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# THE FREQUENCY OF PULMONARY PARENCHYMAL TUBERCULOSIS IN PATIENTS WITH TUBERCULOSIS PLEURAL EFFUSION

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**ABSTRACT:**

OBJECTIVE: *To see the frequency and characteristic of parenchymal tuberculosis in patients with tuberculosis pleural effusion in adult patients.*
DESIGN: *Prospective case control study*
PLACE AND DURATION OF STUDY: *People's Medical College Hospital, Nawabshah during the period of one year from March 1, 2007 to February 28, 2008.*
MATERIAL AND METHODS: *All patients above 15 years old, with a diagnosis of Tuberculosis pleural effusion by simple radiographs and diagnostic thoracentesis, tissue biopsy, AFB smear for mycobacterium tuberculosis (those patients who were able to produce sputum) collected.*
*Patients were selected from chest OPD. All patients were admitted in chest ward for two weeks to confirm the diagnosis and start the treatment.*
*The details of demographic data, clinical characteristic, follow up as well as sputum bacteriology and chest radiographs appearance pleural aspiration and biopsy result were recorded.*
RESULTS: S*ixty patients with tuberculosis pleural effusion were enrolled. Median age 43 years, range 15 to 80 years*
*Among them, 10 patients ( 17 %) had sputum positive for AFB smear for mycobacterium tuberculosis.*
*Lung parenchymal lesions were seen in 26 patients ( 43 %) using simple radiographs, whereas 34 patients ( 57 %) without any parenchymal lesion Pleural effusion were present on the right side in 38 patients (63 %) where as on the left side 14 patients ( 23 %) and on bilateral in 8 patients ( 13 %)*
CONCLUSIONS: *The results of our study suggest that the frequency of pleural effusion alone is more common as compare to pleural effusion associated with parenchymal disease. The patients mostly had features of primary, rather than reactivated tuberculosis.*

**KEY WORKDS:** Pulmonary Tuberculosis, Thoracentesis, Acid Fast Bacilli, Sputum, Pleural effusion, Culture of Mycobacterium Tuberculosis (MTB)

## INTRODUCTION:

Tuberculosis (TB) is the world's largest killer by a single pathogen causing the death of three million people every year which is equal to approximately 6% of all the deaths worldwide[1] and it ranks second after HIV infection as an infections cause .[2] Approximately 2 billion people, nearly one third of world's population, are thought to be infected with Mycobacterium Tuberculosis.[3]
Tuberculosis (TB) has been predicted to be the largest single infectious cause of death between 1990 and 2020. [4]
In 2004 there were nine million new TB cases globally and approximately two million deaths attributable to TB.
Pakistan belongs to the Asian region endemic for TB and has an annual incidence of 181 per 100,000, frequency of 329 cases per 100,000 population and ranks seventh among the 22 high burden TB countries world wide[5].
Extra-pulmonary Tuberculosis comprises 9.7 to 46% of all cases of the disease[6]and its proportion has gradually increased in some regions[7]
Tuberculous pleural effusion is usually the second most form of extra- pulmonary Tuberculosis after Tuberculous lymphadenitis and remain the most common cause of pleural effusion in areas with a high prevalence of tuberculosis[8]
Tuberculous pleural effusion can be primary or as reactivated disease primary pleural

effusion is thought to result from penetration of bacilli into pleural space via rupture of a sub pleural caseous focus[9] protein antigens produced by the Tuberculous bacilli induce a delayed hypersensitivity reaction, causing exudation by increased permeability[10] or decreased clearance [11]

Tuberculous pleural effusion can occur from reactivation of latent infection, In such cases it is usually associated with parenchymal lesions such as cavitation fibro-nodular infiltrates in one or both upper lung field.

**MATERIAL AND METHODS**

This prospective case control study was conducted on 60 patients between 1st March 2006 to 28th February, 2007 at Pulmonology Department, People's Medical College Hospital, Nawabshah.

Detailed history, through physical examination, radiological finding, biochemical finding, Microbiological finding were recorded in the proforma.

SELECTION OF PATIENTS

Patients were selected from out patients department and chest ward, after having confirmed by simple chest radiographs P/A view in every patient and lateral view was taken (if necessary).

The amount of fluid, the side involved, parenchymal involvement, cavitation and any other radiographic abnormalities were noted. Pleural aspiration and biopsy was performed on all patients after obtaining the written consent.

