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Epidemiology and treatment of brucellosis in south Karnataka: A cross sectional study

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Abstract
Background and objectives: Brucellosis is a zoonosis widely distributed around the world. It is transmitted directly or indirectly to humans from infected animals predominantly domesticated ruminants and swine. The interest in brucellosis has been increasing because of the growing phenomena of international tourism and migration in addition to the potential use of Brucella as a biological weapon.
Methods: In this cross sectional study, A total of 30 cases diagnosed as brucellosis were investigated in terms of spread of infection, age and sex distribution, clinical and laboratory characteristics and response to different treatment regimens.
Results: Our study revealed a prevalence of 0.61 percent in adults and 0.1 percent in children. Fever with drenching sweats remained one of the important symptoms of brucellosis. Age groups of 41 to 50 years were more commonly affected by brucellosis. Males were more affected and showed the history of contact with animals. Brucellosis reacted well with the drug regimen and showed an overall better prognosis. 40% of the individuals had positive impact of health education on prevention of Brucellosis.
Conclusions and interpretation: It is concluded that brucellosis is a disease with significantly affecting the age group of 40 to 50 years. Brucellosis was significantly more affected among rural males and those with contact of animals.

Keywords: brucellosis, prevalence, epidemiology, treatment, zoonosis

Introduction
Brucellosis is a zoonotic disease widely distributed around the world. Half a million new cases are reported worldwide each year, but according to the World Health Organization, these numbers greatly underestimate the true incidence of human disease and brucellosis continues to be of great health significance and economic importance in many countries. Brucellosis has been present for millennia [1] and has managed to elude eradication, even in most developed countries [2, 3]. Gram-negative bacteria of the genus Brucella cause it and *Brucella melitensis* is the leading cause of brucellosis in humans. It is transmitted directly or indirectly to humans from infected animals predominantly domesticated ruminants and swine. The illness is characterized by fever, sweats, weakness, malaise and weight loss often without localized findings. Brucellosis is also called as undulant fever, Malta fever or Mediterranean fever.
Prevention of human brucellosis focuses mainly on elimination of infection in hosts (i.e. goats, cows), along with hygiene, vaccine, and effecting heating of dairy products and related foods. The routine pasteurization of milk and milk products has been the single factor most responsible for the control of brucellosis. In many cases, human brucellosis can be an occupational hazard for veterinarians, abattoirs, farmers, and dairy workers. Because contact with infected materials can allow organisms to enter through skin lesions and gain access to the lymphatic system, hygienic precautions are important. Vaccines developed to prevent this disease in humans have had limited efficacy and have been associated with serious medical reactions [4, 5]. Vaccines developed to prevent and control livestock infection are effective in reducing the incidence of human brucellosis. Most veterinary vaccines focus on *B. abortus* and *B. melitensis* [6].
The interest in brucellosis has been increasing because of the growing phenomena of international tourism and migration in addition to the potential use of Brucella as a biological weapon. This is because of the general perception that brucellosis is only seldom encountered in this part of the world. As the disease has a wide variety of clinical presentation, an attempt is made in this study to know the epidemiology and treatment of the disease.

Objectives
The objectives of the present study were to know the epidemiological distribution of brucellosis and modes of prevention of brucellosis.

Methodology

We studied a total of 30 patients of brucellosis and observed for epidemiological distribution and prevention of brucellosis. This a one year cross sectional study conducted on patients admitted in KLES Dr. Prabhakar Kore Hospital and MRC, Belgaum and fulfilling the inclusion criteria formed the material for the study.

Sample size

A sample size of 30 cases was calculated on the basis of 80 percent of the average number of similar cases admitted to KLES Dr. Prabhakar Kore Hospital Belgaum over a period of last three years.

Selection criteria

A clinically compatible case presenting with any of the following: Fever of more than 10 days, Joint pains, Low backache, Body ache and generalized weakness were included in the study, whereas, other diseases known to produce the symptoms in the present cases (malaria, UTI, upper respiratory tract infection, tuberculosis, enteric fever, syphilis, etc) were ruled out by all possible investigations.

