

9 Literaturverzeichnis

Alexander J Jr, Sunagawa K, Chang N, Sagawa K (1987) Instantaneous pressure-volume relation of the ejecting left atrium. *Circ Res* 61:209-219

Appleton CA, Hatle LK, Popp RL (1988) Relation of transmitral flow velocity patterns to left ventricular diastolic function: new insights from a combined hemodynamic and Doppler echocardiographic study. *J Am Coll Cardiol* 12:426-440

Areias JC, Meyer R, Scott WA, Goldberg SJ (1990) Serial echocardiographic and Doppler evaluation of left ventricular filling in full-term neonates. *Am J Cardiol* 66:108-111

Basnight MA, Gonzalez MS, Kershenivich SC, Appleton CP (1991) Pulmonary venous flow velocity: relation to hemodynamics, mitral flow velocity and left atrial volume, and ejection fraction. *J Am Soc Echocardiogr* 4:547-558

Bazett HC (1918) An analysis of the time relations of electrocardiograms. *Heart* 7:353-370

Benjamin EJ, Levy D, Anderson KM, Wolf PA, Plehn JF, Evans JC, Komai K, Fuller DL, St. John Sutton M (1992) Determinants of Doppler indexes of left ventricular diastolic function in normal subjects (the Framingham Heart Study). *Am J Cardiol* 70:508-515

Bowman LK, Lee FA, Jaffe CC, Mattera J, Wackers FJTh, Zaret BL (1988) Peak filling rate normalized to mitral stroke volume: a new Doppler echocardiographic filling index validated by radionuclide angiographic techniques. *J Am Coll Cardiol* 12:937-943

Brun P, Tribouilloy C, Duval AM, Iserin L, Meguira A, Pelle G, Dubois-Rande JL (1992) Left ventricular flow propagation during early filling is related to wall relaxation: a color Doppler M-mode analysis. *J Am Coll Cardiol* 20:420-432

Bryg RJ, Williams GA, Labovitz AJ (1987) Effect of aging on left ventricular diastolic filling in normal subjects. *Am J Cardiol* 59:971-974

Bu'Lock FA, Mott MG, Oakhill A, Martin RP (1995a) Left ventricular diastolic function after anthracyclin chemotherapy in childhood: relation with systolic function, symptoms, and pathophysiology. *Br Heart J* 73:340-350

Bu'Lock FA, Mott MG, Martin RP (1995b) Left ventricular diastolic function in children measured by Doppler echocardiography: normal values and relation with growth.

Br Heart J 73:334-339

Choong CY, Abascal VA, Thomas JD, Guerrero JL, McGlew S, Weyman AE (1988) Combined influence of ventricular loading and relaxation in the transmitral flow velocity profile in dogs measured by Doppler echocardiography. *Circulation* 78:672-683

Courtois M, Ludbrook PA (1994) Intraventricular pressure transients during relaxation and filling, In: Gaasch WH, LeWinter MM (eds). Left Ventricular Diastolic Dysfunction and Heart Failure. Lea and Febiger, Philadelphia, pp150-166

Devereux RB, Reichek N (1977) Echocardiographic determination of left ventricular mass in man. Anatomic validation of the method. *Circulation* 55:613-618

Downes TR, Nomeir A-M, Stewart K, Mumma M, Kerensky R, Little WC (1990) Effect of alterations in loading conditions on both normal and abnormal patterns of left ventricular filling in healthy individuals. *Am J Cardiol* 65:377-382

Farias CA, Rodriguez L, Sun JP, Garcia MJ, Klein AL, Thomas JD (1997) Assessment of diastolic dysfunction by conventional Doppler and Doppler tissue imaging (abstract).

Circulation 96(suppl I):I-343

Firstenberg MS, Vandervoort PM, Greenberg NL, Smerida NG, McCarthy PM, Garcia MJ, Thomas JD (2000) Noninvasive estimation of transmitral pressure drop across the normal mitral valve in humans: importance of convective and inertial forces during left ventricular filling. *J Am Coll Cardiol* 36:1942-1949

Firstenberg MS, Smerida NG, Greenberg NL, Prior DL, McCarthy PM, Garcia MJ, Thomas JD (2001) Relationship between early diastolic intraventricular pressure gradients, an index of elastic recoil, and improvements in systolic and diastolic function. *Circulation* 104(suppl I):I-330-I-335

