Tuberculosis in patients undergoing maintenance hemodialysis: one year follow up study from Nepal

SS Dhakal,[1] L Bhattarai,[1] DN Manandhar,[1] KC Devkota,[1] SK Sharma[2] and N Bhatta[2]

Department of Internal Medicine, [1]Nepal Medical College Teaching Hospital, Jorpati, Kathmandu, Nepal; [2]B. P. Koirala Institute of Health Sciences, Dharan, Nepal

Corresponding author: Dr. Subodh Sagar Dhakal , Associate Professor, Department of Internal Medicine, Nepal Medical College Teaching Hospital, Jorpati, Kathmandu, Nepal; e-mail: subodhs_d@yahoo.com

ABSTRACT

In Nepal where tuberculosis is endemic and data regarding the prevalence of tuberculosis in patients undergoing maintenance haemodialysis is not known we tried to see the cumulative incidence of tuberculosis in these higher risk groups' patients. Forty patients were followed up for one year after initial screening for tuberculosis. Among forty patients 34(85%) were male and 6(15%) were female. During initial screening four patients had sputum positive tuberculosis and three more patients had sputum positive tuberculosis during follow up. Among nine patients with pleural effusion two patients had pulmonary tuberculosis. One patient had tubercular cervical lymphadenitis. Two patients died during follow up and the rest improved with anti tubercular treatment. So in the part of the world where tuberculosis is endemic patients undergoing maintenance haemodialysis should be screened for tuberculosis regularly.

Keywords: Tuberculosis, cervical, lymphadenitis.

INTRODUCTION

Hemodialysis patients are a high-risk group for tuberculosis (TB). Hemodialysis (HD) patients are six to sixteen times more likely to get active TB than other members of their local community.[1-4] Studies have reported rates of TB among hemodialysis patients from endemic areas as high as 28,000/100,000 patients.[5-7] Increased risk of TB is caused by an increase in the likelihood of progression from latent infection to active disease, most likely because of the impaired cell-mediated immunity associated with end-stage renal disease.[8] TB is one of Nepal's major public health problem. About 45% of the population is infected with TB, out of which 60% are in the productive age group. Every year, 44,000 people develop active TB, of whom 20,000 have infectious pulmonary disease.[9] In Nepal where there is a high burden of TB and data regarding the incidence of TB infection in maintenance hemodialysis patients is not available we prospectively evaluated patients for the cumulative incidence of TB in patients undergoing maintenance HD.

MATERIALS AND METHODS

During the period from August 2008 to September 2009, 40 patients who attended Dialysis unit for maintenance haemodialysis at B.P. Koirala Institute of Health Sciences, Dharan, Nepal were enrolled for the study. Detailed clinical history was noted and clinical examination was done in these patients. Investigations including chest x-ray, 3 morning sputum sample for Acid Fast Bacilli (AFB), sputum culture for AFB, Tuberculin skin test were done in all these patients at the beginning of the study. In case of pleural effusion diagnostic pleural fluid tapping was done under strict aseptic condition and fluid was sent for total count, differential count, protein, glucose along with Adenosine Deaminase (ADH) and LDH estimation. Pleural fluid gram-stain and culture sensitivity was also done. Pleural fluid was categorized into exudative and transudative effusion by Light's criteria.[10] In case of lymphadenopathy Fine Needle Aspiration Cytology (FNAC) was done. All other relevant investigations were done as needed. All these patients were followed up for one year. Written informed consent was taken from all the patients.

RESULTS

Among the patients 34 (85%) were male and 6 (15%) female. The mean age was 47.05yrs (SD ±14.58). 8 (7.5%) patients had fever.10 (25%) patients had cough. Among them 6 (60%) patients had cough more than two weeks. 3 (7.5%) patients had past history of tuberculosis in which two had sputum positive pulmonary tuberculosis 8 and 12 years back respectively and one had abdominal tuberculosis diagnosed by FNAC of mesenteric lymph node 3 years back. Regarding etiology of End Stage Renal Disease (ESRD), history of hypertension was present in 22 (55%), Diabetes in 5 (12.5%), both diabetes and hypertension in 2 (5%), Chronic glomerulonephritis in 5 (12.5%), lupus nephritis in 1(2.5%), bilateral renal stones in 1 (2.5%), bladder carcinoma in 1 (2.5%) patient. In three patients the probable cause of ESRD was not known. Five (12.5%) patients used to undergo

Table-1: Clinical profile of patients in maintenance hemodialysis

Total number of patients	40
Male	34
Female	6
Age	47.05 (sd ± 14.58)
Fever	8 (20%)
Cough	10 (25%)
Past history of TB	3 (7.5%)
Hypertension	22 (55%)
Diabetes	5 (12.5%)
Hypertension with Diabetes	2 (%)
Chronic Glomerulonephritis(CGN)	5 (12.5%)
Lupus Nephritis	1 (2.5%)
Mean Duration of dialysis	
Less than 6 months	10
Six months to one year	18
More than one year	12
Dialysis session	
≤ 1 / wk	5 (12.5%)
> 1 ≤2 / wk	23 (57.5%)
> 2 / wk	12 (30%)
Hepatitis B positive	1 (2.5%)
Hepatitis C positive	3 (7.5%)
Immunosuppressive drug	1 (2.5%)

dialysis less than or equal to 1 session per week while 23 (57.5%) patients used to undergo two dialysis session. Twelve (30%) patients used to go three dialysis session per week. Three (7.5%) patients were positive for hepatitis C and 1(2.5%) was hepatitis B positive. One (2.5%) patient was on immunosuppressive drug (corticosteroid 10mg) for last two years (Table-1). All the patients were non smoker.

