

This Week's Citation Classic

CC/NUMBER 40
OCTOBER 6, 1980

Mason D T. Usefulness and limitations of the rate of rise of intraventricular pressure (dp/dt) in the evaluation of myocardial contractility in man. *Amer. J. Cardiol.* 23:516-27, 1969. [Sect. Cardiopulmonary Med., Depts. Med. and Physiol., Univ. California Sch. Med., Davis, CA]

Clinical determination of ventricular pressure rate of rise (dp/dt) constitutes an important new advancement for evaluating myocardial contractility of the intact human heart in health and disease. This paper delineates the proper use, interpretation, and rationale of the dp/dt approaches obtained by cardiac catheterization: peak dp/dt, dp/dt corrected for mechanical factors, and contractile element shortening velocity in intra and interpatient studies. [The SCJ® indicates that this paper has been cited over 295 times since 1969.]

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August 21, 1980

"It is indeed gratifying to learn that my 1969 article has been so frequently cited, and to recognize the progress in cardiac function research since then. This was the first paper presenting the sequence of developments in ventricular dp/dt methodology and its value in examining contractility, which consisted of principal accomplishments of my series of studies in assessing ventricular performance in patients.¹ Thus the article served both as a continuation of my first investigations on the concept's validity and a springboard for my later publications extending this knowledge to myocardial force-velocity properties in quantifying contractility in intact human hearts.²

"The publication occurred fortuitously at an important time in my early academic career. The 1968 American College of Cardiology's Scientific Program Committee asked me to formulate and chair a ventricular function symposium. This paper represents the publication of my presentation at that annual meeting. Furthermore, the timing is noteworthy, since I was negotiating my

present position: professor of medicine and physiology and chief of cardiovascular medicine at the University of California School of Medicine at Davis. The previous seven years, I was assistant section chief of cardiovascular diagnosis in the cardiology branch of the National Heart Institute in Bethesda (1961-1968), having completed my internal medicine residency on the Johns Hopkins Hospital's Osier Service (1958-1961) upon graduating from Duke University Medical School.

"In 1968, at age 35, I had authored 100 original articles on cardiovascular science and clinical cardiology. Subsequently, in the past 12 years here at UC Davis, academic activities have gone well for me as evidenced by 800 such articles and 12 books, and service on 20 scientific journals' editorial boards, American Board of Internal Medicine Cardiovascular Diseases member, past president of the Western Society of Clinical Research, past president of the American College of Cardiology, and currently editor-in-chief of the *American Heart Journal*. In addition, this landmark paper has been largely responsible for over 500 visiting professorships and more than 70 professional honors, including the ASPET Experimental Therapeutics Award, the ATS Research Award, and the Distinguished Duke University Alumnus Award.

"In my opinion, from scientific and practical standpoints, the reason why this paper has been highly cited and is considered a hallmark contribution to progress in ventricular function is that fundamental techniques and explanations were provided for credibility of ventricular dp/dt equations as readily available indices of contractile state for pharmacologic and physiologic investigations which now enjoy widespread, standard application in clinical research and patient care. I consider it insight that dynamic (dp/dt), rather than static, measures of performance emerged from my youthful experiences in professional baseball. Moreover, the paper established the launching pad leading to the impetus for expanding the concept to more complex force-velocity contractility indices of ventricular function clinically by us and other investigators."³

1. **Mason D T & Braunwald E.** Effects of ouabain on the nonfailing human heart. *J. Clin. Invest.* 42:1105-14, 1963.
2. **Mason D T, Spann J F & Zelis R.** Quantification of the contractile state of the intact human heart. *Amer. J. Cardiol.* 26:248-57, 1970.
3. **Mason D T.** *Congestive heart failure.* New York: Dun-Donnelley, 1976. 448 p.