PRESENTATION OF PULMONARY TUBERCULOSIS AT AYUB TEACHING HOSPITAL ABBOTTABAD

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Background: Pulmonary tuberculosis (PTB) may be easily confused with other chest diseases during its initial presentation. This study was carried out to identify presenting clinical and laboratory features that differentiate PTB from other diseases and to correlate clinical features and laboratory findings. **Methods:** This study was carried out at the Department of Pulmonology, Ayub Teaching Hospital Abbottabad, from September 1999 to December 2000. A total of 46 patients were included in the study after being clinically diagnosed as pulmonary tuberculosis. These patients were subjected to detailed history taking recording age, sex, weight, socioeconomic status and smoking habits. They were clinically evaluated and laboratory tests including Hemoglobin, ESR, TLC, DLC and sputum for AFB were done. They were put on standard anti-tuberculous therapy and followed from 2 to 5 months to monitor treatment effect. Statistical analysis was performed by SPSS 8 computer program. **Results:** A bimodal presentation (below age 30 years and above age 50 years), fever, productive cough, weight loss, night sweats and raised ESR were the most common findings in PTB patients. Sputum AFB smears were positive in 50% of diagnosed cases. No correlation was found between clinical and laboratory parameters in establishing a confident diagnosis of the disease. **Conclusions:** The study highlights the importance of further research to pinpoint stronger and more reliable criteria for diagnosis.

INTRODUCTION

Pulmonary tuberculosis (PTB) is currently threatening to re-emerge with a greater threat to morbidity and mortality of patients afflicted by it. The phenomenon of drug and multi-drug resistance (MDR) has made the bacterium *Mycobacterium tuberculosis* one of the most dreaded organisms. This is more strikingly demonstrated by the increased occurrence of tuberculosis among the young, the elderly and the immunocompromised, with AIDS being a classic example.

Tuberculosis kills an estimated 2-3 million people a year; this amounts to a staggering 5500 people a day, with 95-98% of this mortality occurring in developing countries. Someone in the world is newly infected with tuberculosis every second; someone dies of the disease every 10 seconds. Overall one-third of the world population is currently infected with the tubercle bacillus. 5-10% of the people who are infected with tuberculosis become sick or infectious at some time during their life. It is estimated that between 2000 and 2020, nearly one billion people will be newly infected, 200 million people will get sick, and 35 million will die from TB if control is not further strengthened.[1]

One of the strategies that can be adopted by the clinician is to develop clinical protocols for early and accurate diagnosis of the disease among all age groups and even in patients not in the high-risk groups. This problem is compounded not only by the myriad presenting features of pulmonary tuberculosis, but also that underlying pulmonary diseases of other types may co-exist, particularly in the elderly age group. Some of these chronic pulmonary diseases may even contribute to the reactivation or to the maintenance of tuberculous organisms in the lungs, effectively thwarting attempts to eradicate the pulmonary reservoirs of the microorganism.

Some of the diseases from which pulmonary tuberculosis has to be differentiated include: non-tuberculous pneumonias, pleural tuberculosis, fibrosing alveolitis, PIE syndrome, sarcoidosis, lung cancers, fungal pulmonary infections, as well as less common conditions like lupus lung, interstitial fibrosis of the lung, rheumatoid lung, etc. As the respiratory system has only a limited number of responses to the presence of chronic disease in it, the signs and symptoms of these diseases may overlap to a varying extent. Keeping this in view, it becomes a matter of acquiring a certain degree of clinical acumen and experience to be able to diagnose cases of pulmonary tuberculosis with a high degree of clinical precision.

Further complicating the picture is the lack of reliable laboratory facilities to provide a sensitive or specific diagnosis of the disease. Acid Fast Bacillus (AFB) staining may be negative in as many as 40-60% cases of pulmonary tuberculosis even after three consecutive sputum sample tests.[2] Radiological and other imaging modalities may give 'typical diagnostic features', only to discover later on (sometimes after a few months of anti-tuberculous therapy) that the actual disease was not tuberculosis. Other nonspecific tests like the ESR, Sclavo (tuberculin) test, Mycodot and ICT-TB tests do not provide the clinician with specifically useful information.

