

## Hematologic Manifestations of Brucellosis

Behnaz F MD<sup>1</sup>, Mohammadzadeh M MD<sup>1</sup>, Mohammadi moghaddam M MD<sup>2</sup>

1- Assistant professor of infectious diseases department, Shahid Sadoughi University of Medical Sciences and Health Services, Yazd, Iran

2- Shahid Sadoughi University of Medical Sciences and Health Services, Yazd, Iran

---

Received: 5 March 2011

Accepted: 24 July 2011

### Abstract

#### Background

*Brucella mellitensis*, the most invasive strain of brucella, is the predominant Strain of genus brucella in Iran. It causes variety of hematological abnormalities some of which are frequent and causes difficulties in diagnosis.

#### Objective

To find hematological abnormalities of brucellosis in hospitalized patients in an endemic area.

#### Materials and Methods

A retrospective review of patients' medical records who were admitted to four university and general hospitals during 8 years was done. Age, sex, clinical findings, laboratory tests including CBC, platelet count, Erythrocytic Sedimentation Rate (ESR), C-Reactive Protein, wright test were assessed. Confirmation of brucellosis was made by wright agglutination test at a titer;  $\geq 1/160$ . Data were analyzed by Spss16 and Pvalue  $< 0.05$  was taken as significant for differences.

#### Results

Out of 238 patients diagnosed as brucellosis, hematologic evaluation had been performed for 208 patients. Anemia was detected in (55/119) 46% of male and (35/89) 39.3% of female patients (Pvalue 0.383). Leukopenia ( $WBC < 4300/mm^3$ ) was present in (18/208) 8.5%, thrombocytopenia (Platelet  $< 150.000/mm^3$ ) in (24/200) 12% and pancytopenia in (3/200) 1.5% of patients.

#### Conclusion

Brucellosis should be considered in differential diagnosis of any patient with disturbances of hematologic findings in endemic areas.

#### Key Words

Anemia, Leukopenia, Thrombocytopenia, Brucellosis

---

#### Corresponding Author:

Fatemah Behnaz, Assistant professor of infectious diseases department, Shahid Sadoughi University of Medical Sciences and Health Services, Yazd, Iran, Infectious disease ward, Shahid sadoughi hospital, Ebne Sina Avenue, Yazd, Iran email: Fatemah.behnaz@yahoo.com

## Introduction

Brucellosis is a Common zoonosis in some developing Countries including Iran. The predominant Strain of brucella in Iran is *B.mellitensis*(1). *Brucella mellitensis* is the most invasive strain and Causes the most severe disease. The disease causes variety of hematological abnormalities some of which have been frequently associated with acute brucellosis such as anemia and leucopenia (2), but thrombocytopenia and pancytopenia have been less frequent(3). In Some endemic areas for brucellosis, few other infectious diseases are Prevalent Presenting with similar hematological manifestations such as leishmaniasis, tuberculosis, typhoid fever and infectious mononucleosis (2). Crimean Congo Hemorrhagic Fever, an occupationally related infection in some endemic areas for brucellosis, during initial few days of its presentation can mimic brucellosis complicated by pancytopenia ,causing problems in diagnosis in endemic areas(4). In a review of medical records of brucellosis cases admitted to university and general hospitals of an endemic area during 2003-2010, their hematological findings were analyzed.

## Materials and Methods

A retrospective review of patients' medical records who were admitted to four university and general hospitals during 8 years was done.

Variables assessed were demographic (age, sex), clinical signs and symptoms laboratory tests including CBC, platelet count, Erythrocyte Sedimentation Rate (ESR), C-Reactive Protein(CRP), Wright Test ( standard tube agglutination ), Coomb's Wright, dilutional Wright test, Elisa for antibrucella IgG and IgM (in the case standard tube agglutination was negative). Complications were also looked for. Confirmation of brucellosis was made by wright at titer; $\geq 1/160$ .

