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Research Article

A descriptive study on clinical features and biochemical profile in diabetic ketoacidosis

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ABSTRACT

Objectives: To study clinical features and biochemical profile in diabetic ketoacidosis

Material and methods: This cross sectional study was conducted at T.H.Q Hospital Kot Addu from March 2017 to September 2017.

Total 50 patients with diabetic ketoacidosis and meeting the inclusion criteria for diabetic ketoacidosis were selected. Comparison of clinical features and biochemical profile in diabetic ketoacidosis was done.

Results: Of the 50 patients admitted for diabetic ketoacidosis; 42 had type 2 diabetes (84%) and 8 (16%) were type I diabetes. Average age at the time of presentation was 42.9±12.9 years. The commonest precipitating factor was infection (56%) followed by other factors (28%) and irregular treatment (16%). The most common clinical features at the time of presentation were vomiting, abdominal pain, acidotic breathing and dehydration. There was no significant difference in clinical and biochemical profile of patients with type 1 and type 2 diabetes.

Conclusion: Most common precipitating factors are infection and omission of insulin or irregular treatment. Most common clinical features at the time of presentation are vomiting, abdominal pain, dehydration, acidotic breathing and tachycardia. There is no significant difference in the clinical and biochemical profile of patients with type 1 and type 2 diabetes.

Key words: Clinical and biochemical profile; Diabetic ketoacidosis; Mortality predictors; Precipitating factors.

INTRODUCTION

Diabetic ketoacidosis (DKA) is one of the most common medical emergencies in the World. The patient may present with wide range of manifestations like ketosis, ketoacidosis, ketoacidosis pre-coma and coma[1], but often these manifestations are submerged in the clinical presentation of precipitating illnesses. Even though it is more common in type 1 diabetes mellitus it occurs in type 2 diabetes also, especially in certain situations like infections and other co-morbid illnesses.[2] A lot of improvements have been made in early detection and management of both ketoacidosis and the comorbidities to the extent of making changes in the natural history of this illness. Therefore, certainly, it will be interesting to look into the present day scenario of clinical presentation of Diabetic Keto Acidosis and the course of illness in the hospitalized patients.

Majority of the patients presenting with diabetic ketoacidosis are known diabetics on treatment and the commonest precipitating factors are infections (sepsis) and omission of insulin.[3] The commonest presenting complaints include nausea, vomiting, polyuria, polydipsia and main clinical findings include dehydration, acidotic respiration and confusion or coma.[4] Neurological status in such patients correlates statistically significantly with mean random blood glucose, pH and osmolality.[1]

Parameters related to mortality include mainly a) duration of diabetic ketoacidosis prior to admission, b) severity of acidosis and c) severity of peripheral vascular insufficiency and d) comorbid conditions.[3]

This study was therefore undertaken to compare the clinical features and biochemical profile in diabetic ketoacidosis patients, and the response in the patients with standard treatment of diabetic ketoacidosis.

OPERATIONAL DEFINITION

Ketoacidosis:

Diabetic ketoacidosis is biochemically defined as a venous ph<7.3 or serum bicarbonateconcentration<15 mmol/L, serum glucose concentration>200 mg/dL together withketonemia, glucosuria, and ketonuria.

MATERIAL AND METHODS

This cross sectional study was conducted at T.H.Q Hospital Kot Addu from March 2017 to September 2017. Total 50 patients were selected for this study.

Inclusion Criteria:

- All patients with un-controlled type II Diabetes Mellitus with HBA1c levels > 8.
- Both sexes. Male and female
- Patients from 35 to 65 years of age.
- Patients having BMI 18.5 to 40.

Exclusion Criteria:

- Random plasma glucose more than 600 mg/dL.
- Serum osmolality more than 310 mosm/kg.
- Patients with stroke.
- Patients with hepatic and uremic encephalopathy.

DATA COLLECTION PROCEDURE

Study is approved ethically by institutional review board. Patients fulfilling the inclusion criteria were included in this study after taking written consent from every patient. Family history of diabetes mellitus was also be recorded in pre-designed proforma. Random sample of 5 ml blood was drawn and send to the laboratory for investigations like glucose, blood pH and Serum bicarbonate. Fasting urine sample was also be taken for ketones. Demographic data like age and gender wasalso be entered in predesigned Performa.

All the collected data was entered in SPSS version 20 and analyzed. Mean and SD was calculated for numerical data and frequencies and percentages were calculated for categorical data.

