RESEARCH ARTICLE

Relation of hematological abnormalities at the time of admission with various causes of death in diabetes

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Manuscript details:	ABSTRACT
	Introduction: India currently faces an uncertain future in relation to the potential burden that diabetes may impose upon the country. Many influences affect the prevalence of disease throughout a country, and identification of those risk factors is necessary to facilitate change when facing health challenges **Methodology:** In this study, Deaths due to complications of Diabetes formed the study subjects. Totally 200 deaths for the last 10 years were selected by non-probability purposive random sampling technique **Results:** Mean serum creatinine of >2 mg/dl was found in patients with infections, liver diseases and with multiple causes of death apart from patients with CKD. Also, patients with DKA had mean serum creatinine of 1.6 mg/dl. Mean Sr. Creatinine (mg/dl) in CKD and other causes was 5.90 and 2.69 respectively **Conclusion:** Mean RBS was significantly higher in patients with DKA, IHD and infections. **Keywords:** Diabetes, Mortality, Sodium, Creatinine

INTRODUCTION

The prevalence of diabetes for all age-groups worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030. The prevalence of diabetes is higher in men than women, but there are more women with diabetes than men. The urban population in developing countries is projected to double between 2000 and 2030. The most important demographic change to diabetes prevalence across the world appears to be the increase in the proportion of people >65 years of age (Sarah Wild et al.,2004).

Diabetes is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease. In 2000, India (31.7 million) topped the world with the highest number of people with diabetes mellitus followed by China (20.8 million) with the United States (17.7 million) in second and third place respectively.

It is predicted that by 2030 diabetes mellitus may afflict up to 79.4 million individuals in India, while China (42.3 million) and the United States (30.3 million) will also see significant increases in those affected by the disease.
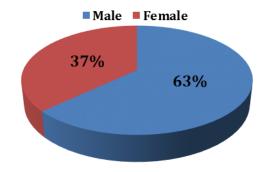
India currently faces an uncertain future in relation to the potential burden that diabetes may impose upon the country. Many influences affect the prevalence of disease throughout a country, and identification of those risk factors is necessary to facilitate change when facing health challenges (Seema Abhijeet Kaveeshwar and Jon Cornwall et al.,2014).

MATERIAL AND METHODS

This was a record based descriptive cross sectional study carried out at a Tertiary care center. In this study, Deaths due to complications of Diabetes formed the study subjects. Totally 200 deaths for the last 10 years were selected by non-probability purposive random sampling technique. A semi structured questionnaire was prepared to gather the required information. All the relevant data was collected and entered in Microsoft excel and was analyzed using mean, standard deviation and proportion.

RESULTS

The mean age in years was 58.71 +/-11.56 and 55.76 +/-13.19 for males and females respectively. The overall mean age of patients in our study was 57.62 +/-12.23 years.

Figure 1: Gender Distribution

Our study has compared various haematological parameters at the time of hospitalisation with various causes of death in diabetes.

The mean serum RBS among all patients was 200.45 mg/dl. We found that RBS was significantly higher in patients with DKA, IHD and infections. Patients with Liver disease had a lower level of 88.5 in our study

In our study, mean serum creatinine of >2 mg/dl was found in patients with infections, liver diseases and with multiple causes of death apart from patients with CKD. Also, patients with DKA had mean serum creatinine of 1.6 mg/dl.Mean Sr. Creatinine (mg/dl) in CKD and other causes was 5.90 and 2.69 respectively.
The mean sodium value in our patients was 130.67 mEq/lt. Patients with DKA (124), Infections (130.38), CKD (130.79) and Liver diseases (127.75) had low sodium in mEq/lt.

The mean WBC count among our patients was 12772 cells/cu.mm. Mean WBC among non-infectious causes was also in higher range of 13601 cells/cu.mm. It was significantly higher in patients with DKA.
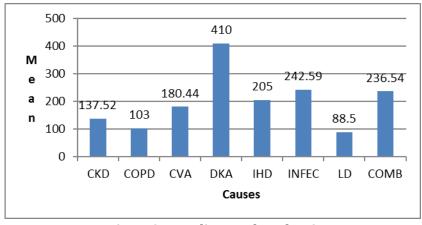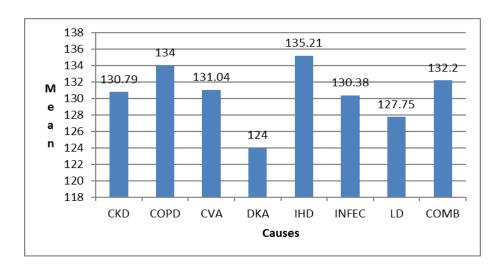

