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SUPERIORITY OF TWO-DIMENSIONAL MEASUREMENT OF AORTIC VESSEL DIAMETER IN DOPPLER ECHOCARDIOGRAPHIC ESTIMATES OF LEFT-VENTRICULAR STROKE VOLUME

Journal

CHEST, 84(3)

ISSN

0012-3692

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Publication Date

1983

SUPERIORITY OF TWO-DIMENSIONAL MEASUREMENT OF AORTIC VESSEL DIAMETER IN DOPPLER ECHOCARDIOGRAPHIC ESTIMATES OF LEFT VENTRICULAR STROKE VOLUME. J M Gardin, FCCP*, J M Tobis, A Dabestani, C Smith, U Elkayam, FCCP, E Castleman, A Allfie, and W L Henry, University of California, Irvine, California.

Attempts to reliably measure stroke volume utilizing the Doppler method have met with varying success. Since stroke volume is the product of Doppler flow velocity integral (FVI) (i.e. area under flow velocity curve) and cross-sectional area of the vessel through which blood flows, both variables are potential sources of error. We have previously shown that Doppler FVI can be measured reproducibly in the ascending AO. In this study, we measured the diameter of the ascending AO by 3 different methods utilizing M-mode and by 6 methods using two-dimensional echocardiography (2D ECHO). Doppler AO flow was recorded with a transducer in the suprasternal notch by mapping the ascending AO until aortic peak flow velocity was recorded. In 19 patients (pts), Doppler stroke volume estimates were compared to simultaneous measurements of stroke volume using the thermodilution technique (THERM SV). In these pts, THERM SV averaged 77 ml (range 24-111 ml). The best correlation with THERM SV (r=.86) was obtained using aortic area estimated from 2D ECHO inner-to-inner wall measurements in the parasternal long axis view distal to the aortic sinuses. Data were related by the equation, THERM SV=.75 (SV 2D ECHO)$\pm$16.9 ml. Stroke volume estimates obtained from M-mode measurements showed poor correlation with THERM SV, the best correlation being r=0.3. We conclude that 2D ECHO is the best method for estimating aortic area when calculating stroke volume by the Doppler technique. Moreover, M-mode echo measurements of aortic diameter apparently do not produce reliable estimates of cardiac output.