

PRECIPITATING FACTORS FOR DIABETIC KETOACIDOSIS

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ABSTRACT

Objective: To determine the frequency of various precipitating factors for Diabetic Ketoacidosis (DKA).

Material and Methods: This descriptive, cross-sectional study based on purposive sampling method was conducted at Medical ward VI, Islamabad Hospital, Pakistan Institute of Medical Sciences, Islamabad from 15th July 2005 to 14th January 2006. Forty Two patients of type 2 diabetes mellitus who at the time of admission had diabetic ketoacidosis were analyzed to sort out the precipitating factor by history, physical examination and investigations both laboratory and radiological.

Results: Out of 42 patients 19 (45%) were male while 23 (55%) were female. 21(50%) had infection, 11(26.19 %) were non-compliant to the treatment, 09 (21.40%) had other co-morbidity (stroke, acute pancreatitis etc) as precipitating factor while one (2.3%) had his first presentation of diabetes mellitus as diabetic ketoacidosis. A mortality of 7.15% was recorded in the study.

Conclusion: Infection, non-compliance to treatment and comorbid conditions are the major precipitating factors for diabetic ketoacidosis.

Key Words: Diabetic Ketoacidosis, Diabetes Mellitus, Ketoacidosis, Precipitating Factors.

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INTRODUCTION

Diabetic Ketoacidosis (DKA), one of the common emergencies in patients with Diabetes Mellitus (DM)^{1,2}, is associated with considerable morbidity and mortality. DKA is more common in Type 1 DM as compared to Type 2 DM but contrary to belief it can frequently complicate type 2 Diabetes and carries relatively high mortality.³ DKA affects both the genders equally; males being affected at an earlier age group. Most frequent presenting complaints are vomiting, abdominal pain, dehydration and respiratory distress.⁴ In order to prevent diabetic ketoacidosis, patient education programs should be implemented and, in addition, the relevant authorities should ensure that the insulin is available to all patients⁵.

Various risk factors have been proposed to precipitate the diabetic ketoacidosis in Diabetic Patients. Infections, non-compliance and co-morbid states like stroke, acute pancreatitis and chronic renal failure (CRF) are most important of the list.⁶⁻⁸ Proper identification of the precipitating factor is very important in management

of DKA. Moreover the mortality associated and number of days of hospitalization have direct relation with the precipitating factor.⁹

As there is scanty data available from within the country it was planned to determine the frequency of various precipitating factors in diabetic patients presenting with DKA.

MATERIAL AND METHODS

Over a period of six months from 15th July 2005 to 15th January 2006, this descriptive study based on purposive sampling was conducted in medical ward VI of Islamabad Hospital, Pakistan Institute of Medical Sciences, Islamabad.

Patients of either gender, above 13 years of age who at presentation have random blood sugar more than 250 mg/dl, PH less than 7.35 serum ketones positive and serum osmolality less than 320 m osmole/l were included in the study.

A detailed history and thorough physical examination was done. Various investigations both laboratory and radiological were done to sought out the precipitating factor were done. All the findings were recorded in a standardized proforma and data was analyzed SPSS version 12.

RESULTS

Out of 42 patients 19 (45%) were male while 23 (55%) were female. Male to female ratio was 1: 1.2. Mean age at presentation was 20 years in type 1 DM

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FREQUENCY OF RISK FACTORS OF DKA

S. No.	Risk factors	Frequency (n=42)	Percentage
1.	Infections	21	50%
2.	Non-compliance	11	26.19%
3.	Co-morbid states	09	21.43%
4.	First presentation	01	2.38%

Table I

while it was 54 years in type 2 DM. Twenty one (50%) had infection, 11 (26.19 %) were non-compliant to the treatment, 09 (21.40%) had other co-morbidity as precipitating factor while one (2.3%) had his first presentation of diabetes mellitus as diabetic ketoacidosis. (Table-I)

Regarding the sex distribution of the precipitating factors; out of 21 patients with infection as precipitating factor, 13 (61.9%) were females while 11(38.10%) were males. Out of 11 patients who were non-complaint, 4 (36.36%) were females and 7(63.63%) were males. Regarding co-morbid states, 6 (66.66%) were females while 3 (33.33%) were females. The only patient who presented for the first time was male. The various co-morbid states are given in Table-II.

