Influence of Age and Sex in the Presentation of Pediatric Type 1 Diabetes Mellitus

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Background

- T1D is the most common form of pediatric diabetes.
- A previous study has shown more severe loss of beta cells in individuals who presented before 6 years of age (compared to those diagnosed between 6 and 12 years, or between 13 and 18 years). Worse glycemic control in females than male children with T1D has been also previously reported.
- However, the effect of age, sex and their interaction on the clinical characteristics at the presentation of pediatric T1D has not been well studied.
- A better understanding of the influences underlying T1D heterogeneity is needed for precision medicine.

Objective: To study how age and sex modify certain clinical characteristics at the onset of T1D in children.

Methods

Population: 1 to 18 year-old patients with newly diagnosed T1D

1. Participants were characterized using descriptive statistics.
2. After failing to observe an interaction between age and sex, the two variables were tested independently for effects on pediatric T1D presentation with multiple regression analyses and pairwise comparisons.

Results

Age (n=631):
- 22% [0,6)
- 54% [6,13)
- 24% [13,18]

Sex (n=631):
- 48% Female
- 52% Male

Tanner Stage (n=583):
- 58% I
- 11% II
- 8% III
- 11% IV
- 10% V

Race and Ethnicity (n=614):
- 59% Non-Hispanic White
- 20% Hispanic
- 16% African American
- 4% Asian
- 1% Mixed

Conclusion

In children with new onset T1D, younger age and male sex were associated with findings suggestive of faster and more aggressive preclinical course, and distinct islet autoantibody profiles at diagnosis.

Results cont'd

- Children with T1D diagnosed at younger age categories had higher glucose but lower HbA1c, lower C-peptide and lower HC03, and were more likely to present with diabetic ketoacidosis (DKA). Males had higher glucose but lower HbA1c, and lower C-peptide than females.
- Younger age category at diagnosis was associated with higher prevalence of autoantibodies to insulin (IAA) and to IA-2 (IA-2A). Males had lower GAD autoantibodies (GADA) prevalence than females.
- We did not observe a statistically significant interaction between the age categories and sex.

Figure 1. Multivariable Linear Regression for Continuous Clinical Outcomes across Age and Sex

*Notes Estimated Means with 95% Confidence Interval Error Bars. Significance at *.05, **.01, ***<.0001.*

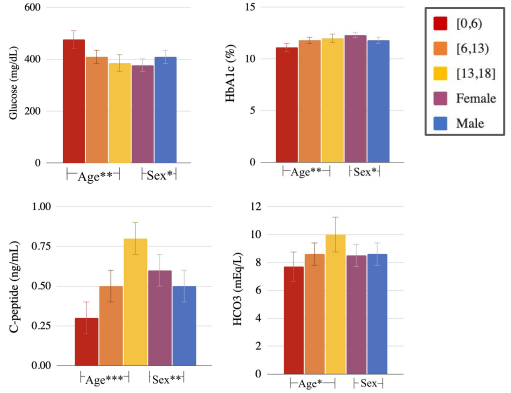

Table 1. Multivariable Logistic Regression Pairwise Comparison Odds Ratios for Binary Clinical Outcomes across Age and Sex

	n	[6,13):[0,6)	[13,18]:[0,6)	[13,18]:[6,13)	Female:Male
Diabetic Ketoacidosis	594	0.8 (0.6, 1.3)	0.4 (0.3, 0.7) **	0.5 (0.3, 0.8) *	0.8 (0.6, 1.1)
IAA	625	0.4 (0.2, 0.5) ***	0.2 (0.1, 0.3) ***	0.6 (0.4, 0.9) *	0.8 (0.6, 1.1)
IA-2A	625	1.1 (0.7, 1.9)	0.5 (0.3, 0.9)	0.5 (0.3, 0.7) **	0.7 (0.5, 1.0)
GADA	626	1.3 (0.8, 2.1)	1.5 (0.8, 2.7)	1.1 (0.7, 1.9)	2.2 (1.5, 3.5) **
High Immunoglobulin A	631	0.6 (0.4, 1.0)	0.4 (0.2, 0.7) **	0.6 (0.4, 1.1)	0.7 (0.5, 1.1)
Low Immunoglobulin A	631	5.2 (1.0, 95.3)	5.7 (1.0, 109.0)	1.1 (0.4, 2.9)	0.8 (0.3, 2.0)
Tissue Transglutaminase Antibodies	628	1.3 (0.7, 2.5)	0.5 (0.2, 1.1)	0.4 (0.2, 0.8)	1.0 (0.6, 1.7)

*Note: (95% Confidence Interval). Significance at *.05, **.01, ***<.0001 with Bonferroni Correction.*

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