INCLUSION CRITERIA

All adult patients = 15 years old with Tuberculosis Pleural Effusion.

New cases - who have not taken anti-TB drugs.

Patients who have taken anti-TB drugs less then four weeks

EXCLUSION CRITERIA

Children below = 14 years of age.

Symptoms less than two weeks.

Malignant Pleural Effusion.

Diabetes The diagnosis of Tuberculosis pleural effusion was based on following criteria:

Demonstration of AFB in pleural fluid or tissue.or lymphocyte predominant exudative effusion.Presence of caseating granulomas in pleural biopsy.

Simple chest radiograph postero-anterior and decubitus views.

Sputum for AFB smear and culture. The sputum samples and pleural fluid samples were sent to Aga Khan University Collection Point Laboratory at Nawabshah. AFB culture and CT scan chest were not done due to financial constraint. All patients were admitted in chest ward for two weeks to confirm the diagnosis and start the treatment.

The treatment was given daily and directly observed during hospital stay. Patients were also closely observed for any side effect of Anti-TB drugs.

**TABLE 1**
**DEMOGRAPHIC DATA FOR THE PATIENTS ARE PRESENTED**

| Patients Characteristic | Number of cases (n-60) | Percent |
|---|---|---|
| Age | | |
| Mean | 43 years | |
| Range | 15 – 80 years | |
| Sex | | |
| Male | 40 | 67 |
| Female | 20 | 33 |
| Mean Body weight | (25 – 65 Kg) 45 | |
| Smoker M / F | 24 / 4 | 40/7 |
| H/o previous Tuberculosis | 16 | 27 |

**TABLE NO.2**
**RADIOLOGICAL FEATURES DEPICTED IN TABLE-2**

| Radiographic Findings | Site | No. of Cases (n-60) | Percentage |
|---|---|---|---|
| Pleural Effusion | Right | 38 | 63 |
| | Left | 14 | 23 |
| | Bilateral | 08 | 13 |
| Lung Parenchymal Lesion | Upper zone | 12 | 20 |
| | Middle zone | 06 | 10 |
| | Lower zone | 02 | 03 |
| | Cavitary | 06 | 10 |

**RESULTS**

There were 40 (67 %) males and 20 (33 %) females with mean age 43 (range 15 – 80) and mean body weight 45 (range 25 – 65 Kg). 24 (40 %) were smoker, majority were male 24 (40 %) whereas 4 (7 %) were female smoker, 16 (27 %) of 60 patients had a history of previous Tuberculosis.

The most of the patients presented with classical symptoms of Tuberculosis (TB) such as:

Cough (100%)
Fever (100%)
Dyspnoea (80%)
Weight loss (70%),

And other symptoms like chest pain, Haemoptysis though less in propensity but significantly higher than other symptoms like night sweat and malaise.

Radiological findings show that 38 (63%) out of 60 patients had pleural effusion on right side where as 14 patients (23%) on left side and 8 patients (13%) had bilateral pleural effusion.According to number of zones involved, there were 20%, 10%, 3% patients having lung parenchymal involvement of upper, middle and lower zone respectively

**TABLE NO.3**
**DIAGNOSIS OF TUBERCULOSIS PLEURAL EFFUSION SHOWN IN TABLE NO.3**

| Lesion | N = 60 | Percentage |
|---|---|---|
| (A) Pleural effusion with parenchymal lesion: | 26 | 43 |
| (a) Sputum AFB smear: Positive | 10 | 17 |
| (b) Sputum AFB smear: Negative | 16 | 27 |
| (B) Pleural effusion without parenchymal lesion: | 34 | 57 |
| (a) Pleural Tissue Biopsy and D/R | 16 | 27 |
| (b) Pleural fluid D/R | 18 | 30 |

and 6 (10%) out of 60 patients had cavitary lesion.

26 patients (43%) diagnosed as Tuberculosis Pleural effusion with parenchymal lesion, out of 10 patients (17 %) were sputum AFB smear Positive where as 16 patients (27 %) were sputum AFB smear Negative and 34 patients (57 %) had pleural effusion without parenchymal lesions, among them 16 patients (27 %) were diagnosed on pleural fluid tissue Biopsy and pleural fluid D/R and remaining 18 patients (30 %) were diagnosed on pleural fluid D/R alone.