Procedure

During the study period; all patients fulfilling the inclusion criteria were subjected to the serological tests and other tests if necessary were carried out to diagnose brucellosis. A diagnosis of brucellosis was made according to the CDC criteria. Patients who are diagnosed to have brucellosis were examined according to the performa to study the age and sex diatribution, contact with animals and other relevant epidemiological data were gathered after obtaining informed written consent. The ethical clearance had been obtained from the institutional committee authorized for the study.

The present study was conducted in KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belgaum and the findings obtained are tabulated as below. During the study period, 576 cases were screened for brucellosis and 30 cases of brucellosis were diagnosed. These 30 cases were studied for the following observations. Out of these 30 cases, 27 cases were from the medical wards and 3 cases were from pediatric wards. Total number of admissions during this period was 4279 in medical wards and 2784 in pediatric wards.

Results

The prevalence of brucellosis in medicine wards was 0.6% where as in pediatrics ward was 0.1 %. In the present study, it was found that for every 62 cases of enteric fever there were ten cases of brucellosis.

In the total of 30 patients, more number of cases i.e. seven cases each (23.33 %) were in the age groups of 41 to 50 years and 21 to 30 years. Out of 30 cases, six cases (20 %) were in the age group 41 to 50 years, five cases (16.66 %) in the age group 21 to 30 years, three cases (10%) in the age group zero to ten years and two cases (6.66%) in the age group 51 to 60 years. We did not find any cases of brucellosis after the age of 60 years. We observed that males are more commonly affected with brucellosis than the females. In our study 23(76.66%) patients were males while 7(23.33%) were females, male to female ratio been 3:1. We observed that the rural dwellers, 26 patients (86.66%) were more commonly affected than the urban dwellers, 4 patients (13.33%). In the present study, 27 patients had history of contact with animals, while 3 patients did not have history of contact with animals.

In the present study, history of raw milk consumption was present in 9 patients whereas 23 patients did not have history of raw milk consumption. In the present study, acute presentation of brucellosis was seen in 19 patients (63.33%), sub acute in nine patients (30%) and chronic in two patients (6.66%). Out of the 30 patients, majority presented with fever- 27 patients (90%). Other common presentations were night sweats in 20 patients(66.66%), arthralgia in 16 patients(53.33%), generalized body ache and loss of appetite in 15 patients(50%), low back ache in 14 patients(46.66%), headache in ten patients(33.33%) and weight loss in five patients(16.66%). Other minor symptoms observed were cough/dyspnea in two patients (6.66%), rashes in two patients (6.66%) and vomiting in one patient (3.33%). In the present study, majority of the patient's, i.e. 27 patients (90%) had fever. Hepatosp lenomegaly was seen in eight patients (26.6%), osteoarticular signs in eight patients (26.6%), splenomegaly in seven patients (23.33 %), hepatomegaly in four patients (13.33%), and lymphadenopathy in four patients (13.33%). Neurological manifestations, orchitis and rashes were rare manifestations. Ophthalmological signs were not seen in the present study.

All patients were treated with standard regimen of rifampicin plus doxycycline for six weeks or streptomycin for three weeks plus doxycycline for a period of six weeks. 14 patients were treated with rifampicin plus doxycycline. Nine patients were treated with streptomycin plus doxycycline. Six patients of neurobrucellosis which included two cases of chronic meningitis, three cases of radiculopathy and one case of myelopathy were treated with the standard regimen plus a third agent- cephalosporin for a duration of six months. One case of infective endocarditis was treated with rifampicin, doxycycline, gentamycin and a fourth agent ceftriaxone for a duration of six months. Health education in terms of elimination of host factors, maintaining of hygiene, vaccination and pasteurization of dairy products played an important role in control of Brucellosis. 40% of individuals who received health education showed less prevalence of brucellosis.

