clinical picture, from meningoencephalitis, myelitis, rediculitis, cranial nerve involvement, brain abscess, and subarachnoid hemorrhage to Guillain-Barré syndrome. [14]

The first case presented with acute meningoencephalitis, and because of the history of prolonged fever and being in an area endemic for brucellosis, *Brucella* as the insulting cause was one of the differential diagnoses from day 1 of admission. Although it took a few days for the CSF culture to be positive, the second case presented with acute meningitis, also with prolonged fever and strong history of contact with animals, which raised the suspicion from early on of *Brucella* meningitis.

The presentation and the laboratory results for both patients were consistent with what has been published in the literature, but what is special for these cases is the excellent outcome and different antibiotic regimens used for both cases that can give more options for our colleques, dealing with similar cases. For example, doxycycline can't be used in children below 8 years of age, because of its effect on the growing cartilages.

A combination of rifampicin plus co-trimoxazole or doxycycline, depending on the patient age, with or without aminoglycoside, has been used commonly, as published in most of the literature. [15, 16]

Conclusion

Although, few cases have been reported in pediatrics in our country, updating the literature with our experience in these two cases can add to what had been published. A high index of suspicion can lead to early diagnosis and prompt treatment and will prevent neurological sequelae and death.

References

1. Samdani PG, Patil S. Neurobrucellosis. *Indian Pediatrics,* 2003; 40:565–568.

2. Ahmed R, Patil BS. Neurobrucellosis: a rare cause for spastic paraparesis. *Braz J Infect Dis.* 2009; 13(3):245.
3. Gul HC, Erdem H, Bek S. Overview of neurobrucellosis: a pooled analysis of 187 cases. *Int J Infect Dis.* 2009; 13(6):e339–343.
4. Dalrymple-Champneys W. Undulant fever: a neglected problem. *Lancet,* 1950; 447:429–435.
5. Diab SM, Araj GF, Al-Asfour AJ, Al-Yusuf AR. Brucellosis: atypical presentation with peritonitis and meningitis. *Trop Geogr Med,* 1989; 41:160–163.
6. Vallejo JG, Stevens AM, Dutton RV, Kaplan SL. Hepatosplenic abscesses due to *Brucella melitensis:* report of a case involving a child and review of the literature. *Clin Infect Dis.* 1996;22:485–489.
7. Bartralot R, García-Patos V, Repiso T, et al, Liquefactive panniculitis in the inguinal area as the first sign of chronic renal brucellosis, *J Am Acad Dermatol.* 1996; 35:339–341.
8. Al-Eissa YA, Unusual suppurative complications of brucellosis in children, *Acta Pediatr,* 1993; 82:987–992.
9. Al-Sibai MB, Halim MA, El-Shaker MM, Khan BA, Qadri SMH, Efficacy of ciprofloxacin for treatment of *Brucella melitensis* infections. *Antimicrob Agents Chemother,* 1992; 36:150–152.
10. Lubani MM, Dudin KI, Araj GG, Manadhar DS, Rashid FY. Neurobrucellosis in children. *Ped Infect Dis.* 1989; 8:79–82.
11. Bahemuka M, Babiker MA, Wright SG, Al Orainey I, Obeid T. The pattern of infection of the nervous system in Riyadh: a review of 121 cases. *O J Med.* 1988; 68:517–524.
12. McLean DR, Russell N, Khan MY, Neurobrucellosis: clinical and therapeutic features. *Clin Infect Dis.* 1992; 15:582–590.
13. Fatima ZO, Samer Z, Ropert A. Neurobrucellosis in children, *Developmental Medicine & Child Neurol.* 1997; 39:762–765.
14. Spink WW, *The Nature of Brucellosis.* Minneapolis: University of Minnesota Press; 1956.
15. Bessisso MS, Elsaid MF, Elshazli SSE, et al. Neuro-brucellosis in children. *Neurosciences,* 2001; 6(1):67–69.
16. Mohammad Reza Hasanjani Roushana et al. A Comparison of the efficacy of two months of treatment with co-trimoxazole plus doxycycline vs vo-trimaxazole plus rirampin in brucellosis. SWISS MED WKLY 2004; 134:454 – 568