

Treatment Failure of Tuberculosis in Diabetic Patients

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Abstract

Background: despite the availability of effective treatment, tuberculosis continues to infect a large number of patients. Treatment failure is one of the major problems in the TB control programs.

Objective: To evaluate the treatment failure in tuberculosis patients with diabetes mellitus.

Patient & Method: In this retrospective study that extended from August 2007 to August 2008, 69 patients with tuberculosis and diabetes mellitus and 105 patients with T.B. only, were included. All patients were from Al-Najaf and treated by (Direct Observe Therapy programs)D.O.T.s. The patients are evaluated by the following data :- demographic data, site of disease by CXR, date of initial diagnosis of TB., purified protein derivative (tuberculin test) results, smoking history. The data were analyzed by using the statistical package social system (SPSS) and P. value <0.05 was regarded as statistically significant.

Results: Patients with tuberculosis and diabetes mellitus were 69 (58 male and 11 female) equal to(40%) of the total patients were treated with direct observe therapy (D.O.T.s) program, the treatment failure were 18 patients (12 male and 6 female) equal to (26%) of patients in this group. Patients with tuberculosis only were 105 (89 male and 16 female) and equal to (60%) of the total patients were also treated with(D.O.T.s),and the treatment failure were 10 patients (7 male and 3 female) that equal to (10%) of patients in this group. The age group(30-50) years had a higher failure rate in both groups. The failure was more in males, smokers, with tuberculin test negative, and in upper lobe lesions.

Conclusion: There was a significant association between diabetes and failure in TB. treatment, which is more in male, smoker, in those have negative tuberculin test, and in TB of upper lobe of the lung.

ملخص الدراسة

الغرض من الدراسة :- معرفة مدى فشل علاج التدرن الرئوي لدى المرضى المصابين بداء السكري .
طريقة العمل:- أجريت هذه الدراسة في مركز التدرن في النجف وقطاعات المناذرة والكوفة والنجف حيث كان عدد المرضى المصابين بالتدرن وداء السكر 69, والمصابين بالتدرن فقط 105 حيث أخذت المعلومات الخاصة لكل مريض من السجلات وكانت تشمل العمر والجنس وتاريخ التشخيص وحالة التدخين وعلاج التدرن والأشعة.
النتيجة:- أظهرت الدراسة ان عدد المرضى المصابين بالتدرن مع داء السكر 69 او كانوا يشكلون (40%) من مجموع المرضى, منهم 58 رجال و 11 نساء تم معالجتهم ببرنامج D.O.T.s. وكان عدد المرضى الذين لم يستجيبوا للعلاج هو 18 (26%), منهم 12 من الرجال و 8 من النساء .
وكان عدد المرضى المصابين بالتدرن فقط 105 (60%), منهم 89 رجال و 16 نساء , أيضاً تم معالجتهم ببرنامج D.O.T.s وان 10 مرضى(10%) من المجموع الكلي, منهم 7 رجال و 3 نساء أصيبوا بفشل علاج التدرن .
وكان الفشل أكثر عند الذكور المدخنين وكان لديهم فحص التوبركلين سالبا وعندما تكون الاصابة في الفص العلوي من الرئة. وعند الفئة العمرية ما بين (30-50)سنة
الاستنتاج : أظهرت الدراسة ان هناك علاقة وثيقة بين فشل علاج التدرن وداء السكري . حيث بينت الدراسة ان المرضى المصابين بداء السكر والتدرن هم اكثر عرضة الى فشل علاج التدرن من اقرانهم الغير مصابين بداء السكري .
وتوصي الدراسة بمراقبة هؤلاء المرضى لتجنب فشل العلاج وتجنب حدوث مقاومة لادوية علاج التدرن.

Introduction

Despite the availability of effective therapy, tuberculosis (TB) continues to infect an estimated one-third of the world's population, to cause disease in 8.8 million people per year, and to kill 1.6 million of those afflicted⁽¹⁾.