Figure 2:Mortality trends and RBS
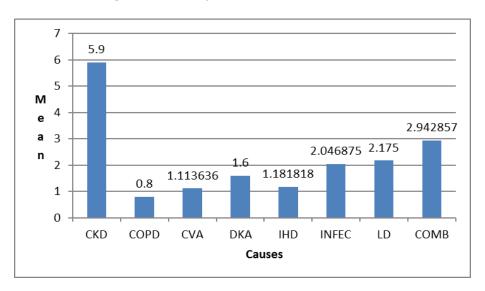
Figure 3:Mortality trends and sodium levels
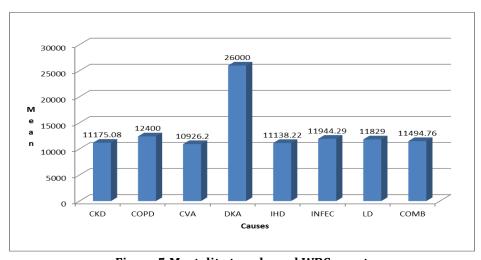

Figure 4:Mortality trends and Creatinine

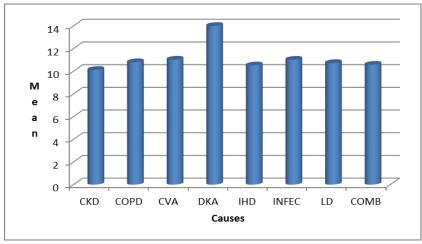**Figure 5:Mortality trends and WBC count**

Figure 6:Mortality trends and HB gm%

DISCUSSION:

The causes of death among diabetics were classified into primary and contributory. The contributory cause refers to the mention on the death certificate of any cause/disease other than diabetes. When there was mention of only one contributory cause other than diabetes, it was referred to as a primary cause.

The leading causes of death were Infections (26.4%), chronic kidney disease (24%), cerebrovascular disease (23.1%), coronary artery disease (21.5%), chronic liver disease (3.3%), chronic obstructive pulmonary disease (0.8%) and diabetic ketoacidosis (0.8%).

Liver diseases constituted 3.3% of total deaths in our study. This is comparable with the study done in Kashmir, in which it was 2.7% (AH Zargar et al., 2009).COPD constituted 2.7% of total deaths. Sasisekhar et al., 2012 showed a lower rate of 0.7%. Studies done outside India by Mceven et al., 2006 showed a rate of 5% with COPD.

Complications related to DKA accounted for % of deaths. With appropriate therapy, the mortality rate of DKA is low (<5%) and is related to underlying or precipitating event such as infections or myocardial infarction. Hypoglycemia, which is largely preventable, is not an uncommon cause of mortality or major morbidity requiring hospitalization. In some earlier studies, it was considered to be the primary or contributing cause of death in up to 4% of patients with diabetes. In Kerala study, deaths attributable to Diabetics mellitus as an underlying cause of death in 17 cases (8.21%) which includes Hypoglycemia 2 (0.97%), Hyper glycaemia 1 (0.48%) and Diabetic

ketoacidosis 14 (6.76%) (Jimmy Antony et al., 2011). In another study it was 5.1% (Goldacre MJ.,2004) and in a retrospective study conducted in a Medical college hospital, Srinagar, Kashmir revealed that Hypoglycemia 3.5% and Diabetic ketoacidosis 3.4% of deaths.

Our study has compared various hematological parameters at the time of hospitalization with various causes of death in diabetes. The mean serum RBS among all patients was 200.45 mg/dl. We found that RBS (Random Blood Sugar) was significantly higher in patients with DKA, IHD and infections. Hyperglycemia not only precipitates many infections, it is also an independent risk factor for IHD, CKD and CVA. In our study, mean serum creatinine of >2 mg/dl was found in patients with infections, liver diseases and with multiple causes of death apart from patients with CKD. This signifies the impairment in kidney, even before presenting to a tertiary center and hence having a high mortality. This also shows the delay in referral to a tertiary center or lack of awareness in patients about complications. Patients with DKA (124), Infections (130.38), CKD (130.79) and Liver diseases (127.75) had significantly low sodium in mEq/lt. Mean WBC among non-infectious causes was also in higher range of 13601 cells/cu.mm. It was significantly higher in patients with DKA. The mean Hb in our patients at the time of hospitalization was 11.08 gm/dl.

CONCLUSION

In our study, mean serum creatinine of >2 mg/dl was found in patients with infections, liver diseases and with multiple causes of death apart from patients with

CKD. Patients with DKA , Infections, CKD and Liver diseases had significantly low sodium in mEq/lt.

Conflicts of interest: The authors stated that no conflicts of interest.

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