A mortality of 7.15% was recorded in the study.

CO-MORBIDITY STATES

S. No.	Co-morbid state	Frequency (n=9)	Percentage
1	Stroke	03	33.33%
2	Acute Pancreatitis	02	22.22%
3	CRF	01	11.11%
4	CLD	01	11.11%
5	Subendocardial Infarct	02	22.22%

Table II

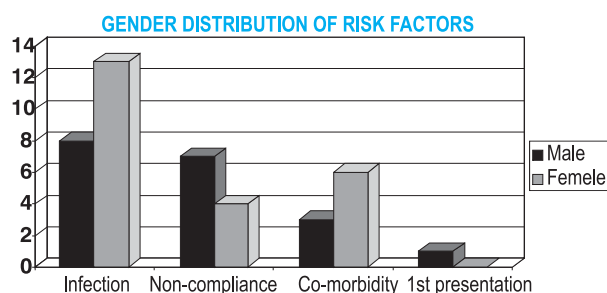


Fig. 1:

DISCUSSION

Diabetic Ketoacidosis is the most common emergency in hyperglycemic patient in England.¹ The annual incidence of diabetic ketoacidosis (DKA) among subjects with type 1 diabetes is between 1% and 5% in European and American series respectively.¹⁰ About one out of four health care dollars is spent on direct care of adult patients with hyperglycemia.¹ Commonest clinical features included nausea and vomiting (48%), Polyuria and polydypsia (46%), abdominal pain (33%) and dizziness (21%). Coma at presentation was rare.¹¹

The mean age at presentation is 20 years in type 1 DM and 54 years in type 2 DM. Zafar S. et al⁵ reported mean age of 22 years while Mehmood K. et al³ reported 21.6 years for type 1 DM and 48.7 years for type 2 DM. So age at presentation is comparable to already available data from national source.

This study of 42 patients of DKA confirmed the previously known facts about the precipitating factors of DKA. Our data suggests infection as a principal precipitating factor followed by non-compliance. In current study infection accounts for 50% of cases; a figure comparable to already reported rate of 30% to 50%.^{1,5,12-14} Umpierrez GE et al¹ published a study which shows infection as most frequent precipitating factor for DKA. According to that study urinary tract infections and pneumonia were the leading infections precipitating DKA. Another study revealed that Mycoplasma Pneumoniae was most common agent related to DKA.⁶ Another study by Mallane et al⁸ showed the same results.

Some of the national and international studies showed non-compliance as principal precipitating factor followed by infection a fact contrary to the current study. Zafar S. et al⁵ reported non-compliance accounting for 54% of the cases while infection contributing to 28%. The same results are reported by Ko SH. And colleagues.¹⁴ While another study³ reported that infection is most common precipitating factor in type 2 DM and non-compliance is most common in type 2 DM.

Some times the DKA is precipitated by some other pathologies like stroke, acute pancreatitis, chronic renal failure or chronic liver disease. Shoney SD et al⁷ concluded acute pancreatitis may present with diabetic ketoacidosis in non-diabetic patients. In present study only two patients developed DKA due to acute pancreatitis and both of them had clear history of DM.

The mortality rate in current study is 7.15%. This is comparatively lower than 15.9% reported by Zafar N. et al¹⁰ and 11.9% reported by Mehmood K. et al³ while is higher than 5% as reported elsewhere.⁵

CONCLUSION

Infection, non-compliance to treatment and comorbid conditions are the major precipitating factors for diabetic ketoacidosis.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.