RESULTS

Out of 50 cases of diabetic ketoacidosis, 42 were classified as type 2 diabetes mellitus (84%) and 8 were as type 1 diabetes mellitus (16%). (Table 1)Out of 50 patients, 25 were male (50%) and 25 were female (50%). M : F ratio was 1 : 1. (Table 2)In our study, the minimum age was 14 yrs and the maximum age observed was 69 years and the mean 42.9±12.9 years. Maximum number of cases 20 (40%) observed were in the age group 41-50 years. Minimum number of cases 2 (4%) were in the age group 21-30 years. Majority of patients are in the age group 31-60, that is 39 patients (78%). (Table 3)

In our study, minimum duration of diabetes in DKA patients is 6 months and maximum duration is 17 years. Maximum number of patients i.e., 16 (32%) were diabetic for 2-5 years. Patients with diabetes more than 10 years were 10(20%). (Table 4)In this study, the commonest precipitating factor was found to be infection in 28 patients (56%). 8 (16%) patients had either omitted treatment or were on irregular treatment.

In 5 (10%) patients surgery was found to be the precipitating factor and CVA and IHD in 4 (8%) and 3 (6%) patients respectively. Amongst infections, majority i.e. 6(12%) patients had respiratory tract infection and 4 (8%) had urinary tract infection. (Table 5)

Table 1: Distribution of Type 1 and Type 2 diabetes mellitus in diabetic ketoacidosis

Total no. of cases	Type 1	Type 2
50	8 (16%)	42 (84%)

Table 2: Distribution of Patients according to Sex

Sex	No.of case	Percentage
Male	25	50
Female	25	50

Table 3: Distribution of Patients according to Age

Age (years)	No.of case	Percentage
11-20	6	12
21-30	2	4
31-40	10	20
41-50	20	40
51-60	9	18
61-70	3	6
Total	50	100

Table 4: Distribution of patients according to the duration of diabetes

Duration of diabetes (years)	No.of case	Percentage
0-1	9	18
2-5	16	32
6-10	15	30
>10	10	20
Total	50	100

Table 5: Precipitating Factors in Diabetic Ketoacidosis

Precipitating factors	Type 1 (n=8)	Type 2 (n=42)	Total (n=50)
I) Irregular treatment	5 (62.5%)	3 (7%)	8 (16%)
II) Infection: - UTI - Acute gastroenteritis - Diabetic foot - RTI - Perianal abscess - Enteric fever - CNS infection - Septic shock - Acute cholecystitis - Chronic pancreatitis	3 (37.5%) - 1 - 2 - - - - - -	25 (60%) 4 2 2 4 2 3 2 2 2 2	28 (56%) 4 (8%) 3 (6%) 2 (4%) 6 (12%) 2 (4%) 3 (6%) 2 (4%) 2 (4%) 2 (4%) 2 (4%)
II) Others: - Cerebrovascular accident - Head injury - Surgery - IHD	 - - - -	14 (33%) 4 2 5 3	14 (28%) 4 (8%) 2 (4) 5 (10%) 3 (6%)

DISCUSSION

In this study the minimum age was 14 yrs and the maximum age was 69 years. The mean age was 42.9±12.9 yrs. In one study the age range was 6 to 80 yrs and the mean age was 36yrs.[5] Several other studies have reported that the average age of patients admitted for diabetic ketoacidosis was 40 to 50 years.[6]

In our study Male : Female ratio was 1 : 1. One study has shown a higher incidence of diabetic ketoacidosis in women compared to men.[5] Some other studies have also reported a female predominance.[7]

The duration of diabetes in our patients varied from 6 month to 17 years. In the first year of disease there were 9 (18%) cases of diabetic ketoacidosis. The maximum number of cases (16) were in the age group 2-5yrs constituting 32%. In one study the duration of diabetes varied in the following manner: Up to 1 year incidence of diabetic ketoacidois was 2.2%, 1–5 years 2.8%, 6 – 10 yrs 2.9% and >10 yrs 4.3%.[8]

In our study, the commonest precipitating factor was infection (56%). Amongst infections, respiratory tract infection was the commonest cause (12%) followed by urinary tract infection (8%). Other studies have also shown that the most common cause in the development of diabetic ketoacidosis is infection and other factors were CVA, omission or irregular treatment.[9] One study reported infection as the leading precipitating factor in 41%.[10]

Another study reported non-compliance with treatment (63.7%), infection (30.5%) and newly diagnosed (5.8%) as the cause.[11]

In our study the most common symptoms were vomiting and abdominal pain with 74% and 50% respectively. The most commonly found signs were dehydration (82%), and acidotic breathing (80%). Abdominal pain was complained by 50% of patients. Altered sensorium was found in 30% of patients. In one study the clinical features were as follows:- polyuria (75.2%), polydipsia (74.4%), polyphagia (33%), nausea (83.4%), vomiting (78.5%) and abdominal pain (51%).[12] Another study reported polyuria, polydipsia, abdominal pain and vomiting as the predominant clinical features.[12]

Conclusion: Most common precipitating factors are infection and omission of insulin or irregular treatment. Most common clinical features at the time of presentation are vomiting, abdominal pain, dehydration, acidotic breathing and tachycardia. There is no significant difference in the clinical and biochemical profile of patients with type 1 and type 2 diabetes.

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