JMSCR Vol||04||Issue||10||Page 13156-13159||October 2016

www.jmscr.igmpublication.org
Impact Factor 5.244
Index Copernicus Value: 83.27
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v4i10.58

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Erythrocyte Sedimentation Rate Values in Cases of Active Tuberculosis without HIV Co-Infection

Authors
Saket Kumar Mandal[1], Laxmikant Chavan[2]
[1]MBBS, DNB (General Medicine), Resident Physician, Jurong Heath, Singapore
[2]MBBS, MD (Internal Medicine), Medical Superintendent Class I / Specialist Physician, Sub_District Hospital, Karjat

ABSTRACT

Background: *In clinical practice, it is commonly done as a non-specific test for a wide range of pathological conditions such as acute or chronic infections, systemic inflammatory conditions and neoplastic conditions. The ESR is commonly done as a nonspecific test during the initial diagnostic work-up for TB, which is a chronic bacterial infection. A few studies have documented ESR values associated with the infection. The present study was designed to study the ESR values among TB patients without HIV co-infection in an effort to contribute to the clinical knowledge on the levels of ESR elevation in active TB disease.*

Material & Methods*: The study subjects included 100 patients above 12 years of age without HIV co-infection of newly diagnosed cases of pulmonary and extrapulmonary tuberculosis diagnosed. The ESR was performed by a rapid modified Westergren method on whole blood samples obtained through standard venipuncture techniques.*

Results: *Out of the 100 cases of tuberculosis collected from our hospital, 55 patients were PTB, and 45 were of extra-pulmonary tuberculosis. ESR was elevated in 87 (87%) and normal in 26 (26%) of these patients. Mean ESR in all patients was 67.6 mm/hr with no statistically significant difference between pulmonary, extra-pulmonary and disseminated TB.*

Discussion: *The findings of our study tend to suggest that active TB is associated mostly with very high ESR values (≥ 100 mm/h). In patients with suggestive features of TB but without any other underlying disease affecting the ESR, the baseline ESR may be a valuable diagnostic test to suspect TB in resource poor countries.*

Keywords: *Tuberculosis, erythrocyte sedimentation rate, HIV co-infection.*

INTRODUCTION

A variety of haematological changes have been described in patients with tuberculosis such as anemia, increased erythrocyte sedimentation rate, low serum albumin level and leukocytosis [1].

The Erythrocyte Sedimentation Rate (ESR) is a blood test measuring the rate of fall of red blood cells in a column of anticoagulated blood in 1 hour, with the units expressed in millimetres per hour (mm/h) [2]. ESR is an inexpensive, easily available investigation particularly in resource poor countries, where TB is common.

In clinical practice, it is commonly done as a non-specific test for a wide range of pathological conditions such as acute or chronic infections, systemic inflammatory conditions and neoplastic conditions [2]. The ESR is usually elevated in such conditions, and infections, collagen diseases,

metastatic malignant tumours and renal disease are said to be the leading causes of elevated values ≥ 100 mm/h [2,3]. The ESR is commonly done as a nonspecific test during the initial diagnostic work-up for TB, which is a chronic bacterial infection. A few studies have documented ESR values associated with the infection [4,-6].

There are few studies that have investigated the ESR in patients with TB [7-10]. The present study was designed to study the ESR values among TB patients in an effort to contribute to the clinical knowledge on the levels of ESR elevation in active TB disease.

MATERIAL AND METHODS

The study subjects included 100 patients of newly diagnosed active cases (defined as up to two weeks after the start of antituberculous treatment) of pulmonary and extra-pulmonary tuberculosis diagnosed between October 2006 to October 2008 in the Medicine and Chest TB department of Mahatma Gandhi Mission's Medical College, New Mumbai.

The inclusion criteria were patients first time diagnosis, no current or previous anti-tuberculous drug treatment, and not to be suffering from any other chronic disease. The exclusion criteria included past history of pulmonary TB, currently on antituberculous drug or any other drugs which affected bone marrow or peripheral blood, and known at the time of study to have a chronic disease which will adversely affect the body systems including the bone marrow and the peripheral blood.

Depending on the site/s involved, TB was classified as pulmonary or extra-pulmonary as per WHO guidelines [11] and disseminated if the patient had miliary TB or involvement of two or more organ systems. Detailed clinical history and physical examination was done of all the enrolled patients. Pulmonary TB patients were diagnosed on the basis of positive sputum smears for acid fast bacilli (AFB), and /or radiographic reports, skin tests and positive culture reports. For extra pulmonary TB, detection of AFB in the samples, radio-imaging reports, skin tests and positive culture reports were taken into account. Data was collected pertaining to demographics and past history of contact with, or treatment for TB, Skin test results, bacteriologic studies, radiographic reports, and symptoms upon presentation were also assessed for each subject.