Current TB control measures focus on the prompt detection and treatment of those with infectious forms of the disease to prevent further transmission of the organism. Despite the enormous success of this strategy in TB control, the persistence of TB in many parts of the world suggests the need to expand control efforts to identify and address the individual and social determinants of the disease⁽³⁾. A large number of TB patients treated outside the purview of national tuberculosis programme in private and semiprivate clinics lead to incomplete medical treatment, non compliance and treatment failure.

Since the early part of the 20th century, clinicians have observed an association between diabetes mellitus (DM) and TB, although they were often unable to determine whether DM caused TB or whether TB led to the clinical manifestations of DM^(2,6). More recently, multiple rigorous epidemiological studies investigating the relationship have demonstrated that DM is indeed positively associated with TB^(7, 11), while the investigators suggested that the association reflects the effect of DM on TB, some controversy over the directionality of the association remains due to observations that TB disease induces temporary hyperglycemia, which resolves with treatment^(12,13).

A causal link between DM and TB does not bode well for the future, as the global burden of DM is expected to rise from an estimated 180 million

prevalent cases currently to a predicted 366 million by 2030⁽¹⁴⁾. It appears that diabetic patients as a group are more susceptible to having tuberculosis therapy failure and this is due do impaired GI drug absorption even in the absence of the clinical gastroparesis 14. Patients with tuberculosis infection are prone to reactivation; one of the conditions that may predispose to reactivation is diabetes mellitus.^(5, 15, 16) The relative risk of developing bacteriologically confirmed pulmonary tuberculosis is up to five times higher in diabetics (14). Convincing data regarding tuberculosis in diabetics are lacking, and information on diabetic status is not routinely obtained on reported cases in the hospitals or health primary care that deals with treatment of TB.

The aim of this study is to identify the effect of diabetes mellitus on the treatment of tuberculosis (failure rate).

Patients and Method

In this retrospective study, 69 patients with tuberculosis and diabetes mellitus (58 male and 11 female), and 105 patients with tuberculosis only (89 male and 16 female), patients ages were from (1—70) years .All the patients were selected from (Al-Najaf, Al-Manathera, Al-Kufa) primary health care districts and TB. center in Al-Najaf , from August 2007 to August 2008.The data that obtained from the patients cards were including:- age, sex, details of TB. disease (site, date of initial diagnosis, treatment), tuberculin test results , details of diabetic treatment and smoking history. Chest radiograph reports were available for review for all patients. The failure to treatment was defined as any patient of tuberculosis who, while on treatment, is sputum smear positive

at 5 months or later during the course of treatment.⁽²⁾ All patients diagnosed as T.B. by bacteriological examination of sputum for A.F.B.

All patients with chronic renal failure, HIV infection, drug resistant, and pregnant ladies were excluded from this study.

The data were analyzed by using the statistical software, SPSS version 10. The data with quantitative variables were expressed by mean and standard deviation while the qualitative variables were estimated by frequency and percentage. Statistical analysis was estimated using chi-square test. P-value of <0.05 was regarded as statistically significant.

Results

In this study (table 1) , 69 patients with tuberculosis and diabetes mellitus

Table 1. Demographic and Clinical Characteristics of patients in group 1 (TB&DM) and group 2 (TB only)

Characteristics		Group 1 -69patient -40% of total		Group 2-105 patient -60%of total	
		No.	%	No.	%
Number of patients					
Age group , years	1-30	10	14%	18	17%
	31-40	19	28%	34	32%
	41-50	15	23%	27	25%
	51-60	13	19%	18	17%
	> 61	12	17%	8	7%
Sex	Male	58	84%	89	8.5%
	Female	11	16%	16	15%
*Tuberculin test	Positive	25	36%	58	55%
	Negative	44	64%	47	45%
Site of infection	Lungs	69	100%	105	100%
Cigarette use		54	78%	75	71%

The treatment failure (table 2) is higher in group 1 than that in group 2 ,which was 18 patient (26%) versus 10 patient(9.5 %), p value was <0.05.

