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UNMASKING BRUCELLOSIS: EXTENSIVE PULMONARY INVOLVEMENT AND BEYOND

General Medicine

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ABSTRACT

Background - Brucellosis is an ignored cause of febrile illnesses in areas with high exposure to animals or unpasteurized milk and dairy products. It may present with multisystem involvement. **Case Description -** Our patient, a 39-year-old male who presented to emergency with history of high-grade fever with chills and not well responding to antibiotics. After a series of investigations and detailed history it was found that he was farmer by occupation, has been using unpasteurized milk of cows and buffaloes and is also in contact with them in poorly maintained cattle shed. Upon investigation, serum antibodies for brucellosis were positive. He was started on combination therapy with rifampicin and doxycycline. After 3 days he became afebrile and was discharged. It should be noted that ineffective history could lead to delay the diagnosis and therefore the management. We should have high index of suspicion for brucellosis in rural patients with unknown febrile illness.

KEYWORDS

Brucellosis, Zoonotic disease

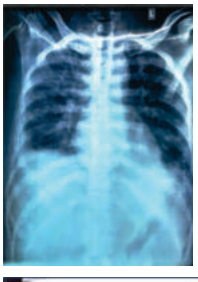
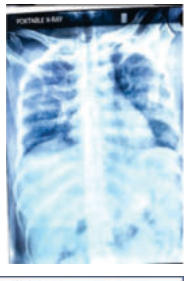
INTRODUCTION

Brucellosis is a bacterial disease and one of the most widespread zoonoses transmitted by an animal. It can affect any organ system, but pulmonary involvement is an unusual presentation (1). The most common mode of infection is by consuming unpasteurized milk or dairy products. Human infections are primarily acquired through contact - direct contact (eating, or drinking animal products) or indirect contact with infected animals and their secretions. Human-to-human transmission takes place through blood transfusion, bone marrow transplantation, and mother-to-foetus transmission (2). The signs and symptoms of brucellosis are not specific in which fever, sweat, fatigue, combined with body aches, sweating, and various unspecified signs and symptoms Brucellaempyema, pleural effusion, granulomas and solitary nodules, interstitial pneumonia, mediastinum lympha-denopathy, military spreading, and even pneumothorax have all been reported. Many of these signs and symptoms are similar to influenza, severe colds, coronavirus disease 2019 (COVID-19), malaria, and other infectious diseases, so clinical diagnosis is difficult in place of lack of health facility and specific and rapid diagnostic methods(3). The nervous system is affected in 4–7% of cases. The manifestations are variable which may include meningo-encephalitis as well as peripheral nervous system involvement (4). The diagnosis relies on culture, which can be falsely negative as in our case. Agglutination tests for the various species of the organism are the mainstay for diagnosis. Treatment is for 3–6 months with combination therapy including Doxycycline, Rifampicin and ceftriaxone. The main issue is prevention of disease and better animal husbandry.

Case History

A 39-year-old male patient farmer by occupation presented with complaints of High-grade fever (101.8°F) with chills for 10 days which was continuous associated with body ache, headache and abdominal pain. Abdominal pain was on epigastric and umbilical region and was associated with complaints of watery diarrhoea in the last 5 days with frequency of 4-5 episodes per day. On examination patient was vitally stable and bilateral conjunctival congestion was noted. Patient was evaluated for acute febrile illness and gastroenteritis for which tests for malaria, Dengue and widal was done by rapid methods which came out to be negative. Chest radiograph was done which was normal. Patient was started with Infusion paracetamol and fluids after which fever was resolved. Two days later, Patient again had an episode of high-grade fever and suddenly became tachypnoeic with drop in saturation levels. Patient was shifted to Intensive care unit where he was started with oxygen support and antibiotics (3rd generation cephalosporin's). Chest X-ray was repeated in which patchy opacities were noted predominantly in right middle and lower lobes with blunting of bilateral costophrenic angles suggesting bilateral pleural effusion. High Resolution CT Thorax showed patchy areas of ground glass opacities diffusely involving bilateral lung fields predominantly involving bilateral apical segments with moderate amount of bilateral pleural effusion. Pleural tap was done which was transudate and on cytology it showed predominantly mesothelial cells with negative microscopic examination for acid fast bacilli and molecular test (CBNAAT). No organism was isolated in blood culture. After ruling out other possible causes serum samples for brucellosis was sent which came out to be positive (IgG and IgM) and diagnosis of Brucellosis was made. Patient was started on Doxycycline 100mg PO twice daily and Rifampicin 600mg PO once daily. Patient was asymptomatic after two days of starting treatment and was discharged after three days of observational period with proper education regarding animal husbandry, use of pasteurised milk and safer handling of cattle.