Flachskampf FA, Rodriguez L, Chen C, Thomas JD (1989) Calculation of mitral inertial mass: a factor critical to extracting relaxation from Doppler filling profiles: an in vitro study (abstract). *Circulation* 80(suppl II):II-567

Flachskampf FA, Chen C, Guerrero JL, Griffin BP, Picard MH, Weyman AE, Thomas JD (1990) In vivo determination of net left atrioventricular compliance from mitral Doppler profiles (abstract). *Circulation* 82(suppl III):III-127

Flachskampf FA, Weyman AE, Guerrero JL, Thomas JD (1992) Calculation of atrioventricular compliance from the mitral flow profile: analytic and in vitro study. *J Am Coll Cardiol* 19:998-1004

Garcia MJ, Rodriguez L, Ares MA, Griffin BP, Thomas JD, Klein AL (1996) Differentiation of constrictive pericarditis from restrictive cardiomyopathy: assessment of left ventricular diastolic velocities in the longitudinal axis by Doppler tissue imaging. *J Am Coll Cardiol* 27:108-114

Garcia MJ, Ares MA, Asher C, Rodriguez L, Vandervoort P, Thomas JD (1997) An index of early left ventricular filling that combined with pulsed Doppler peak E velocity may estimate capillary wedge pressure. *J Am Coll Cardiol* 29:448-454

Garcia MJ, Thomas JD, Klein AL (1998) New Doppler echocardiographic applications for the study of diastolic function. *J Am Coll Cardiol* 32:865-875

Garcia MJ, Smerida NG, Greenberg NL, Main M, Firstenberg MS, Odabashian J, Thomas JD (2000) Color M-mode Doppler flow propagation velocity is a preload insensitive index of left ventricular relaxation: animal and human validation. *J Am Coll Cardiol* 35:201-208

Gilbert JC, Glantz SA (1989) Determinants of left ventricular filling and of the diastolic pressure-volume relation. *Circ Res* 64:827-835

Greenberg NL, Vandervoort PM, Thomas JD (1995) Estimation of diastolic pressure gradients from color Doppler M-mode spatiotemporal velocities: analytical Euler equation solution. Los Alamitos, CA: Computers in Cardiology 1994, IEEE Computer Society Press, pp 465-468

Grossman W, Jones D, McLaurin LP (1975) Wall stress and patterns of hypertrophy in the human left ventricle. *J Clin Invest* 56:56-64

Grossman W (1991) Diastolic dysfunction in congestive heart failure. *N Engl J Med* 325:1557-1564

Harada K, Shiota T, Takahashi Y, Tamura M, Toyono M, Takada G (1994) Doppler echocardiographic evaluation of left ventricular output and left ventricular diastolic filling changes in the first day of life. *Pediatr Res* 35:506-509

Harada K, Suzuki T, Tamura M, Ito T, Takahashi Y, Shimada K, Takada G (1995a) Role of age on transmitral flow velocity patterns in assessing left ventricular diastolic function in normal infants and children. *Am J Cardiol* 76:530-532

Harada K, Takahashi Y, Shiota T, Suzuki T, Tamura M, Ito T, Takada G (1995b) Effect of heart rate on left ventricular diastolic filling patterns assessed by Doppler echocardiography in normal infants. *Am J Cardiol* 76:634-636

Harada K, Takahashi Y, Tamura M, Orino T, Takada G (1999) Serial echocardiographic and Doppler evaluation of left ventricular systolic performance and diastolic filling in premature infants. *Early Hum Develop* 54:169-180

Harrison MR, Clifton GD, Pennell AT, DeMaria AN, Carter A (1991) Effect of heart rate on left ventricular diastolic transmitral velocity patterns assessed by Doppler echocardiography in normal subjects. *Am J Cardiol* 67:622-627

Holmgren SM, Goldberg SJ, Donnerstein RL (1991) Influence of age, body size and heart rate on left ventricular diastolic indexes in young subjects. *Am J Cardiol* 68:1245-1247

Huwez FU, Houston AB, Watson J, McLaughlin S, Macfarlane PW (1994) Age and body surface area related upper and lower limits of echocardiographic measurements and left ventricular volume and mass from infancy to early adulthood. *Br Heart J* 72:276-280

Isaaz K, Thompson A, Ethevenot G, Cloez JL, Brembilla B, Pernot C (1989) Doppler echocardiographic measurement of low velocity motion of the left ventricular posterior wall. *Am J Cardiol* 64:66-75

Isaaz K, Munoz del Romeral L, Lee E, Schiller NB (1993) Quantitation of the motion of the cardiac base in normal subjects by Doppler echocardiography. *J Am Soc Echocardiogr* 6:166-167

Ishida Y, Meisner JS, Tsujoka K, Gallo JI, Yoran C, Frater RWM, Yellin EL (1986) Left ventricular filling dynamics: influence of left ventricular relaxation and left atrial pressure. *Circulation* 74:187-196

Keren G, Meisner JS, Sherez J, Yellin EL, Laniado S (1986) Interrelationship of mid-diastolic mitral valve motion, pulmonary venous flow, and transmitral flow.