Discussion

576 cases of suspected brucellosis admitted in KLES Dr. Prabhakar Kore Hospital and Medical Research Centre from January 2007 to December 2007 were investigated clinically, serologically, bacteriologically and with other laboratory investigations to confirm the diagnosis of brucellosis. Out of the 576 cases, 30 cases were diagnosed as brucellosis according to the CDC criteria. Of the 30 cases 27 were in the adult patients and 3 cases were in the pediatric age group. In the present study, prevalence of brucellosis in adult patients getting admitted to KLES Dr. Prabhakar Kore Hospital and Medical Research Centre was 0.61%. Prevalence in the present study was slightly less compared to the study of hospitalized patients at GMC, Srinagar [7] which quoted a prevalence of 0.8% and Mantur *et al* [8] reported a prevalence

of 1.8% in patients hospitalized at BLDEA, Bijapur.

We observed cases of brucellosis through out the year although a small peak was observed in the months of June to August. Calving of animals usually occurs in April and May in this area, which could explain the peak incidence of brucellosis in this season in this study. The data clearly elucidate the endemicity of brucellosis in this area.

Karabay et a [9] have reported a prevalence of 1 percent in certain areas of Turkey, although another study from Turkey by Sumer *et al* [10] and one from Saudi Arabia by Al Sekait *et al*[11] have reported a higher prevalence of 3.2% and 4.5% respectively. The difference in endemicity may be due to the prevalent practices in the population and also the incidence of brucellosis in the community.

In this study more number of cases were seen in the age group of 11 to 50 years; which is in accordance with the study by Savas *et al* [12] of Turkey and Mantur *et al* [7] of Bijapur, India. This reflects the magnitude of the socioeconomic impact of brucellosis in this area, as it affects mainly the most productive group in the community.

In the present study males were more commonly affected than females. This is in accordance with the study by Mantur *et al* [7]. However in the study by Savas *et al* [12], females were more commonly affected than males. This is probably due to the fact that outdoor activities and contact with animals is more in males than in females in our region.

In this study, most cases were from rural areas; indicating that brucellosis is still a disease of the rural population. This is in accordance with the study by Savas *et al* [12]. We made an attempt of finding the source of infection in our study patients and found that 90 % of the patients had history of close contact with animals and 30% of the patients had history of raw milk consumption.

Conclusion

The present study was conducted in the KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belgaum on patients with brucellosis and it was concluded as following; Prevalence of brucellosis in admitted patients was 0.61 % in adults and 0.1 % in children. All patients responded to either rifampicin plus doxycycline or rifampicin plus streptomycin regimen. Over all prognosis was good and none of the patients expired. Brucellosis should be considered as a differential diagnosis in all cases of pyrexia of unknown origin, low backache, arthralgia, sciatica and in all cases of progressive weight loss.

Table 1: Status of patients admitted with Brucellosis

Year	Ward	Total admissions	No. of brucellosis	%
Jan 07 – Dec 07	Medicine	4279	27	0.63
Jan 07 – Dec 07	Pediatrics	2784	03	0.1

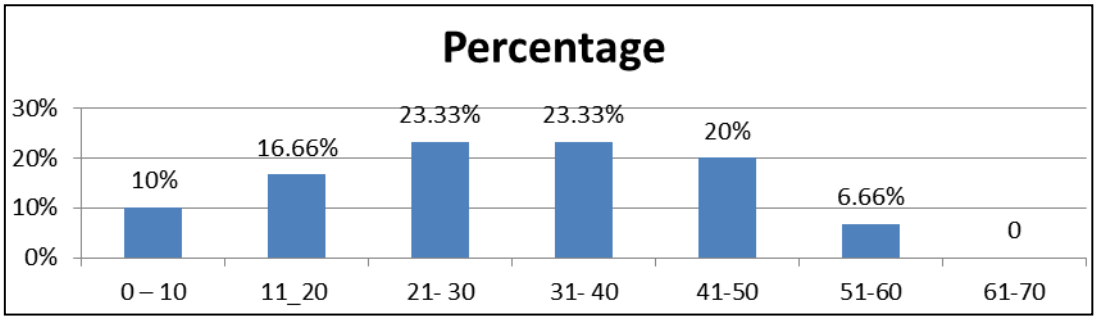

Fig 1: Age-wise distribution of cases

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