DIABETIC KETOACIDOSIS AMONG EGYPTIAN CHILDREN WITH TYPE 1 DIABETES: 3 YEARS STUDY

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INTRODUCTION:

Diabetic ketoacidosis (DKA) is a serious endocrine disorder that commonly associated with type 1 diabetes mellitus (T1DM) (1). In the last decade, DKA mortality rate reached 13% to 19% and its prevalence occurred in a rate of 1 to 10 per 100 diabetic children (2, 3). In the last few years, there has been an incremental increase in the incidence of T1DM all over the world (4). However, this increase wasn't always associated with increase in DKA rates (5, 6). Although the exact incidence of DKA in developing countries is unclear, it's believed that it's higher than that of developed one (7). Beyond incidence of DKA, data regarding childhood T1DM from Egypt are scanty. This limitation is related to inappropriate way of recoding and database shortage.

According to International Diabetes Federation, incidence of T1DM is 8/100,000 per year among Egyptian children under the age of 15 years.(8) A large study investigated the incidence of T1DM in children in the Delta region, one of the most overcrowded areas in Egypt. They estimated 1600 patients between 0 and 18 years over a period of 18 years from January 1994 to December 2011. (9) This scarce information pushed us to investigate the incidence of diabetic ketoacidosis (DKA) and associated risk factors in type 1 diabetic children admitted in our regional clinical center.

OBJECTIVE:

1. To identify demographic, clinical and laboratory variables of paediatric patients diagnosed with DKA at Suez Canal university hospital through three years;
2. To identify the determinants of DKA severity among Egyptian children

METHODS:

We conducted a retrospective study from medical records of children and adolescents presented with DKA at emergency department of a Suez Canal university pediatric hospital between 2013 and 2016. DKA severity was categorized as mild, moderate, or severe. Data collected obtained demographic, clinical and laboratory variables. Multivariate regression analysis was applied to identify determinants for of DKA severity.

RESULTS:

From a total of 86 DKA patients, Females (61.6 %) were almost twice number of males (38.4%). one third of patients (31.4%) have positive family history of diabetes. More than 65% were newly diagnosed to have type 1 DM at admission. The most frequently presented symptoms at admission were vomiting, polyuria, and abdominal pain. mean HbA1c was 10.6 ±2.24 and mean random blood sugar at admission was 431 ±108 mg/dl. Blood gases parameters at presentation showed that mean pH was 7.18 ±0.15 and mean bicarbonate was 11.04 ±4.5. mean sodium and potassium levels were 136 ±10.5 and 3.9 ±0.68, respectively. Regarding symptoms, vomiting presentation was found to be significantly different among grades of DKA (p=0.041). There were also statistically significant differences in HbA1c (p=0.019), pH (p<0.01), bicarbonate (p<0.01), and sodium level (p=0.02) among different grades of DKA (table 1). Multivariate analysis showed that DKA severity isn't associated with any of demographic, clinical or laboratory variables (table 2).

Table 1.Group comparison between different grades of DKA with other variables

Variables		Mild (n= 18)	moderate (n=50)	Severe (n=18)	P-value
Gender	male	7 (8.1)	20 (23.3)	6 (7)	0.88
	female	11 (12.8)	30 (34.9)	12 (14)	
Consanguinity		9 (10.5)	26 (30.2)	9 (10.5)	0.98
Family history		5 (5.8)	16 (18.6)	6 (7)	0.92
History of TIDM	Newly diagnosed	13 (15.1)	28 (32.6)	14 (16.3)	0.18
	Known to have	5 (5.8)	22 (25.6)	4 (4.7)	
Abdominal pain		6 (7)	20 (23.3)	5 (5.8)	0.628
Vomiting		7 (8.1)	30 (34.9)	5 (5.8)	**0.041***
Weight loss		6 (7)	7 (8.1)	5 (5.8)	0.16
Dyspnea		2 (2.3)	3 (3.5)	1(1.16)	0.38
confusion		2 (2.3)	7 (8.1)	2 (2.3)	0.92
Polyuria		8 (9.3)	17 (19.8)	10 (11.6)	0.262
Polyphagia		1 (1.2)	11 (12.8)	4 (4.7)	0.27
Random sugar (mg//dl)		453.8 (128)	422.1 (100.1)	448.2 (136.9)	0.35
HbA_{1c} (%)		11.3 (3.01)	10.1 (1.8)	12.1 (2.8)	**0.019***
pH		7.33 (0.04)	7.22 (0.05)	6.91 (0.08)	**<0.01***
Bicarbonate (mmol/1)		15.9 (3.34)	11.31 (3.13)	5.6 (4.1)	**<0.01***
Creatinine (mg/dl)		0.71 (0.54)	0.63 (0.2)	0.83 (0.35)	0.072
Sodium (mEq/L)		137.2 (5.9)	134.1 (9.5)	140.2 (13.2)	**0.02***
Potassium (mEq/L)		3.7 (0.63)	4.00 (0.67)	3.7 (0.78)	0.34
Hemoglobin (gm/dl)		11.7 (1.64)	11.65 (1.2)	11.3 (1.6)	0.61

*** P-values are based on fisher exact test. Statistical significance at p < 0.05.**

Table 2. Multivariate analysis of predictors of severe diabetic ketoacidosis in children admitted with diabetes mellitus

Predictor	Odds Ratio	(95%-CI)	p Value
Age	1.12	0.94 –1.32	0.19
Sex Female vs male	0.96	0.30 –3.01	0.94
Dyspnea yes vs no	0.24	0.02 –2.12	0.20
Polyphagia yes vs no	4.01	0.88 –18.11	0.07
Serum Sodium	1.018	0.96 –1.07	0.51
HbA1c	1.09	0.83 –1.42	0.52
Creatinine	1.68	0.27 – 10.48	0.57

CONCLUSION:

There is no determinants can be relied upon regarding the DKA severity

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