X-ray chest was normal in 23 (57.5%) patients. Abnormal X-ray was present in 17 (42.5%) patients. Consolidation was present in 2 (5%), 5 (12.5%) had pleural effusion, 4 (7.5%) patients had consolidation with pleural effusion, 3 (7.5%) had unilateral infiltration and 2 (5%) patients had bilateral infiltration, 1 (2.5%) had fibrosis. During initial screening at the beginning of the study 4(10%) were sputum positive for AFB on ZN stain. During follow up 3 more patients were sputum positive for AFB at 3 months, 6 months and 9 months respectively. All the

Table-2: Investigation profile of patients undergoing maintenance hemodialysis

Chest X-ray:	
Normal	23 (57.5%)
Pleural effusion	5 (20.83%)
Consolidation with effusion	4 (7.5%)
Consolidation	2 (5%)
Unilateral Infiltration	3 (7.5%)
Bilateral Infiltration	2 (5%)
Fibrosis	1 (2.5%)
Pleural effusion:	
Present	9 (22.5%)
Exudative	3 (33.33%)
Transudative	6 (66.66%)
Adenosine Deaminase > 47	2 (22.22%)
Lymphocyte / Neutrophil ratio > 0.75	2 (22.22%)
Ascites Present	6 (15%)
Sputum AFB positive in initial screening	4 (10%)
Sputum AFB positive during follow up	3 (8.33%)
Lymph Lode FNAC suggestive of Tuberculosis	1 (2.5%)
Tuberculosis skin test : ≥10mm (positive)	15 (37.5%)

patient had culture positive mycobacterium tuberculosis. Nine (22.5%) patients had pleural effusion among which 3 patients had consolidation with effusion. Among these patients, 3 patients had exudative pleural effusion by Light's criteria where as rest had transudative effusion. Among 3 patients with exudative pleural effusion 2 had high Adenosine deaminase level (ADA) more than 47 IU with lymphocyte neutrophil ration more than 0.75 which was treated as a case of tubercular pleural effusion.1 (2.5%) had lymphadenopathy which was suggestive of tuberculosis on FNAC. Six (15%) had ascites. As all these patients had pleural effusion as well, separate diagnostic tapping was not done.15 (37.5%) patients had tuberculin skin test more than or equal to 10mm (Table-2).

All these patients who were diagnosed to have tuberculosis were started on antitubercular drug (ATT) consisting of four drugs that include rifampicin, isoniazide, pyrazinamide and ethambutol in the maintenance phase for two months followed by intensive phase of rifampicin and isoniazide for 4 months. One patient died of myocardial infarction during treatment, one patient died at home, the cause of his death could not be identified. All other patients recovered fully after 6 months of ATT (Table-3 and 4).

Table-3: Mode of diagnosis of Tuberculosis

Microbiology	7
Tubercular pleural Effusion	2
Tubercular lymhadenopathy	1

Table-4: Outcome after treatment

Cured	38
Death	2

DISCUSSION

The prevalence of TB in dialysis patients is closely related to, and several times higher than, its prevalence in the general population.[1,2] There was a male preponderance (85%) in our study. Predominance of both males[1,11] and females has been reported in different studies.[5,12] The mean age was 47.05 yrs in our study which was similar to other series.[1,7] Fever and cough were the most common symptoms in patients**.** Common constitutional symptoms reported in other studies were fever, anorexia, weight loss and generalized weakness.[5-7] Cough was present in 25% of the patients in a study done by Sasaki etal.[1] Three(7.5%) patients had past history of tuberculosis and 5 had history of diabetes .Patient with past history of tuberculosis and diabetes were reported to be more prone to develop tuberculosis during maintenance dialysis.[13] Among these three patients with past history of tuberculosis one patient had an active pulmonary tuberculosis during initial screening and among 5 diabetics one develop tuberculosis on sixth month of follow up. Among 10 patients who were diagnosed to have TB, 5 patients were on dialysis less than or equal to one dialysis per week because of economic constrain. This support the fact that immune status of patient improve only after regular maintenance hemodialysis.[1,7] As two patients of pleural effusion who had lymphocytic exudative effusion along with high ADA improved with ATT, ADA estimation can be quite useful for diagnosing tubercular pleural effusion in an endemic region like Nepal.[14,15] Initial screening with chest X-ray seems to be a good investigation modality for the screening of tuberculosis in a patient undergoing maintenance hemodialysis as only two patients who were treated for tuberculosis had normal chest X-ray. The most common X-ray findings in a patient with tuberculosis were pleural effusion, pleural effusion with consolidation followed by infiltration in lung field. We could not comment on the interpretation of tuberculin testing as the prevalence of anergy in a patient undergoing maintenance hemodialysis is not available in Nepal .Due to anergy to tuberculin skin test in a high percentage of HD patient, it is advisable for HD centers to perform routine tuberculin skin test to determine the prevalence of anergy in their HD population.

Patients on HD are at increased risk of developing active tuberculosis after primary infection, activation of quiescent disease, or reactivation of old tuberculous infection. In an endemic region like Nepal where 40% of the general populations are infected with mycobacterium tuberculosis it seems mandatory to screen for tuberculosis in patients undergoing maintenance hemodialysis.

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