

Neuro-brucellosis in children

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ABSTRACT

Brucellosis is an infection caused by gram negative coccobacilli (Brucellae). Presentation is usually non-specific and diagnosis depends on high index of suspicion. Nervous system involvement in children is rare as only 47 cases were reported until 1998. We are reporting two patients with neurobrucellosis. The first case was an 8-year-old boy who presented with papilloedema, and neck stiffness of one month duration. Cerebrospinal fluid pressure was 360mm/water, protein 0.63gm/dl, and cerebrospinal fluid sugar/serum sugar 0.2/4.7mmol. Brucella titer was high in serum and cerebrospinal fluid. The second case was a 3-year-old girl with congenital hydrocephalus, with history of fever, loss of weight, and abdominal cyst around the distal end of ventriculo-peritoneal shunt tube. Brucella mellitenensis was isolated from cerebrospinal fluid and blood. Both cases were treated successfully by 3 antibiotics for 8-12 week.

Keywords: Brucella, brucellosis, neurobrucellosis.

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Brucellosis (Mediterranean fever, Undulant fever; Malta fever) is an infection caused by gram negative coccobacilli (Brucellae)¹, the first of which was isolated by Bruce² in 1887. The organism is facultative intracellular bacteria, which can reside in both nonphagocytic and phagocytic cells.³ Brucella infects a variety of both wild and domesticated animals. Sheep, goats, cattle, and camels are the reservoirs for human infection.³ Brucellosis is both occupational and public infection acquired via contact with animal secretions or tissues or milk ingestion.⁴ The organism infects multiple organs. Neurobrucellosis is the most serious brucella manifestation. The annual incidence rate ranges from 0.01 to > 200 per 100,000 in endemic areas. This wide range reflects under reporting and missing cases. Brucellosis is uncommon in developed countries owing to eradication programs coupled with the mandatory pasteurization of milk.⁴ The number of cases dropped in USA from 6000 in 1947 to 200 in the recent years.⁵ The zoonosis, however, remains endemic in many Middle Eastern, Mediterranean

countries and Latin America particularly in regions where goats, sheep, or camels are herded. The incidence is increasing in the Middle East because of importing animals from endemic areas, foundation of big farms and increased awareness of the disease.⁶ In Qatar, where the habit of raw milk ingestion especially among Bedouins is common, the disease is endemic. However, reported cases dropped from 194 patients (1993-1995) to 79 patients (1996-1998). We are reporting two children with neurobrucellosis; one of them has an unusual presentation.

Case reports. Patient 1. An eight-year-old Indian boy presented with fever, headache and neck pain for one month, oral antibiotics were prescribed in the primary health centers for possible bacterial infections without any response. Examination showed neck stiffness and bilateral papilloedema. computerized tomography (CT) scan and magnetic resonance imaging (MRI) were normal. Lumbar puncture showed cerebrospinal fluid (CSF) pressure

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Figure 1 - Entrapment of anterior horn of the left lateral ventricle due to septation causing shift of midline.

360 mm/Hg, protein 0.63 gm/dl, CSF sugar/serum sugar 0.2/4.7 mmol/L, WBC count $< 5/mm^3$, gram stain, latex test and culture (for Pneumococci, Haemophilus Influenza and Neisseria meningitidis) were negative. Initial treatment was ceftriaxone 100mg/kg/day for possible partially treated meningitis. The clinical response after four days of treatment was not satisfactory. Other causes of aseptic meningitis were looked for. Brucella titer checked in the serum and CSF was 1:320 and 1:1280 in CSF and serum respectively. Treatment was changed to minocycline, rifampine and septrin. Patient showed good response within few days of treatment, which maintained for 8 weeks.

Patient 2. A three-year-old Bedouin girl had congenital hydrocephalus. Ventriculo-peritoneal (VP) shunt was placed when she was one week old. Later the patient presented with fever, weight loss and abdominal swelling. Clinically; the patient was sick, had a stiff neck and an abdominal mass in the right upper quadrant. Abdominal ultrasound showed cystic collection around the distal end of the VP shunt. Cranial CT scan showed dilated ventricles and periventricular edema (Figure 1). Shunt was exteriorized and CSF collected from the reservoir. Analysis of this showed protein 2 gm/dl, CSF sugar/serum sugar 0.5/5 mmol/dl, WBCs count $75/mm^3$,

25% lymphocytes and 75% polymorphs. Brucella titer in serum 1: 5120. Brucella mellitensis was isolated from blood and CSF. Treatment with ceftriaxone for two weeks, rifampine and septrin for 12 weeks was instituted and the patient showed a good response to treatment.

