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Retrospective Analysis of Suspected Clinical Cases of Human Brucellosis in Anand, Gujarat, India

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Abstract

Introduction: Brucellosis is a zoonosis that is emerging in some parts of the world. Although, brucellosis is a mandatory reporting disease and is not eliminated in Gujarat. The aim of the present study was to study the prevalence of human brucellosis in Anand district of Gujarat along with the trend of the disease over a period of 6 years. We also tried to study the common clinical presentations and diagnostic test used for confirmation of cases. **Methods**: In this study, we retrospectively analyzed the data available at the Shree Krishna Hospital, Karamsad during the past 6 years (2015 ± 2021) to get insight into the prevalence of human brucellosis in Gujarat. **Results:** According to the available data, 113 samples had positive serology for *Brucella* spp. The age of the patients enrolled in the study ranged from 12 to 78 years with an average age of 35.58. The majority were males 96 (85%), Out of 113 patient's total 37 patients admitted to the hospital in year 2019. According to the available data, out of a total of 113, 55 patients were positive for *Brucella abortus*, while only nine patients were positive for *Brucella melitensis*. **Conclusion:** As this study constitutes a retrospective analysis, some of its methodological limitations relate to the lack of information that would allow a more comprehensive analysis of risk factors (e.g., occupation, risk factors, and area of residence of patients).

Keywords: Clinical presentations, Diagnosis, Human brucellosis, Treatment

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Introduction

Brucellosis is an important zoonotic disease caused by the facultative anaerobic species of *Brucella* found worldwide. According to the World Health Organization (WHO) 500,000–12.5 million cases are reported each year in endemic areas.[1-3]

In India, with 80% of the population living in villages and small towns, religious beliefs discourage practices that involve testing and slaughtering farm animals for infectious diseases.[4,5] *Brucella* infections are a public health concern in most parts of the country, including Gujarat, because direct human-animal contact is more common in villages due to livestock farming.[4,5] The infection is transmitted to humans through contact with fluids from infected animals or food products such as unpasteurized milk and dairy products. It is a systemic disease that can affect the whole body.[1,2]

The exact burden of human brucellosis is not known in Gujarat as there are not enough cases and the disease is misdiagnosed as another condition. In Gujarat, only few studies looked at prevalence of brucellosis. Hence, the aim of this study was to contribute to a more accurate assessment of the epidemiological situation of human brucellosis in Gujarat, through the analysis of available data at Shree Krishna Hospital collected between 2015 and 2021.

Methods

This was a retrospective observational study carried out between year 2020 and 2021 at Shree Krishna Hospital Karamsad, a 1000 beded teaching hospital located in rural Gujarat, India. Ethical approval was obtained from the institutional research ethics board (vide letter 62). Medical records of patients diagnosed with brucellosis were retrieved from the medical record section for duration of 6 years from July 2015 to March 2021. Data received in the form of an electronic copy. A case of brucellosis was defined as any clinically suspected case admitted with signs and symptoms of the diseases with either a significant *Brucella* (*Brucella melitensis* and *Brucella abortus*) titer of ≥1:160 performed by standard agglutination test (SAT) and/or a positive blood culture. A total of 113 files of cases diagnosed with brucellosis were accesses and data were collected. Patients' information, laboratory parameters, diagnostic methods (serology/culture) used for confirmation of *Brucella* and treatment data were recorded. All the patients information like age, sex, year of admitted, presenting signs, symptoms, occupation, history, laboratory parameters, (haemoglobin, white blood cell count, platelet count, C-reactive protein, liver function testing), diagnostic methods (serology/culture) used for confirmation of *Brucella* and treatment data were obtained. We tried to study information regarding history, occupation, clinical presentations and diagnostic tests and treatments received in the hospital. All the obtained information entered into an Excel sheet and analyzed using SPSS 22. Descriptive statistics was uses. Available quantitative parameters were described in terms of frequency, mean, and percentages.

