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# Neurobrucellosis with Gait Disturbance: A Neurological Case Report

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## Abstract

Brucellosis is a multi-system infectious disease that exhibits various manifestations and complications. Neurobrucellosis is a rare but serious presentation of brucellosis that can be discovered in every stage of the disease. Laboratory tests, physical examination, and patient history are generally the basis for diagnosing the disease. It has both insidious and prolonged clinical course of the disease and long-term therapies. Also, the most common pattern of the exhibition is sub- acute or chronic. We reported a case of a young female who had a history of painless weakness in the right lower limb (proximal and distal) that started gradually and had progressed over time, and after a month she felt weakness in the left lower limb with the same pattern. Lumbosacral Magnetic Resonance Imaging (MRI) with and without contrast was shown evidence of enhancement thickening of caudal equina ventral roots. Brucella agglutination test was positive, the result was 1/160. And other clinical tests were normal. The patient was treated with Intravenous Injection (IV) Rifampicin and Intravenous Cotrimoxazole. The patient was discharged with good health and continuing all two medications for 5 months. The decision was taken to report this case as a result of the entire response in the patient's illness after an enduring disease. Neurobrucellosis is a treatable disease in which it would be better to consider a high indication of suspicion. If ignored, it may cause significant morbidity and mortality.

**Keywords:** Neurobrucellosis • Gait disturbance • Adrenal glands • Flaccid paraprasia • Weakness

## Introduction

The most frequent bacterial zoonosis disease is Brucellosis and leads to more than 500,000 human infections per year worldwide [1]. Although the disease has been reported all over the world, it has a higher widespread in countries where health care problems and animal health are not standardized. In Asian countries and Turkey, a high prevalence of the disease has been reported [2,3]. Different and non-specific clinical manifestations make the diagnosis difficult. The most frequent symptoms are fever, myalgia, arthralgia, weight loss and night sweats. Neurologic complications of brucellosis occur in less than 5% of adolescents [4-6]. but its incidence in pediatric is less than 0.8-1% [7,8]. Neurological complications include encephalitis, meningoencephalitis, radiculitis, myelitis, peripheral and cranial neuropathies, subarachnoid hemorrhage, psychiatric manifestations, brain abscess, and demyelinating syndrome [9,10]. In endemic areas, if a patient is discovered with neurological symptoms, diagnostic tests including serum antibodies detection, isolation of Cerebrospinal Fluid (CSF), and bone marrow must be performed. Examining the patient's complete history such as travel history, occupation, and similar symptoms in other family members could also be very helpful to rule out Neurobrucellosis [11]. Analysis of CSF reveals an elevated protein concentration, moderate leukocytosis, and hypoglycorrhachia [11,12]. CSF and blood cultures can be negative. Thus, the diagnosis is made by detecting Brucella antibodies in CSF. This is diagnostic [13]. We report a 13-year-old female patient with painless weakness in both lower limb with the same patterns, gait disturbance, flaccid paraprasia, and loss of appetite. That has rarely been reported as a manifestation of neurobrucel losis.

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## Case Report

A 13-year-old female patient was admitted in August to Firoozgar hospital, with a history of gait disturbance and loss of appetite without weight loss for 3 months. She'd had painless weakness in the right lower limb (proximal and distal) that started gradually and had progressed over time, and after a month she felt weakness in the left lower limb with the same pattern. On arrival in the hospital, she had no fever and other parts of the vital signs were normal. No history of vomiting, headache, other sensorium, or seizure was reported. The patient belonged to a rural area and there is no history of contact with cows and goats and no raw milk has been consumed. Her vaccination program during infancy and childhood had been completely done and she had not any recent vaccination. Her parents were not relatives. Her father had treated brucellosis 20 years ago and her mother had been on treatment until 3 months ago. She had two younger sisters and neither of them has the same symptoms. On nervous system examination, our patient was conscious, Motor examination revealed normal muscle bulk, grade III power in the proximal lower limb, and grade II in distal and proximal force of the lower limb.

