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Diabetes Mellitus, Chronic Renal Failure & Pulmonary Tuberculosis

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Abstract

Tuberculosis is one of the most common infectious diseases worldwide. Several risk factors including diabetes mellitus, chronic renal failure are known to impair the immunity and are involved in spread of TB. We report a case of diabetes mellitus with chronic renal failure and tuberculosis.

Keywords: Tuberculosis; Diabetes Mellitus; Hemodialysis; ESRD.

Introduction

The first report of the association between diabetes mellitus (DM) and tuberculosis (TB) was documented by Avicenna (980-1027 AD) over one thousand years ago. Since that time, the relationship between DM and TB, and the nature of their interaction with regards to comorbidity have largely been suggested by several epidemiological studies [1]. The World Health Organization began developing guidelines for addressing Tuberculosis (TB) and diabetes (DM) way back in 2009, however the magnitude and importance of this double burden has not quite sunk in even today, among public health practitioners, clinicians and the public.

It is estimated that in 2010 there were 8.8 million (range: 8.5-9.2 million) new cases of TB. On the other hand, TB is the cause of death for approximately two million people every year [2, 3]. Aging, changes in life style, socioeconomic factors, and population growth have led to an increased prevalence of DM, particularly type 2 DM. The total number of diabetic people worldwide is predicted to rise from 285

million in 2010, accounting for 3.5 million deaths, to 439 million in 2030 [4,5]. Up to 80% of patients with DM live in low income and developing countries [6]. Asia is the epicenter of the growing burden of DM [5] and the largest contribution is from India and China[7].

Chronic renal failure is known to impair immune function and therefore is associated with an increased incidence of TB. Among patients with chronic renal failure requiring renal replacement therapy, rates of TB 10 to 25 fold greater than those in the general population have been reported from the United States, Canada, Europe, and Japan, equating to incidence rates of approximately 250 cases per 100,000 per year [8, 9]. We report a case of a male patient with chronic renal failure and diabetes mellitus, who was diagnosed to have tuberculosis of the lung.

Case Report

A 67 years old male presented to the Urology OPD services with LUTS, breathlessness and uncontrolled

diabetes mellitus. On preliminary laboratory tests, serum creatinine was 9.72 mg%, random blood sugar 301 mg% and serum potassium 6.76 mEq/L. Chest X-ray revealed left sided pleural effusion (Figure 1). Patient was managed by emergency dialysis. The pleural effusion did not subside even after 4 sessions of dialysis. Pleural fluid aspiration was done and its analysis revealed neutrophils 20%, lymphocytes 70%, glucose 371 mg%, LDH 381 U/L and ADA 40 U/L. Pleural fluid PCR (polymerase chain reaction) was positive for TB. A clinical diagnosis of pulmonary tuberculosis was made and patient was put on anti-tubercular treatment.

Patient gradually started to improve. The chest x-rays showed minimal pleural collection. Fever subsided and patients' general condition improved. Patient was also put on maintenance dialysis.

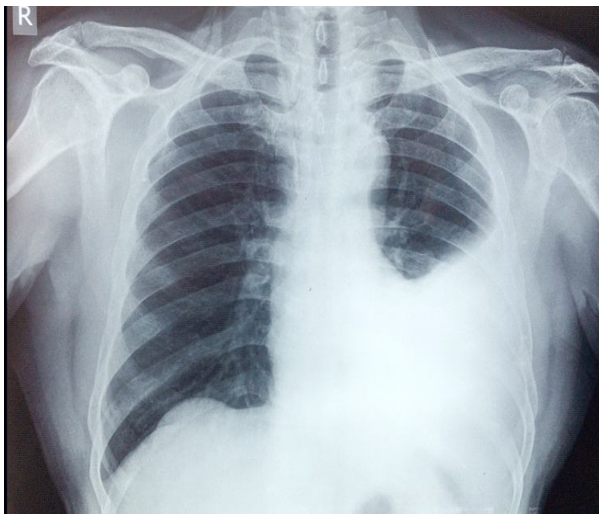


Fig. 1: Chest x-ray revealed left sided pleural effusion.

Discussion

Worldwide, 70% of diabetics live in TB endemic countries. In the 22 countries with the highest burden of TB, the prevalence of DM in the general population ranges from 2% to 9% [5], and eight of the ten countries with the highest incidence of DM are also classified as high burden countries for TB by the World Health Organization (WHO) [10]. China, India, Peru, Indonesia and Russia are the countries that need to be given particular attention [11]. Pulmonary TB is the ninth most frequent complication of DM [12] and due to a rising prevalence of DM, the relative contribution of DM to the TB epidemic is increasing [4,5]. The frequency of DM among active cases of tuberculosis was 5.6%, 7.3% and 14.8% in studies from India, Turkey and Indonesia, respectively. In 35% to 61% of these patients, DM was diagnosed for the first time after detection of TB [13-15].

Chronic kidney disease (CKD) is associated with relative compromise in acquired cell-mediated immunity, which constitutes the major determinant of host resistance for further development of disease. In recent years, the increase in the number of patients with immune suppression, such as those with renal transplantation, has led to increased TB rates in the chronic kidney disease population [16]. The incidence of TB in dialysis patients is higher than in the general population, so screening remains important. Kazancioglu *et al.*, reported that out of 925 Hemodialysis (HD) patients screened from seven different centers, 31 (3.35%) were found to have TB [17].

Our case represents an elderly male with long standing poorly controlled DM and having breathlessness. Evaluation in the hospital revealed chronic renal failure and pulmonary tuberculosis. As reported by the WHO [3], there is abundant evidence of high rates of tuberculosis in patients with DM, and often tuberculosis is only discovered if actively screened/looked for. Strategies to improve health care access, diagnosis, clinical care, financial risk protection, and prevention need to be adapted to this reality. Coordinated efforts for planning and implementation across public health programmes are required.

The sole purpose of this report is to re-emphasize that the world faces a looming co-epidemic of TB-diabetes, and that this is a serious public health risk we all need to urgently address. Physicians of all departments should realize that diabetes makes a person two to three times more likely to develop TB and that the interaction between the two diseases constitutes a worldwide health threat. TB kills more people every year than any other infectious disease except HIV/AIDS. An estimated nine million fell ill with TB in 2013, and 1.5 million died. About one in three people worldwide, an estimated two billion people live with a latent TB infection. In most cases this infection will remain dormant for one's entire life, never making the person sick. However, the risk that this latent infection will progress to active TB disease increases significantly if a person's immune system is compromised for example by diabetes [3,18].

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