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A Study of Clinical Profile of Diabetic Ketoacidosis

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ABSTRACT

Background: Due to the increasing burden of diabetes mellitus, it is very important to assess the clinical profile of its complications, especially the lethal complication, diabetic ketoacidosis (DKA).

Methods: This cross sectional study was conducted in the department of General Medicine at Sri Devaraj URS Medical College, during the period of June 2021 to September 2021. Study population includes 44 cases with diabetic ketoacidosis.

Results: In this study, 90.9% of cases survived and it was noted that infection being the predisposing factor for the occurrence of DKA. Also the mean difference in total leucocytes counts was significantly elevated among the cases with bad outcome compared to survived cases.

Conclusion: Infection, among the cases with diabetes mellitus should be addressed promptly because it predispose to DKA among the cases with uncontrolled diabetes mellitus.

Keywords: *Diabetic ketoacidosis, clinical profile, infection*

1. INTRODUCTION

Hyperglycemia, ketonemia, and metabolic acidosis are the biochemical triad of diabetic ketoacidosis (DKA). It is regarded as one of the most serious diabetes mellitus acute complications. Despite advancements in diabetes care, diabetic ketoacidosis remains a significant clinical problem[1]. The incidence of diabetic ketoacidosis varies between 4.6 and 8 episodes per 1000 diabetic patients[2]. Diabetic ketoacidosis has long been thought to be a sign of type 1 diabetes, but there have recently been reports that it can occur in both type 1 and type 2 diabetes[3].

DKA is caused by an absolute or relative insulin deficiency that is insufficient to prevent ketosis, combined with an excess of counter regulatory hormones[4]. Increased glyconeogenesis, accelerated glycogenolysis, and impaired glucose utilization in peripheral tissues all contribute to hyperglycemia[5]. Transient insulin resistance as a result of hormone imbalance, as well as elevated free fatty acids, exacerbates this condition [6].

The majority of patients with diabetic ketoacidosis have a history of diabetes mellitus, while 27% to 30% of patients have newly diagnosed diabetes mellitus discovered only during the ketoacidosis episode[7]. In children and adolescents with type 1 diabetes, DKA is the leading cause of death[8]. Adults have a mortality rate of less than 1%, but the elderly and patients with concomitant life-threatening diseases have a mortality rate of more than 5%[9]. With this huge burden of the disease, it is very important to assess the clinical profile and the predisposing factors of diabetic ketoacidosis.

Objectives

The objective of this study is to assess the clinical profile and precipitating factors in the patients presenting with Diabetic ketoacidosis.

Methods

This study was conducted as a cross sectional study in the Department of General Medicine at Sri Devaraj URS Medical College, Tamaka, Kolar a tertiary care teaching hospital during the period of June 2021 to September 2021. Study population includes cases with diabetic ketoacidosis from both genders were included in the study. Cases on immunosuppressant, pregnant and lactating females were excluded from the study. A total of 44 cases with diabetic ketoacidosis those who got admitted during the study period were included in the study.

All participants were thoroughly explained about the study and its need in their native language and informed written consent were obtained from them. If the patients were unconscious, then their relatives were explained about the study and written consent was obtained from them. Principal investigator collected the demographic details about the patients, all their blood samples were analyzed for blood grouping and all the cases were closely followed up till discharge. All details of the patients were entered in a proforma. Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics and chi square tests were used, appropriately to calculate the statistical significance. P value of < 0.05 was considered as statistically significant.

2. RESULTS

Study participant's demographic profile and background profile are shown in Table 1. Probable etiology for the present disease and the outcome status of the patients were shown in Table 2.

Table 1: Characteristics of study participants

Age Group	**Frequency**	**Percentage**
≤ 20 years	2	4.5
21-40 years	25	56.8
41-60 years	10	22.7
61-80 years	7	15.9
Gender	**Frequency**	**Percentage**
Female	13	29.5
Male	30	68.2
Transgender	01	2.3
Type of DM	**Frequency**	**Percentage**
Type 1 DM	21	47.7
Type 2 DM	23	52.3
Presenting complaints*		
Nausea and vomiting	21	56.8
Fever	18	40.9
Abdominal pain	11	25.0
Polyuria	14	31.8
Polydypsia	09	20.5
Shortness of breath	12	27.3
Drowsiness	07	15.9
Loss of consciousness	04	9.1

*multiple response

Table 2: Etiology and outcome of the study participants

Probable etiology	**Frequency**	**Percentage**
Infections	18	40.9
COVID - 19	09	20.5
SARI	06	13.6
Others	03	6.8
Non adherence to diabetic medications	14	31.8
Acute pancreatitis	02	4.5
Myocardial infraction	01	2.3
Not known	09	20.5
Outcome status	**Frequency**	**Percentage**
Discharged	40	90.9
Death	04	9.1