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Results

A total of 113 patients were diagnosed with brucellosis during the 6-year study duration (2015–2021). All required information was available only for 29/113 (25.66%) cases. The age of the patients in the study ranged from 12 to 78 years with a mean age of 35.58 year. Majority were (85%) of cases were males. Out of 113 patients 39 patients were hospitalized in the year 2019. A the total number of patients hospitalized in a year is shown in Table 1.

Patients aged <20–> 61 years; 6 (5.3%) were <20 years old, while 72 (63.71%) were 21–40 years old, 17 (15.0%) were 41–60 years old, and 3 (2.6%) over were 61 years old. A total number of age group-related observations of patients is given in Table 2.

Result of SAT was available for all cases. Out of a total of 113, 55 (48.6%) patients were positive for *B. abortus,* while only 9 (4.4%) patients were positive for *B. melitensis* [Table 3]. Result of blood culture was available for six patients. *Brucella* bacteremia (positive blood culture) was identified in only six patients. SAT titre greater than or equal to 1/80 indicates brucellosis [Table 4].

Out of 113 cases included in the study, complete/clinical data was available only for 29 patients. The most commonly reported symptom was fever (89.6%) followed by chills (48.2%) and weakness (27.5%) [Table 5]. Considering patients with specific organ involvement due to brucellosis, there were 15 (51.7%). Lymphadenopathy was observed in 24.1% of patients, hepatomegaly in 20.6%, while splenomegaly and endocarditis were observed in 3.44% of patients. Complications in different age groups were compared and were observed more frequently in the younger age group compared to the older age group. Symptoms and complications were more observed in men than in women. Liver enzymes were initially evaluated in more than half of the patients, and aspartate transaminase and alanine transaminase levels were found to be elevated in 60% and 25% of patients, respectively. It was found that CRP high levels at diagnosis in 68.96% of patients were only in 5 patients not performed. In the analysis of complete blood counts, leukopenia was found in 20.6% of patients, thrombocytopenia in 17.24%, and anemia occurred in 48.2% of patients. The treatment protocols followed were different with doxycycline monotherapy in 16 (55.1%) and ceftriaxone in 5 (17.4%), while doxycycline-rifampicin in 3 (10.3%). Most of the patients were admitted and diagnosed as being from Anand District (Gujarat).

Table 1: Gender-wise distribution of cases (*n*=113) during study period

Year of Admission	*Gender*		*Total (%)*
	Female	*Male*	
2015	1	1	2 (1.76)
2016	3	5	8 (7.0)
2017	3	10	13 (11.5)
2018	8	26	34 (30)
2019	2	37	39 (35.5)
2020	0	2	2 (1.76)
2021	0	15	15 (13.3)
Total	17 (15.0)	96 (85)	113 (100)

Table 2: Age- and gender-wise distribution of cases (*n*=113)

Age (year)	*Female*	*Male*	*Total no of Patients (%)*
<20	2	4	6 (5.3)
21–40	8	72	80 (70)
41–60	5	17	22 (19.4)
>61	2	3	5 (4.4)
Total	17 (15.0)	96 (85)	113 (100)

Table 3: Performance of SAT test result in cases (*n*=113) during study period

Year of Admission	*Brucella abortus positive*	*Brucella melitensis positive*	*Both positive*	*Total (%)*
2015	2	0	0	2 (1.76)
2016	7	1	0	8 (7.0)
2017	8	3	2	13 (11.5)
2018	21	4	11	36 (31.8)
2019	11	1	25	37 (32.7)
2020	0	0	2	2 (1.76)
2021	6	0	9	15 (13.2)
Total	55 (48.6)	9 (4.4)	49 (43.3)	113 (100)

Discussion

Brucellosis is a zoonotic disease that spreads all over the world and is a direct public health problem[1,2] In the present study, we wanted to shed some light on the still unveiled prevalence scenario of human brucellosis in Gujarat by conducting a retrospective study. We also tried to study common clinical presentations and diagnostic tests used for case confirmation.

