

Demographic trend and clinical features of brucellosis in patients with history of lower back pain - A study in tertiary care hospital

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Abstract

Introduction: Even though Lower Backpain (LBP) is the common symptom presenting to orthopedic OPD, not all the patients get relief from back pain. Due to complexity of the problem and heterogeneity of its nature many patients suffer from chronic lower back pain for long period. Infective agents do play a significant role in LBP and one of the differential diagnosis is Brucellosis. The present study is intended to find epidemiological correlation between brucellosis and LBP patients with pertinent serological tests and aid in decreasing morbidity associated with back pain. **Materials and methods:** Study involved evaluation of seventy adult patients (n=70) with history of low back pain attending orthopedic OPD. A detailed history of fever, work atmosphere, occupation in animal husbandry and ingestion of raw milk were collected and followed by radiological investigation (X-ray lower back). After physical examination serum samples were collected from these patients. First year MBBS students (n=30) without history of LBP were taken as controls. **Results:** Out of these 70 patients, seropositivity was seen in 10 patients by rapid slide agglutination test as screening procedure followed by tube agglutination test (SAT) as confirmatory test. Patients affected were men of 31 to 40 years age group. Incidence of brucellosis in our patients was 14.1%. Most of them were farmers by occupation. Of these 6 gave history of ingestion of raw milk. 6 patients had history of occupational exposure to animals and fever was seen in 5 cases. Radiological findings were positive in 4 patients. **Conclusion:** Diagnosing Brucellosis in patients with chronic backache is a challenge due to heterogeneity of condition. High clinical suspicion in patients with rural back ground, relevant serological tests with radiological evidence help in clinching the diagnosis of brucellosis in patients with chronic lower backpain.

Keywords: Brucellosis, Low Back pain (LBP), SAT (standard agglutination test).

Introduction

Lower Backpain (LBP) is one of the most common complaint in patients attending outpatient clinic in orthopedic department. Studies indicate the annual worldwide LBP incidence in adults to be 15% [1] and the point prevalence to be 30% [2]. There are number of etiological factors in LBP which vary from trivial trauma to malignancy affecting the spine. There is increasing trend of back pain in developing countries and infective agents do play a significant role in LBP.

Apart from Tuberculosis [3] and Propionibacterium acnes [4] commonly affecting spine, brucellosis could be one of the differential diagnosis. Being a zoonotic disease, long-term complication of brucellosis is musculoskeletal pain in the form of LBP [5,6,7]. In our Indian patients with rural back ground and occupational exposure to animals, diagnosis can be missed easily.

Diagnosis of brucellosis can be suspected in patients with relevant history of contact with animals along with radiological evidence. This will aid in serological diagnosis of case of brucellosis [8] where treatment

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with antibiotics will significantly alter course of LBP and reduce morbidity associated with back ache. Thus, this present study was undertaken to see if brucellosis existed as a cause of lower back pain in Miraj and to identify the clinical setting in patients of backache where brucella serology is indicated. Confirmation of diagnosis was done by proper serological methods and culture which could aid measures for appropriate treatment in patients suffering from LBP.

Material and Methods

A prospective study was conducted at the Government Medical College, Miraj, Maharashtra after obtaining Institute Ethical Committee clearance.

Inclusion criteria- Study cohort involved seventy (70) consecutive adult patients with chronic backache attending the orthopedic out patient. Thirty (30) medical students of 1st year MBBS with no history of fever or backache or animal contact were taken as control group.

Exclusion Criteria: Extremes of age group (less than 10yrs to more than 80 years) were excluded from the study.

Sample collection: A detailed history of back ache was taken followed by physical examination. In history special emphasis was placed on rural/urban background, residing in endemic zone, history of fever, occupational exposure to animal, dietary exposure and

Results

Demographic distribution of patients is shown in Table No 1. Men were affected more commonly, and most were in their third decade of life. Most of them were farmers by occupation. Among patients complaining of chronic low back pain 10 were tested positive for brucellosis by screening and confirmatory tests. Out of 10 patients who tested positive for brucellosis 8 were men and 2 were women.