The ESR was performed by a rapid modified Westergren method on whole blood samples obtained through standard venipuncture techniques in 4 mls BD vacutainer tubes (BD, Plymouth, UK) or vacuette tubes (Greiner Bio-one, Kremsmunster, Austria) with di- or tri-postassium EDTA. Clean and dry, open ended straight glass tubes measuring 30 mm in length and not less than 2.5 mm in diameter were used. Blood collected in EDTA was drawn till 200 mm mark by means of mechanical devise and placed undisturbed for 60 minutes. Read to the nearest 1 mm the height of clear plasma above upper limit of column of sedimenting cells. Our hospital laboratory has a normal reference range of 0-15 mm/hr for males and 0-20 mm/hr for females.

RESULTS

A total of 100 patients newly diagnosed as pulmonary and extra pulmonary TB were enrolled in this present study. Out of the 100 cases of tuberculosis collected from our hospital, 55 patients were PTB, of which 11 had mild, 23 moderate and 21patients were found to have severe lung disease.

Among the 45 cases of EPTB, 29 cases had pleural effusion, 11 had disseminated TB, 3 had abdominal TB and 2 cases of TB lymophadeno-pathy were seen. Of the 29 cases of effusion 9 had associated lung parenchyma involvement. 4 cases of disseminated TB had evidence of TB meningitis. Forty out of 55 cases of pulmonary TB were male patients. Similar trend was seen in mild, moderate and severe lung involvement. Among pleural effusion 15 were male and 14 female patients. 1 male and 2 female patients had abdominal involvement. Both cases of TB lymphadenitis were female. Out of the 11 cases of miliary or disseminated TB, 9 were cases of miliary TB. Pulmonary TB was the most common

form of TB (Table 1). All the patients were treated with isoniazid, rifampicin, pyrazinamide, and ethambutol and the median treatment period was 212 days.

Table 1: Symptom wise distribution of patients (n=100)

Total number	**100**
Sex	64:34
Male: Female	
Age	44
Mean Age (years)	
Types of TB	
Pulmonary	29
Extra pulmonary TB	34
Disseminated TB	11

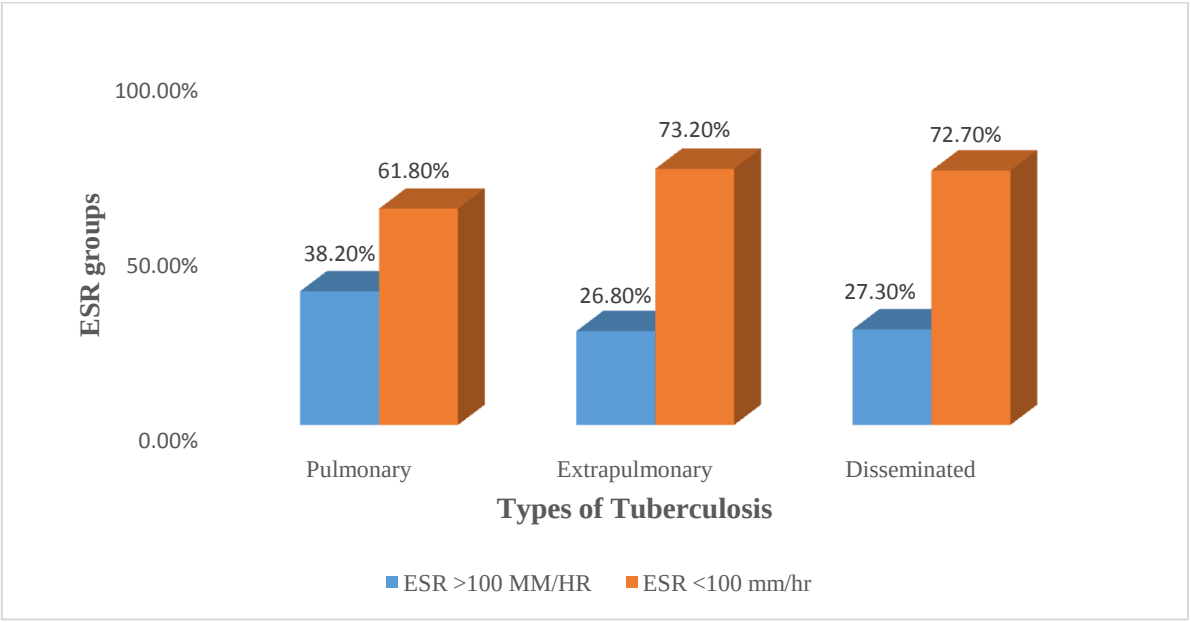
ESR was elevated in 87 (87%) and normal in 26 (26%) of these patients. Mean ESR in all patients was 67.6 mm/hr with no statistically significant difference between pulmonary, extra-pulmonary and disseminated TB with p=0.50 (Table 2).