The failure rate was more in males in both groups, which was statistically significant.

In females the rate was less in both groups, but it was statistically not significant.

(group1) that forming 40% of all patients , and 105 patients with tuberculosis only that forming 60% of all patients in this study (group2),both groups were compared demographically and clinically .The male patients were more than females in both groups (84%males in group 1 and 85% males in group 2).The predominant age that involved in both groups was renegeing from (31- 50) years and including about 50% of patients .

Tuberculin test was positive in 25% of patients in group 1, and in 55% of patients in group 2.

The sit of infection was the lung in both groups but in different pulmonary sites.

Smoking was positive in 78% and 71% in both groups respectively.

The age group (31-50) years were associated with high treatment failure in both groups (20% versus 5.7%) which was statistically significant.

In group 1 the failure rate was 10% with positive tuberculin test, while in group 2 it was 7.8%, but it is not significant statistically.

The negative tuberculin test was associated with 16% failure rate in

group 1, but it was 2% in group 2, and it was statistically significant.

Smoking was associated with high failure rate in both groups 1&2 (14.5% and 5.7%) and p value <0.05.

Regarding the radiological finding in group 1 the failure was high in patients

with upper lobe lesion 17.3% versus 4.7 in group 2 and it was statistically significant. In other location (middle, and lower lobes and milliary type) there was no much difference.

Table 2. Show treatment failure in both study groups

Characteristics		Treatment Failure in group1(No.69) .		Treatment Failure in group2 (No. 105).		p-value
		No.	%	No.	%	
Sex	Male	12	17.3	7	6.6%	<0.05
	Female	6	8.7	3	3%	> 0.5
Age	30-50 years	14	20%	6	5.7 %	<0.05
Tuberculin test	+ve	7	10%	8	7.6%	>0.05
	- ve	11	16%	2	1.9%	<0.05
smoking	+ ve	10	14.5	6	5.7	<0.05
	- ve	8	11.6	4	4	>0.05
CXR finding	Upper lobe	12	17.3	5	4.7	<0.05
	Middle & lower lobe	1	1.4	2	2	>0.05
	Miliary TB	5	7.2	3	2.8	>0.05
Total Patients with treatment failure		18	26	10	9.5	<0.05

Discussion

In spite of over thirty years of National Tuberculosis Programme (NTP) and the availability of near 100 percent effective treatment regimens , control of tuberculosis is nowhere in sight. In fact, the challenge of TB has increased. Besides increase in the number of patients, we have an increase incidence of the drug failure. (19)

In this study the treatment failure in patients with TB and DM was (26%) while in Frieden and colleagues study in New York city in 1991 the failure rate was 23% 9, which similar to our results.

This study showed that the failure rate in males was higher than that in females in both study groups with (2:1) ratio, and the mainly affected age group was between (30 -50) years which also have high treatment failure rate than other groups, which was similar to that study conducted by A.

Jabbar, S. F. Hussein and A.A. Khan in Pakistan⁽¹⁷⁾

In our study there was high treatment failure rate in TB. and DM. patients with negative tuberculin test, while there was no difference in treatment failure rate among tuberculin test negative or positive in study by Kim, Sh, Hong , YP, and lew, in Hong Kong (1) .

The effect of smoking on treatment failure was significant in this study but not in a study by Catherine R. Stevenson Nita G. Forouhi in Cambridge, UK (18) .

The study of Sosman and Steidel in Mexico and Perez Gusman et .al. in Malaysia showed that the lower lobe lesion affection and treatment failure was more than other pulmonary lesion depend on X ray finding ^{12,13} , while in this study the affection and treatment failure was higher in upper lobe of lung .

Conclusion and recommendation

The failure rate was higher among patients with TB and DM compared to non DM patients especially in male sex, tuberculin test negative, smoker, and in patient with upper lobe lesion, so the patient with TB and DM should be treated and followed carefully to avoid treatment failure and the development of drug resistance.

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