Based on the outcome the difference in mean age, arterial blood gas- pH, arterial blood gas- HCO3, HbA1c, Hemoglobin and Platelet count was found to be statistically insignificant however, the mean difference in total leucocyte count among the cases those who dead and survived was found to be statistically significant with p value of 0.037, which could be due to infection. (Table 3)

Table 3: Comparison of clinical parameters based on outcome

Parameter	**Death**	**Discharged**	**Pvalue**
Mean age (in years)	41.6±16.8	37.7±14.3	0.497
ABG pH	7.0±0.1	7.1±0.1	0.063
ABG HCO3 (mmol/L)	7.8±3.6	8.3±2.9	0.697
HbA1c (%)	12.1±3.4	11.4±2.9	0.549
Hemoglobin (mg/dl)	10.7±2.9	12.1±2.7	0.721
Total leucocytes counts (per microliter)	21751±6781	16581±4381	0.037*
Platelets (per microliter)	255856±13615	272713±12383	0.718

*Significant

3. DISCUSSION

The findings of this study were comparable with the following studies. Razavi Z et al[10] conducted a study and reported that the most common noted symptoms were polyuria (86.1%), polydipsia (84.7%) followed by gastrointestinal symptoms. Also in theor study, 40.2% of cases presented with an altered level of consciousness. The mean blood glucose levels at the time presentation was 423 ± 96 mg/dL. Prajapati BK et al[11] performed a study and reported that a total of 48 cases with DKA were included in their study and among them 73% of cases had type 2 diabetes mellitus and 23% of cases were newly diagnosed diabetes mellitus. In their study they reported that fever, polyuria and polydipsia were the commonly reported presenting complaints. High serum urea level were reported in 42% of cases and 33% of cases had high serum creatinine level. The common precipitating factor of diabetic ketoacidosis in type 2 diabetic patients was infection.

In another study, Ciric V et al[12] in their case study reported that in newly diagnosed type 2 diabetes, DKA could be due to constant glucose toxicity and the presence of stressors that cause increase lipolysis due to counter regulatory hormones. Also they stated that the case was able to discontinue insulin after the resolution of DKA. Also, Rao V et al[13] in their study reported that 81% had type 2 diabetes and 19% had type 1 DM. in their study they noted that non compliance or discontinuation of drug therapy was reported in 50% of cases.

Rahim Ma et al[14] performed a study among 50 type 2 diabetes mellitus cases with DKD. They reported that the incidence of DKA in known diabetic cases as 64% and in newly diagnosed diabetes cases was 36%. The common presenting complaints were vomiting (48%), fever (38%), nausea (32%), abdominal pain (28%), weakness (26%), polyuria (24%) and polydypsia (16%). They reported that infection (36%) was the most common precipitating cause for the occurrence of DKA followed by inadherence to insulin therapy (34%). In their study reported that 24% of cases had no cause for the occurrence of DKA. Glycaemic control was poor with HbA1c levels more than 7% in 98% of cases. Also in their study severe acidosis was reported in 8% of cases neutrophilic leukocytosis was noted 88% of cases, irrespective of presence of infection. Also they stated that the mortality rate was 6% in their study.

However, Ashraf UA et al[15] conducted a study and reported that the mean age of the study participants in their study was 38.3 years. In their study, 80% of the cases with DKA were known diabetics and 20% were diagnosed newly. Infection was reported as the cause for DKA in 40% of cases followed by noncompliance was reported in 28% of cases. In another study, Rahim MA et al[16] reported that common presentations included nausea (63%), vomiting (61%), polyuria (43%), polydypsia (42.5%), fever (29%), abdominal pain (28%), shortness of breath (28%), drowsiness (20%), blurred vision (13%), leg cramps (6.5%) and coma (7%). Infection is the predominant precipitating cause for the occurrence of DKA in 45.5% of cases followed by non-adherence to insulin therapy which was noted in 31% of cases. The other precipitating factor includes acute pancreatitis (5%), myocardial infarction (2%), stroke (1%) and surgery (1.5%). Etiology of DKA was not known in 14% of cases. Mean HbA1c was reported as 11.3% and severe acidosis was noted in 8.5% of cases. In their study the mortality rate was reported as 6.5%.

4. CONCLUSION

In this study, 90.9% of cases survived and it was noted that infection being the predisposing factor for the occurrence of DKA. Also the mean difference in total leucocytes counts was significantly elevated among the cases with bad outcome compared to survived cases. Thus infection, among the cases with diabetes mellitus should be addressed promptly because it predispose to DKA among the cases with uncontrolled diabetes mellitus

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