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A Clinical Study of Tuberculosis in Patients on Maintenance Hemodialysis

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I. Introduction:

India has the highest burden of TB in the world, an estimated 2 million cases annually. This accounts for approximately one fifth of the global incidence of TB.

It is estimated that about 40% of the Indian population is infected with TB bacteria. The vast majority of infected people have latent TB rather than active tuberculosis. It is also estimated by the World Health Organisation (WHO) that 300,000 people die from TB each year in India.(1)

It is well known that there is increased incidence of TB in patients with chronic kidney disease and those on dialysis. A systematic review and meta analysis showed an increased risk of active TB in ESRD patients compared to general population (2). Increased prevalence of TB in CKD may be due to malnutrition, anemia, alteration in immune response. Often delay in diagnosis is due to nonspecific complaints which can be confused to uremia.

II. Patients And Methods:

This study was conducted in Gandhi hospital, Hyderabad, Telangana, India for a period of 2 years.

132 patients were on maintenance hemodialysis at our centre at the beginning of the study 632 new patients were added during the study period. Out of these 764 patients, 548 patients were excluded from the study due to transfer out ,drop outs and deaths. .217 patients were studied after excluding the above patients.

Patients registered at our centre were given 8-12 sessions of hemodialysis per month, 4 hours each session under cashless government funded scheme(AROGYA SREE) run as flagship health scheme by Govt of Telangana .Patients were dialysed using polysulfone dialyser and 2 doses of erythropoietin injections 4000 IU/week were given free of cost .

Patients epidemiological data, H/O DM, HTN, Hepatitis B ,Hepatitis C seropositivity, BMI, duration of HD, complications during HD,H/O tuberculosis ,contact with tuberculosis ,H/O TST documented or undocumented ,BCG vaccination status ,duration of ATT and the outcome of treated patients were obtained . Haemoglobin percentage, serum creatinine and viral markers were done at monthly intervals.

Inclusion criteria:

1.Patients on maintenance haemodialysis registered at our centre.
2.Duration of hemodialysis>1 mon
3.Patients who have given consent for the study

Exclusion criteria:

1.Patients who are registered elsewhere and
2.Patients who died during study period were excluded.
3.Duration of hemodilaysis<1 mon
4.Patients who have not given consent for the study.

III. Statistical Analysis

Statistical analysis is done by using SPSS software and P values were calculated using Chi-square test .P value <0.05 was considered as significant

IV. Results

Ten cases of TB were identified in a population of 150 patients. Mean age of the group was 43.72+13.75 years .There were 92 men and 58 women. Majority of them had presumed CGN or CIN as the diagnosis. In the study population,105 (70%) were between 31-60 years age.(31-40 = 26% ,41-50 =21% , 51-60=22%), age range being 18-70 years (table 1).Factors that were found to have statistically significant

association with development of tuberculosis were : smoking, past history of TB and hepatitis B seropositivity. Relative risk with the factors identified was also found to be significant.

Table 1: Baseline characteristics of patients with TB and without TB

Variable		TB (%)	No TB (%)	p
Age		44.6±27.6	43.7±24.5	0.51
Sex M: F:		4/10(40%) 6/10(60%)	88/140(62.8%) 52/140(37.1%)	0.18
Smoking		5/10(50%)	27/140(19.2%)	<0.05*
BCG vaccination		8/10(80%)	126/140(90%)	0.78
DM		5/10(50%)	30/140(21.4%)	<0.05*
HTN		9/10(90%)	130/140(92.8%)	0.67
Hepatitis B		2/10(20%)	4/140(2.8%)	<0.05*
Hepatitis C		1/10(10%)	15/140(10.7%)	0.78
Past h/o TB		3/10(30%)	7/140(5%)	<0.05*
Contact with TB		1/10(10%)	18/140(12.8%)	0.94
BMI	<18.5	3/10(30%)	55/140(39.29%)	0.74
	>18.5	7/10(70%)	85/140(60.71%)	
Vintage	<2yrs	3/10(30%)	47/140(33.5%)	0.55
	>2yrs	7/10(70%)	93/140(66.6%)	
Hb <10gm/dl		6/10 (60%)	40/140(28.57%)	<0.05*
IDWG		7/10(70%)	83/140(59.28%)	0.74
IDH		8/10(80%)	93/140(64.28%)	0.49
Kt/v	<1.2	4/10(40%)	79/140(56.4%)	0.64
	>1.2	6/10(60%)	61/140(43.5%)	
LVD		6/10(60%)	69/140(49%)	0.74

