

## Original Article

# Risk Factors and Clinical Presentation of Brucellosis in Al-Jahra Hospital (1997-1999)

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**ABSTRACT**

**Objectives:** To analyze the clinical and demographic features of brucella patients hospitalized at the Jahra Hospital (JH) between January 1997 and December 1999.

**Methods:** Variables were obtained directly from medical records.

**Results:** A total of 115 patients were reviewed, representing 0.9% of all medical admissions; down from 10% in the mid-80s. Almost all cases had a history of contact with cattle and/or ingestion of raw milk. Male Bangladeshi shepherds were the most predominantly represented group among our cases. The median age of patients was 32 years. The season of infection culminated in the spring and was lowest in the winter.

The median stay in hospital was six days, and was longest for Bangladeshis and Kuwaitis compared to other nationalities. Serious complications occurred in only two patients and resolved without sequel. Two other patients relapsed and required a second course of antibiotics.

**Conclusions:** The remarkable decline in the incidence of brucellosis in Al-Jahra is very likely due to changes in diet and animal husbandry. Shepherds are still at high risk, and consideration to their socio-economic vulnerability and harsh work conditions must be addressed to further reduce the incidence of brucellosis in Kuwait.

KEYWORDS: diet, Kuwait, occupation, relapse, shepherds

**INTRODUCTION**

Brucellosis is a zoonosis caused by non-motile aerobic gram negative coccobacilli, which is transmitted to the human population mostly as an occupational disease or through the ingestion of raw goat or sheep milk and/or unpasteurized dairy products<sup>[1]</sup>. Camels are also believed to be a reservoir for brucellosis<sup>[2]</sup>. The occupational risk is especially important for *Brucella abortus* and *B. suis* infections, commonly found among abattoirs workers and those engaged in animal husbandry. Studies within abattoirs have documented the risk of aerosols as a mode of transmission<sup>[3]</sup>. *B. melitensis* infection, on the other hand, is primarily foodborne<sup>[1]</sup>. While rare cases of brucellosis transmitted by blood transfusion or bone marrow transplantation have been reported<sup>[4]</sup>, the disease is not readily transmitted between human beings<sup>[5]</sup>. Contact with cattle and the ingestion of raw milk are particularly important in Al-Jahra in view of the persistence of rural traditions in that part of Kuwait<sup>[6]</sup>. Al-Jahra has the highest number of livestock among all Kuwaiti governorates.

Brucellosis is endemic in Kuwait. Reported infection rates increased in the 1980s from 5.1 in 1982 to 68.9 per 100,000 population in 1985<sup>[6,7]</sup>. This important increase, however, can be attributed

mostly to an improvement in the diagnosis and reporting of the disease<sup>[8]</sup>. Since the beginning of the 1990s, reported cases have decreased somewhat, but brucellosis remains one of the most commonly reported infectious conditions in this country (Fig. 1).

The objective of this study was to analyze the clinical and demographic features of patients hospitalized at the Jahra Hospital (JH) between January 1997 and December 1999 with a diagnosis of brucellosis. The overall aim is to add to our knowledge of changes in the epidemiological and clinical features of brucellosis in Al-Jahra and, by extension, in Kuwait

**METHODS****Study design and sources of data**

Data for this descriptive case-series analysis were obtained from medical records of patients discharged with a diagnosis of brucellosis (1997-1999). The socio-demographic characteristics of patients were obtained directly from the records. They included age, sex, nationality, and occupation. Also obtained were presenting signs and symptoms, results of the medical and blood work-ups, including those of blood cultures and of the serological agglutination test (BAT). ELISA results were obtained for patients who had been

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hospitalized prior to any antibiotherapy. The diagnosis of acute brucellosis depended mostly on BAT titers 1:160 in symptomatic patients<sup>[9]</sup>. The numbers of hospitalization days and complications due to the disease or to the antibiotherapy were also tabulated.

After discharge, BAT and ELISA were routinely done every three months for up to two years or until results returned to normal. Those data were also obtained from the records. The occurrence of relapse was also noted. Relapse was confirmed either by isolating *Brucella sp.* from the blood of a patient with recurring symptoms some time after a course of treatment or when titers of IgG antibodies which had initially started to decrease began to rise again<sup>[10]</sup>. Relapse generally occurs within weeks to months after the end of therapy and may be due to inappropriate drugs, failure to complete the lengthy course of treatment, localized foci of infection that require surgical drainage or emergence of antibiotic-resistant strains of *Brucella*<sup>[11]</sup>. Most relapsing patients are cured by another course of antibiotics.

