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TO KNOW THE CLINICAL FEATURES IN PATIENTS HAVING TUBERCULOSIS WITH AND WITHOUT RENAL FAILURE

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Abstract:
Background: *in recent period, renal failure has exposed a dreadful increase globally and there are increasing facts demonstrating that it can affect presentation and results of treatment in patient of TB disease. This study was performed to study the differences in presentation of pulmonary tuberculosis in patients who present with renal failure and who present without renal failure.*
Study Design: *This was a Comparative Observational Study.*
Place and Duration of Study: *This study was conducted at the Department of Medicine, Khyber Teaching Hospital MTI Peshawar from January 2020 to July 2020.*
Materials and Methods: *The study comprised of a total of 107 patients. All the patients who were diagnosed cases of pulmonary tuberculosis were chosen for this study and on the basis of the data patients were allotted to two groups. The patients of tuberculosis who were found to have renal failure were kept in Group one and other group had patients of tuberculosis without renal failure. Data was analyzed using SPSS version 20.0. Quantitative data was presented as mean ± SD while qualitative was presented as frequency (%). T-test and chi- square test were used to assess the significance and p-value was set at 0.05.*
Results: *In a total of 107 patients 62 (58%) were males and 45(42%) were females divided into 2 groups. The mean age of patients was 64.56±8.77 years in renal failure group and 38.25±12.70 years in without renal failure group. Substantial differences were observed between the 2 groups with respect to not only the laboratory values such as lymphocytes, neutrophils and protein but also with regards the clinical features ($p<0.001$).*
Conclusion: *The present study concluded that a significant difference existed regarding the clinical indices of TB patients with renal failure and without renal failure in the patients.*
Key Words: *Pulmonary Tuberculosis, renal failure, non-renal failure.*

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INTRODUCTION:

Although advancements have been achieved in anti-Tuberculosis (anti- TB) medicines as well as the utilization of directly observed treatment short course (DOTS) therapy has been prescribed for many decades. However, the mortality of tuberculosis still remains at a greater level in many parts of the world, especially developing ones[1,2]. Worldwide estimates of death due to tuberculosis are at about 1.7 million per annum, approximately 3 deaths per minute[3]. In order to manage the patients of TB, it is of prime importance to investigate the clinical features linked with mortality of TB. Nevertheless, more intense and aggressive treatment can be provided by clinicians to patients through early identification as well as stratification of patients to prevent its spread. Increasing age associated with underlying co-morbid conditions is often regarded to be independent morality predictors in TB[4]. In contrast, extensive presentation radio-logically as well as bacterial load in sputum is less likely to be regarded as an independent risk factor[5]. Researches evaluating drug safety profiles on mortality have shown to report controversial results[6], and many of the morality predictors are non-modifiable[7].

Susceptibility to tuberculosis (TB) is highly increased in patients having chronic kidney disease (CKD) / renal failure in comparison with patients having normal kidney function[8]. Impairment of cell-mediated immunity, human immunodeficiency virus (HIV) co-infection, and renal failure associated diabetes mellitus (DM) and immunosuppressive medicines are some of the chief reasons for TB infection in CKD / renal failure patients. It has been reported that patients belonging to ethnic minorities have shown to be particularly at higher risk for CKD and TB development[9]. However, in CKD/ renal failure patients, diagnosing TB becomes a challenge as well as delayed because of presentation of non-specific symptoms plus a high involvement of extra pulmonary TB[10]. As stated above, since patients with TB are at increased risk for developing renal disease[11], especially in patients belonging to ethnic minority groups who have been reported to be at a particular risk of developing active TB infection plus also have a high prevalence of CKD and renal failure. The dilemma exists in a way that no guidelines have investigated and / or treated TB disease with renal failure in such population[12]. Even though it is established for the medical treatment and duration of TB that different views exist with respect to its dosing in renal failure patients. Almost no trial has been carried out in TB patients having renal failure, especially in dealing with immune suppression as well as transplantation. Even limited evidence is present for screening as well as treating latent infections and shows variations in practicing of approach in order to prevent reactivation[13].

The reasons for the cause of increased susceptibility to TB with regards to CKD/ renal failure and with patients on dialysis or post transplantation are; patients born in foreign countries that have visited UK in the last 5 years, having Asian, African, East European or South American ethnicity or with a history of contact with positive smear Tb infection[14]. Approximately half of the patients with CKD show a decreased sensitivity to tuberculin skin test; therefore, cure from TB cannot be confirmed by a negative tuberculin skin test in a TB patient with renal disease[15].

The objective of this study was to investigate the association and features of renal failure with clinical presentation of TB patients in Pakistan, since very few studies done here have evaluated this association. Therefore, this study was conducted in order to explore the role of renal failure on clinical presentations of patients diagnosed with TB.