Circulation 74:36-44

Klein AL, Hatle LK, Burstow DJ, Steward JB, Kyle RA, Bailey KR, Luscher TF, Gertz MA, Tajik AJ (1989) Doppler characterization of left ventricular diastolic function in cardiac amyloidosis. *J Am Coll Cardiol* 13:1017-1026

Kozák-Bárány A, Jokinen E, Ratonen T, Saraste M, Tuominen J, Jalonen J, Välimäki I (2000) Efficiency of left ventricular diastolic function in healthy full-term infants during the first months of life. *Early Hum Develop* 57:49-59

Kozák-Bárány A, Jokinen E, Saraste M, Tuominen J, Välimäki I (2001) Development of left ventricular systolic and diastolic function in preterm infants during the first month of life: a prospective follow-up study. *J Pediatr* 139:539-545

Labovitz AJ, Lewen MK, Kern M, Vandormael M, Deligonal U, Kennedy HL (1987) Evaluation of left ventricular systolic and diastolic dysfunction during transient myocardial ischemia produced by angioplasty. *J Am Coll Cardiol* 10:748-755

Lahiri A, Rodrigues EA, Carboni GP, Rafferty EB (1990) Effects of long-term treatment with calcium antagonists on left ventricular diastolic function in stable angina and heart failure.

Circulation 81(2 suppl):III130-III138

Lau VK, Sagawa K (1979) Model analysis of the contribution of atrial contraction to ventricle filling. *Ann Biomed Eng* 7:167-201

Lewis BS, Lewis N, Sapoznikov D, Gotsman MS (1980) Isovolumic relaxation period in man. *Am Heart J* 100:490-499

Little WC, Ohno M, Kitzman DW, Thomas JD, Cheng C-P (1995) Determination of left ventricular chamber stiffness from the time for deceleration of early left ventricular filling.

Circulation 92:1933-1939

Marijjanowski MMH, van der Loos CM, Mohrschladt MF, Becker AE (1994) The neonatal heart has a relatively high content of total collagen and type I collagen, a condition that may explain the less compliant state. *J Am Coll Cardiol* 23:1204-1208

Marino P, Faggian G, Bertolini P, Mazzucco A, Little WC (2004) Early mitral deceleration and left atrial stiffness. *Am J Physiol (Heart Circ Physiol)* (April 15, Epub ahead of print)

Masuyama T, Jung-Myung L, Yamamoto K, Tanouchi J, Hori M, Kamada T (1992) Analysis of pulmonary venous flow velocity patterns in hypertensive hearts: its complementary value in the interpretation of mitral flow velocity patterns. *Am Heart J* 124:983-994

McDiken WN, Sutherland GR, Moran CM, Gordon LN (1992) Colour Doppler velocity imaging of the myocardium. *Ultrasound Med Biol* 18:651-654

Meisner JS, McQueen DM, Ishida Y, Vetter HO, Bortolotti U, Storm JA, Peskin CS, Yellin EL (1985) Effects of timing of atrial systole on ventricular filling and mitral valve closure: computer and dog studies. *Am J Physiol* 249(*Heart Circ Physiol* 18):H604-H619

Meisner JS, Pajaro OE, Yellin EL (1986) Investigation of left ventricular filling dynamics: development of a model. *Einstein Quart J Biol Med* 4:47-57

Miyatake K, Okamoto M, Kinoshita N, Owa M, Nakasone I, Sakakibara H, Nimura Y (1984) Augmentation of atrial contribution to left ventricular inflow with aging as assessed by intracardiac Doppler flowmetry. *Am J Cardiol* 53:586-589

Miyatake K, Yamagishi M, Tanaka N, Uematsu M, Yamazaki N, Mine Y, Sano A, Hiramata M (1995) New method for evaluating left ventricular wall motion by color-coded tissue Doppler imaging: in vitro and in vivo studies. *J Am Coll Cardiol* 25:717-724

