

Research Article

An evaluation of diabetic ketoacidosis in cases of diabetes mellitus

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ABSTRACT

Objective: To evaluate the diabetic ketoacidosis in cases of diabetes mellitus

Material and method: Total 204 diabetic patients presenting at Department of Medicine, Bahawal Victoria Hospital Bahawalpur from January 2017 to June 2017, both male or female with age range from 35-65 years were selected for this cross sectional study for the investigation of diabetic ketoacidosis.

Results: Among the 204 diabetic patients, rate of diabetic ketoacidosis was 48 (24%). Diabetic ketoacidosis was noted in 27 (24.32%) patients of age group 35-50 years and in 21 (22.58%) patients of age group 21 (22.58%) patients. Statistically insignificant association between age group and diabetic ketoacidosis was observed with p value 0.8687. Diabetic ketoacidosis was observed in 22 (25.88%) male patients and in 26 (21.85%) female patients. Gender of the patients was insignificantly associated with diabetic ketoacidosis with p value 0.5084.

Conclusion: In present study, a higher number of diabetics was found with DKA. Insignificant association of DKA with age, gender and obesity was noted. DKA was significantly associated with family history of DM

Key words: Diabetic ketoacidosis, diabetes mellitus, fasting serum glucose, random serum glucose.

INTRODUCTION:

Diabetes mellitus is a syndrome with disordered metabolism and inappropriate hyperglycemia due to either a deficiency of insulin secretion or to a combination of insulin resistance and inadequate insulin secretion to compensate.¹ The prevalence of diabetes mellitus for all age groups worldwide was estimated to be 2.8% in year 2000 but it will increase to 4.4% by the year 2030.² No accurate figures for the prevalence of diabetes mellitus in Pakistan are available but according to several small scale studies conducted in different parts of the country prevalence 5.3 of diabetes.³ The

prevalence of diabetes mellitus vary from 5.3% to 16.2%. The prevalence of diabetes mellitus has increased dramatically in the past two decades. It is estimated that the number of diabetic patients will grow from 135 million to 300 million by year 2025 in the world. Unfortunately the major increase will occur in developing countries, and in Pakistan the number of diabetic patients in the year 2025 is estimated to be doubled. In Pakistan approximately 8 million people have diabetes mellitus and the same number is suffering from impaired glucose tolerance.⁴

Diabetic ketoacidosis and hyperosmolar non ketotic coma are the most common acute complications of diabetes mellitus.^{5,6} Diabetic ketoacidosis is a life threatening medical emergency with overall mortality rate which varies from 1 to 10% depending upon experience of treating center.⁷ In one study by Sheikh GA, frequency of diabetic ketoacidosis was 14.3%.⁸

In this study the frequency of diabetic ketoacidosis will be determined in type II diabetic patients presenting to medical departments of BVH Hospital Bahawalpur.

The frequency of diabetic ketoacidosis in type II diabetic patients has not been studied much in Pakistani population. Our study will provide local data about diabetic ketoacidosis and will help to improve medical care, and decrease mortality and morbidity of patients presenting with diabetic ketoacidosis.

MATERIAL AND METHOD:

This was a cross sectional study and conducted at Department of Medicine, Bahawal Victoria Hospital Bahawalpur from January 2017 to June 2017. Total 204 patients of DM, both gender with age range from 35-65 years were selected. Patients having stroke, patients with serum glucose level >600mg/dl, plasma osmolality >310mosm/kg and patient hepatic encephalopathy were excluded from the study.

Family history of DM was taken and BMI of all the patients was calculated after measuring height and weight of all the patients. Five ml blood sample was taken and send to laboratory for serum glucose, serum bicarbonate and blood pH and urine was also taken for ketones. Demographic profile was also taken. All the data was noted on pre-designed profoma.

Data was entered on computer software SPSS version 16. Mean \pm SD was calculated for age as quantitative variable. Frequencies and percentages were calculated for ketoacidosis, gender, obesity and family history of diabetes mellitus as categorical variables. Pie chart was also be drawn for frequency of ketoacidosis.

Stratification was done for age, gender, obesity and family history of diabetes mellitus to control the effect modifiers. Chi-square test was applied and p-value ≤ 0.05 was considered as significant.

RESULTS:

Total 204 type-II diabetics were selected for this study. Mean age of the patients was 50.29 ± 9.36 . Among the 204 diabetic patients, rate of diabetic ketoacidosis was 48 (24%) (Fig. 1)

Selected patients were divided into two age groups, age group 35-50 years and age group 51-65 years. Age group 35-50 years consisted on 111 (54.41%) patients and age group 51-65 years consisted on 93 (45.59%) patients. Diabetic ketoacidosis was noted in 27 (24.32%) patients of age group 35-50 years and in 21 (22.58%) patients of age group 51-65 years. Statistically insignificant association between age group and diabetic ketoacidosis was observed with p value 0.8687. (Table 1)

Male patients were 85 (41.67%) and female patients were 119 (58.33%). Diabetic ketoacidosis was observed in 22 (25.88%) male patients and in 26 (21.85%) female patients. Gender of the patients was insignificantly associated with diabetic ketoacidosis with p value 0.5084. (Table 2)

Total 128 (62.75%) patients found with family history of diabetes mellitus and diabetic ketoacidosis was noted in 32 (25%) patients. Total 76 (37.25%) patients were found without family history of diabetes mellitus and diabetic ketoacidosis was noted in 16 (21.05%) patients. No relation of family history of diabetes mellitus with diabetic ketoacidosis was noted (P value 0.6095). (Table 3)

