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Brucella Seroprevalence in Spinal Patients of Radicular Syndromes, and Backache in Thar Desert

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Abstract

Introduction: India is an endemic zone for *Brucella*. North west part of the India comprises of the Thar Desert, which mainly extend to the Rajasthan state of the country. Middle to lower class population is dependent on animal dwelling and agriculture. Reported *Brucella* sero-prevalence in this area is quite variable. Awareness about this disease is still less. There are very occasional documented literature on *Brucella* sero-prevalence here, more so in context to patients of back pain, spine and radiculopathy syndromes. So we planned and carried out a prospective observational study in this regard.

Methods: In an ongoing prospective study consecutive 350 patients with backache, and radiculopathy visiting to neurology out patient department of our tertiary health care station in the region, from January 2016 to Dec 2017, were screened for *Brucella* sero-prevalence by tube agglutination test. Other work-up was performed as per patient's clinical status. The treatment was planned and executed, depending on individual patient's condition and supportive laboratory investigations.

Results: The male to female ratio was 170:180:: 48.57: 51.43. The *melitensis* species of the *Brucella* was found to be much more common than *abortus* one. The females were much more affected by *Brucella melitensis*. The young population was more commonly affected, and elderly patients were quite less positive for *Brucella* agglutination test.

Conclusion: The sero-prevalence of *Brucella* in our study was 22.85%. It signifies the endemicity of the disease in this area. The study shows the necessity to take adequate steps to handle this endemic disease very seriously as many a times the diagnosis is missed, as the variable, and unusual clinical manifestations of the brucellosis. The lack of public and healthcare awareness further hampers curb the disease burden.

Keywords: *Brucella abortus; Brucella melitensis; Backache; Radicular Syndrome*

Abbreviations

CRP: C-Reactive Protein; ESR: Erythrocyte Sedimentation Rate; MRI: Magnetic Resonance Imaging; CT: Computerized Tomogram; NSAIDS: Non-Steroidal Anti-Inflammatory Drugs

Introduction

Brucellosis is widely prevalent bacterial zoonosis worldwide, more so in and around animal dwellers in developing countries and, is an important public health problem [1]. Endemic brucellosis has an important adverse effect on animals and human beings and causes loss to livestock industry and small-scale livestock holders [2]. Brucellosis is also endemic and an under recognized disease in India [3], and so is in the Thar desert of Rajasthan in North-west India, causing an enormous economic losses [3,4]. The prevalence report in India varies a lot from 0.8% to 26.6%, in different populations [5]. In the latest available study from India in 2015 the sero-prevalence of brucellosis was found to be to the tune of 7 - 10% in rural population of Maharashtra state [6].

Backache is a commoner problem all over the world, with various quite different causes [7] for it like posture, trauma and infection like tuberculosis, Brucellosis, Propionibacterium etc [8,9].

Prevalence or seroprevalence data are lacking from this area especially for spinal symptoms like backache, low backache, cervical pain and spinal radicular symptoms. There is lack of well documented data from this area. So the purpose of our study was to see the sero-prevalence of *Brucella* in patients of spinal radicular syndrome and back or spinal/paraspinal pain in rural and sub-urban areas around our city situated in the Thar desert, as animal dwelling used to be the mainstay of livelihood for centuries and still it is there for milk and dairy purpose at least.

Methods

Our medical college is a strong catchment area for the population of the Thar desert, extending over five to six hundred kilometers. In an ongoing study (part of which is already published elsewhere [10]), consecutive 350 patients of backache with or without radicular pain coming to our out-patient department of neurology of this tertiary level health care station, over a period of 2 years from January 2016 to Dec 2017, were included in the study. Out of these, 309 patients had radiculopathy (radicular syndrome) and, remaining 41 patients had backache only. Those patients having an alternative cause for backache or radiculopathy or even probabilities like that of tuberculosis, secondaries spine, fluorosis, those with history of trauma etc. were excluded from the study by clinical clues, respective and relevant investigations. After exclusion of alternative diagnosis the remaining patients were screened for *Brucella* serology by tube agglutination test, mainly for the a*bortus*, and *melitensis* species. of *Brucella*. This test is an excellent screening test, freely available in our institute and no other tests are available. The samples were taken in nearby microbiology laboratory and the sera were put for tube agglutination test. Other pertinent investigations like C reactive protein (CRP), erythrocyte sedimentation rate (ESR), skiagram, magnetic resonance imaging(MRI), computerized tomogram (CT), and other relevant investigations on individual patient's clinical status and investigation profile were done. Individual patients data were noted, recorded and were analyzed as shown in table, which are elaborated more extensively in discussion and conclusion. Patients with significant titers of *Brucella* agglutination i. e. 1:160 or above in an endemic area as of ours, were treated with doxycycline 100 mg twice a day with rifampicin 900 mg per day for six weeks as per standard treatment schedule. Injection streptomycin 750 - 100 mg for initial 14 days was given to some patients as per disease severity. Other supportive and symptomatic treatment was done depending upon clinical status of the patients with that of non-steroidal anti-inflammatory drugs(NSAIDS), pregabalin, muscle relaxants, vitamin D_3 supplementation etc. The data were analyzed with respect to age, sex, type of *Brucella* subspecies etc. as given in observation table.

