EVALUATION OF ECHOCARDIOGRAPHIC PARAMETERS FOR RIGHT HEART FUNCTION AND PULMONARY HYPERTENSION IN THE PROGRESSION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

SASHA KJAEVA ANASTASOVA[1], Prof.D-r.Elizabeta Srbinovska-Kostovska[1], D-r Elena Grueva-Nastevska[1], D-r Savetka Paljovskovska-Jordanova[1], D-r Dean Risteski[1], D-r Danica Petkoska-Spirova[1], D-r Enes Shehu[1], D-r Irina Angelovska[2], D-r Angela Debreshliovska[2]

(1) University clinic of cardiology, Skopje, North Macedonia;

(2) University clinic of pulmo-allerology, Skopje, North Macedonia

Introduction

Chronic opstructive pulmonary disease (COPD) is one of the diseases with highest mortality rate, high morbidity and early mortality. Right ventricular hypertrophy with preserved systolic function is most common finding in patients with COPD.COPD patients not so rarely have increased pulmonary vascular resistance (PVR), moderate to severe form of pulmonary hypertension, ''cor pulmonale" and right heart failure. Our study investigated the echocardiographic parameters used to assess right ventricular function and pulmonary hypertension in patients with chronic obstructive pulmonary disease (COPD) according to their specificity and sensitivity and disease progression.

Material and methods

We have analysed 94 patients with COPD (Gold class I-IV). The 13 echo-cardiography parameters important for assessment of right ventricular function and pulmonary hypertension due to their sensitivity and specificity and progression of the disease were evaluated: basal dimension of the right ventricle(DV bazal), right atrium(DA), right atrial area(DA area), S'wave of the right ventricle of TDI, TAPSE, functional area change (FAC %), (SPAP), Vmax of tricuspid regurgitation , acceleration time of pulmonary artery (AT), pulmonary vascular resistance (PVR), myocardial performance index of the right venricle (MPI), global strain of the right ventricle(GL strain), collapsibility of vena.cava inferior >/<50 %.

Results and discussion

Predictors of disease progression with high specifity ans sensitivity are the parameters: MPI DV TDI, Global strain of DV and collabsibility of v.cava inferior less then 50%. Predictors of disease progression with high specifity and low sensitivity are : DV bazal, DA, DA area, S TDI, TAPSE, FAC, SPAP, V max TR. Predictors of disease progression with low specifity and high sensistivity are parameters: shortened acceleration time of the pulse Dopler of the pulmonary valve and the development of pulmonary vascular resistance

Parameters	Sensitivity	Specificity
DV bazal.	34.48%	97.22%
DA	27.58%	100%
DA area	24.13%	91.66%
S TDV DV	32.75%	100%
TAPSE	32.75%	100%
FAC	5.17%	100%
SPAP	37.93%	100%
Vmax	37.93%	94.44%
AT a.pulm	100%	11.11%
PVR	96.55%	13.88%
MPI DV TDI	82.75%	66.66%
GL.strain	65.51%	72.22%
col.v.cava>50%	77.58%	86.11%

The echocardiographic parameters which we analyzed in terms of sensitivity and specificity and progression of the disease are given in Table

Conclusion

Echocardiography is a non invasive and useful method for evaluation and follow up the patients with COPD. All this indicates that the values of certain echocardiographic parameters can help us detect disease progression, with high sensitivity, high specificity or both

References

1. Jeji PS, Kapila S, Gupta S, Mittal S. Echocardiographic Evaluation of Right Heart in Patients of Chronic Obstructive Pulmonary Disease. J Evol Med Dent Sci. 2020; 9(12). doi:10.14260/jemds/2020/210

2.Das M, Tapadar SR, Mahapatra ABS, Chowdhury SP, Basu S. Assessment of RV Function in Patients of (COPD). J Clin Diagn Res. 2014; 8(3): 11-13. doi:10.7860/JCDR/2014/6440.4090

3. Tannus-Silva DGS, Masson-Silva JB, Ribeiro LS, Conde MB, Rabahi MF. Myocardial performance index correlates with the BODE index and affects quality of life in COPD patients. Int J Chron Obstruct Pulmon Dis. 2016; 11(1): 2261-2268. doi:10.2147/COPD.S110779

4. Masson-Silva JB, Tannus-Silva DGS, Furtado RG, da Silva Júnior CG, Araújo FA, de Araújo Costa S. Correlation Between 2D Strain and Classic Echocardiographic Indices in the Diagnosis of Right Ventricular Dysfunction in COPD. Int J Chron Obstruct Pulmon Dis. 2021; 16(1): 1967-1976. doi:10.2147/COPD.S290957