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Which Method used for the Assessment of Left Ventricule Ejection Fraction is more Correlated with the Left Ventricule Global Strain?

Süleyman Karakoyun[1], Mustafa Ozan Gürsoy[2], Kamuran Kalkan[3], Zakir Lazoğlu[3], Halil İbrahim Tanboğa[3], Tayyar Gökdeniz[4]
[1]Doç. Dr.Yaşar Eryılmaz Doğubeyazıt State Hospital, Department of Cardiology, Ağri, [2]Iğdır State Hospital, Department of Cardiology, Iğdır, [3]Ataturk University, Medical School, Heart Center, Department of Cardiology, Erzurum, [4]Kafkas University, Medical School, Department of Cardiology, Kars

Background: The assessment of LVEF is dependent on the calculation method and the operator's experience. In this study, we aimed to investigate the relationship between LVEF evaluated by 3 methods (Teicholz, biplane Simpson and visual assessment) and left ventricule longitudinal strain values calculated with the utility of speckle tracking echocardiography.
Methods: This prospective study was comprised of 107 patients who were admitted to cardiology clinic between November 2012 and April 2013. Exclusion criteria included age < 18 years, atrial fibrillation, severe valvular stenosis or insufficiency, concomitant systemic disease, constrictive pericarditis, restrictive or hypertrophic cardiomyopathy and poor visual quality. All patients provided written informed consent prior to transthoracic echocardiographic examination. LVEF measurements were performed by Teicholz and biplane Simpson and visual assessment based on current recommendations. 2D echocardiography images were obtained from LV apical 4-chamber (4C), LAX (long axis) and 2-chamber (2C) views. Strain measurements were reported as the peak longitudinal strain (LS) for 4C, LAX, and 2C views, and global strain (GS) was calculated by the average of the three apical views. Statistical analysis were conducted using MedCalc (MedCalc, version 11.3.8.0, statistical software).
Results: The mean age of the study population was 58±13 (F:62, M: 45). Twenty-nine patients (31.2%) had hypertension, 9 (9.2%) had diabetes mellitus, 21 (22.6%) had hyperlipidemia, 20 (21.5%) had history of smoking and 56 (52%) had coronary artery disease. The LVEF values measured by biplane Simpson, Teicholz, and visual assessment were 59±11, 63±17 and 57±10, respectively. Area under curve (AUC) was 0.685, 95% CI:0.580-0.777 for biplane Simpson method whereas AUC for visual assesment and Teicholz were 0.657, 95% CI:0.551-0.752 and 0.531, 95% CI:0.425-0.635, respectively. The ROC curve analysis of LVEF values measured by the three methods were compared. There was significant statistical difference between biplane Simpson and Teicholz methods (p:0.020), whereas there was no statistical difference between biplane Simpson and visual assessment or between visual assessment and Teicholz (p:0.261 and p:0.070, respectively). Significant correlation was observed between LVEF measured by biplane Simpson and GS (r:-0.445, p<0.001).
Conclusıon: The biplane Simpson method, which is used for the evaluation of LVEF, has higher correlation with GS compared to Teicholz method and visual assessment.

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The Effect of Respiratory Functions and Pulmonary Artery Pressure on Right and Left Ventricular Diastolic Function

Şeref Alpsoy[1], Aydın Akyüz[1], Dursun Cayan Akkoyun[1], Mustafa Oran[2], Levent Cem Mutlu[3], Birol Topçu[4], Hasan Değirmenci[1], Banu Çiçek Yalçın[2]
[1]Namık Kemal University, Faculty of Medicine, Cardiology Department, Tekirdag, [2]Namık Kemal University, Faculty of Medicine, Internal Medicine Department, Tekirdag, [3]Namık Kemal University, Faculty of Medicine, Chest Disease Department, Tekirdag, [4]Namık Kemal University, Faculty of Medicine, Biostatistics Department, Tekirdag

Introductıon: The aim of the study was to evaluate of biventricular diastolic function and to investigate the effect of pulmonary function and pulmonary artery pressure on diastolic functions in people with chronic obstructive pulmonary disease (COPD).
Materials-Method: Sixty patients with COPD and 40 healthy individuals were assessed by echocardiography and pulmonary function tests (PFTs). Forced expiratory volume in one second [FEV1]) and forced vital capacity [FVC]) were determined. Correlation and regression analysis were performed to investigate the relationship between FEV1, FEV1/FVC, mean pulmonary artery pressure (MPAB) and diastolic function parameters.
Results: Right ventricular diameter and free wall thickness and mitral E / mitral septal annulus E' were higher whereas tricuspid E and E / A, tricuspid lateral annulus E 'and E' / A ', mitral septal annulus E' and E '/ A' values were lower in the COPD group (all p values of <0.05). FEV1 was positively correlated with lateral tricuspid annulus E 'and E' / A '. Tricuspid E/A, tricuspid lateral annulus E 'and E' / A ', mitral septal annulus E' and E'/A' values were positively correlated with FEV1/FVC, whereas negatively correlated with MPAB. Mitral E/ mitral anulus septal E' was negatively correlated with FEV1/FVC, and positively correlated with MPAB. FEV1/FVC was decisive for tricuspid lateral annulus E' and E'/A', mitral annulus septal E' and E'/A' values.
Conclusıon: Right and left ventricular diastolic function are impaired in patients with COPD. Chronic hypoxia and increased pulmonary pressure are important factors in the development of diastolic dysfunction in patients with COPD.