### Statistical analysis

Categorical variables of interest were tabulated as frequencies, and continuous ones were presented as means, standard deviations (SD) and medians. Relevant comparisons were tested with X-square and non-parametric tests depending on the variables involved. The association between two continuous variables was tested using Spearman's rank correlation coefficient. Significant differences were those with a p-value < 0.05. Most comparisons could not reach that level of significance because of the small number of cases available for most cells in stratified analysis. All computations were conducted on SPSS-Windows.

### RESULTS

Records showed that 115 patients were admitted, and two readmitted, to the JH Medical Department during the study period between January 1997 and December 1999. During that period, admissions or re-admissions for brucellosis constituted about 0.9% of the total 12,718 admissions to the department. This figure shows the importance of the economical burden that this one infectious entity can have on the operations of a general hospital such as JH's. The caseload of hospitalizations was accumulated for each month over the three-year period (Fig. 2). It indicates that hospitalization start increasing in March and decreases after July. The spring increase is believed to correspond to variations in milk production linked to the reproductive cycles in sheep and goats.

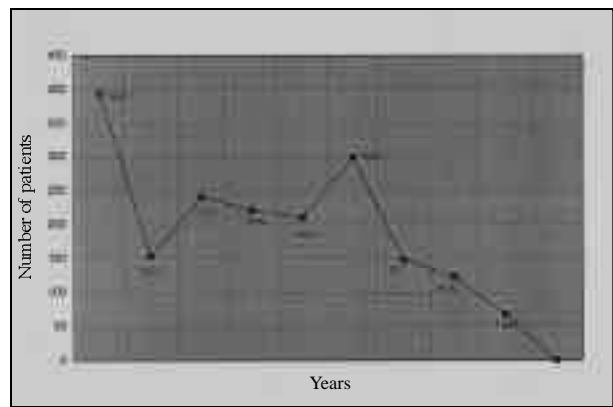


Fig. 1: Notified cases of brucellosis in Kuwait from 1988 to 1999

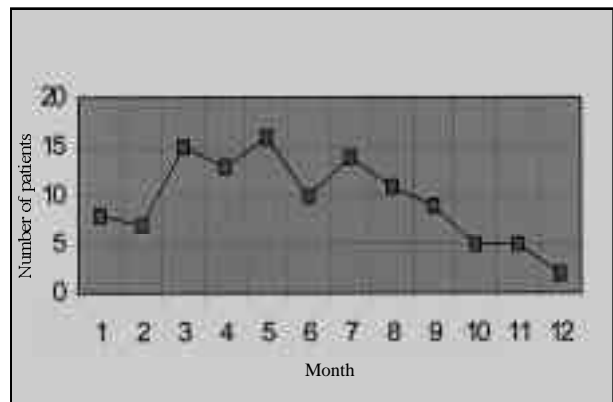


Fig. 2: Case-load of brucellosis patients by month. Cumulative figures (January 1997-December 1999)

The male to female ratio was 10:1, with only 11 female cases (9.5%). If we exclude the Bangladeshi patients, the male to female ratio would be 3:1. The age of patients ranged between 15 and 80 years, with a mean of 34.4 years (SD = 11.5), and a median of 32 years. Most patients gave a history of contact with cattle (sheep or goats): 64 were shepherds (56%) and 43 (37%) owned cattle. Almost all patients (96%) usually drank raw milk drawn directly from the cattle they own or tend. Table 1 shows the distribution of nationalities among cases. The median hospitalization period was six days for males and seven for females ( $P = 0.524$ ). The median hospitalization period was longest (6 days) for Bangladeshis and Kuwaitis and shorter for Saudis (4 days). All other nationalities had a median hospitalization of five days ( $P = 0.098$ ).

All hospitalized patients presented with fever, sweating, fatigue, headache, and generalized body aches. Eight patients (6.9%) presented with thrombocytopenia, two patients (2.1%) with splenomegaly, and none with detectable lymphadenopathy. Seven patients (6%) presented with mildly elevated liver enzymes not related to previous treatments. Five patients (4.3%) showed markedly elevated liver enzymes after starting Rifampicin, and had to be shifted to another antibiotic. There was no significant rise in WBC or

**Table 1**

Distribution of nationalities among brucellosis cases at the Jahra Hospital (1997-1999)

Nationality	Number	Percentage
Bangladeshis	64	55.6
Saudis	21	18.3
Kuwaitis	16	13.9
Non-Kuwaitis	8	7
Egyptians	3	2.6
Others	3	2.6
Total	115	100

ESR in most of the patients. Upon exploration, all 115 patients had blood cultures positive for *Brucella* species. ELISA was positive for the 90 patients who received the test. Only three patients of 115 (2.6%) had negative BAT results.