## DISCUSSION

Tuberculosis pleural effusion is the second commonest manifestation of Extra-Pulmonary Tuberculosis, that is treatable. In the primary form, effusion typically develop 6 to 12 weeks after infection[12]. and are believed to result from a hypersensitivity response to small amounts of tuberculo-protein released into the pleural effusion[13]. In our study, on simple radiograph we found that evidence of parenchymal tuberculosis in 26 (43 %) patients. Among those 10 (17%) had positive AFB smear indicating active pulmonary disease.

This frequency is much similar to the previous studies reports. [14,15,16,17]

The result of our study found to be similar to the internationally published studies.[13]

Another internationally conducted studies reports[16-17] have denied the association of the radiographic characteristics with reactivated tuberculosis.

In our study there is less frequency of parenchymal lesions in association with Tuberculosis pleural effusion. Most of the 34 patients 57% with primary lesion had characteristic features of primary disease rather than reactivated tuberculosis. There is only 27% or 46% [13] association reported previously and that is similar to the study conducted at People's Medical College Hospital that shows 34 patients 57% (Pleural effusion without parenchymal lesion).The possible reason for high frequency of primary tuberculosis pleural effusion disease in our country is due to rise of TB annually incidence and frequency in Pakistan.[5] In our study most of the 34 patients 57 % without lung prenchymal lesion had no radiographic features of reactivated disease, such as cavitation, fibrosis or calcified lesions mainly in upper lobe.

## CONCLUSION

This study concluded that the frequency of pleural effusion alone is more common as compare to pleural effusion associated with parenchymal disease. The patients mostly had features of primary, rather than reactivated tuberculosis.

Pleural biopsy will be useful as an ultimate procedure in case with diagnostic problem as it is a procedure that can give a definitive tissue diagnosis.

## REFERENCES


1. Jynes LL. Tuberculosis: the continuing story. JAMA 1993; 27: 2616-17) and it ranks second after HIV infection as an infections cause.
2. Dye C, Scheele S, Dolin P, Pathania V, Raviglione ME. Global burden of Tuberculosis; estimated incidence,frequency and mortality by country. W.H.O.Global Surveillance and Mortality Project.JAMP 1999, 282: 677-86.
3. Dolin PJ, Raviglion MC, KOCH A. Global Tuberculosis incidence and mortality during 1990-2000. Bull World Health Organization 1994; 213-20.
4. MURRAY CJ, LOPEZ AD. Alternative Projections of mortality and disability by cause 1990-2020. Global Burden of Disease Study. LANCET 1997; 349 (9064): 1408-504.
5. WHO, Global Tuberculosis Control, Surveillance, Planning and Financing Geneva: World Health Organization, 2000.
6. Rieder H I , Snider DE, Jr Cauthen GM. Extra-pulmonary tuberculosis in the United States. Am Rev Respir Dis 1990: 141: 347-351.
7. Elder NC. Extra-pulmonary tuberculosis: a review. Arch FAM Med 1992: 191-95.
8. Valdes L, Alvarez D, Valle JM. The aetiology of pleural effusions in an area with high incidence of tuberculosis. Chest 1996: 109: 158-162.
9. Berger HW, Mejia E. Tuberculous pleurisy. Chest 1973: 63: 88-92.
10. Light RW. Tuberculous pleural effusions. In: Light RW ed. Pleural disease. Philadelphia, PA: Lippincott Williams & Wilkins, 2001: 182-195.
11. Apicella MA, Allen Jc. A Physiologic differentiation between delayed and immediate hypersensitivity. J Clin Invest 1969; 48: 250-259.
12. LECKIE WJH, Tothhill P. Albumin turnover in pleural effusions. Clin Sci 1965; 339-352.
13. Antoniskis D, Amin K, Barnes PF.Plenui-tis as a manifestation of reactivation tuberculosis. Am J Med 1990, 89: 447-450.
14. Yilmaz MU,Kumcuoglu Z. Utkaner G, computed tomography findings of tuberculosis pleurisy, Int. J. Tuberc Lung DIS 1999, 3: 816-822.
15. Valdes L. Alvarez D. San Jose E, Tuberculosis Pleurisy: a study of 254 patients Arch Intern Med 1998; 158:2017-2021
16. GENG E, KREISWIRTH B, BURZYNSKI J, Clinical and radiographic correlatesof primary and reactivation tuberculosis a molecular epidemiology study JAMA 2005; 293: 2740-2745.
17. JONES BE, RYU R, YANG Z, Chest radiographic findings in patients with tuberculosis with recent or remote infection. Am J Respir crit care Med 1997; 156: 1270-1273.