It is thus worthwhile to critically reappraise the presenting clinical features and diagnostic criteria used for differentiating pulmonary tuberculosis from other chronic lung conditions. The present study was undertaken to try

and evaluate the possibility of finding earlier and more sensitive and specific indicators of the disease through clinical means as well as laboratory tests.

Our objectives were to:

Determine presenting criteria for differentiating pulmonary tuberculosis from other common pulmonary diseases in our setting.

Determine clinical and laboratory diagnostic criteria for pulmonary tuberculosis.

Determine correlations between clinical features and laboratory diagnostic tests.

MATERIALS AND METHODS

An observational study was carried out at the Department of Pulmonology, Ayub Teaching Hospital Abbottabad, from September 1999 till December 2000. Patients were selected from either the Outpatients Department (OPD), or from those admitted to the Pulmonology Ward through other sources such as private clinics or referred from other wards and OPDs. A total of 46 patients were selected from a larger pool of chronic pulmonary disease after being clinically diagnosed as pulmonary tuberculosis. These patients were subjected to detailed history taking through a well-designed and comprehensive proforma, this included recording age, sex, weight, socioeconomic status, smoking habits. They were later clinically evaluated for a battery of signs and symptoms. A number of laboratory tests including Hemoglobin, ESR, TLC, DLC and sputum for AFB were done. The criteria for microscopic estimation of AFB load adopted were that of the WHO summarized in Table 1. After establishing the diagnosis they were treated with standard anti-tuberculous therapy and followed from 2 to 5 months afterwards to monitor treatment effect. During the follow-up various clinical and laboratory parameters were assessed for evaluation of the response to therapy. Statistical analysis was performed by SPSS 8 computer program.

Table-1: WHO criteria for reporting AFB load on microscopic smear

Number of bacilli reported in a smear	Result reported
No AFB / 100 Oil immersion fields	0
1–9 AFB / 100 Oil immersion fields	Scanty
10– 99 AFB / 100 Oil immersion fields	One Plus (1+)
1–10 AFB per oil immersion field	Two Plus (2+)
> 10 AFB per oil immersion field	Three Plus (3+)

RESULTS

Relevant data of patients at the time of admission is presented in Tables 2-6, while clinical, laboratory and radiological findings are given in tables 7-9.

Table-2: Basic demographic data of patients (n = 46)

AGE (Yrs)	SEX	Monthly income (Rs. / month)
10 – 30 20	Males: 15 (32.6%)	< 3000 30 (65.2%)
31 – 50 09	Females: 31 (67.4%)	3000-600013 28.3%)
51 – 70 14		6000-10000 03 (6.5%)
> 70 03		> 10000 Nil

Table-3: Weight characteristics of patients (n = 46)

WEIGHTS AT ADMISSION (Kgs)		HISTORY OF WEIGHT LOSS
25 – 35 (15.2%)	07	Weight Loss: 36 (78.3%)
36 – 45 (32.6%)	15	
46 – 55 (34.8%)	16	No weight loss: 10 (21.7%)
56 – 65 (10.9%)	05	
66 – 75	03 (6.5%)	

Table-4: Smoking characteristics of patients (n = 46)

SMOKING HISTORY	DURATION OF SMOKING		CIGARETTES PER DAY	
Smokers: 7 (15.2%)	2 years	02	5 cigs/day	01
	10 years	01	7 cigs/day	01
Nonsmokers: 39 (84.8%)	16 years	01	10 cigs/day	01
	20 years	01	40 cigs/day	01
	40 years	02	60 cigs/day	01

Table-5: Symptoms and their frequency (n = 46)