Observations

Age wise distribution and other important parameters are tabulated as under.

Age group	No. of patients (N = 350)	Brucella positive (N = 80) F:M::61:19 P = .0001	Brucella melitensis (N = 50) F: M::33:17 P = .0455	Brucella abortus (N = 18) F:M::13:5 P = .1387	Brucella abortus + Brucella melitensis (N = 12) F:M::7:5 P = .8596
10 - 20	14	07	04	02	01
21 - 30	103	27	16	07	04
31 - 40	98	22	13	05	04
41 - 50	51	14	10	03	01
51 - 60	59	07	03	02	02
61 - 70	25	03	02	01	0
71-Above	00	00	00	00	00

Total number of patients studied (N)= 350.

Male : Female :: 170:180:: 48.57:: 51.43%. Young population is more commonly affected. Elderly people were quite less affected. Females were more commonly affected and the commoner culprit was Brucella melitensis.

The C reactive protein (CRP) was raised in 50% of the patients in our study in comparison to an earlier study where it was raised in 58.4% patients [1]. There was no significant difference in sero-prevalence as per the academic education as observed in an earlier study [6].

Discussion

Animal dwelling was hit hard from draught, diseases, outer invaders etc. from time to time., but still it stood with time without significant social and demographical changes. With time the shortage of landscape and creation of new avenues by education, the animal dwelling was affected a lot, but still it is quite contributory to the economy of middle to lower class residents in rural and suburban area. Even in main city milk from cattle dwellers directly or via transport trader which is usually unpasteurized and countryside dairy sources. An old Indian myth that un-boiled milk is better than boiled one also contributes to the problem which is also supported by studies from Saudi Arabia [11]. Of course such myth may be true, once infection or contamination is ruled out.

The transmission of *Brucella* is by consumption of raw milk or infected milk products, contact with infected animals or through the respiratory tract, abraded skin, wound or conjunctiva [12]. The early phase of bruceller illness is difficult to diagnose especially when there is only single or non-specific symptom because of a variety of non-specific clinical signs [2], which is further supported by certain recent case reports [13-15].

Diagnosis of these patients and appropriate management can prevent morbidity and mortality to a great extent. In a recent study it was found that one third of brucellosis in humans is associated with skeletal complication, among which peripheral arthritis, sacroiliitis and spondylitis are the frequent ones [16]. The involvement of spine is the most serious complication with a reported incidence being 2 - 60% [17]. So Brucellar spondylodiscitis be considered in the differential diagnosis specially in endemic areas and, practitioner should take adequate measures to rule out Brucellosis with sufficient reasons. Magnetic resonance imaging may be of help in such cases up to some extent, but it is not easily and adequately available in the poor regions affected by Brucellosis, which is usually the scenario, and the early stages of such illness may even be missed with MRI [18,19].

Male to female ratio of 170:180 (49.49%: 51.49%) in our study is similar to a large retrospective series of 1028 cases, where it was 52.4: 47.6 [1].

In our study the young adult population was more frequently affected, which is quite similar to most earlier studies [6].

Similarly elderly population, that is after age of 50 years was less frequently affected by *Brucella*, comprising only 7 patients in 51 - 60, and three patients in 61 - 70 age group, which is similar to the observation of recent study from India [5], but different to the findings of Ramos., *et al*. where the elderly population is more frequently affected [20].

Brucella melitensis was much more commonly found in our observation than the *Brucella abortus*, which is statistically significant with one tailed p value of 0.0455 by Fisher's exact test, and is similar to the trends of other studies from different parts of the world [1,6].

The very important observation of our study is that there was much higher sero-prevalence in females in comparison to males (76.25% :: 23.75%), with p value 0.0001, which is extremely statistically significant and different from earlier observed studies and a very recent Indian study from different state [6]. This we attribute to the traditional habit of caring the pet animals by females in this desert state as males are busy away from house for other supplementary livelihood earning, lower educational level in female and so the less awareness about personal hygiene, less importance to female health care in general, there being a possibility of extra nidus for infection in females and responsible for pregnancy related complications as reported in a recent study [21], no such data are documented from this region in any earlier study or the observation according to the available literature.

