RESEARCH ARTICLE

Time Domain Measures of Heart Rate Variability during Acute Mental Stress in Type 2 Diabetics: A Case Control Study

Anupama Deepak[1], Deepak AN[2], Shobha Nallulwar[1], Vitthal Khode[1]

[1] Department of Physiology, SDM College of Medical Sciences & Hospital, Dharwad, Karnataka, India

[2] Jayadeva Institute of Cardiovascular Sciences and Research, Bangalore, Karnataka, India

Correspondence to:
Anupama Deepak
(anupamadeepak789@yahoo.com)

ABSTRACT

Background: Cardiovascular Autonomic Diabetic Neuropathy (CADN) is one of the most important diabetes- associated complications. Reduced heart rate variation (HRV) is the earliest indicator of CADN. The prospect of using time domain analysis of HRV using mental arithmetic as a stressor has for early diagnosis of CADN has not been studied so far.

Aims & Objective: To compare time domain parameters of HRV at rest and during acute mental stress between Type 2 diabetics and non- diabetics.

Materials and Methods: 30 male asymptomatic, Type 2 diabetics with duration of diabetes of 2-8 yrs with RBS ≥ 200 mg/dl or FBS ≥ 126 mg/dl in the age group of 30-65 yrs were chosen as subjects. 30 age and sex matched healthy non-diabetics were chosen as controls. HRV analysis was done using ECG recorded at rest in supine position for 5 min and during 5 min of acute mental stress testing.

Results: At rest standard deviation of all R-R intervals (SDNN), root mean square of successive RR- interval differences (RMSSD), number of intervals differing by > 50ms from adjacent interval (NN50) and percentage of NN50 (pNN50) were significantly less in diabetics as compared to non-diabetics. Mental stress showed increases in HR, SBP and DBP in non-diabetics as well as diabetics but SDNN was significantly less in diabetics as compared to non- diabetics during stress.

Conclusion: Data from the study demonstrated that diabetics with 8-10 yrs history had already developed parasympathetic autonomic neuropathy. Time domain analysis of HRV during mental stress can be used as a valuable tool for early diagnosis of autonomic neuropathy to prevent further complications.

Key Words: Heart Rate Variability; Time Domain Analysis; Cardiovascular Diabetic Autonomic Neuropathy