HEMATOLOGICAL CHANGES IN TUBERCULOUS SPONDYLITIS PATIENTS AT THE HOSPITAL UNIVERSITI SAINS MALAYSIA

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Abstract. In this study, we compared the platelet count with erythrocyte sedimentation rates (ESR) in patients with tuberculous spondylitis to evaluate the correlation. This was a retrospective 3-year study covering January 2004 to December 2006 at the Hospital Universiti Sains Malaysia. Platelet counts, hemoglobin levels, ESR, peripheral blood counts and peripheral blood smears on 17 patients with tuberculous spondylitis were obtained. The ages of the patients ranged from 20 to 70 years old. The male to female ratio was 3.2:1. The majority of the patients were anemic (88.2%) and 52.9% of the patients had thrombocytosis. All the patients had normal lymphocyte counts and a high in ESR at diagnosis. There was a linear correlation between the platelet count and ESR (r = 0.60, p < 0.01). The platelet count was also significantly correlated with the hemoglobin level (r = -0.6, p < 0.02). The degree of thrombocytosis was related to the degree of inflammation measured by the ESR. Thrombocytosis also correlated with the hemoglobin level. We suggest that evaluating hematological values in suspected cases of tuberculosis should be considered. The presence of hematological changes should raise the suspicion of tuberculosis in spondylitis patients.

INTRODUCTION

Tuberculosis (TB) is a major public health problem in Malaysia. Although involvement of bones accounts for 1 to 5% of all TB cases, multifocal involvement of the skeleton is extremely rare (Ozol et al, 2006). Spinal TB is the commonest form of skeletal TB (Turgut, 2001; Kumar, 2005). TB of the spine (Pott's disease) is both the most common and most dangerous form of TB infection. Spinal TB occurs as a result of hematogenous dissemination from a primary focus in the lungs or lymph nodes. Delay in establishing the diagnosis and management may lead to spinal cord compression and spinal deformity (Turgut, 2001). Early recognition is therefore necessary to minimize residual spinal deformity and/or permanent neurological sequelae (Sinan et al, 2004). Spinal TB, in its atypical forms, is a rare clinical entity and a low index of suspicion on the part of the surgeon may result in misdiagnosis as a neoplasm (Tanriverdi et al, 2003). The diagnosis of spinal TB is difficult and commonly occurs at an advanced stage (Cormican et al, 2006).

The differential diagnosis of tuberculosis should be entertained in patients with some abnormal hematological findings (Singh et al, 2001). Hematological parameters are useful indicators of severity in TB infection (Bozoky, 1997). Hematological changes associated with TB infection have been incompletely investigated (Singh et al, 2001). To the best of our...
knowledge, there is no comprehensive study assessing the hematological abnormalities in spinal TB patients in Malaysia.

MATERIALS AND METHODS

This retrospective study evaluated hematological findings in 17 adult patients with TB spondylitis treated at the Hospital Universiti Sains Malaysia from January 2004 to December 2006. Infection was diagnosed in patients having characteristic histologic and/or microbiologic evidence of TB spondilitis, diagnostic radiographic features or following adequate response to antituberculous therapy. All patients had a peripheral blood count and erythrocyte sedimentation rate (ESR) test on diagnosis. A hemoglobin level, lymphocyte count, platelet count and ESR were also obtained. Pearson correlation was used for statistical analysis.

RESULTS

Seventeen patients were diagnosed with TB spondylitis from January 2004 to December 2006. The ages of the patients ranged from 20 to 70 years old, with a mean age of 48.5 years old. The male to female ratio was 3.2:1. The majority of patients were anemic (88.2%) with hemoglobin levels ranging from 8.6 g/dl to 14.3 g/dl with a mean hemoglobin of 11.4 g/dl. Normocytic normochromic anemia was the most common abnormality observed. The total white cell count ranged from 4.4 x 10^9/l to 16.0 x 10^9/l with the mean total white count of 8.3 x 10^9/l. The lymphocyte counts ranged between 1.0-3.9 x 10^9/l. Thrombocytosis was noted in 52.9% of patients, which were ranged from 190 x 10^9/l to 665 x 10^9/l. All patients had an elevated ESR ranging from 21 mm/h to 123 mm/h.

There was a linear correlation between the platelet count and ESR (r = 0.60, p <0.01). The platelet count was also significantly correlated with the hemoglobin level (r = -0.6, p <0.02). There was no significant correlation between the platelet count and the total white cell count.

