

# Brucellar Brain Abscess in a Child

## Çocukta Brusella Beyin Absesi

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### Abstract

A ten-year-old boy developed symptoms consistent with brucellosis and was treated with combined tetracycline and streptomycin. Despite therapy, he abruptly developed dysarthria and fear of death. A cranial magnetic resonance imaging revealed an abscess. *Brucella abortus* was isolated from the blood culture. He recovered completely with doxycycline plus rifampicin therapy.

(*Çocuk Enf Derg* 2010; 4: 89-91)

**Key Words:** Brain abscess, brucellosis, children

### Özet

Brusellozla uyumlu bulguları gelişen 10 yaşındaki erkek olguya tetrasiklin ve streptomisin kombine tedavisi verildi. Tedaviye rağmen olguda ani başlangıçlı konuşma bozukluğu ve ölüm korkusu gelişmesi üzerine çekilen kraniyal magnetik rezonans görüntülemesinde abse saptandı. Olgunun kan kültüründe *Brucella abortus* üremesi oldu. Doksisisiklin ve rifampisin tedavisi ile olgu tamamen düzeldi.

(*Çocuk Enf Derg* 2010; 4: 89-91)

**Anahtar Kelimeler:** Beyin absesi, bruselloz, çocuk

### Introduction

Brucellosis is a zoonosis with worldwide geographical distribution that affects domestic and wild animals. The disease is transmitted to man mainly after consumption of unpasteurized milk and milk products and, less often, after direct contact with infected animals (1). Brucellosis is still an important infectious disease, being widespread with endemic and sporadic cases in Turkey (2). In Turkey about 18,000 new cases of brucellosis are diagnosed annually. The prevalence of serologically positive people in the Turkish population varies from 2.6% to 14.5% (2). Neurobrucellosis is a rare condition (3). The most common clinical forms of neurobrucellosis that involve the central nervous system (CNS) are meningitis, myelitis, polyradiculitis and mononeuritis (3). Neurological complications of brucellosis may be divided into two major groups: (i) those related to the acute toxic-febrile state that occurs in acute disease: and (ii) those related to actual invasion and localization of the pathogen in the

CNS (3). Brain abscess due to brucellosis is exceedingly rare. We report a case of a brain abscess due to *Brucella abortus*. The patient was successfully treated with medications, without need for surgical treatment, and followed-up radiologically and microbiologically.

### Case Report

A ten-year-old boy, who had been in good health until 2 weeks before admission, was admitted to the local hospital with a history of fever, malaise, anorexia and weakness. Physical examination revealed fever (38°C) and cervical lymphadenopathy. Serologic investigation in serum revealed high agglutination titers against brucella (1:1280). Considering it was brucellosis, therapy with oral tetracycline (at a dose of 30 mg/kg/day, divided into 4 doses) and intramuscular streptomycin (at a dose 20 mg/kg/day, once daily) was started. However, after 10 days of treatment, the patient abruptly developed dysarthria and fear of death and was referred to our hospital. He reported having ingested unpasteurized dairy products