SYMPTOMS	FREQUENCY
Cough	45 (97.8%)
Fever	44 (95.7%)
Sputum production	39 (84.8%)
Night Sweats	29 (63%)
Anorexia	28 (60.9%)
Chest Pain	27 (58.7%)
Clubbing	06 (13%)
Hemoptysis	05 (10.9%)
Peripheral lymphadenopathy	02 (4.3%)

Table-6: Distribution of duration of disease (n = 46)

Duration (days)	Numbers and Percentages	Mean Duration ± S.D.
≤ 30	09 (19.6%)	15.67 ± 7.16
31 – 90	22 (43.4%)	66.14 ±19.45
91 – 180	06 (12.9%)	150 ± 26.83
181 – 365	08 (17.4%)	365 ± 0.00
> 365	01 (2.2%)	730 ± 0.00

The mean weight for all the five groups defined in Table 3 was 46.94 ± 11.1kg. After adjusting for age groups shown in Table 2, this value came out to be significantly lower than the expected weights for the corresponding age groups ($p < 0.05$), indicating an effect of the disease on normal weight parameters for the growing years, adult age group and the elderly. A history of weight loss was found in 78.3% of patients only after questioning, rather than as a presentation symptom.

Table-7: Haematological data of patients

TEST	Mean ± S.D.	VALUES	
		Results	Numbers
Hb (gms/dl) (n = 44)	11.014 ± 1.775	7–9	06 (13.6%)
		9.1–11	12 (27.3%)
		11.1–13	22 (50.0%)
		> 13	04 (9.1%)
ESR (Mm/ 1st hour) (n = 42)	58.190 + 37.301	< 5	02 (4.8%)
		6–30	09 (21.4%)
		31–55	12 (28.6%)
		56–80	07 (16.6%)
		81–105	06 (14.3%)
		106–130	05 (11.9%)
		> 130	01 (2.4%)
TLC (count / cmm) (n = 44)	7165.91 + 3271.37	3–5	12 (27.3%)
		5.1–7	16 (36.3%)
		7.1–9	08 (18.2%)
		9.1–11	04 (9.1%)
		> 11	04 (9.1%)
DLC POLYS (%) (n = 44)	66.136 + 9.612	50–60	16 (36.4%)
		61–70	13 (29.5%)

		71–80	13 (29.5%)
		> 80	02 (4.5%)
LYMPHOS (%) (n = 44)	30.341 + 9.311	Up to 10	02 (4.5%)
		11 – 20	06 (13.6%)
		21 – 30	18 (40.9%)
		31 – 40	12 (27.3%)
		41 – 50	06 (13.6%)

Table-8: Sputum AFB results of patients (n = 44)

Specimen for AFB stain	**Result**	
	Positive	**Negative**
Sputum (n = 40) (90.91%)	20 (50%)	20 (50%)
	Scanty 04 (20%)	
	One plus 05 (25%)	
	Two plus 04 (20%)	
	Three plus 07 (35%)	
No Sputum n = 4 (9.09%)		
TOTAL = 44	20 (45.45%)	20 (45.45%)

Table-9: Chest X-ray findings in patients (n = 43)

Types of lesions	**As a single lesion**	**As a second lesion**
Normal	1 (2.3%)	-
Infiltrates	17 (39.5%)	-
Opacities	07 (16.3%)	1 (2.3%)
Consolidation	08 (18.6%)	-
Cavitation	02 (4.7%)	03 (6.5%)
Miliary lesions	01 (2.3%)	01 (2.3%)
Hilar LAD	02 (4.7%)	01 (2.3%)
Bronchiectasis	01 (2.3%)	-
Collapse	01 (2.3%)	-
Pneumothorax	01(2.3%)	03(6.9%)

Effusion	02 (4.7%)	-
Calcification	-	02 (4.7%)
Total	43 (100%)	11/43 (25.0%)

DISCUSSION

Our results indicate two age groups at presentation, a younger group of less than 30 years, the other of older people aged 51 – 70 years. This is in accordance with the known predisposition of pulmonary tuberculosis to attack the younger and older aged groups, perhaps because of some age-related immune defect. There is also a marked female to male preponderance with a M:F ratio of 1:2.1. This finding may not be in accordance with global data, where males have a greater prevalence rate for pulmonary tuberculosis. Majority of patients was in the low-income group, with a monthly income less than Rs. 3000 per month.