The power of upper limb was normal. Deep Tendon Reflex (DTR) of the upper limb was 2+, ankle and knee were 0. The plantar response was downward bilaterally. Laboratory tests including Complete Blood Counts (CBC), Blood Urea Nitrogen (BUN), serum creatinine, electrolytes, and liver function tests proved to be normal. Erythrocyte Sedimentation Rate (ESR) was 6 and C-Reactive Protein (CRP) 1. SSA-RO and SSB-LA both were 0.1. Antibody for HIV virus, HBs Antigen, and Anti HCV was negative. Lumbar puncture was per- formed and checked for analysis (Table 1). The serological test results were positive (Table 2). Lumbosacral MRI with and without contrast was shown evidence of enhancement thickening of caudal equina ventral roots (Figure 1). Because of normal Sensory Nerve Action Potential (SNAP)

**Table 1.** Pattern of CSF analysis.

| Fluid Bodies | |
|---|---|
| **Test** | **Result** |
| **Complete CSF** | |
| W.B.C. | 150 |
| R.B.C. | 0 |
| Glucose | 19 |
| Total Protein | 152 |
| **LDH** | |
| LDH-P | 53 |
| **Differential Results** | |
| Segment | 20 |
| Lymphocyte | 80 |

**Table 2.** Serological findings.

| Serology Test | Result | Unit | References |
|---|---|---|---|
| Wright | 1/160 | Titer | Positive: ≥ 1/80 |
| Coombs Wright | 1/160 | Titer | Positive: ≥ 1/80 |
| 2 ME Wright (IgG)Titer | 1/80 | Titer | Positive: ≥ 1/40 |
| PPD | | | |
| **Nodular reaction Borderline** | | | |
| State | | | Negative: <5 mm |
| 7 mm | | | Borderline: 5-10 mm |
| mm | | | Positive: >10 mm |

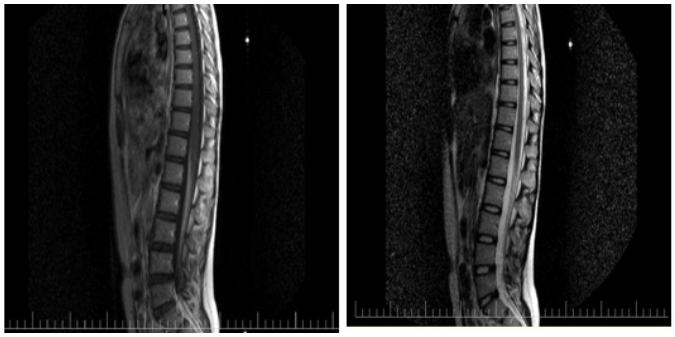

**Figure 1.** Enhancement of caudal equina ventral roots.

and decrease the amplitude of Compound Muscle Action Potential (CMAP), the result of Electromyography (EMG) has shown subacute involvement of Anterior Horn Cell, especially in L5, S1 territory. Treatment was commenced with Intravenous Injection (IV) Rifampicin and Intravenous Cotrimoxazole. The patient was discharged with good health and continuing all two medications (Rifampicin and Cotrimoxazole) for 5 months. She returned to the hospital with recurrence symptoms due to discontinuing medications before completing the course of treatment.

## Discussion

It was observed that neurobrucellosis rarely reported on reviewing the literature. Brucellosis is an endemic infectious disease in Iran [14]. Norobrucellosis accounts for about 3-5% of cases of brucellosis. The most common forms of neurobrucellosis are Meningitis and meningoencephalitis. We reported a patient with gait disturbance, which is rare among reported cases. The consumption of unpasteurized milk products is one of the most com- mon causes of transmission of the disease [15]. Yet our case, despite being rural, has no history of consumption of unpasteurized milk. Also, our patient presented with the enhancement of caudal equina ventral roots in MR imaging and positive serology test. In one study carried out in Saudi Arabia, they found clinical manifestations were related to the imaging abnormalities. They also categorized the changes of nervous system involvement of neurobrucellosis into 4 categories including 1) Normal, 2) Inflammation (abnormal enhancement), 3) Alteration of white matter and 4) Radiologic findings which display vascular alteration [16]. In another study, Gul HC, Erdem H, Gorenek L, et al. from Turkey reported that the diagnosis was established by serum antibodies test and CSF findings in 11 cases of neurobrucellosis. And they did not utilize imaging techniques to diagnose it [17]. In the treatment of this disease, due to the central nervous system is involved, antibiotics are used that can cross the blood-brain barrier well. It is preferable to use Co-trimoxazole, Doxycycline, and Rifampicin. Combination treatment with at least two medications of those indicated earlier is recommended [18]. The decision was taken to use Rifampicin and Co-trimoxazole for this patient.

## Conclusion

In conclusion, Neurobrucellosis as an infectious disease can be treated with a favorable result. The diagnosis of this disease is contingent generally upon high clinical attention in endemic areas such as Iran. The disease differs in clinical diagnosis or radiology, especially in young patients with neurological disorders. Imaging neurobrucellosis results can be potentially misleading because they are different and can mimic other infectious, or inflammatory diseases like Tuberculosis. The sentence of what follows is drawn to the literature of Harrison's textbook of Medicine. Patients should ideally be followed clinically for up to 2 years because recurrence occurs in up to 30% of patients.

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