MATERIALS AND METHODS:

This was a cross sectional observational study conducted at the Department of Medicine, Khyber Teaching Hospital MTI Peshawar from January 2020 to July 2020. 107 patients who were diagnosed to have pulmonary tuberculosis were chosen for this study and were divided into two groups' i.e. one group with renal failure and other group without renal failure. Patients with age between 20 to 70 years, new onset of respiratory symptoms, non-smokers, not associated with acute illness, raised ADA level on pleural D/R, chest radiographic findings of patchy infiltrates, bilateral or unilateral hilar lymphadenopathy, cavitations, homogenous patch & pleural effusion and known cases of renal failure with respiratory complaints were included in this study. Patients with multiple co-morbids, mass lesion on chest x-ray, smokers, with known respiratory illness, no positive sputum or pleural fluid findings and with extra pulmonary tuberculous symptoms were excluded. Informed consent was taken from the patients with complete concealment of the data. All patients were examining for respiratory symptoms and investigated with chest X-ray, Sputum studies, pleural fluid studies (D/R, C/S, and Gene Expert plus ADA levels), HbA1C and ultrasound kidney ureter and bladder. All patients were started on Anti Tuberculous Therapy on the basis of radiographic findings, sputum studies, or pleural fluid studies and those who responded to the treatment within 3 weeks were taken as subjects.

Data Analysis: For analysis of data the statistical software SPSS version 20.0 was used. Quantitative data was presented as mean ± SD while qualitative was presented as frequency (%). T-test and chi-square test were used to assess the significance and p-value was set at 0.05.

RESULTS:

Total 107 diagnosed cases of tuberculosis were taken who were divided into 41 patients with renal failure (24 males while 17 females) and 66 patients without renal failure (38 males while 28 females) patients. Mean age of patients with renal failure was 64.56± 8.77years while that of patients without renal failure was 38.25 ±12.70 years. Significant differences were observed in specific gravity, lymphocytes, neutrophils, low density lipoprotein, proteins and creatinine levels in renal failure and without renal failure group. (Table-1)

Night sweat was present in 03 (7.3%) patients with renal failure whereas it was present in 52 (78.8%) patients without renal failure with significant difference (p<0.001). Fever was present in 10 (24.4%) patients with renal failure whereas it was present in 60 (90.9%) patients without renal failure with significant difference (p<0.001).Fatigue was present in 25 (61%) patients with renal failure whereas it was present in 53 (80.3%) patients without renal failure with a significant difference (p=0.03).Shortness of breath was present in 39 (95.1%) patients with renal failure whereas it was present in 19 (28.8%) patients without renal failure with significant difference (p<0.001).Productive Cough was present in 40 (97.6%) patient with renal failure whereas it was present in 28 (42.4%) patients without renal failure with significant difference (p<0.001).Chest Pain was present in 37 (90.2%) patients with renal failure whereas it was present in 18 (27.3%) patients without renal failure with significant difference (p<0.001).

Table No.1: Comparison of quantitative variables in renal and non-renal failure TB patients

Variables n=107	Renal failure Yes (n=41) Mean ± SD	Non renal failure (n=66) Mean ± SD	p-value
Age(years)	64.56±8.77	38.25±12.70	<0.001
Urine Specific Gravity	1.03±0.16	0.46±0.52	<0.001
Lymphocytes (%)	69.67±9.22	77.55±10.65	0.002
Neutrophils (%)	29.22±11.06	18.86±10.24	<0.001
Low Density Lipoproteins	874.56±410.67	328.24±459.59	<0.001
Proteins	7.13±0.95	2.77±3.34	<0.001
Creatinine Clearance	46.63±7.31	57.86±7.80	<0.001

Table No.2: Association of clinical features in two groups

Variables		Renal failure Yes (n=41) n(%)	Non renal failure(n=66) n(%)	p-value
Gender	Male	24(58.5%)	38(57.6%)	0.922
	Female	17(41.5%)	28(42.4%)	
Night Sweats	Yes	3(7.3%)	52(78.8%)	<0.001
	No	38(92.7%)	14(21.2%)	
Fever	Yes	10(24.4%)	60(90.9%)	<0.001
	No	31(75.6%)	6(9.1%)	
Fatigue	Yes	25(61.0%)	53(80.3%)	0.029
	No	16(39.0%)	13(19.7%)	
Shortness of Breath	Yes	39(95.1%)	19(28.8%)	<0.001
	No	2(4.9%)	47(71.2%)	
Productive Cough	Yes	40(97.6%)	28(42.4%)	<0.001
	No	1(2.4%)	38(57.6%)	
Chest Pain	Yes	37(90.2%)	18(27.3%)	<0.001
	No	4(9.8%)	48(72.7%)	
Hemoptysis	Yes	22(53.7%)	6(9.1%)	<0.001
	No	19(46.3%)	60(90.9%)	
Effusion	Yes	31(75.6%)	20(30.3%)	<0.001
	No	10(24.4%)	46(69.7%)	
History of Diabetes Mellitus	Yes	32(78.0%)	8(12.1%)	<0.001
	No	9(22.0%)	58(87.9%)	

Hemoptysis was present in 22 (53.7%) patients with renal failure whereas it was present in 06 (9.1%) patients without renal failure with significant difference (p<0.001). Effusion was present in 31 (75.6%) patients with renal failure whereas it was present in 20 (30.3%) patients without renal failure with significant difference (p<0.001). Diabetes mellitus was present in 32 (78.0%) patient with renal failure whereas it was present in 08 (12.1%) of patients without renal failure with significant difference(p<0.001). (Table 2)

DISCUSSION:

Substantial differences were observed in our study in pulmonary tuberculosis patients with or without renal failure with regards to TB specific as well as non-specific symptoms. Symptoms such as fever, fatigue, night sweats, shortness of breath, productive cough, chest pain, hemoptysis, pleural effusion all were reported to have significant differences.