## Results

Among 238 Brucellosisdocuments, hematological evaluation was studied for 208 (87.4%) of them who were enrolled into study. Platelet count had been reported for 200 patients(84.3%). Male to female ratio was 1.34/1 including 119 male and 89 female patients. Mean and Median of their age was  $38.5 \pm 21$  and 35 years respectively (range 1.5years to 82 years). Their clinical findings were fever (78%), Sweating (56%) chills (45%), generalized weakness (42%), Low back pain (41.6%), splenomegally (31.7%), hepatomegally 24%, musculoskeletal pain 32.5%, weight loss 30%, headache 27.3%, arthralgia 26.5%, lymphadenopathy 8.4% and Cough 7.6%.

Anemia was detected in 55/119 (46%) of male and 35/89 (39.3%) of female patients (P value 0.383). Mean of hemoglobin in male patients was  $13.1 \pm 1.99$  g/dl while mean  $12.33 \pm 1.3$ , g/dl for female (P value= 0.002).

Leucopenia ( $WBC < 4300/mm^3$ ) was present in 18/208 (8.5%) of patients.

Leukocytosis ( $WBC > 10800/mm^3$ ) in 30/208 (14.2%) of patients. Thrombocytopenia (Platelet  $< 150.000/mm^3$ ) was detected in 24/200 patients (12%). Ten patients (5%) had thrombocytosis (Platelet  $> 450.000/mm^3$ ).

Patients records revealed that ESR was done for 189 (79.4%) as follows: 44 patients (23.2%) had ESR  $< 20$  mm/1<sup>st</sup> hour, 126 patients (72%) 20-99 mm/1<sup>st</sup> and only 19 cases (4.8%) of them had ESR  $\geq 100/1$ <sup>st</sup> hr. CRP was Positive in 164 (77%). Three patients (1.5%) had pancytopenia, one with petechiae and purpura and another one presented with melena, initially treated as Crimean Congo hemorrhagic fever. Biopsy done on his bone marrow revealed granuloma and Wright agglutination test was positive at a titer; 1/ 640.

## Discussion

Brucellosis is a Common disease in many developing Countries especially in Middle East including Iran. Clinical and laboratory Findings of brucellosis are heterogeneous and non specific, so it should be considered in differential diagnoses of any patient with hematological abnormalities in endemic areas (5).

The present study revealed that 42% of patients had anemia. Due to WHO definition of anemia it was not statistically different between sexes, Although hemoglobin Concentration was significantly lower in women. Anemia aggravates fatigue which is frequently seen in brucellosis. Anemia has been reported in 15.1% to 83% of Patients in different studies on brucellosis patients (2, 5-11). This wide range of anemia may be partly due to different definition criteria.

Normal leukocyte count has been reported in many studies (8, 9) and Leukopenia in 3% to 68% of patients (2, 5, 6, 9, 13). Differences is partly due to different definitions of leukopenia (<4000/mm<sup>3</sup> to <4500/mm<sup>3</sup>). In the present study 8.5% of patients had leukopenia which is in the range of other studies(3% in a northern Iranian study to 28.7% in a Spanish study), although a Greek study reported it as an extremely rare event(3,14,15) . Thrombocytopenia observed in 12% of our patients, had been reported in 3.4% to 33% of patients in other studies (2, 5, 6).

Pancytopenia observed in 3 (1.5%) of patients in the present study had been reported in 3 to 21% of patients reported in previous studies (2, 16).

Abnormal ESR defined as >20mm/1st hr observed in 145 (76.8%) of our patients has been reported in many studies in the range of 61% -65.9 % ( 2, 5, 10, 17). However it has been reported in 22.2% of patients in a study in northern Iran (6).

Positive CRP was seen in 59.1%-64.7% of patients in tow studies in Iran (6, 10) and in 78.9% of patients in a study in Balkan (5).

As a conclusion, since brucellosis is endemic in our area it may be concluded that this disease should be considered in differential diagnosis of any patient with variety of disturbances of hematologic findings in endemic areas.

## Acknowledgment

We appreciate contribution of shahid Sadoughi hospital, shahid Rahnemoun hospital, Shohadaye Kargar hospital and seyedolshohada hospital in data collection.