Conclusion

Brucellosis remains a neglected health care problem, and a diagnostic dilemma due to misleading and non-specific manifestations and increasing unusual presentations [6]. In humans, Brucellosis may lead to serious morbidity, and it continues to be a major health problem [1]. Serological surveillance is not practiced routinely even in *Brucella* - endemic countries, of course it is supposed to be a part of laboratory testing coupled with a high index of clinical suspicion to improve the level of case detection. Screening family members of index cases in an endemic area should be undertaken to pick up additional un-recognized cases [6]. A patient of infection and inflammation in *Brucella* endemic regions should be seen in context of rare presentation of *Brucella*, until unless an alternative satisfactory diagnosis is there.

Bibliography

1. Buzgan T., *et al*. "Clinical manifestations and complications in 1028 cases of brucellosis: a retrospective evaluation and review of the literature". *International Journal of Infectious Diseases* 14.6 (2010): e469-e478.

2. Franc KA., *et al*. "Brocellosis remains a neglected disease in the developing world: a call for interdisciplinary action". *BMC Public Health* 18.1 (2018): 125.

3. Hundal JS., *et al*. "Awareness, knowledge, and risks of zoonotic diseases among livestock farmers in Punjab". *Veterinary World* 9.2 (2016): 186-191.

4. World Health Organisation. The Control of Neglected Zoonotic Diseases: A Route to Poverty Alleviation. Geneva, 20-21, September, 2005: Geneva Report of a Joint WHO/DFID-AHP Meeting with the participation of FAO and OIE (2006).

5. Mantur BG., *et al*. "Review of clinical and laboratory features of human Brucellosis". *Indian Journal of Medical Microbiology* 25.3 (2007): 188-202.

6. Smita S., *et al*. "Serological, clinical, and epidemiological profile of human brucellosis in rural India". *Indian Journal of Community Medicine* 40.3 (2015): 163-167.

7. Richard A Deyo. "The role of spinal manipulation in the treatment of low back pain". *Journal of the American Medical Association* 317.14 (2017): 1418-1419.

8. Albert HB., *et al*. "Antibiotic treatment in patients with chronic low back pain and vertebral bone edema (Modic type 1 changes): a double-blind randomized clinical controlled trial of efficacy". *European Spine Journal* 22.4 (2013): 607-707.

9. Shubhakaran K and Khichar Rekha J. "Backache and Infection". *European Spine Journal* 22.10 (2013): 2348.

10. Shubhakaran K. "Seroprevalence of Brucella in spinal radicular syndroms and backache". *World Journal of Pharmaceutical Sciences* 6.10 (2017): 1445-1450.

11. Cooper CW. "Risk factors in transmission of brucellosis from animals to humans in Saudi Arabia". *Transactions of the Royal Society of Tropical Medicine and Hygiene* 86.2 (1992): 206-209.

12. Al DEEB SM., *et al*. "Neurobrocellosis". *Neurology* 38 (1998): 354.

13. Ebrahimpour S., *et al*. "Skeletal comolications of brucellosis: Astudy of 464 cases in Babol Iran". *Caspian Journal of Internal Medicine* 8.1 (2017): 44-48.

14. Mrabet D., *et al*. "Brucellar spondylodiscitis affecting non-contiguous spine levels". *BMJ Case Reports* (2011): bcr0120113788.

15. Lazutkin A., *et al*. "Otolaryngology/head and neck region manifestations of Brucella". *Laryngoscope* (2018).

16. Sharma PP., *et al*. "Neurobrucellosis presenting as pseudotumor cerebri: First report from Oman". *Oman Medical Journal* 32.6 (2017): 507-509.

17. Argyrion AA., *et al*. "Neurobrucellosis presenting as clinically definite amyotrophic lateral sclerosis". *International Journal of Neuroscience* 128.1 (*2018*): 686-688.

18. M Gao., *et al*. "Comparison of tuberculous and Brucellar dpondylitis on Magnetic Resonance Images". *Spine (Phila Pa 1976)* 42.2 (2017): 113-121.

19. Yang X., *et al*. "Value on magnetic resonance imaging in brucellar spondylodiscitis". *La Radiologia Medica* 119.12 (2014): 928-933.

20. Ramos TR., *et al*. "Epidemiological aspectsof an infection by Brucella abortus in risk occupational groups in the micro-region of Araguaína, Tocantins". *Brazilian Journal of Infectious Diseases* 12.2 (2008): 133-138.

21. Gafirita J., *et al*. "Seroprevalence of Brucellosis among Patients Attending a District Hospital in Rwanda". *American Journal of Tropical Medicine and Hygiene* 97.3 (2017): 831-835.

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