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Original Research Article.

Analysis of Clinical and Laboratory Diagnosis of Sputum Smear-Negative Pulmonary Tuberculosis Patients: An Institutional Based Study

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ABSTRACT

Background: The present study was conducted for evaluating Clinical and laboratory diagnosis of sputum smear-negative pulmonary tuberculosis patients.

Materials & Methods: Data extracted from the clinical records included demographic factors, the presence of signs and symptoms and family history of TB. All patients underwent chest X-rays and other tests such as white blood cell count (WBC); C-reactive protein (CRP) etc. The chest X-ray was classified either having typical (presence of parenchymal infiltrates, localized cavities in the upper/apical zone) or atypical patterns (presence of findings other than typical images, such as lobar or diffuse infiltrations, mediastinal lymphadenopathy, miliary patterns, pleural effusions, etc.), or normal. Analysis of results was done using SPSS software.

Results: Out of 250 cases, 50 cases were of confirmed SNPTB cases while 200 were unconfirmed SNPTB cases. Incidence of night swears was higher in confirmed cases. Unconfirmed cases had higher incidence of atypical radiographic findings. Mean WBC count was higher in unconfirmed cases.

Conclusion: The diagnostic accuracy of clinical and radiologic findings to give reasonable results. However; the diagnosis of SNPTB remains a major challenge in LMIC.

Key words: Pulmonary, Tuberculosis, Negative.

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INTRODUCTION

Tuberculosis remains a worldwide problem despite well documented, well publicised methods of prevention and cure. Poverty and HIV infection are major reasons for its persistence. Most tuberculosis programmes use direct smear examination of sputum but, if resources permit, culture is desirable. Reliable susceptibility testing is a luxury few developing countries can afford, although it is especially desirable for purposes of re-treatment. Rapid methods of culture and susceptibility testing are widely available in the wealthier nations.[1-3]

Molecular techniques have provided quick, sensitive, and specific tests for Mycobacterium tuberculosis—such as polymerase chain reaction, DNA and RNA probes, and γ interferon tests—but these are expensive and technically demanding. They are most useful in diagnosing multi-drug resistant organisms quickly and in differentiating M tuberculosis from other, non-infectious mycobacterial species.[4, 5] Hence; the present study was conducted for evaluating Clinical and laboratory diagnosis of sputum smear-negative pulmonary tuberculosis patients.

MATERIALS & METHODS

The present study was conducted for evaluating Clinical and laboratory diagnosis of sputum smear-negative pulmonary tuberculosis patients. Patients with more than 18 years of age with history of cough of three weeks duration were enrolled. Data extracted from the clinical records included demographic factors, the presence of signs and symptoms and family history of TB. All patients underwent chest X-rays and other tests such as white blood cell count (WBC); C-reactive protein (CRP) etc. The chest

X-ray was classified either having typical (presence of parenchymal infiltrates, localized cavities in the upper/apical zone) or atypical patterns (presence of findings other than typical images, such as lobar or diffuse infiltrations, mediastinal lymphadenopathy, miliary patterns, pleural effusions, etc.), or normal. Analysis of results was done using SPSS software.

Table 1: Clinical characteristics of confirmed and unconfirmed cases of SNPTB

Variables	Confirmed (n=50)	Unconfirmed (n=200)	p-value
Mean age (years)	56.8	54.1	0.135
Males (n)	26	102	0.325
Females (n)	24	98	
Fever	33	135	0.174
Sputum	46	188	0.228
Haemoptysis	8	30	0.346
Chest pain	15	50	0.945
Dyspnoea	21	71	0.285
Anorexia	32	129	0.645
Night sweats	19	30	0.001 (Significant)

Table 2: Lab characteristics of confirmed and unconfirmed cases of SNPTB

Variables		Confirmed (n=50)	Unconfirmed (n=200)	p-value
X-ray	**Typical**	10	15	0.0001 (Significant)
	Atypical	40	185	
Mean WBC Count (/dL)		6125.12	9912.84	0.0021 (Significant)
Raised C Reactive proteins		41	121	0.0117 (Significant)
Night sweats		19	30	0.001 (Significant)

RESULTS

Out of 250 cases, 50 cases were of confirmed SNPTB cases while 200 were unconfirmed SNPTB cases. Incidence of night swears was higher in confirmed cases. Unconfirmed cases had higher incidence of atypical radiographic findings. Mean WBC count was higher in unconfirmed cases.

DISCUSSION

Tuberculosis (TB) is a contagious, infectious disease, due to Mycobacterium tuberculosis (MT), which usually lasts throughout the life course and determines the formation of tubercles in different parts of the body. MT has very ancient origins: it has survived over 70,000 years and it currently infects nearly 2 billion people worldwide; with around 10.4 million new cases of TB each year, almost one third of the world's population are carriers of the TB bacillus and are at risk for developing active disease.[6- 8]

In spite of newer modalities for diagnosis and treatment of TB, unfortunately, millions of people are still suffering and dying from this disease. TB is one of the top three infectious killing diseases in the world: HIV/AIDS kills 3 million people each year, TB kills 2 million and malaria kills 1 million. Even though tubercle bacilli were identified nearly 130 years ago, a definitive understanding of pathogenesis of this disease is still deficient.[9- 11] Hence; the present study was conducted for evaluating Clinical and laboratory diagnosis of sputum smear-negative pulmonary tuberculosis patients.

