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The 60th International Conference of the Israel Heart Society
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22-23 April 2013, ICC International Convention Center, Jerusalem

Effects of Heart Rate on Coronary Artery Flow: Insights into the Mechanisms of Tachycardiomyopathy

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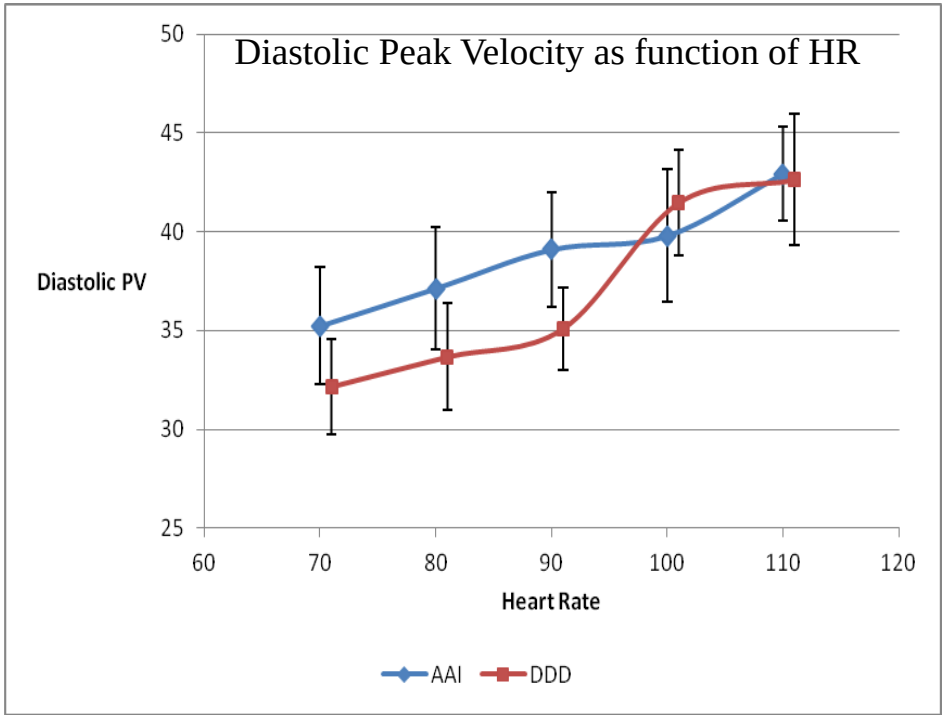
Introduction: Tachcardiomyopathy is the most frequently unrecognized cause of heart failure heart and is associated with tachyarrhythmia which resolves completely or at least partially after resolution of the tachyarrhythmia. Tachycardia on one hand increases myocardial oxygen demand and on the other hand decreases the diastolic interval which may reduce coronary artery flow.

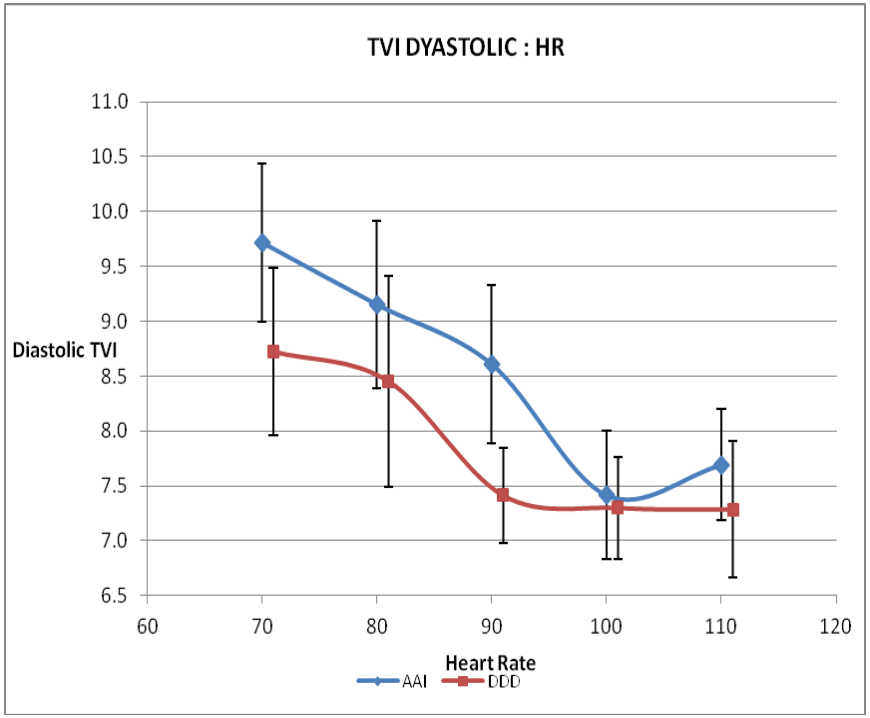
Aim: Evaluate coronary artery blood flow and its relation to myocardial oxygen demand during increase in heart rate.

Methods: 26 patients with sick sinus syndrome and preserved atrio-ventricular conduction were evaluated. All had complete baseline transthoracic Doppler echocardiographic studies.