The data indicate that patients presenting with pulmonary tuberculosis in our setting do show distinct subjective and objective features that allow their differentiation from other acute or chronic pulmonary diseases. In this study, the most common features at presentation were productive cough with fever, weight loss, night sweats, anorexia and chest pain. These findings were present in a bimodal distribution with a younger age group of less than 30 years and an older group of between 51–70 years. Surprisingly, females were affected twice as often as males. This may be due to a poorer socio-economic and nutritional status of these females, or some other unknown predisposition. There is no mention of any sex-related predisposition of pulmonary tuberculosis in the literature. Our presenting symptoms are in concordance with those established by the WHO.[1]

We may mention however that clubbing was observed in 13% of our cases (Table 4). Since there was only one case of bronchiectasis seen on chest X-rays (Table 9), this finding is remarkable as pulmonary tuberculosis is not known for causing clubbing. We do not have any explanation for this finding.

A majority of patients (over 65%) belonged to the poor socio-economic group with a mean monthly income of less than Rs. 3000. This group is further predisposed to malnutrition of several types, and perhaps has a poor immunity, allowing re-emergence of previous infections or even newer infections of tuberculosis.[3] Low income also tends to affect the treatment regimen, insofar as drug availability and duration of therapy is concerned.

Patients tend to present within 1 to 3 months of the start of their disease-related symptoms, with a majority of over 80% presenting by six months. This is perhaps related to lack of awareness of the presence of tuberculosis and its early symptoms among most of our population. Pulmonary symptoms tend to be attributed to other conditions like colds and flu, so that patients wait for the disease to become more advanced before seeking medical attention.

Smoking was not a common finding in our patients, as the majority (about 85%) was nonsmoker.

Laboratory data showed anaemia of mild to moderate degree in all cases, with a mild leukocytosis, this has been shown by others as well[4]. The ESR was raised in 95.2% of cases.

Sputum smears for AFB were positive in 50% of the cases. This value ranges from 30 to 50% in many studies, but a figure of 50% is accepted by the WHO as a good index of tuberculosis diagnosis and control programs.[5,6] Of the positive cases, 55% had an AFB load of more than two plus, as defined by the WHO criteria (Table 1).

There was no statistically significant difference in the clinical or laboratory parameters between the AFB positive and AFB negative groups ($p > 0.05$ for all parameters), so that no differentiation is possible between these groups on any basis other than the sputum AFB results. Similarly there were no significant correlations between clinical and laboratory parameters in patients with pulmonary tuberculosis ($p > 0.05$ for all parameters).

We conclude that there are no specific diagnostic criteria, either clinical or laboratory-based, to diagnose pulmonary tuberculosis with confidence. It would be more meaningful to look at the disease as a symptom-complex or a syndrome, with clinical and laboratory features related to nonspecific events like tissue injury, body responses, etc. The exact role of *M. tuberculosis* in the pathophysiology of the disease is not reflected in clinical or laboratory diagnostic criteria.

The distribution of findings in this study is reflective of the global clinical and laboratory findings in patients with pulmonary tuberculosis[7]. Other than the female predisposition, our findings are in concordance with the diagnostic findings published in the world literature. Clinical and laboratory criteria by themselves are helpful in the initial investigative workup in only about 50% of cases of pulmonary tuberculosis. This necessitates the need for development of further diagnostic protocols, such as bronchoscopy for obtaining BAL (bronco-alveolar lavage)

specimens, transbronchial lung biopsy with active sputum induction[8] by nebulizing normal saline and PCR based strategies[9] for diagnosing the infection in covert cases, where the index of suspicion is high.

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