RESEARCH ARTICLE

Diabetes among pulmonary tuberculosis cases – An impact of glycemic control on clinic-radiological profile

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ABSTRACT

Background: Pulmonary tuberculosis and diabetes mellitus are major public health concerns in India. Pulmonary tuberculosis in cases with diabetes shows an unusual radiographic pattern and higher frequency for cavitation.

Aim and Objectives: To evaluate the impact of glycemic control on the clinico-radiological profile of pulmonary tuberculosis in cases with diabetes mellitus.

Materials and Methods: A total of 126 cases clinically confirmed and microbiologically diagnosed as pulmonary tuberculosis above 21 years of age were recruited. Based on the blood glucose levels cases were divided into prediabetics, newly diagnosed diabetics, and known diabetics. Clinical and radiological examinations were conducted.

Results: Cough was the most prevalent clinical symptom followed by fever, loss of appetite, loss of weight, and dyspnea. In the radiographic examination, lower lung field was most commonly involved in newly diagnosed and known diabetes cases. Cavitary lesions were commonly noticed in multiple zone implication, multiple cavities, and bilateral cavity involvement was observed more often in newly diagnosed and known diabetic cases. Among the diabetic cases (94), satisfactory glycemic control was observed in 39 cases and poor glycemic control was seen in 55 cases. The mean symptom score in the cases with satisfactory glycemic control was 3.87 and in poor glycemic control was 3.99.

Conclusion: Diabetic cases with lower lung field lesions may be an indication of tuberculosis which needs immediate diagnosis and management. In this study, poor glycemic control influence the radiological manifestations of pulmonary tuberculosis cases with diabetes.

KEY WORDS: Pulmonary Tuberculosis; Diabetes Mellitus; Radiographic Manifestations; Glycemic Control

INTRODUCTION

Pulmonary tuberculosis and diabetes mellitus are strongly associated conditions where diabetes has 3 times higher chance of increase incidence of tuberculosis than person without diabetes.[1,2] In India, more than 77 million adults are living with diabetes mellitus. This huge prevalence of diabetes may increase the risk of tuberculosis. The cases under anti-tuberculosis therapy have a higher chance of morbidity and mortality.

The diabetes has an immense impact on the clinico-radiological profile, diagnosis, and management of tuberculosis.[3] Several studies reported that pulmonary tuberculosis in cases with diabetes show an unusual radiographic pattern and distribution.[4] The co-existing tuberculosis and diabetes may lead to pulmonary atypical manifestation such as higher incidence of lung lesions, lower lobe lung opacity, cavities, and substantial lung parenchyma involvement. Studies indicated that glycemic control in diabetes is potentially correlated with the radiological manifestations.[5-7] With the above reference the present study was designed to evaluate...
the impact of glycemic control on clinico-radiological profile of pulmonary tuberculosis in cases with diabetes mellitus.

MATERIALS AND METHODS

The present cross-sectional study was conducted in the Department of Pulmonary Medicine at MNR Medical College and Hospital, Sangareddy from August 2019 to August 2021. A total of 126 cases clinically confirmed and microbiologically diagnosed as pulmonary tuberculosis attending the Department of pulmonology were recruited. Newly diagnosed and microbiologically confirmed pulmonary tuberculosis cases with diabetes mellitus were included in the study. Cases with drug-resistant tuberculosis, chronic pulmonary tuberculosis, cases without diabetes, pregnancy and lactating mothers, and cases with cerebrovascular complications were excluded. Informed consent was obtained from all the study participants and study protocol was approved by the institutional ethics committee (No. IEC: MNRMC/EC/1422).

The demographic data were collected. The classification of diabetes mellitus was done based on the guidelines of the American Diabetes Association Criteria. Based on the blood glucose levels cases were divided into prediabetics, newly diagnosed diabetics, and known diabetics. The clinical symptoms were assessed based on cough, chest pain, fever, breathlessness, hemoptysis, and loss of appetite in the above mentioned groups. Radiological examinations were done in all the study participants.

Descriptive statistics were used to estimate the frequency and percentages of demographic data. Chi-square test was used to assess the association between study variables. SPSS version 16.0 was used to conduct the statistical analysis.