Mulvagh S, Quinones MA, Kleinman NS, Cheirif J, Zoghbi WA (1992) Estimation of left ventricular end-diastolic pressure from Doppler transmitral flow velocity in cardiac patients independent of systolic performance. *J Am Coll Cardiol* 20:112-119

Myreng Y, Smiseth OA (1990) Assessment of left ventricular relaxation by Doppler echocardiography. Comparison of isovolumic relaxation time and transmitral flow velocity with time constant of isovolumic relaxation. *Circulation* 81:260-266

Nagueh SF, Kopelen HA, Zoghbi WA (1995) Feasibility and accuracy of Doppler echocardiographic estimation of pulmonary artery occlusive pressure in the intensive care unit. *Am J Cardiol* 75:1256-1262

Nakatani S, Firstenberg MS, Greenberg NL, Vandervoort PM, Smerida NG, McCarthy PM, Thomas JD (2001) Mitral inertance in humans: critical factor in Doppler estimation of transvalvular pressure gradients. *Am J Physiol (Heart Circ Physiol)* 280:H1340-H1345

Opie LH (1991) *The Heart. Physiology and Metabolism*. 2nd ed, Raven Press, New York

Ohno M, Cheng CP, Little WC (1994) Mechanism of altered patterns of left ventricular filling during the development of congestive heart failure. *Circulation* 89:2241-2250

Oki T, Tabata T, Yamada H, Wakatsuki T, Shinohara H, Nishikado A, Iuchi A, Fukuda N, Ito S (1997) Clinical application of pulsed Doppler tissue imaging for assessing abnormal left ventricular relaxation. *Am J Cardiol* 79:921-928

Palka P, Lange A, Fleming AD, Donnelly JE, Dutka DP, Starkey IR, Shaw TR, Sutherland GR, Fox KA (1997) Differences in myocardial velocity gradient measured throughout the cardiac cycle in patients with hypertrophic cardiomyopathy, athletes and patients with left ventricular hypertrophy due to hypertension. *J Am Coll Cardiol* 30:760-768

Parker TG, Cameron D, Serra J, Morgan CD, Sasson Z (1987) The effect of heart rate and A-V interval on Doppler ultrasound indices of left ventricular diastolic function (abstract). *Circulation* 76(suppl.IV):IV-124

Plehn JF, Southworth J, Cornwell GG III (1992) Brief report: atrial systolic failure in primary amyloidosis. *N Engl J Med* 327:1570-1573

Plotnik GD, Kmezo JJ, Gottdiener JS (1991) Effect of autonomic blockade, postural changes and isometric exercise on Doppler indexes of diastolic left ventricular function. *Am J Cardiol* 67:1284-1290

Rajagopalan N, Garcia MJ, Rodriguez L, Murray RD, Klei AL (1998) Comparison of Doppler echocardiographic methods to differentiate constrictive pericarditis from restrictive cardiomyopathy. *J Am Coll Cardiol* 31:146A

Ren JF, Pancholy SB, Iskandrian AS, Lighty GW, Mallavarapu C, Segal BL (1994) Doppler echocardiographic evaluation of the spectrum of left ventricular diastolic dysfunction in essential hypertension. *Am Heart J* 127:906-913

Roelandt JRTC, Pozzoli M (2001) Non-invasive assessment of left ventricular (dys) function and filling pressure. 2nd Virtual Congress of Virtual Cardiology.

www.fac.org.ar/scvc/lave/echo/roeland/roelandi.htm

Sahn DJ, DeMaria A, Kisslo J, Weyman A (1978) Recommendations regarding quantitation in M-mode echocardiography: results of a survey of echocardiographic measurements. *Circulation* 58:1072-1083

Sandor GGS, Popov R, de Souza E, Morris S, Johnston B (1992) Rate-corrected mean velocity of fiber shortening – stress at peak systole as a load-independent measure of contractility. *Am J Cardiol* 69:403-407

Scalia GM, Greenberg NL, McCarthy PM, Thomas JD, Vandervoort PM (1997) Noninvasive assessment of the ventricular relaxation time constant (τ) in humans by Doppler echocardiography. *Circulation* 95:151-155

Schiffmann H, Flesch M, Häuseler C, Pfahlberg A, Böhm M, Hellige G (2002) Effects of different inotropic interventions on myocardial function in the developing rabbit heart. *Basic Res Cardiol* 97:76-87