Investigation	Patients value on admission	Patients value on discharge	Reference value
Haemoglobin	14.1	12.4	13-17gm%
Total count	17000	8200	4000-11000
Total platelets	1.0	1.74	1.5-4.5lacs/mm3
creatinine	0.8	0.6	0.6-1.3
Sr. sodium	131	134	135-145mmol/lit
Sr. potassium	3.7	4.2	3.5-5.5mmol/lit
Sr. chloride	100	99	98-110mmol/lit
CRP	177	4.12	0-6mg/lit


DISCUSSION

Brucella species are Gram-negative, non-motile, non-spore-forming, slow-growing, facultative intracellular bacteria. Brucellosis is a bacterial infection caused by Brucella species. Humans often are an occasional host where the infection is mainly caused by B. Melitensis (most virulent); B. abortus; B. suis; and B. Canis (7). It is the most prevalent zoonosis in the world and a significant public health issue in many areas with inadequate resources.

The infection can be transmitted to people by direct or indirect contact with infected animals or their products. The persistence of brucellosis as a public health concern can be partially attributed to the growth of animal industries, urbanization, and the absence of sanitary practices in food processing and animal husbandry. Another factor contributing to the spread of human brucellosis is the expansion of worldwide transportation, which increases the desire for dairy products such fresh cheese that may be contaminated, as well as the importation of such items into areas free of Brucella (10)

The most prevalent sign and symptom of brucellosis, occurring in most of the patients is fever with chills. In regions with low endemicity, individuals are frequently initially diagnosed with fever of undetermined origin (FUO). Anorexia, asthenia, weakness, malaise, and weight loss are among the other constitutional symptoms of brucellosis, which are often always associated. Arthralgias (localized or generalized), low back pain, spine and joint discomfort may or may not be present.

Any organ can be involved in this disease, so it is necessary to have a complete history of exposure and clinical suspicion to avoid a delay in the diagnosis.

Different chest radiographic abnormalities were revealed, including soft military mottling, parenchymal nodules, consolidation, chronic diffuse changes, hilar or paratracheal lymphadenopathy(5)_(10). Pulmonary brucellosis could be mistaken for tuberculosis and sarcoidosis, so patients with brucellosis and pulmonary manifestations should be examined for tuberculosis with ZN stain of sputum and sputum culture for tuberculosis(6). The diagnosis of human brucellosis is confirmed by a culture of the organism from blood, body fluids (urine, cerebrospinal fluid, synovial fluid, and pleural fluid), or tissue (such as bone marrow or liver biopsy) or a fourfold or greater rise in Brucella antibody titre between acute and convalescent-phase serum specimens obtained ≥2 weeks apart

In situations where culture is not available or submission of two serology samples inapplicable, a presumptive diagnosis can be made by Brucella total antibody titre of greater than or equal to 1:160 by standard tube agglutination test (SAT) or Brucella microagglutination test (BMAT) in one or more serum specimens obtained after the onset of symptoms or Detection of Brucella DNA in a clinical specimen by PCR assay (8)

A variety of antimicrobial drugs have activity in vitro against Brucella species; however, the results of routine susceptibility tests do not always correlate with clinical efficacy. Consequently, beta-lactam antibiotics, such as penicillin's and cephalosporins, and macrolide antibiotics, such as erythromycin, are associated with high rates of relapse when used to treat patients with brucellosis (9)

Doxycycline (a long-acting tetracycline analogue) is the preferred drug in case of remission which can be given in a dose of 100 mg every 12 hours orally and is administered for a period of six weeks.

Monotherapy can be considered in uncomplicated cases but the rate of relapse when tetracycline or doxycycline are given alone remains between 10–20%. Therefore, the preferred aminoglycoside for usage in conjunction with tetracycline doxycycline has long been streptomycin (1 g/day intramuscularly) given for two to three weeks. Studies on bacterial killing have revealed that the combination kills Brucella species more quickly than either antibiotic alone, despite the fact that it is challenging to demonstrate synergy between the two medications using standard in vitro tests. The WHO recommended 200 mg of doxycycline and 600–900 mg of rifampicin orally daily for six weeks in order to offer a fully oral regimen for treating brucellosis. In vitro, rifampicin exhibits anti-Brucella activity, is highly lipid soluble, and accumulates in eukaryotic cells.

Other alternative therapy includes use of Fluoroquinolones, Trimethoprim/sulfamethoxazole (TMP/SMZ, co-trimoxazole), etc.(9)

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