The most common complication was epididymo-orchitis of the left testicle for 10 patients, and of the right testicle for one case, constituting 9.5% of all patients. Osteoarticular complications were noted in six patients (5.2%), affecting most commonly the sacro-iliac joint. Serious complications occurred in two patients (1.7%). One patient suffered endocarditis due to *B. abortus*. The infection was localized in the aortic valve, with a sub-annular abscess of the right and left commissures, below the pulmonary artery. The aortic valve was damaged to the point where it had to be surgically removed and replaced with a prosthesis. The patient did well thereafter and completed a 12-week triple-antibiotic course. The other patient received a triple-antibiotic therapy for meningitis and recovered without any sequel.

After discharge, 97 patients (84.3%) were never seen on follow-up again. The 18 patients (15.6%) who returned for follow-up showed remarkable improvement. After completing their usual course of treatment, two patients (1.7%) relapsed and had to be re-hospitalized for a second course of antibiotics. One of the two patients had developed an infra-renal abdominal aortic aneurysm at the time of re-admission nine months after his first discharge. The other one had not completed his course of treatment after discharge, and was re-admitted after eight months with no particular clinical features beyond those of the relapsing infection.

## DISCUSSION AND CONCLUSIONS

In JH, patients with brucellosis constituted 10.6% of the total medical admissions in the period between April 1985 and September 1986<sup>[6]</sup>. A decade later, between January 1997 and December 1999, they constituted 0.9% of the total medical admissions; a tribute to progress in the prevention,

control, early diagnosis and treatment of the infection. The decrease in the incidence of brucellosis in Al-Jahra in particular, and throughout Kuwait in general, can be largely attributed to changing lifestyles and the vaccination program done by the Authority of Animal and Fish Resources. Many herds were slaughtered during the Iraqi occupation and have not been renewed at the same rate after the Liberation. When renewed, they have been tended less by family members, this role being left mostly to single expatriate shepherds from South East Asia. The Authority for Animal and Fish Resources provided vaccines free of charge for private herds before the invasion but stopped doing so after 1990. This change in policy does not seem to have affected the incidence of brucellosis in Kuwait in any major way. The increasingly sophisticated Kuwaiti consumer has been abandoning raw milk and dairy products prepared on the farm in favor of pasteurized products bought directly from the supermarket. Occupational transmission of brucella in abattoirs has been practically unknown in view of good hygiene and safety measures there. In addition, all animals destined to the abattoirs must come with a certificate of vaccination against brucella.

The management of brucellosis is quite successful at JH as indicated by the small number of complications and/or relapses. Complications seen here, one case of endocarditis and one case of meningitis, were relatively rare. *Brucella* endocarditis had been reported in the literature in 14 cases between 1988 and 1999<sup>[12,13]</sup>. The incidence of neurobrucellosis as mentioned in the literature is less than 2%<sup>[14,15]</sup>. Epididymo-orchitis can be the presenting complaint, however it usually occurs in association with signs of systemic infection<sup>[16]</sup>. Relapses can usually be attributed to poor compliance. Better patient-doctor communication regarding the risk associated with non-compliance may be a good way to prevent relapses or chronicity in the future<sup>[17]</sup>.

The social characteristics of shepherds, the occupational group most at risk for brucellosis both through direct contact with herds and consumption of raw milk, is interesting to consider. Bangladeshi males have almost exclusively run this occupation. As a result, the male to female ratio, which was 2:1 in 1985<sup>[6]</sup>, has now changed to 10:1. The relative social isolation of these patients is reflected in the fact that, when sick, they tend to stay longer in the hospital than other non-Kuwaiti groups. The reduction of the occupational exposure to brucellosis in shepherds should be an important preventive issue towards the elimination of brucellosis as a human infection in Kuwait. To do

so, more care should be given to the harsh conditions under which these shepherds operate, as they are often neglected and left to their own devices under very difficult conditions for many days. Providing better food and hygiene structures to the shepherds would certainly decrease their risk for brucellosis.

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