Table 2: ESR in patients with different types of tuberculosis

Types of TB	Number (%)	Mean ESR	SD	Median ESR
Pulmonary TB	55 (55%)	71.77	36.026	73
Extra pulmonary TB	34 (34%)	65.57	35.027	59
Disseminated TB	11 (11%)	65.51	35.309	69
Total	100 (100%)	67.62	34.656	70

Twenty-three (23%) patients had ESR 100 mm/hr or more while 77 (77%) had ESR <100 mm/hr. ESR below 100 or 100 mm/hr or more in patients with different types of TB is shown in Fig.1, respectively.

Fig 1: Patients with ESR <100 or ≥ 100 mm/hr in patients with different types of TB (N=100)



DISCUSSION

In this study of newly diagnosed cases of active TB, we found that ESR was elevated in 87% and normal in 26% of the patients. The mean ESR in pulmonary TB patients was found to be 71.77. A previous Saudi study of 50 patients with sputum smear positive cases of pulmonary TB evaluated hematological abnormalities and detected mean ESR of 70.13 and 73.65 with a range of 1-140 and 6-113 mm/hr in male and female patients respectively, however, no details about number of patients having ESR in normal, above normal or above 100 was described [9].

Another study, conducted in India, authors concluded that it probably holds true that a lower ESR value in a TB case might be associated with HIV infection in a developing country such as India, and that the higher the ESR value the lower the chance of associated HIV infection [6].

In a study of 68 children up to 14 years with TB from Qatar, where the diagnosis of TB was based on culture or response of the patients to antituberculous treatment, 33% of the children had normal ESR with only 4 (5.9%) children having ESR >100 mm/hr [10]. Another study from South Africa [12], looked at the ESR in patients with active TB (88% cases had pulmonary TB with HIV positive in 83% of patients). ESR was raised in all these patients with 76% of the patients having ESR >100 mm/hr. However, there was no detail about the methodology of diagnosis of TB and definition of pulmonary or extra-pulmonary TB.

The differences in the results of these studies may also be due to the other factors which affect the values of ESR including nutritional status, hemoglobin and albumin level or other associated infections or conditions which may independently raise the ESR and whether the TB is primary, relapse or recurrent infection.

In conclusion, the findings of our study tend to suggest that active TB is associated mostly with very high ESR values (≥ 100 mm/h). In patients with suggestive features of TB but without any other underlying disease affecting the ESR, the baseline ESR may be a valuable diagnostic test to suspect TB in resource poor countries.

Source of funding: Nil
Conflict of interest: None to declare

REFERENCES

1. Olaniyi JA, Aken'Ova YA. Haematological profile of patients with pulmonary tuberculosis in Ibadan, Nigeria. Afr J Med Med Sci 2003; 32: 239-42.
2. Brigden ML. Clinical utility of the erythrocyte sedimentation rate. Am Fam Physician 1999; 60: 1443-1450.
3. Levay PF, Viljoen M. Erythrocyte sedimentation rates equal to or above 100 mm/h in the pre-AIDS era. S Afr Med J 2002; 92: 286-287.
4. Levay PF, Retief JF. Causes of high erythrocyte sedimentation rates in an in patient population. S Afr Med J 2005;95(1):45-46.
5. Al-Marri MR, Kirkpatrick MB. Erythrocyte sedimentation rate in childhood tuberculosis: is it still worthwhile? Int J Tuberc Lung Dis 2000; 4: 237-239.
6. Sarkar K, Baraily S, Dasgupta S, Bhattacharya SK. Erythrocyte sedimentation rate may be an indicator for screening of tuberculosis patients for underlying HIV infection, particularly in resource-poor settings: An experience from India. Journal of Health, Population and Nutrition 2004;22:220-221.
7. Mirsaeidi SM, Tabarsi P, Amiri MV. Clinical and radiological presentation of adult tuberculous spondylitis. Tanaffos 2003;2:59-65.
8. Alothman A, Memish ZA, Awada A, Al Mahmood S, Al Sadoon A, Rahman MM, et al. Tuberculous spondylitis: analysis of 69 cases from Saudi Arabia. Spine 2001;26:E565-E570.
9. Al-Omar IA, Al-Ashban RM, Shah AH. Hematological abnormalities in Saudis suffering from pulmonary tuberculosis and their response to treatment. Res J Pharmacol 2009;3:78-85.
10. Al-Marri MRHA, Kirkpatrick MB. Erythrocyte sedimentation rate in childhood tuberculosis: is it still worthwhile? Int J Tubrc Lung Dis 2000;4:237-9.
11. WHO (2006 a). Global tuberculosis control: Surveillance, planning and nancing. Geneva, Switzerla-nd: WHO; 2006. Publication WHO/ HTM/ TB/2006.362.
12. Ukpe IS, Southern L. Erythrocyte sedimentation rate values in active tuberculosis with and without HIV co-infection. S Afr Med J 2006;96:427-428.