

# **Impact of glycemic control, disease duration, and exercise on heart rate variability in children with type 1 diabetes**

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摘要

## **Abstract**

### Background/Purpose

Type 1 diabetes is commonly associated with autonomic neuropathy. The present study investigated the influences of glycemic control, disease duration (DD), and exercise on autonomic nervous function in children with type 1 diabetes by analysis of their heart rate variability (HRV).

### Methods

Seventy-nine type 1 diabetic children were recruited and categorized into four groups by HbA1c of 8% and DD of 4.5 years. HRV parameters as determined by separate frequency domain components (low frequency: LnLF, 0.04–0.15 Hz; high frequency: LnHF, 0.15–0.5 Hz; total power: LnTP, 0.04–0.5 Hz) were measured both at rest and during exercise. Pearson's correlation, one-way ANOVA, and multiple regressions with stepwise method were used for statistical analysis.

### Results

While at rest, HbA1c and DD were negatively correlated with all HRV parameters. Both HbA1c and DD were significant predictors in LnTP. However, only HbA1c was a significant predictor in LnLF and LnHF. Type 1 diabetes patients with HbA1c > 8% and DD > 4.5 years had a significantly lower HRV than the other patients. During exercise, HRV reduced significantly and no significant correlation between HbA1c and HRV or between DD and HRV was observed. Also, a significant difference in HRV among the four groups was not demonstrated. The smallest decrement in HRV from resting to exercise were in subjects with HbA1c > 8% and DD > 4.5 years.

### Conclusion

HbA1c was a more dominant predictor for LnTP, LnHF and LnLF than DD in children with type 1 diabetes at rest. HRV reduced significantly from resting to exercise. However, the responses of HRV during exercise differ from the responses of HRV at rest.