In a study by Moran et al, 68 cases of active TB were identified. Incidence was lowest in those with stage 1 or 2 renal failure/ CKD and was recorded highest in patient-years in those having renal replacement therapy. Almost half of the cases (48%) were pulmonary TB and 87% of which were TB patients that reported an ethnicity of either being Black / Black British or Asian/Asian British, substantially higher than in non-TB with renal failure group.[16]

In another study by Vikrant reported that about 68.7% of patients with TB in their study had chronic kidney disease. 20 % of patients among them were on hemo-dialysis. 75 % of the patients had extra-pulmonary TB. Pleuro-pulmonary (41.8%), kidney and urinary

tract (20%), abdominal and lymph node (13% each) were most commonly noted site of TB. The chief clinical presentation of TB was: fever / pyrexia of unknown origin (24.3%), constitutional symptoms like anorexia, fever, night sweats, and weight loss (27.8%), abnormal chest radiograph in 31.2%, ascites/peritonitis in 13.9%, pleural effusion in 25.2%, lymphadenopathy in 20%, and sterile pyuria/hematuria/chronic pyelonephritis in 13%[17]. In comparison to the above study, our study only included pulmonary tuberculosis patients with or without renal failure. Even though fever was present in a similar frequency in patients, i.e., 24.4% of TB patients having renal failure However a higher incidence of pleural effusion was observed in our study, i.e. in 75.6% of patients having concomitant renal failure possibly due to the fact that only pulmonary tuberculosis patients were selected in our study.

In a study by Chuang et al, on tuberculosis patients having renal failure and on hemodialysis, the mean age of patients at diagnosis was 57.41 years (ranging from 34 to 75 years). The presenting symptoms were fever (35.3%), abdominal fullness (35.3%), and disturbances in consciousness (11.8%), cervical lymphadenopathy (11.8%), abdominal pain (5.9%), bone pain (11.8%), chest pain (5.9%), and skin rash (5.9%). Laboratory studies showed hypercalcemia (64.7%), hypo- albuminemia (47.1%) and leukocytosis (35.3%). The mean serum-calcium level was 10.71.7mg/dl (range from 8.3 to 13.4mg %). The mean serum albumin was 2.80.6g/dl (range from 1.5 to 3.6). The mean peripheral-leukocyte count was 11,423 /mm3[18]. In our study the mean age in TB patients with renal failure was 64.56±8.77 years and without renal failure were 38.25±12.70 years. Fever was present in 24.4% with renal failure and in 90.9% without failure. Hypoalbuminemia was observed in patients without renal failure. Lymphocytosis was reported in our study in which majority of the patients were those without renal failure.

Out of 304 positive cases for TB, Narainet al reported the mean age of patients with TB was 54.40 + 06.04 years with majority males (68%) and females (32%). The reported symptoms were weight loss 86.8%, anorexia 80%, and fever 55%, vomiting 13.8% and headache 7.2% [(19)]. In our study the mean age in TB patients with renal failure was 64.56±8.77 years and without renal failure were 38.25±12.70 years. Fever was present in 24.4% with renal failure and in 90.9% without failure. Since in our study, newly diagnosed cases were selected, therefore decreased frequency of weight, anorexia was reported.

During a study done by Venkata et al, from over 900 renal failure patients, only 04% were reported to have TB. In majority of the TB patients (69.4%), TB was observed in association with end stage renal failure. Ranges of age were 25 - 77 years, male: female ratios were 33: 3. Fever, malaise and weight loss were the most common symptoms observed at presentation. Extra-pulmonary tuberculosis (23 patients, 63.8%) predominated over pulmonary tuberculosis (10 patients, 36.1%)[20]. In our study, only pulmonary tuberculosis patients were enrolled in order to report the presence of renal failure only in pulmonary tuberculosis patients and not in patients with extra-pulmonary tuberculosis, since the rate of pulmonary tuberculosis is very high in Pakistan as compared with extra pulmonary tuberculosis.

The qualitative way of our study has certainly evaluated the wide range of clinical features of tuberculosis patients with and without renal failure. However, the study might be having the observer and reporting bias. Relating the interpretation of our study and to what range these clinical features might be constant with other comorbid in patients would be helpful to discover more facts about the clinical features of tuberculosis.

CONCLUSION:

The present study reported that a substantial difference existed regarding the clinical features of Tuberculosis patients with and without renal failure. The features including shortness of breath, productive cough, chest pain, hemoptysis, pleural effusion and diabetes mellitus were observed to be more common in renal failure group while night sweats, fever, and fatigue in non-renal failure group.

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