Demographic and anthropometric characteristics, pulmonary function tests and biochemical parameters of the patients and the control group

	Patients group, n=60	Control group, n=60	p value*
Age, years	49 ± 7.4	48.5 ± 7.2	0.134
Gender, female (n, %)	16 (% 26.7)	11 (% 27.5)	0.831
BMI, kg/m2	26 ± 5	25.8 ± 2.6	0.647
Sistolic BP	126 ± 12	128 ± 17	0.848
Diastolic BP	80 (60 – 90)	78 (60 – 90)	0.281
Smoking, (n, %)	16 (% 26.7)	11 (% 27.5)	0.745
Hipertension, (n, %)	10 (% 16.7)	6 (% 15)	0.635
Dyslipidemia, (n, %)	22 (% 36.7)	14 (% 35)	0.728
Duration of disease, years	9 ± 3.3 (4 - 15)	0	<0.001
Hematocrit, %	52 (36 - 65)	38 (35 - 46)	<0.001
Heart rate, beat/min	86 (63 - 115)	75 (55 - 95)	<0.001
FEV1, %	67 (24 - 92)	93 (89 - 120)	<0.001
FVC, %	87 (45 - 138)	93 (85 - 110)	0.003
FEV1/FEVC	59.2 (35 - 69)	89.5 (81 - 95)	<0.001
Fasting glucose, mg/dl	92 (53 - 113)	93 (77 - 114)	0.821
Total cholesterol, mg/dl	200 (115 - 318)	195 (121 - 260)	0.1
Triglyceride, mg/dl	130 (43 - 368)	143 (52 - 288)	0.838
LDL-cholesterol, mg/dl	133 (34 - 231)	130 (63 - 191)	0.314
HDL-cholesterol, mg/dl	44 (18 - 64)	42 (30 - 56)	0.642
Uric acide, mg/dl	5 (3 - 9)	5.2 (4 - 8)	0.980
CRP, mg/dl	3.5 (1 - 10)	3 (2 - 12)	0.134

*Chi square, Student t test and Mann Whitney U test. BMI:Body mass index, BP:Blood Pressure, FEV1: Forced expiratory volume in one second, FVC: Forced vital capacity, HDL: High density lipoprotein, LDL: Low density lipoprotein.

Table 2. Two-dimensional, M-mode and conventional Doppler findings of the patients and the control group

	Patients group, n= 60	Control group, n= 60	p değeri *
LVDD, mm	47 (40 - 56)	46 (41 - 53)	0.525
LVSD, mm	30 ± 3.67	29 ± 3.21	0.053
IVS, mm	11 (8 - 13)	11 (8 – 13)	0.211
PW, mm	11 (9 - 13)	11 (9 - 13)	0.189
LVEF, %	66.± 4.2	66.4 ± 3.9	0.165
Left atrium, mm	31.5 (25 - 41)	31 (26 - 40)	0.882
Aortic root, mm	32 ± 3.2	30.5 ± 4	0.520
Mitral E, cm/s	70.5 (60 - 110)	79 (46 - 108)	0.145
Mitral A, cm/s	65 (35 - 98)	70 (45 - 89)	0.406
Mitral E/A	1.12 (0.6 - 2.3)	1.13 (0.6 - 2.12)	0.936
DT, ms	171 (115 - 204)	182.5 (95 - 226)	0.486
IVRT, ms	89 (68 - 114)	85.5 (70 – 108)	0.148
RV MPI	0.45 ± 0.08	0.44 ± 0.037	0.124
RVDD, mm	26 (20 - 28)	21 (18 -25)	<0.001
RVFWT, mm	4 (2.8 – 4.6)	3 (2.3 – 3.5)	<0.001
Tricuspid E, cm/s	52.5 (42 - 66)	71 (40 - 95)	<0.001
Tricuspid A, cm/s	64.5 (55 - 90)	63 (40 - 80)	0.418
Tricuspid E/A	0.83 (0.5 - 1.7)	1.15 (0.6 - 1.9)	<0.001
RV MPI	0.43 ± 0.07	0.43 ± 0.04	0.364
MPAP, mmHg	27.3 (20.3 – 41.6)	0	<0.001

*Student t test and Mann Whitney U test, DT: Deceleration time, IVRT: Isovolumetric relaxation time, IVS: Interventricular septum, LV MPİ: Left ventricle myocard performance index, MPAP: Mean pulmonary artery pressure, RVDD: Right ventricle diastolic diameter, LVDD: Left ventricle diastolic diameter, LVSD: Left ventricle diastolic diameter, LVEF: Left ventricle ejection fraction, PW: Posterior wall, MPAP: mean pulmonary artery pressure,RV MPİ: Right ventricle myocard performance index, RV FWT: Right ventricle free wall thickness.