Table 2 : Factors showing Relative risk

Variable	RR	95%CI
Smoking	3.68	1.13-11.8
Hepatitis B	6.00	1.60-22.3
Past h/o TB	6.00	1.82-19.7

Regarding the clinical features of TB in these patients, cough was the most common complaint .Complete recovery of all the patients was observed within due duration of therapy (table 3).

Table 3 : Clinical features of patients with TB

Variable	No.
PTB	7/10
EPTB (LN/Pleural)	3/10 (2/1)
Cough	8/10
Breathlessness	1/10
Wt loss.	2/10
LN pathy	2/10
FNAC	2/10
Sputum(AFB)	3/10
Xray	2/10
Pleural fluid	2/10
TST	1/10
Rx :6 months /9 months	8/2
Relapse	0
Complete recovery	10
Deaths	0

Factors associated with Pulmonary Tb and extrapulmonary TB were analysed.Hepatitis B, IDWG,IDH were found to be statistically significant in PTB group (table 4)

Table 4 : Characteristics of patients with PTB and EPTB

Variable	PTB	EPTB	P
Age	40.7±19.8	53.6±7.76	0.5
gender (M:F)	4:3	0:3	0.9
Smoking	3/7	1/3	0.17
BCG	5/7	2/3	0.36
DM	3/7	2/3	0.46
HTN	7/7	2/3	0.2
Hepatitis B	2/7	0/3	0.02

Hepatitis C	1/7	0/3	0.17
Anemia	5/7	1/3	0.36
BMI <18.5 :>18.5	2:5	1:2	0.36
Vintage of dialysis (<2:>2 years)	2:5	1:2	0.36
Kt/v(<1.2:>1.2)	4:3	0:3	0.97
IDWG	5/7	3/3	0.02
IDH	5/7	3/3	0.02

V. Discussion

A wide range on increased risk of TB in patients on dialysis has been reported (6.9 – 52.5 times) compared to general population(3).Risk factors for high incidence of TB in India was reported to be due to poor nutrition, increased number of contacts. India alone accounts for 24% of global burden of TB.(2).Increased risk of TB in dialysis patients is due to alteration in immune response , anergy exacerbated by uremia, old age, frequent hospitalizations ,low BMI. In our study, majority of the study population was between 31-60 years. Neither age nor BMI were found to be significant predictors for development of TB.

Klote etal reported advanced age, hemodialysis, underlying ischemic heart disease,poor nutrition,unemployment, low BMI,smoking, illicit drug use, Asian race as risk factors for development of TB in patients on dialysis.(4).Rao etal male gender, DM, smoking,past h/o TB, mining as occupation,duration >24 months, unemployment as some of the risk factors for development of TB (5).

In our study,on univariate analysis, smoking, presence of diabetes, hepatitis B, past h/o TB and anemia showed statistically significant association with TB. Smoking causes reduced immunologic response and enhanced non specific inflammatory response.Smoking is known to be associated with increased radiographic manifestations of PTB though not with increased incidence of death (6).Patients with diabetes have worse tuberculosis, poor outcomes , higher rate of relapse and a higher risk of death (7).

VI. Conclusions

Patients with CKD and on hemodialysis are at higher risk of development of TB.
Pulmonary TB is as common as extrapulmonary TB in patients on maintenance hemodialysis

LIMITATIONS :
Our population study is small
Duration of study is short.

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