Table 4 : Titre of SAT in cases (*n*=113) during study period

Year	*SAT Result*				
	Titers Positive	*1:80*	*1:160*	*1:320*	*1:640*
2015	BA	-	-	2	-
	BM	-	-	-	-
	Both	-	-	-	-
2016	BA	-	2	3	1
	BM	1	-	-	-
	Both	-	-	-	-
2017	BA	-	3	-	6
	BM	2	-	-	
	Both	-	-	-	1
2018	BA	12	6	2	1
	BM	4	3	1	-
	Both	2	4	1	-
2019	BA	7	9	1	2
	BM	5	2	2	-
	Both	4	3	4	6
2020	BA	-	1	-	-
	BM	1	-	-	-
	Both	-	-	1	-
2021	BA	6	4	-	-
	BM	3	-	1	-
	Both	3	1	1	-

BA: *Brucella abortus*, BM: *Brucella melitensis*

Table 5: Distribution of clinical features in the cases (*n*=29)

Symptoms	*n%*
Fever	26 (89.6)
Chill	14 (48.2)
Joint pain	3 (10.3)
Headache	6 (20.6)
Decrease Appetite	6 (20.6)
Back pain	1 (3.4)
Body pain	4 (13.7)
Weakness	8 (27.5)
Neck pain	1 (3.4)
Abdominal pain	5 (17.2)
Nausea/Vomiting	6 (20.6)
Weight loss	1 (3.4)

In the present study, the serological diagnostic identified 113 positive cases of human brucellosis, of which 96 (85%) were male, which is in agreement with the study of Agasthya *et al*. 2007[6] that reported a higher seropositivity in men (98.96%) than women (1.03%), half of the cases were in the age groups between 21±40 years. Our results are similar to those of Corbel, MJ (2006) that reported that the disease mainly affects men aged between 20 and 45 years, and suggests that the distribution by gender is connected to occupational factor.[7] In present study the lower infection rate observed in <20 year age group.

Blood cultures are characterized by low sensitivity and require several weeks of incubation, which may indicate the importance of serological tests.[1,2] In the present study, the 113 analyzed data, 55 (48.6%) were positive for *B*. *abortus* and 9 (44%) were positive for *B. melitensis* (SAT Test). Our result is similar to those of Nowihi (2017) that reported 24 (27.59%) were positive for B. *abortus*, and 5 (5.75%) were positive for *B. melitensis* by SAT test.[9]

The most commonly reported symptom was fever (89.6%) followed by chills (48.2%) and weakness (27.5%). While the findings of the present study, fever was reported as a disorder in 72.2% of cases in a study by Buzgan *et al*.,[10] 79.5% of cases in a study by Demiroglu *et al*.[2] and 79.8% of cases in a study by Aygen *et al*.[11] Values of CRP at diagnosis were elevated in 68.96% of cases in our study. Our result are similar to those of Guler *et al*. (2014) that reported elevated levels of CRP at diagnosis.[12] Of the present cases, 3.44% had splenomegaly, 20.6% had hepatomegaly, and 24.1% had lymphadenopathy. These rates are lower than those reported in other studies[10-11,13-16] The higher rates observed in the present study could be due to the fact that the diagnoses of splenomegaly and hepatomegaly were based not only on physical examinations but also on the basis of ultrasound.

Hematologic abnormalities have been reported during the course of brucellosis. Occasionally these signs they are the most striking manifestations of the disease. In a report from Peru, anemia was observed in 74% of patients with brucellosis, leukopenia in 45%, neutropenia in 21%, lymphopenia in 63%, and thrombocytopenia in 39.5%.[17] In our study, anemia observed in 48.2%, thrombocytopenia in 17.24%, and leukopenia in 20.6% of cases.