DISCUSSION

This retrospective study of hematological changes in tuberculous spondylitis patients was the first carried out in Malaysia. The mean age of spinal TB infections in our patients was similar to a study by Tasova et al (2006) who reported a mean age of 44.7 with a range of 18 to 80 years old.

In this study we found the majority of patients had normocytic normochromic anemia with thrombocytosis. These findings are similar to a study by Morris et al (1989) who found hematological abnormalities among their patients with pulmonary TB included normochromic normocytic anemia, thrombocytosis and elevated ESR. There was a close correlation between acid-fast bacilli in sputum and abnormal values, particularly those with low body weight, low hemoglobin, high platelet count, abnormal white cell count and erythrocyte sedimentation rate (Morris, 1989). Olaniyi and Aken'ova (2003) also observed significant hematologic abnormalities in TB patients which included high ESR, anemia, leukocytosis, neutrophilia, lymphopenia, thrombocytosis and thrombocytopenia.

Most of the patients in our study with TB spondylitis had thrombocytosis. Reactive thrombocytosis (RT) is found in a number of clinical situations including infectious diseases, such as pulmonary TB (Unsal et al, 2005). The regulation of thrombopoiesis is under the control of an array of hematopoietic growth factors (Hsu et al, 1999). The concentration of cytokines in the bone marrow correlates well with those in the peripheral blood. The endogenous levels of thrombopoietin (TPO), interleukin 6 (IL 6) and soluble interleukin 6 (sIL6) receptor were significantly higher in
reactive thrombocytosis (Hsu et al, 1999). Significant elevation of TPO during the acute phase of infection precedes the development of thrombocytosis, suggesting an important role for TPO in RT (Ishiguro et al, 2002).

Elevated values of TPO were found in a majority of patients with acute infections and were observed more frequently during the acute phase with fever than after the fever disappeared (Ishiguro et al, 2002). TPO was found to be significantly elevated in the first week of infections. In contrast to TPO, the platelet count were peaked in the second and third weeks (Ishiguro et al, 2002).

The exact mechanism of elevated TPO levels in RT is still unknown, however it has been observed to be correlated with IL6 and production can be enhanced by inflammatory processes (Hsu et al, 1999).

Serum IL6 concentrations are significantly correlated with thrombocyte counts and albumin concentrations. IL6 may play a contributory part in reactive thrombocytosis and the acute phase response in pulmonary TB (Unsal et al, 2005).

Interleukin 8 (IL8) was also found to be elevated in RT. IL8 is a potent chemoattractant and activating factor for neutrophils and has proinflammatory effects. Elevated levels of IL8 in patients with RT are probably caused by an increased population of megakaryocytes (Hsu et al, 1999).

Baynes et al (1987) reported the degree of thrombocytosis correlated significantly with the degree of inflammation measured by the ESR and serum C-reactive protein concentration. We also observed that there was a significant correlation between thrombocytosis and elevated ESR.

The ESR, a sensitive measure of the inflammatory response, is elevated in 90% of patients who have a serious orthopedic infection (Schulac et al, 1982). Our patient determination of the ESR is useless for early detection of malignancy but valuable in detecting inflammatory arthritides and major sepsis (Schulac et al, 1982).

An ESR value exceeding 100 mm/hr has a 90% predictive value for serious underlying disease, such as infection, collagen vascular disease or metastatic tumor (Brigden, 1998). ESR and CRP are both significantly increased in patients with infection, inflammation or both (Katz et al, 1989). However, CRP is a superior diagnostic test to ESR (Mok et al, 2008).

Body weight loss, white blood cell count, hemoglobin level and ESR are useful indices of severity in TB. The return of these indices to a normal level is a good indication of disease control in that they correlate with sputum conversion to acid-fast bacilli negative (Olaniyi and Aken’Ova, 2003). Hematological and biochemical abnormalities in pulmonary tuberculosis are common and may be valuable aids in diagnosis. Some hematological markers also reflect response to treatment (Morris et al, 1989).

In conclusion, awareness of the demographics, clinical, and laboratory features of spinal TB patients may facilitate earlier diagnosis (Cormican et al, 2006). The unexplained presence of any of these hematological or biochemical abnormalities should raise suspicion of the disease (Morris et al, 1989). In view of the varied hematological abnormalities observed in patients with tuberculosis in this part of the world, we suggest the differential diagnosis of tuberculosis should be entertained in patients with varied hematological disorders.

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REFERENCES