History of occupational exposure to animals was seen in 6 patients among whom 5 were men and 1 was women and all belonged to rural background. History of exposure to animals was not seen in rest 4 patients. History of fever was seen only in 5 patients out of 10 Brucella patients. History of raw milk consumption was seen in 6 out of 10 patients with majority being men (n=5). Radiological finding suggestive of brucellosis like disc space reduction (Fig 1), Bridging osteophyte suggestive of spondylitis (Fig 2) and osteolytic lesions with sclerosis were seen in 4 patients.

Of 70 patients complaining of backache 10 (14.28%) patients were positive for Brucella by rapid slide agglutination tests. Subsequent determination of titer, all 10/10 sera samples showed antibodies in diagnostic titers (1:320) by Standard agglutination tests (SAT).

Blood culture however was negative for growth of *Brucella spp.* None of the healthy controls tested positive for presence of Brucella antibodies. Treatment with triple antibiotics, Doxycycline and rifampin with gentamicin for initial 2-3 weeks, followed by 6 weeks of rifampin and doxycycline was given.

The patients were followed for a period of 6 months and were asymptomatic at the end of 6 months. Among the controls none of the students tested positive for brucellosis.

work atmosphere was taken. Relevant radiological investigations like X-ray Dorso-lumbar spine were done. Patients were then subjected to serological tests which constituted screening test by Rapid Slide Agglutination for anti-Brucella antibodies.

The antigen used was Rose Bengal Plate Test (RBPT) antigen (Indian Veterinary Research Institute, Izatnagar) with sensitivity of 99% and a specificity of 97.6%. But as sensitivity of RBPT is less in chronic LBP patients [9], confirmation was done by Standard tube agglutination (SAT) test [10] where antigen used was a suspension of a pure smooth culture of *Brucella abortus* strain 99 in phenol saline with sensitivity of 70% and specificity of 70%. In chronic disease SAT may be negative or positive in low titers [11].

Another phenomenon observed in brucellosis is "blocking antibody" character of antibrucellar antibodies which is usually IgG or IgA variety. Though high titers usually indicate infection, low titer or negative reaction in SAT do not exclude the possibility of infection. This emphasizes the need to use more than one serological test for diagnosis [12].

Statistical analysis: All the data collected was entered in Microsoft excel sheet and relevant statistical tests like Fishers Exact two tailed Chi square test were done using SPSS software version 19. A p value less than 0.05 was taken as statistically significant.

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Table No.-1: Demographic data of patients with Seropositivity (n=10).

Sex	Distribution
Males	8
Females	2
Age Group	
21-30	3
31-40	5
41-50	2
Occupation	
Farmer	6
Dairy worker	1
Others	2
At home	1
Residence	
Rural	6
Urban	4

Table No-2: Distribution of patients with clinical and radiological findings

Total seropositive (n=10)	Males	Females
Fever (n=5)	3	2
H/O raw milk ingestion (n=6)	5	1
H/O animal contact (n=6)	5	1
Radiological findings (n=4)	3	1

Discussion

Brucellosis is a zoonotic disease caused by *Brucella spp.* Although *Brucella* is an intracellular pathogen causing systemic infection, which ranges from asymptomatic to severe manifestations its primary manifestation is fever, sweating, malaise, anorexia, headache, pain in muscles, joint, and/or back, fatigue. It can also affect bones and joints causing arthritis, bursitis, tenosynovitis, sacroiliitis, spondylitis and osteomyelitis which is regarded as the one of the common complication of brucellosis. As Spondylitis is the most common osteoarticular complication due to brucellosis [13] chronic backache is usually complained by these patients and such patients tend to cluster more in orthopedic OPDs.

In the present study men were most commonly affected out of 10 seropositive cases which could be attributed to outdoor activity with occupational exposure during agricultural activity. Most were young men between 31-40 years. Our study is comparable to study done by Bin Jia et al [14] in-Xinjiang province, an agriculture dominated area in western china.

Occupation plays a vital role in brucellosis. As brucellosis is a zoonotic disease more often seen occupational groups like dairy workers, butchers, abattoir workers and farmers. Veterinarian occupational history needs to be kept in mind while dealing with patients complaining of backache. In present study history of contact with domestic animals could be elicited in 6 cases and history of ingestion of raw milk was seen also in 6 cases. In three cases there was history of both animal contact and ingestion of raw milk or cheese. Similar findings were noted by Mahakur and Panda et al [15]. Various studies done have shown that animal contact can be traced in many cases of brucellosis. Virtually all infections derive directly or indirectly from animal exposure [16]. Most cases of infection caused by *Br. abortus*, *Br. melitensis*, *Br. ovis*, and *Br. canis* arise from occupational or domestic contact with infected animals or with an environment contaminated by their discharges. Infected animals that have recently aborted or given birth present the greatest hazard [07]. It is also suggested that ingestion of unpasteurized goat milk leads to brucellosis according to studies by Zaks N. et al [17], Gokhale Y.A. et al [18].