Different combinations of antibiotics can be used to treat brucellosis. In the present study, doxycycline monotherapy in 16 (55.1%) and ceftriaxone in 5 (17.4%), while doxycycline-rifampicin in 3 (10.3%). which is in agreement with the study of Ariza *et al*. 2007[6] that reported 12 out of 16 patients received optimal treatment while four patients received doxycycline monotherapy which is reported to be associated with higher disease relapse rates according to various studies.[18]

The limitation of this study is the fact that the data acquired were limited with the recordings. For example, Erythrocyte Sedimentation Rate, Risk Factors, Occupation data were not recorded; therefore, we were unable to analyze the data according to this parameter. We were unable to obtain data on disease progression and treatment outcomes because patient follow-up was limited or not recorded after diagnosis.

Conclusion

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References

1. Muhammad ZK An overview of brucellosis in cattle and humans, and its serological and molecular diagnosis in control strategies. Trop Med Infect Dis 2018;3:65.
2. Godfroid J, Al Dahouk S, Pappas G, Roth F, Matope G, Muma J, *et al*. A "One health" surveillance and control of brucellosis in developing countries: Moving away from improvisation. Comp Immunol Microbiol Infect Dis 2013;36:241-8.
3. Hull NC, Schumaker BA. Comparisions of brucellosis between human and veterinary medicine 2018;8:1500846.
4. Grace D. Food safety in low and middle income countries. Int J Environ Res Public Health 2015;12:10490-507.
5. Chand P, Chhabra R. Herd and individual animal prevalence of bovine brucellosis with associated risk factors on dairy farms in Haryana and Punjab in India. Trop Anim Health Prod 2013;45:1313-9.
6. Agasthya AS, Isloor S, Prabhudas K. Brucellosis in high risk group individuals. Indian J Med Microbiol 2007;25:28-31.
7. Corbel MJ. Brucellosis in humans and animals. Geneva: World Health Organization; 2006.
8. Corbel MJ. Brucellosis in Humans and Animals. Geneva: World Health Organization; 2006.
9. Nowihi MA, Abdullah QY, Alkhyat SH, Almahbashi AA, AlThobahni A, Al Bana MN. Comparison of standard agglutination test and enzymelinked immunosorbent assay to detect *Brucella* infection in Yemeni pregnant women. J Microbiol Exp 2017;5:00160.
10. Buzgan T, Karahocagil MK, Irmak H, Baran AI, Karsen H, Evirgen O, *et al*. Clinical manifestations and complications in 1028 cases of brucellosis: A retrospective evaluation and review of the literature. Int J Infect Dis 2010;14:469-78.
11. Aygen B, Doanay M, Sümerkan B, Yıldız O, Kayaba U. Clinical manifestations, complications and treatment of brucellosis: A retrospective evaluation of 480 patients. Méd Mal Infect 2002;32:485-93.
12. Guler S, Kokoglu OF, Ucmak H, Gul M, Ozden S, Ozkan F. Human brucellosis in Turkey: Different clinical presentations. J Infect Dev Ctries 2014;8:581-8.
13. Akdeniz H, Irmak H, Demiröz AP. Evaluation of brucellosis cases in Van region of Eastern Anatolia: A-3 year experience. Nagoya Med J 1998;42:101-10.
14. Kokoglu OF, Hosoglu S, Geyik MF, Ayaz C, Akalin S, Buyukbese MA, *et al*. Clinical and laboratory features of brucellosis in two university hospitals in southeast Turkey. Trop Doct 2006;36:49-51.
15. Colmenero JD, Reguera JM, Martos F, Sánchez-De-Mora D, Delgado M, Causse M, *et al*. Complications associated with *Brucella melitensis* infection: A study of 530 cases. Medicine 1996;75:195-211.
16. Mousa AR, Elhag KM, Khagali M, Marafie AA. A nature of human brucellosis in Kuwait: Study of 379 cases. Rev Infect Dis 1988;10:211-7.
17. Crosby E, Llosa L, Quesada MM, Carrillo C, Gotuzzo E. Hematologic changes in brucellosis. J Infect Dis 1984;150:419-24.
18. Ariza J, Bosilkovski M, Cascio A, Colmenero JD, Corbel MJ, Falagas ME, *et al*. Perspectives for the treatment of brucellosis in the 21st century: the ioannina recommendations. PLoS Med 2007;4:e317.