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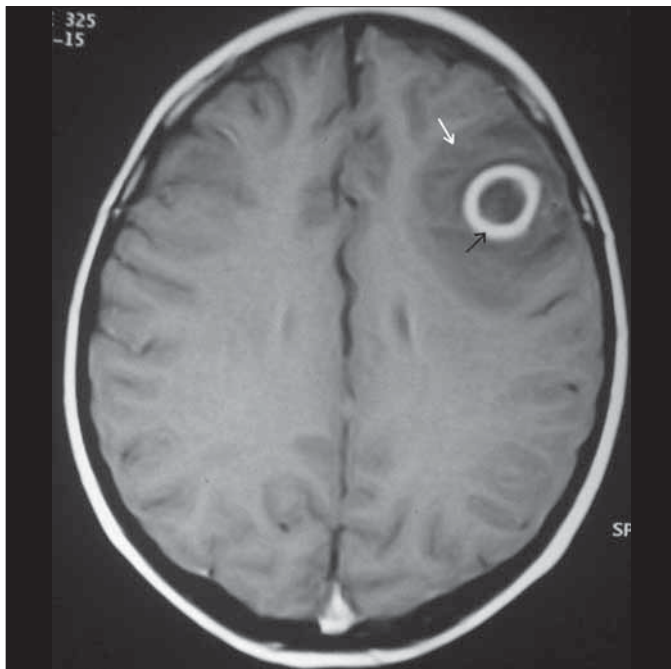
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2 months before admission to the hospital. Physical and fundoscopic examinations were normal. Neurological examination yielded dysarthria and irritability. Laboratory analysis showed white blood cell (WBC) count of 8400/mm<sup>3</sup> (64% neutrophils, 30% lymphocytes, 4% monocytes, 2% eosinophils), hemoglobin 12.3 g/dl, platelet 243000/mm<sup>3</sup>, erythrocyte sedimentation rate 40 mm/h and C-reactive protein 12 mg/dl (normal CRP in serum < 0.5 mg/dl). Other biochemical parameters were within normal ranges. The standard tube agglutination test revealed titers of *Brucella* antibodies in serum of 1:640. Examination of cerebrospinal fluid (CSF) obtained by lumbar puncture revealed a WBC count of 5 /mm<sup>3</sup>, a glucose level of 78 mg/dl, and a protein concentration of 18 mg/dl; titers of agglutinating antibodies in CSF were 1:80. Cranial magnetic resonance (MR) imaging showed a brain abscess characterized by a lesion with ring enhancement surrounded by edema in the left frontal lobe (Figure 1). Therapy was changed to doxycycline (5 mg/kg/day, divided into 2 doses) and rifampicin (20 mg/kg/day, divided into 2 doses). Prednisone (2 mg/kg/day, divided into 4 doses) was added to therapy because of edema surrounding the brain abscess. Blood and cerebrospinal fluid were inoculated into BACTEC peds plus/F (Becton Dickinson, Sparks, MD) culture bottles. All bottles positive in the system were subcultured to eosin-methylene blue and blood agars. After 48-72 hours incubation on blood agar, round, moist, translucent, non-hemolytic colonies 1 mm in diameter were isolated. The microscopic morphology of the isolate was typical of *Brucella* spp. Conventional methods were used for the identification of *Brucella* spp. (4) and the isolate serotyped as *Brucella abortus*.

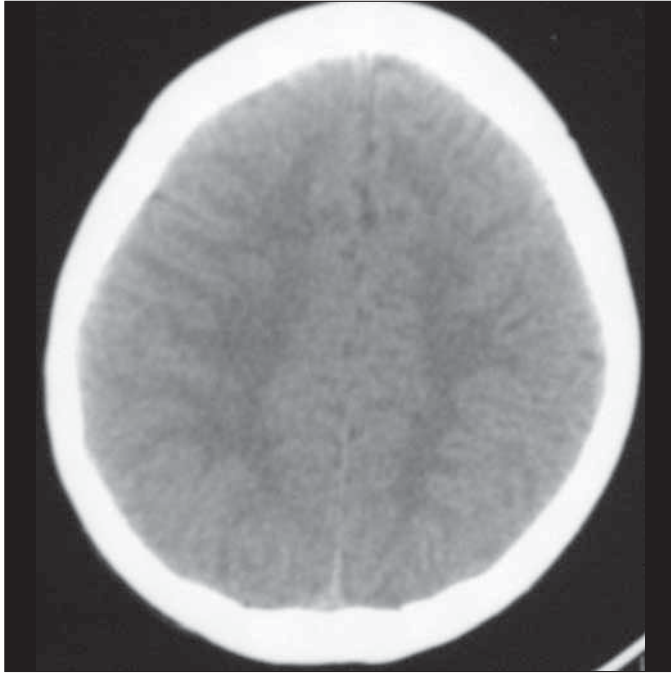
Susceptibility of *Brucella* spp. to various antibiotics was in accordance to the National Committee for Clinical Laboratory Standards (NCCLS) recommendations (5). Cultures of blood yielded *B.abortus*, however no organism was isolated from CSF culture. The electroencephalogram showed organization disorders. Carbamazepine was initiated at a dose of 7.5 mg/kg, twice daily. The patient's condition improved after initiation of therapy. Three weeks later, the brain lesion and edema decreased in size, as shown by computed tomographic (CT) scan (Figure 2). Because of progressive clinical improvement of the patient and decreasing size of lesion, surgical drainage of the abscess was not required. Prednisone was given for 3 weeks. After four weeks of therapy, the patient was discharged home with no detectable neurological deficit. The patient was followed up for 3 years after 2, 4 and 6 months and then every 6 months. Doxycycline plus rifampicin therapies were given for 4 months. The patient developed yellow-brown discolouration of his teeth at the third month of the treatment period. Fortunately, this complication was resolved 2 months after discontinuation of therapy, and did not require termination of doxycycline therapy. The blood brucella agglutination test was repeated at every follow-up visit, and cranial CT and EEG were repeated after 6 months. He completed a 16-week course of antimicrobial therapy and the repeat CT scan revealed almost complete resolution of the lesion (Figure 3). Blood brucella agglutination titer became negative after four months. EEG revealed no abnormality. Carbamazepine was discontinued at 2 years because no epileptic seizure recurred. He remained well throughout the three-year follow-up.



