Correspondence

Changes in transmital velocities with heart rate

Sir,

During a study of changes in afterload induced by the cold pressor test, Smith et al (1989;61:344–7) recognised a relation between heart rate and transimtrial velocities derived from pulsed Doppler recordings. We specifically studied the relation between transmital velocities and differing RR intervals during exercise and respiration in healthy men. We found a clear cut linear change in peak early transmital velocity and late (active) transmital velocity with increasing heart rate and decreasing RR interval. Early velocity increased on average by 16% when heart rate increased from 53 beats per minute to 94 beats per minute but active velocity increased by 89%. This led to a linear decrease in the ratio of peak early diastolic velocity to peak atrial velocity (E/A) (correlation coefficient r = -0.99). Similarly, with respiratory induced sinus arrhythmia, the E/A ratio cycled in the opposite direction to the RR interval, so that as the heart rate increased the ratio fell.

Doppler derived indices of left ventricular diastolic dysfunction that rely on transmital velocities must take into account the relation with heart rate.

K S Channer,
Royal Hallamshire Hospital,
Glossop Road,
Sheffield S10 2JF.

J V Jones,
Bristol Royal Infirmary,
Bristol BS2 8HW.

References


This letter was shown to the authors, who reply as follows:

Sir,

We thank Dr Channer and Dr Jones for their letter and support of our observations on the influence of heart rate on Doppler measurements of transmital flow velocity.

When we examined the effect of a short term increase in blood pressure on transmital velocities, we found that the duration of the RR interval profoundly influenced the peak atrial velocity (A or active) and its relation with early filling (A/E ratio). The studies of Channer and Jones during exercise and respiration further confirm this relation.

Other circulatory variables such as preload that will be altered by exercise and respiration may also influence transmital velocities. However, the studies of Channer and Jones suggest that nearly all of the change in A and A/E is due to changes in heart rate. In several studies in which abnormal transmital velocities were attributed to left ventricular diastolic dysfunction the effect of differences in heart rate were not taken into account.

We agree that when transmital velocities are used as indices of left ventricular diastolic function that heart rate must be controlled or taken into account.

P E Aylward,
A E Russell,
S A Smith,
J M Sheppard,
J E Stoner,
Flinders Medical Centre,
Bedford Park,
South Australia 5042.

References


2 Channer KS, Jones JV. Change with exercise in the contribution of atrial systole to diastolic blood flow across the mitral valve in man [Abstract]. J Physiol (Lond) 1988;398:56P.


Changes in transmitral velocities with heart rate.

K S Channer and J V Jones

*Br Heart J* 1989 62: 415
doi: 10.1136/hrt.62.5.415-a

Updated information and services can be found at:
http://heart.bmj.com/content/62/5/415.1.citation

**Email alerting service**

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

**Notes**

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/