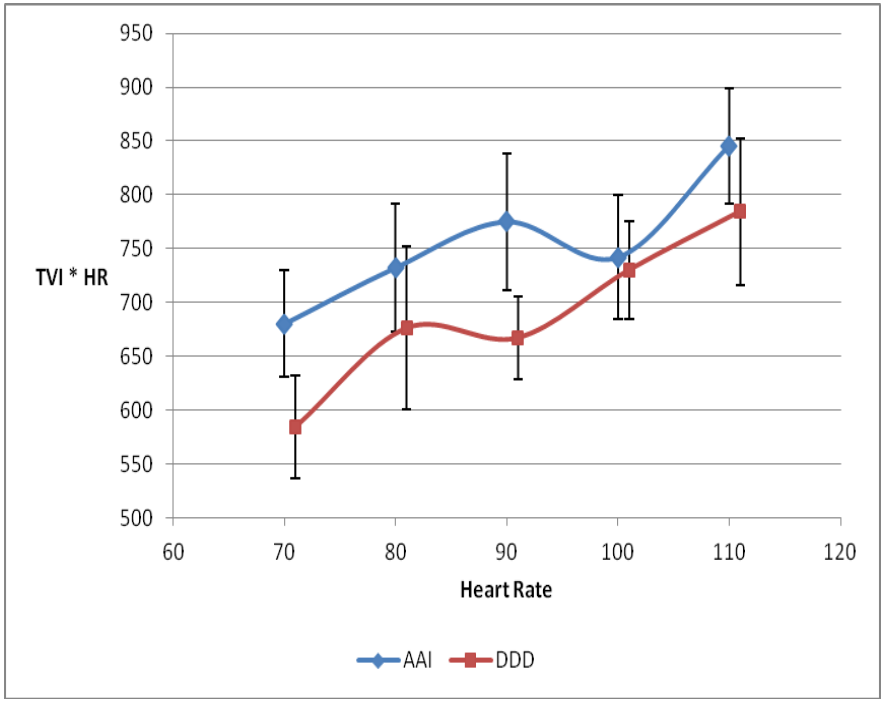
Atrial pacing rate: was increased by 10bpm from 70bpm to 110bpm. AT each stage, sampling of blood velocity of the left anterior descending coronary artery (LAD) was performed. In addition, ventricular outflow and inflow velocities as well as well as tissue Doppler imaging were performed

Results I

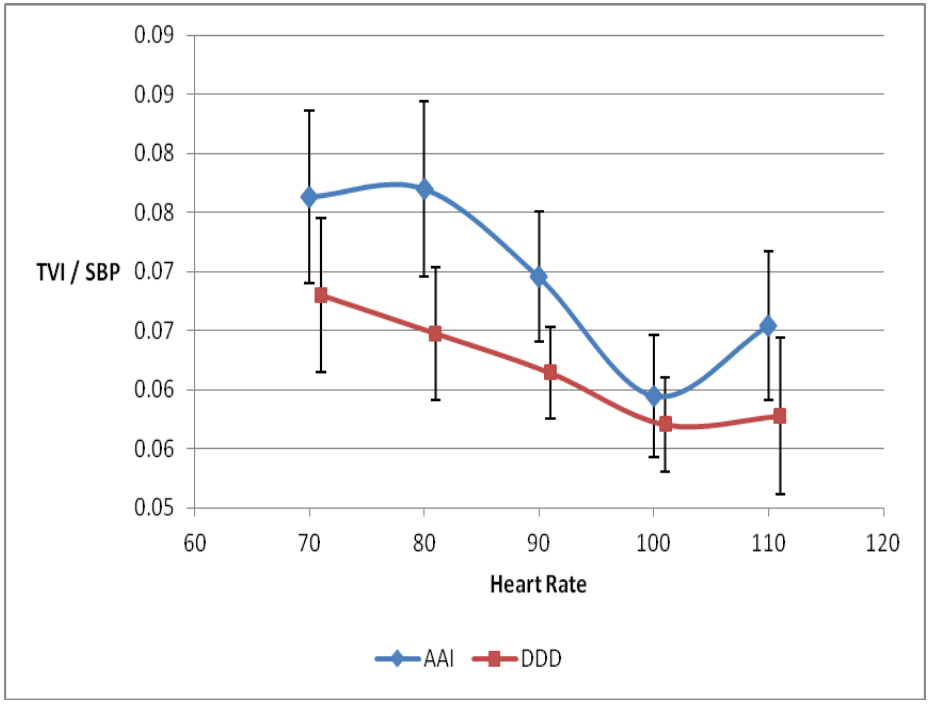

Diastolic Peak Velocity as function of HR
Diastolic PV
50
45
40
35
30
25
60
70
80
90
100
110
120
Heart Rate
AAI
DDD


TVI DYASTOLIC : HR
Diastolic TVI
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
60
70
80
90
100
110
120
Heart Rate
AAI
DDD

Results II



TVID*HR as a function of HR



TVID/SBP as a function of HR

Conclusions:

Increase in heart rate is associated with increase in diastolic coronary velocity and flow, however coronary flow to myocardial oxygen demand ratio decreases which may contribute to the development of tachycardiomyopathy.