Sohn DW, Chai IH, Lee DJ, Kim HC, Kim HS, Oh BH, Lee MM, Park YB, Choi YS, Seo JD, Lee YW (1997) Assessment of mitral annulus velocity by Doppler tissue imaging in the evaluation of left ventricular diastolic function. *J Am Coll Cardiol* 30:474-480

Stoddard MF, Pearson AC, Kern MJ, Ratcliff J, Mrosek DG, Labovitz AJ (1989a) Influence of alteration in preload on the pattern of left ventricular diastolic filling as assessed by Doppler echocardiography in humans. *Circulation* 79:1226-1236

Stoddard MF, Pearson AC, Kern MJ, Ratcliff J, Mrosek DG, Labovitz AJ (1989b) Left ventricular diastolic function: comparison of pulsed Doppler echocardiographic and hemodynamic indexes in subjects with and without coronary artery disease. *J Am Coll Cardiol* 13:327-336

Stork TV, Muller RM, Piske GW, Ewert CO, Hochrein H (1989) Noninvasive measurement of left ventricular filling pressure by means of transmitral pulsed Doppler ultrasound. *Am J Cardiol* 64:655-660

Stugaard M, Smiseth OA, Risoe C, Ihlen H (1993) Intraventricular early diastolic filling during acute myocardial ischemia: assessment by multigated color M-mode Doppler echocardiography. *Circulation* 88:2705-2713

Stugaard M, Risoe C, Ihlen H, Smiseth OA (1994) Intracavitary filling pattern in the failing left ventricle assessed by color M-mode Doppler echocardiography. *J Am Coll Cardiol* 24:663-670

Tabata T, Thomas JD, Klein AL (2003) Pulmonary venous flow by Doppler echocardiography: revisited 12 years later. *J Am Coll Cardiol* 41:1243-1250

Takatsuji H, Mikami T, Urasawa K, Teranishi J, Onozuka H, Takagi C, Makita Y, Matsuo H, Kusuoka H, Kitabatake A (1996) A new approach for evaluation of left ventricular diastolic function: spatial and temporal analysis of left ventricular filling flow propagation by color M-mode Doppler echocardiography. *J Am Coll Cardiol* 27:365-371

Thomas JD, Weyman AE (1989a) A fluid dynamics model of mitral valve flow: description with in vitro validation. *J Am Coll Cardiol* 13:221-233

Thomas JD, Flachskampf FA, Guerrero JL, O'Shea JP, Weyman AE (1989b) Net left atrial and ventricular compliance can be derived from transmitral velocity curves: a hydrodynamic in vitro study (abstract). *J Am Coll Cardiol* 13:198A

Thomas JD, Choong CYP, Flachskampf FA, Weyman AE (1990) Analysis of the early transmitral Doppler velocity curve: effect of primary physiologic changes and compensatory preload adjustment. *J Am Coll Cardiol* 16:644-655

Thomas JD, Weyman AE (1991a) Echocardiographic Doppler evaluation of left ventricular diastolic function. Physics and physiology. *Circulation* 84:977-990

Thomas JD, Newell JB, Choong CYP, Weyman AE (1991b) Physical and physiological determinants of transmitral velocity: numerical analysis. *Am J Physiol* 260(*Heart Circ Physiol* 23):H1718-H1730

Thomas JD, Flachskampf FA, Chen C, Guerrero JL, Picard MH, Levine RA, Weyman AE (1992) Isovolumic relaxation time varies predictably with its time constant and aortic and left atrial pressure: implications for the non-invasive evaluation of ventricular relaxation. *Am Heart J* 124:1305-1313

Triulzi MO, Castini D, Ornaghi M, Vitolo E (1990) Effects of preload reduction on mitral flow velocity pattern in normal subjects. *Am J Cardiol* 66:995-1001

Vanoverschelde JL, Robert AR, Gerbaux A, Michel X, Hanet C, Wijns W (1995) Noninvasive estimation of pulmonary arterial wedge pressure with Doppler transmitral flow velocity pattern in patients with known heart disease. *Am J Cardiol* 75:383-389

Wind BE, Snider AR, Buda AJ, O'Neill WW, Topol EJ, Dilworth LR (1987) Pulsed Doppler assessment of the left ventricular diastolic filling in coronary artery disease before and immediately after coronary angioplasty. *Am J Cardiol* 59:1041-1046

Yellin EL (1983) Mitral valve motion, intracardiac dynamics and flow pattern modelling: physiology and pathophysiology. In: Ghista DN (edt.): *Advances in Cardiovascular Physics*. Basel, Karger; Vol. 5:pp 137-161