## Conflict Of Interest

None

## References:

1. Zowghi E, Ebadi A. typing of brucella strains in Iran. Arch Ins Razi 1997;36:154-5.
2. Akdeniz E, Irmak H, Seckinli T, Buzgan T, Demiroz A. Hematological manifestations in brucellosis cases in Turkey. Acta Medica Okayama 1998;52 10: 63-65.
3. Sari I, Altuntas F, Hacioglu S, Kocyigit I, Sevinc A, Sacar S , etal. A multicenter retrospective study defining the clinical and hematological manifestations of brucellosis and pancytopenia in a large series: Hematological malignancies, the unusual cause of pancytopenia in patients with brucellosis Am. J. Hematol 2008 83:334–339.
4. Mardani M, Rahnavard M, Rajaeinejad M, Holakoui Naini K, Chinikar S, Pourmalek F, etal. Crimian Congo hemorrhagic fever among health care workers in Iran. A seroprevalence study in tow endemic regions Am J Trop Med .Hyg 2007;76(3) pp443-45.
5. Bosilkovski M, Krteva L, Dimzova M, Kondova I. Brucellosis in 418 patients from the Balkan Peninsula: exposure-related differences in clinical manifestations, laboratory test results, and therapy outcome International Journal of Infectious Diseases 2007; 11, 342—347.

6. Hasanjani Roushan M. R., Mohrez M., SmailnejadGangi S.M., Soleimani Amiri M. J., Hajiahmadi M. Epidemiological features and clinical manifestations in 469 adult patients with brucellosis in Babol, Northern Iran *Epidemiol. Infect.* 2004; 132, 1109–1114.
7. Tsolia M, Drakonaki S, Messaritaki A, Farmakakis T, Kostaki M, Tsapra H, et al. Clinical features, complications and treatment outcome of childhood brucellosis in central Greece *J Infect.* 2002;44(4):257-62.
8. Namiduru M, Gungor K, Dikensoy O, Baydar I, Ekinci E, Karaoglan I, Bekir NA. Epidemiological, clinical and laboratory features of brucellosis: a prospective evaluation of 120 adult patients *Int J Clin Pract.* 2003;57(1):20-4.
9. Kokoglu OF, Hosoglu S, Geyk MF, Ayaz C, Akalin S, Buyukbese MA, et al. clinical and laboratory features of brucellosis in tow university hospitals in southern turkey *Trop Doct* 2006;36(1):49-51.
10. Abdi Liae Z, Soudbakhsh A, Jafari S, Emadi H, Tomaj K. Hamatological manifestations of brucellosis *Acta Medica Iranica* 2007; 45, 2:145-148.
11. Andropoulos P, Tsironi M, Deftereos S, Aersopos A, Assimakopoulos G. Acute brucellosis: presentation, diagnosis and treatment of 144 cases. *International Journal of Infectious diseases* 2007;11,52-57.
12. Tohme A, Zein E, El Rassi B, Koussa S, Nasnas R. Human brucellosis in Lebanon. Clinical features and therapeutic responses in 88 patients. *J Med Liban.* 2004;52(3):149-55.
13. Bukharie HA. Clinical features, Complications and Treatment Outcome of Brucella infection: Ten Years' Experience in an Endemic Area *Trop. J pharm Res* 2009; 8 (4): 303-31.
14. Galanakis E, Bourantas KL, Leveidiotou S, Lapatsanis PD. Childhood brucellosis in north-western Greece: a retrospective analysis. *Eur J Pediatr.* 1996; 155(1):1-6.
15. Colmenero JD, Reguera JM, Martos F, Sanchez-de-Mora D, Delgado M, Causse M, et al. Juarez Complications Associated with Brucella melitensis Infection: A Study of 530 Cases. *Medicine* 1996;75(4): 195-211.
16. Caglar CE, Erkasar CE, Bilge T, Dilek A. Hematologic Manifestations of Brucellosis in Children: 5 Years Experience of an Anatolian Center *Journal of Pediatric Hematology/Oncology.* 2010;32(2):137-140.
17. Demroglu YZ, Turunc T, Aliskan H, Coakoglu S, Arslan H Brucellosis: retrospective evaluation of the clinical, laboratory and epidemiological features of 151 cases *Mikrobiyol Bul* 2007;41(4):517-27.