In present study, out of 10 serologically positive cases, 5 cases showed associated history of fever while remaining cases were a febrile. It is consistent with study done by Nagalotimath et al [19]. One should note that majority of chronic cases

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of brucellosis are devoid of fever. Hence, fever need not to be taken as a diagnostic feature of brucellosis. But as brucellosis is considered as one of the causes of pyrexia of unknown origin fever history should be interpreted cautiously.

Radiological findings to differentiate tubercular spondylitis from Brucella spondylitis is important as the former is more common in our country. Involvement of multiple vertebral bodies with involvement of disc space suggests tubercular spondylitis [20]. Characteristic findings of brucellar spondylitis are predilection for the lower lumbar spine (68% of lesions), bone destruction limited to the end plates, disk collapse, and granulation tissue or localized soft-tissue edema [21]. The radiological findings seen in our study suggests that brucellosis has effect on musculoskeletal system and our findings were similar to studies done by Ozgul Aet al [22], Sadat-Al M. et al [23] but differs from study of Sankaran-Kuttyet al [24] who found that clinical, radiological and histological features are not specific for diagnosing brucellosis.

One author Rajapaskeet al [25] found bone scanning was more sensitive than radiographs particularly in detecting acute sacroiliitis. Kheteeb et al [26], Malik G. M. et al [27] found that sacroiliitis being the most common presentation in brucellosis patients which is regarded as the common osteoarticular complication of brucellosis.

Blood Culture is regarded as gold standard in definite diagnosis of brucellosis but due to inefficiency, danger involved during isolation, serology is the cost-effective procedure [28]. Serological diagnosis helps in decreasing the morbidity among chronic spondylarthritis patients. Serology has a vital role in brucellosis as new screening tests by rapid slide agglutination methods are available. Serology is considered as confirmatory evidence for brucellosis keeping the background and contact history of patient [29]. In the present study 10 cases were positive for Brucella agglutinins in their sera and also present in diagnostic titers. In our study the incidence of brucellosis in Backache has been found to be 14.2%. High Incidence was probably due to small sample size of our study. But correlates with the findings of the studies done by Gokhale and Bichile et al (8.3%) [18] and Mousa and Muhtaseb et al (6%) [30].

Though there are reports of brucellosis in backache patients from various parts of World, it is just the tip of the iceberg, as many cases remain undiagnosed. The failure to diagnose brucellosis is due to the failure to suspect it. The only way to diagnose it is to suspect it and then to have a serological test on the patient's serum and if it is positive to proceed with blood culture [28].

We acknowledge the limitations of our study. Our sample size was small and study in larger population needs to be done to establish the role. The clinicians miss the diagnosis of brucellosis due to lack of awareness and high clinical suspicion. A history of occupational or environmental exposure to possible sources of infection should always be sought. The awareness of the disease in the people involved in veterinary profession is also of prime importance.

This would help to take necessary preventive measures. It is suggested that the individuals engaged in an occupation which brings them in contact with Brucella infected animals and Brucella cultures should be screened periodically for Brucella agglutinin [31].



Fig.1: X ray Dorsolumbar spine lateral view showing reduction in disc space between L4 and L5.



Fig-2: X ray Dorsolumbar spine lateral view showing Bridging osteophyte between L2 and L3 (indicated by arrow)

Conclusion

To conclude the role of infective etiology should always be kept in mind in patients with chronic lower back pain. High clinical suspicion in patients working in animal husbandry and those come in contact with livestock like farmers should undergo a detailed testing. With brucellosis in mind relevant serological tests will help in establishing diagnosis due to their ease and cost effectiveness as there is difficulty in culturing this organism due to its fastidious nature and need for BSL (Biosafety Level)-3 precautions which is not available in every laboratory. Hence long-term analgesic treatment could be avoided and evidence-based treatment in the form of antibiotics should be started to these patients to relieve chronic low back pain.

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