Total 130 (63.73%) patients were obese and 74 (36.27%) patients were non-obese. Diabetic ketoacidosis was noted in 30 (23.08%) obese patients and 18 (24.32%) non-obese patients. Statistically insignificant association between obesity and diabetic ketoacidosis was noted with p value 0.8648. (Table 4)

Fig. 1: Rate of diabetic ketoacidosis

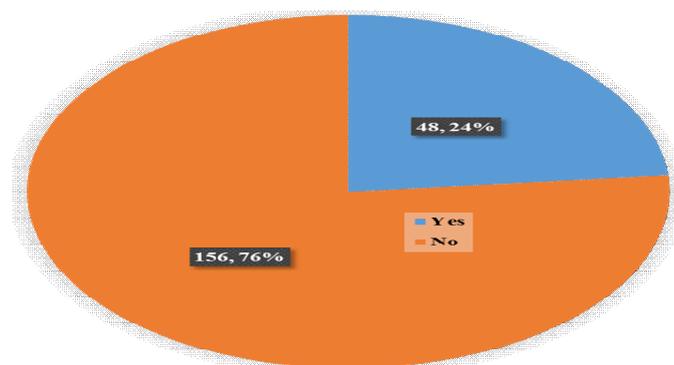


Table No. 1: Stratification for age

Age Group	Diabetic Ketoacidosis		Total	P. value
	Yes (%)	No (%)		
35-50	27 (24.32)	84 (75.68)	111 (54.41%)	0.8687
51-65	21 (22.58)	72 (77.42)	93 (45.59)	
Total	48 (23.53)	156 (76.47)	204	

Table No. 2: Stratification for gender

Gender	Diabetic Ketoacidosis		Total	P. value
	Yes (%)	No (%)		
Male	22 (25.88)	63 (74.12)	85 (41.67)	0.5084
Female	26 (21.85)	93 (78.15)	119 (58.33)	
Total	48 (23.53)	156 (76.47)	204	

Table No. 3: Stratification for family history of diabetes mellitus

Family History of DM	Ketoacidosis		Total	P. value
	Yes (%)	No (%)		
Yes	32 (25)	96 (75)	128 (62.75)	0.6095
No	16 (21.05)	60 (78.95)	76 (37.25)	
Total	48 (23.53)	156 (76.47)	204	

Table 4: Association of diabetic ketoacidosis with obesity

Obesity	Ketoacidosis		Total	P. value
	Yes (%)	No (%)		
Obese	30 (23.08)	100 (76.92)	130 (63.73)	0.8648
Non-obese	18 (24.32)	56 (75.68)	74 (36.27)	
Total	48 (23.53)	156 (76.47)	204	

DISCUSSION:

Diabetic ketoacidosis is the most common hyperglycemic emergency in patients with diabetes mellitus.⁸ It is a life threatening condition with mortality rate less than 5% in experienced centers whereas overall mortality may be up to 10%.⁹ DKA tends to occur in individuals younger than 19 years in type 1 diabetes mellitus whereas it may occur in diabetes of any age.¹⁰ The cardinal biochemical features of DKA are hyperglycemia more than 200 mg/dL, blood pH less than 7.3, serum bicarbonate less than 15 mEq/L and hyperketonemia. In the absence of insulin, tissues like muscles, fat and liver do not take up glucose, and counter regulatory hormones such as glucagon, growth hormone and catecholamines enhance triglyceride breakdown into free fatty acids, and increased gluconeogenesis is the main cause of hyperglycemia. Beta oxidation of free fatty acids leads to increased formation of ketone bodies.¹¹

Nausea and vomiting are often prominent in DKA and their presence in diabetic's warrants laboratory evaluation. Abdominal pain may be severe and can resemble with ruptured viscus and acute pancreatitis. Hyperglycemia leads to glucosuria, volume depletion, tachycardia and hypotension. Kussmaul's breathing and fruity odour are classic signs of this disorder. Lethargy and central nervous system depression may evolve into coma in severe DKA. Cerebral edema and ischemic stroke are extremely serious complications of DKA.¹²

In present study mean age the diabetic patients was 50.29 ± 9.36 years, similar mean age of diabetic was reported by Sheikh et al.⁸ Mean age of diabetics reported by Pinto et al¹³ was 45 ± 12 which is also comparable with our study. Male patients were 41.67% and female patients were (58.33%) which is comparable with a study by Sheikh et al,⁸ in his study male patients were 38.6% and female patients were 61.4%. Study of Habib is also in agreement with our study, he reported in his study male diabetics were 41% and female diabetics were 59%.¹⁴

In our study diabetic ketoacidosis was found in 24% patients. Ganieet al¹⁵ reported diabetic ketoacidosis in 20% patients. His findings are in agreement with our findings. Sheikh et al found diabetic ketoacidosis in 14.3% patients. In another study a higher proportion (41.7%) of patients with diabetic ketoacidosis was reported.¹⁶ Pitteloudet al¹⁷ reported diabetic ketoacidosis in 16% patients which is also comparable with our findings. Prevention of DKA and reduction of its frequency should be a goal in managing patients of diabetes mellitus. Increasing standards of medical and general awareness among diabetic patients can contribute to this.⁸

CONCLUSION:

Results of this study showed that male or female can be equally victim of diabetic ketoacidosis. Diabetic ketoacidosis can be develop equally in younger or older age group. No significant difference for the development of diabetic ketoacidosis was found between obese/non-obese and patients with family history of diabetes or without family history of diabetes.

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