DISCUSSION. Clinically Brucellosis presentation is usually non-specific in character. Diagnosis is thus depends mainly on high index of suspicion. The most common complaints are fever, malaise, arthralgia, myalgia, weight loss, headache, abdominal pain, and night sweats.^{3,4} Clinical signs include fever, lymphadenopathy, hepatomegaly, splenomegaly, and orchid-epididymitis.^{3,4} Almost all body tissues are susceptible to seeding with the organism, including liver^{7,8}, spleen⁸, peritoneum⁷, kidney⁹, lung¹⁰, heart¹¹ and joints¹². Brucellosis accounts for a large proportion of CNS infections in countries where the disease is endemic.¹³ The nervous system is directly involved in 2% to 5% of cases mainly by Brucellae mellitensis but at times with other species.¹⁴ However the incidence is $< 1%$ in children.¹⁵ Previously only 2-shunt malfunctions due to brucella infection were reported. We are reporting a similar case.^{16,17} Until the year 1998, only 47 cases of pediatric neurobrucellosis had been documented.^{15,23} In the Middle East, there are 29 reported cases.^{12,15,16,18-25} Meningitis is the most common neurologic manifestation of Brucellosis.²⁶ Brucellosis should be considered in the differential diagnosis of any apparent aseptic meningitis²⁶ in both acute and chronic meningitides.^{27,28} Patients with Brucellae meningitis patients typically present with nonspecific symptoms consisting of fever, vomiting, and headache, making it difficult to distinguish meningitis from systemic diseases. Nuchal rigidity may be evident in fewer than 50% of cases.²⁹ The suspicion of partially treated meningitis or tuberculous meningitis in our first patient was due to previously given oral antibiotics before lumbar puncture. Cerebrospinal fluid findings (lymphocytic predominance, high protein, and low sugar) can raise the possibility of partially treated bacterial meningitis or tuberculous meningitis.^{29,30} Papilloedema and optic neuritis were reported in several children.^{15,25} Visual disturbance with or without papilloedema can result either indirectly from raised intracranial pressure or directly from involvement of the optic nerves with basilar meningitis.^{25,30} Intracranial pressure may be raised in neurobrucellosis as a consequence of the basilar meningitis impeding the flow of CSF or pseudotumour cerebri or cerebritis.²⁹ Only five patients out of 47 patients had seizures associated with neurobrucellosis.¹⁵ Computerized tomography abnormalities were found in 4 patients; consisting of brain edema, atrophy subdural collection and hydrocephalus.^{12,15,24} The diagnosis of

neurobrucellosis requires the demonstration of meningeal inflammation plus direct or indirect evidence of brucella in the CSF. Whether the meningitis caused by brucella is acute or chronic the CSF findings tend to be similar. The most consistent CSF abnormality is lymphocytic pleocytosis in 91% of cases.^{29,30} Cerebrospinal fluid protein levels are usually elevated. Cerebrospinal fluid glucose levels tended to be either normal or modestly depressed in 50% of cases.²⁹ Opening pressure raised in 50% of cases. Blood cultures are positive in approximately 48%, while CSF yields positive cultures in about 25% of cases.³¹ Positive CSF cultures may, however, be obtained in the face of negative blood cultures.³¹ Antibody agglutination, the most valuable test in establishing the presence of infection in the serum, is less reliable when performed on CSF, and lower titers are generally accepted as positive for CSF than for serum.³¹ Antibiotics used in treatment of neurobrucellosis are streptomycin, trimethoprim, sulphamethoxazole, doxycycline and rifampine. Treatment with a combination of three antibiotics is now more routinely prescribed, at least for the initial few weeks of therapy.^{12,30} A combination of fluoroquinolones and ciprofloxacin are also used.¹¹ The courses of antibiotics for treating neurobrucellosis are generally longer than for treating systemic disease, typically ranging from 2 to 6 months or until CSF glucose returns to normal, drop of cell count to < 100/mm³ and CSF brucella antibodies level drops.²⁹ In cases of severe disease or relapse, 9-19 month courses have been given.²⁹ The outcome in all reports was good, however one child was left with permanent neurological sequellae and one death have been reported.^{15,23,29,32} A good outcome was also noticed in adults, but no information was available for comparison between different ages.

Neurobrucellosis in children is a rare but treatable disease. A high index of suspicion can lead to early diagnosis and prompt treatment thus preventing neurologic sequellae and death.

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