**Figure 1.** Contrast-enhanced magnetic resonance image reveals abscess with capsule formation (2x2 cm in size) (black arrow) and surrounding edema (white arrow) in the left frontal lobe



**Figure 2.** Contrast-enhanced computed tomography shows a reduction in the size of the abscess (black arrow) and edema (white arrow)



**Figure 3.** On the last computed tomography, abscess disappeared completely

## Discussion

Neurobrucellosis is rather rare in pediatric patients, comprising 3-10% of all cases reported in the literature (2,3,6). A PUBMED search of the English language literature revealed 5 previous reports of brain abscess caused by *Brucella* spp. in children (7-11). Six brain abscesses were documented (7) in a 4-year-old boy who had headache and papilledema that persisted after a full course of therapy with oral tetracycline plus streptomycin was given to treat the brucellosis. Another case (8) occurred in a 12-year-old boy with tetralogy of Fallot who developed a brain abscess caused by *B.abortus* and *Staphylococcus aureus*. Al-Eissa YA (9) reported that a three-year-old boy who developed brucella cerebellar abscess. All of these patients required surgical drainage of their abscesses for clinical cure. Keihani-Douste Z et al. (10) reported the involvement of the spinal cord with concomitant multiple brain abscesses caused by neurobrucellosis in a 12-year-old patient presenting with quadriplegia.

Clinical symptoms and signs of brucellosis are variable and non-specific (9). Our patient presented with dysarthria and fear of death. In our patient, therapy with tetracycline plus streptomycin improved systemic symptoms but did not prevent progression of disease to the CNS. The development of brain abscess during therapy was an unusual finding. As in our patient, Guvenç H et al. (7) reported that multiple brain abscesses developed during antimicrobial therapy. There are no characteristic CSF biochemical or cellular findings of neurobrucellosis (2,3,6). A positive serological reaction to *Brucella* antigen in the CSF sample is considered to be a reliable indication, while culture of the

organism may be difficult (2,6). In our patient, a diagnosis of brucellosis was made from the clinical picture combined with positive serologic and bacteriologic evidence.

Although the antimicrobial therapy of systemic brucellosis is well established, the best regimen for the treatment of localized lesions has not been clearly determined. Different combinations of anti-*Brucella* drugs and different durations of therapy have been used for treatment of nervous system brucellosis (2,3,6). Our patient was treated with doxycycline and rifampicin. The combination of doxycycline and rifampicin is the specific treatment for brucellosis. Both of these antibiotics can cross the blood-brain barrier and have synergistic effects. The complicated form of the disease such as neurobrucellosis needs to be treated for 4 months with a combination of these two drugs (12,13). Our patient recovered fully with this antibiotic combination without need for surgical treatment.

In conclusion, the patient was treated with doxycycline plus rifampicin therapies, evolving to complete clinical and radiological resolution, without neurosurgical intervention. Neurobrucellosis must be considered in the differential diagnosis of patients with febrile illnesses and unexplained neurologic symptoms, particularly in endemic areas.

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