Out of 250 cases, 50 cases were of confirmed SNPTB cases while 200 were unconfirmed SNPTB cases. Incidence of night swears was higher in confirmed cases. Unconfirmed cases had higher incidence of atypical radiographic findings. Mean WBC count was higher in unconfirmed cases. In a previous study conducted by Swai HF et al, determined the sensitivity and specificity of the tuberculosis treatment algorithm used for the diagnosis of sputum smear negative pulmonary tuberculosis. Remaining patients were provided appropriate therapy. 467 subjects were enrolled. Of those, 318 (68.1%) were HIV positive, 127 (27.2%) had sputum culture positive for Mycobacteria Tuberculosis, of whom 66 (51.9%) were correctly treated with anti-Tuberculosis drugs and 61 (48.1%) were missed and did not get anti-Tuberculosis drugs. Of the 286 subjects with sputum culture negative, 107 (37.4%) were incorrectly treated with anti-Tuberculosis drugs. The diagnostic algorithm for smear negative pulmonary tuberculosis had a sensitivity and specificity of 38.1% and 74.5% respectively. The presence of a dry cough, a high respiratory rate, a low eosinophil count, a mixed type of anaemia and presence of a cavity were found to be predictive of smear negative but culture positive pulmonary tuberculosis.[12]

In another previous study conducted by Alavi-Naini R et al, authors described the proportion of patients with chronic cough and negative smear microscopy appropriately diagnosed as tuberculosis (TB) and to identify clinical features that could be used in developing a diagnostic scoring system for smear-negative patients. They compared confirmed smear-negative pulmonary TB (PTB; culture-positive) and unconfirmed smear-negative patients (culture-negative) to describe the appropriateness of treatment and their characteristics. They assess 350 patients, of which 52 (14.8%) were culture-positive and 298 (85.2%) culture-negative. Of these, 38 out of 52 (sensitivity 73%) confirmed SNPTB were diagnosed as TB and 283 out of 298 (specificity 95%) unconfirmed sputum-negative

patients were diagnosed as non-PTB. Variables associated with confirmed SNPTB were the presence of night sweats, family history of TB, typical chest radiography, erythrocyte sedimentation rate > 45 mm and white blood cell count < 11000/mL. The score constructed with these variables had a sensitivity of 94% and specificity of 74% with an area under the curve of 0.90. They concluded that The clinical differences between SNPTB and control patients could be used to develop a clinical scoring system to identify patients with SNPTB.[13]

CONCLUSION

The diagnostic accuracy of clinical and radiologic findings to give reasonable results. However; the diagnosis of SNPTB remains a major challenge in LMIC.

REFERENCES

1. Cantwell MF, Snider DE Jr, Cauthen GM, Onorato IM. Epidemiology of tuberculosis in the United States, 1985 through 1992. JAMA 1994; 272: 535-9.
2. Raviglione MC, Snider DE, Kochi A. Global epidemiology of tuberculosis: morbidity and mortality of a world-wide epidemic. JAMA 1995;273: 220-6.
3. Corbett EL, Watt CJ, Walker N, Maher D, Williams BG, Raviglione MC, et al. The growing burden of tuberculosis: global trends and interactions with the HIV epidemic. Arch Intern Med 2003;163: 1009-12.
4. Crampin AC, Floyd S, Mwaungulu F, Black G, Ndhlovu R, Mwaiyeghele E, et al. Comparison of two versus three smears in identifying culture-positive tuberculosis patients in a rural African setting with high HIV prevalence. Int J Tuberc Lung Dis 2001;5: 994-9.
5. Roguin A. René Théophile Hyacinthe Laënnec (1781-1826): the man behind the stethoscope. Clin Med Res. 2006;4(3):230–235.
6. Nuland SB. Doctors: the illustrated history of medical pioneers. New York: Black Dog & Leventhal Publishers; 1988. pp. 193–227.
7. Krush AJ. Hermann Lebert's contributions to the understanding of cancer and cancer genetics. 1977. pp. 436–436. Transactions of the Nebraska Academy of Sciences and Affiliated Societies.
8. Daniel TM. Hermann Brehmer and the origins of tuberculosis sanatoria. Int J Tuberc Lung Dis. 2011;15(2):161–162. i.
9. Gradmann C. Robert Koch and the pressures of scientific research: tuberculosis and tuberculin. Medical History. 2001;45(1):1–32.
10. Bartolozzi G. Vaccini e vaccinazioni. Terza edizione. Milano: Elsevier; 2012.
11. Dye C, Williams BG. Eliminating human tuberculosis in the twenty-first century. J R Soc Interface. 2008;5(23):653–662.
12. Swai, H. F., Mugusi, F. M., & Mbwambo, J. K. Sputum smear negative pulmonary tuberculosis: sensitivity and specificity of diagnostic algorithm. BMC research notes 2011; 4: 475.
13. Alavi-Naini R, Cuevas LE, Squire SB, Mohammadi M, Davoudikia AA. Clinical and laboratory diagnosis of the patients with sputum smear-negative pulmonary tuberculosis. Arch Iran Med. 2012 Jan;15(1):22-6.

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