

Epidemiology of type 1 diabetes in children and adolescents: a 50-year, single center experience



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INTRODUCTION

Global variations in epidemiology of type 1 diabetes (T1D) exist worldwide. It has been reported that the incidence of T1D has increased and diabetes occurs at earlier ages especially in the last two decades [1, 2].

AIM

This study is designed to determine the demographic and clinical characteristics of T1D in the past three decades, and to analyze changing trends in epidemiology over the past 50 years.

METHOD

Epidemiological and clinical characteristics of 925 patients with T1D were analyzed in three decades between 1991 and 2019. In addition, previously published data of 477 patients before 1991 (1969-90) was compared to data of the current study [3]. Study included patients from all over the country. Patients were stratified into two-year periods according to age at diagnosis.

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RESULTS

At diagnosis	1969-1991	1990-1999	2000-2009	2010-2019	P value
Mean age (yrs)	9.5±4.1	8.3±3.9	7.7±3.8	7.1±3.6	<0.001
Peak age interval (yrs)	12-14	10-12	4-6	4-6	0.005
Boy to girl ratio	1.0	0.93	0.9	0.94	0.005

- The most common season of initial admission was winter and autumn.
- 35% of patients had infection at the time of diagnosis.
- Geographical distribution, seasonality, and the presence of infection at diagnosis were similar during the last 50 years.
- The most common symptoms were polyuria (79.2%), polydipsia (79.4%), and weight loss (69.5%).
- Prevalence of enuresis nocturna and vomiting increased with younger age (enuresis nocturna: 39.9% for ≤6 yrs, 29.9% for 6-12 yrs, 7.9% for ≥12 yrs, p<0.001, and vomiting 40.1% for ≤6 yrs, 29.4% for 6-12 yrs, 19.7% for ≥12 yrs, p<0.001).

	1990-2019 (n:925/925) (100%)	1990-1999 (n: 135/925) (14.6%)	2000-2009 (n:385/925) (41.6%)	2010-2019 (n:405/925) (43.8%)	p value
Presence of DKA	442/925 (47.8%)	68/135 (50.4%)	192/385 (49.8%)	182/405 (44.9%)	0.865
Presence of DK	352/925 (38.1%)	54/135 (40.0%)	135 /385 (35.1%)	163/405 (40.3%)	0.825
Hyperglycemia without ketosis or acidosis	131/925 (14.1%)	13/135 (9.6%)	58/385 (15.1%)	60/405 (14.8%)	0.485
Mild DKA (%)	155/442 (35.1%)	17/68 (25.0%)	60/192 (31.3%)	78/182 (42.9%)	<0.001
Moderate DKA (%)	185/442 (41.8%)	34/68 (50.0%)	88/192 (45.8%)	63/182 (34.6%)	<0.001
Severe DKA (%)	102/442 (23.1%)	17/68 (25.0%)	44/192 (22.9%)	41/182 (22.5%)	0.425

- In the last 30 years, 47.8% of all patients presented with ketoacidosis, 38.1% with ketosis, 14.1% with only hyperglycemia.
- Prevalence of ketoacidosis and ketosis as well as severe ketoacidosis at presentation did not change within the last 30 years.
- The ratio of mild ketoacidosis increased while that of moderate ketoacidosis decreased over time.

	All the cases (n:925) (100%)	≤6 years (n:446) (48.2%)	6-12 years (n:327) (%35.4%)	≥12 years (n:152) (%16.4%)	p value
Duration of symptoms	238/925 (25.7%)	143/446 (32.1%)	65/327 (19.9%)	30/152 (19.7%)	0.008
≤15 days	363/925 (39.2%)	178/446 (39.9%)	132/327 (40.4%)	53/152 (34.9%)	
15-30 days	324/925 (35.0%)	125/446 (28.0%)	130/327 (39.7%)	69/152 (45.4%)	
>30 days					
Presence of DKA	442/925 (47.8%)	235/446 (52.7%)	147/327 (45.0%)	60/152 (39.4%)	0.005
Presence of DK	352/925 (38.1%)	162/446 (36.3%)	125/327 (38.2%)	65/152 (42.8%)	0.025
Hyperglycemia without ketosis or acidosis	131/925 (14.1%)	49/446 (11.0%)	55/327 (16.8%)	27/152 (17.8%)	0.009
Severity of DKA					<0.001
Mild DKA (%)	155/442 (35.1%)	52/235 (22.1%)	77/147 (52.4%)	26/60 (43.3%)	
Moderate DKA (%)	185/442 (41.8%)	112/235 (47.7%)	49/147 (33.3%)	24/60 (40.0%)	
Severe DKA (%)	102/442 (23.1%)	71/235 (30.2%)	21/147 (14.3%)	10/60 (16.7%)	

- Prevalence and severity of DKA were higher among children ≤6 years, while duration of symptoms was significantly shorter in comparison to 6-12 and ≥12 year age-groups.

CONCLUSIONS

The age at diagnosis shifted to younger ages in children with T1D during the last 50 years. Nearly half of the patients had ketoacidosis at the time of diagnosis with no change within the last 30 years. The shift to younger ages in T1D during the last half century, in addition to an unchanging prevalence of DKA suggest that awareness of diabetes should be increased in our community in terms of early diagnosis and treatment.

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