RESULTS

Among the diabetic cases (94), satisfactory glycemic control was observed in 39 cases and poor glycemic control was seen in 55 cases. The mean symptom score in the cases with satisfactory glycemic control was 3.87 and in poor glycemic control was 3.99. The fever, cough, polyuria, chest pain and loss appetite did not show any significant change in related to glycemic control. There was no significant difference in frequency with respect to upper zone and lower zone (P > 0.05). The incidence of bilateral involvement, multi zone involvement and frequency of multiple cavities was more frequent in poor glycemic control group than satisfactory control group. [Tables 1-3 and Figure 1]

DISCUSSION

Pulmonary tuberculosis and diabetes mellitus are global health concerns. Tuberculosis and diabetes have immense relationship that tuberculosis has a significant impact on diabetes, whereas diabetes has immense impact on clinico-radiological profile, diagnosis, and management of tuberculosis. The present study was undertaken to evaluate the impact of glycemic control on clinico-radiological profile of pulmonary tuberculosis in cases with diabetes mellitus. A
A total of 126 cases clinically confirmed and microbiologically diagnosed as pulmonary tuberculosis above 21 years of age were recruited. Among the study cases, the majority were between age group 5th and 6th decade. Male (69.84%) participants were more than females (25.40%). In this study, the cough was most prevalent clinical symptom followed by fever, loss of appetite, loss of weight, and dyspnea in three study groups. Polyuria, chest pain, and hemoptyysis were seen more in newly diagnosed and known diabetic cases [Table 2]. The pre-diabetes group (3.24) had the lowest symptom score followed by known diabetes group (3.52) and newly diagnosed group (3.96). In this study, the lower lung field was most commonly involved in newly diagnosed and known diabetes cases. In this study, cavitary lesions were commonly noticed in multiple zone implication, multiple cavities and bilateral cavity involvement were observed more often in newly diagnosed and known diabetic cases [Table 3]. Among the diabetic cases (94), satisfactory glycemic control was observed in 39 cases and poor glycemic control was seen in 55 cases. The mean symptom score in the cases with satisfactory glycemic control was 3.87 and in poor glycemic control was 3.99. The fever, cough, polyuria, chest pain, and loss of appetite did not show any significant change in related to glycemic control. There was no significant difference in frequency with respect to the upper zone and lower zone. The incidence of bilateral involvement, multi-zone involvement, and frequency of multiple cavities was more frequent in poor glycemic control group than satisfactory control group.

A study by Krishna et al., noticed that fever, hemoptyysis, and weight loss were commonly encountered clinical symptoms. Lower lung field (56%) was more involved than the upper field and bilateral involvement (18%). Cavitary lesions were commonly noticed in the upper lung field.[3] A study by Saalai et al., noticed fever in all the study subjects followed by weight loss in 80% and night sweats in 8% of subjects. Cavitary lesions were usually seen in lower lung zones. The number and size of the cavities were high in poor glycemic control group.[3] A study by Chen et al., noticed abnormal opacity of lung parenchyma in 98.6% cases (n = 1209). Among them, 93.1% had opacity over the upper lung field and 73.1% had opacity over the lower lung field. The Cavitary lesions were seen in 40.5% of cases, among them 37.6% of lesion were present over upper lung field, 8.8% over lower lung field. A study by Avuthu et al., noticed cavitary lesions in 10 cases with optimal glycemic control group and 36 cases with poor glycemic control. Lower lung field involves more commonly in cases with poor glycemic control (29.8%). A study by Singh HC stated that cough (94.55%) is a common clinical symptom followed by fever (90%) and anorexia (52.73%). Other symptoms like loss of body weight, dyspnoea, night sweats, and chest pain were also associated with tuberculosis cases with diabetes. Radiological examination revealed that multiple lobes (45.45%) involvement is common than upper (30.90%) and lower lung fields (20.91%). A study by Carreira et al., stated that multiple lobe (72.3%) involvements was more common followed by isolated upper lung field (17.1%) and isolated lower lung field (10.6%). A study by Shaik et al., noticed that cough, fever and anorexia are the commonly associated clinical symptoms.[13] A study by Anand et al., stated that anorexia, cough, and fever are the most common clinical symptoms noticed in tuberculosis cases with diabetes.[14] A study by Dousa et al., stated that clinical symptoms such as fever, cough, weight loss, and hemoptyysis were comparable between cases with and without diabetes.[15]

The results of the present study were consistent with the findings of above study where fever, loss of appetite, loss of weight, and dyspnea were commonly noticed associated clinical symptoms, and polyuria, chest pain, and hemoptyysis were seen more in newly diagnosed and known diabetic cases. The cavitary lesions were commonly noticed in multiple zone implication, multiple cavities and bilateral cavity involvement were observed more often in newly diagnosed and known diabetic cases. The present study was limited to single radiological evaluation method; however, evaluation with more radiological methods is needed. Therapeutic outcome was not measured and unmatched number of subjects between the study groups could have impacted the accuracy of findings.

CONCLUSION

The early diagnosis of diabetes is essential to take precautionary steps and to start medication. Diabetic cases with lower lung field lesions may be an indication of tuberculosis which needs immediate diagnosis and management. In this study, poor glycemic control influences the radiological manifestations of pulmonary tuberculosis cases with diabetes. Continuous monitoring of glycemic control is necessary for tuberculosis cases with diabetes.

REFERENCES


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