
The authors reply:
To the Editor:
As Dr. Mirsky points out, clinical determinations of cardiac contractility are complicated both by errors inherent in obtaining data and difficulties in interpretation. We attempted in the manuscript to discuss these problems in detail. It does not seem fruitful to repeat the discussion; however two points deserve further comment.

Dr. Mirsky states: “In numerous studies with children it has been observed that analysis of data taken from Statham SF-1 and P23Db pressure transducers yield significantly different results.” We are not aware of any data to document that statement. The only published studies in children which we have seen are from the laboratory of Dr. Mirsky and his associates.1,2 They utilized both catheter-tip transducers and fluid-filled catheter systems and imply that similar results were obtained. Our conclusion, based on detailed estimates of the errors introduced by the limited dynamic response of fluid-filled catheters presented in our paper, is that well-designed systems can be used successfully to obtain Vmax.

In our initial studies,3 we obtained results in a small group of 12 patients which were similar to those of Gault et al.4 in 15 patients. As we expanded the series and included more patient groups, we found that the correlations based on VCR at peak stress and peak VCF were not useful in separating patients.

HERMAN L. FALSETTI, M.D.
ROBERT E. MATES, PH.D.
DAVID G. GREENE, M.D.
IVAN L. BUNNELL, M.D.
Departments of Medicine and Mechanical Engineering, State University of New York at Buffalo
Buffalo, N. Y.

References
2. MIRSKY I, ELLISON RC, HUGENHOLTZ PG: Assessment of myocardial contractility in children and young adults from ventricular pressure recordings. Amer J Cardiol 27: 359, 1971

Ultrasonic Echoes
To the Editor:
Ultrasonic echoes show motion of the mitral ring, not the opening of the valve. Ultrasonic echoes from the pericardium, the walls of the heart chambers and the valves have given useful diagnostic information. But we must realize that the echo labeled “anterior mitral leaflet” only shows motion of the ring, and tells us nothing about separation and approximation of the leaflets, for there rarely is any echo from the posterior leaflet.

Siggers1 suggests that the motion observed is a composite of motion of the leaflet and that of the ring. Actually it has only the pattern of ring motion, familiar to us for a quarter of a century in the studies of calcific rings by fluoroscopy,2 slit kymography,3 and cinefluorography.4 It moves toward the apex during systole as the papillary muscles, through tension on the chordae and leaflets, pull the base of the heart down. It moves toward the atrium during diastole when muscular relaxation, the filling of the ventricle, and emptying of the atrium allow the ring to move back up.

The leaflet echo shows only the motion of the ring, whose septal edge has the largest excursion of any part of the heart,5 and a separation of a posterior leaflet from the conventional echo in diastole is observed only in markedly dilated hearts.6 The diastolic aperture is a crescentic slit and motion of the leaflets relative to the ring or to each other is “surprisingly” small.7

The actual motion of the leaflets, as described in dogs, has been confirmed in man by cineangiography.8 It has been best analyzed by ultrasonic echoes and cineangiocagrams of the mitral area in patients whose chordae and papillary muscles have been removed and who have an aortic homograft with semilunar cusps in the mitral orifice.9 These valve leaflets bulge toward the atrium throughout systole and remain wide open, pushed toward the apex, during diastole. Their pattern of motion matches that of normal mitral leaflets in studies which exclude annular motion, and is quite different from the conventional “anterior leaflet” echogram.

It is desirable to name an echo which moves like a ring as though it originated in the ring, and
Perhaps ultrasonic regularly show usually mitral ventricular closure and transient occlusion contract. slowly moves reversal pressure the mitral is motion mitral insufficiency10,11 from and mitral leaflets which might occur in third and fourth sounds in diastole, since transient reversals of pressure gradients at the mitral valve have been recorded in horses, which usually have third and fourth sounds.12 Perhaps ultrasonic echoes from horses would regularly show echoes from both leaflets in these huge and relatively slowly moving organs.

William Dock, M.D.
145 East 16th Street
New York, New York 10003

References

5. McDonald IG: The shape and movement of the human left ventricle during systole. Amer J Cardiol 26: 221, 1970
7. Rushmer RF: Cardiac Diagnosis. Philadelphia, W. B. Saunders Co., 1956, p 216

Reply to Dr. Dock:

To the Editor:

I have to disagree with Dr. Dock's Letter to the Editor entitled "Ultrasonic Echoes." I believe there is ample evidence from several investigators documenting that the echocardiogram does indeed record echoes from the leaflets of the mitral valve and not just the mitral ring. This evidence ranges from work done a number of years ago by Dr. Edler.1 There is also anatomical data obtained from a group from Philadelphia.2 Our studies with intracardiac injections of indocyanine green dye3 also demonstrate that the mitral valve echo is truly intracavitary and is not a border-forming structure as would be the case with the mitral ring.

There is no question that the mitral valve echoes do reflect ring motion as well.4 This fact is
Ultrasonic Echoes
WILLIAM DOCK

Circulation. 1971;44:487-488
doi: 10.1161/01.CIR.44.3.487-a
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 1971 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/44/3/487.2.citation

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org//subscriptions/