

# LEFT VENTRICULAR STIFFNESS AND CENTRAL BLOOD PRESSURE IN PATIENTS WITH DIASTOLIC DYSFUNCTION IN DIFFERENT AGE GROUPS

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**INTRODUCTION.** Heart failure is the world's most widespread cardiovascular disease. In recent years, many studies of pathophysiology of heart failure with preserved ejection fraction (HFpEF) were published. These studies show that diastolic dysfunction (DD) and arterial wall stiffness play an important role in the development of HFpEF [1,2].

**OBJECTIVE.** To evaluate arterial wall stiffness, central blood pressure and myocardial relaxation and left ventricular (LV) filling pressure in patients with DD in different age groups.

**MATERIALS AND METHODS.** 140 patients (61 male and 79 female), aged from 20 to 80 yrs (mean age  $50.6 \pm 16.8$  yrs), with arterial hypertension, obesity, diabetes mellitus and chronic renal disease were enrolled in the study. In all patients, echocardiography was performed to evaluate the DD. M-mode, B-mode, pulse wave Doppler and tissue Doppler were used to calculate the velocities and ratio of early and late LV diastolic filling (E/A), the ratio of early LV diastolic filling and diastolic mitral annulus velocity (E/e') and the amplitude of the aortic root excursion (cm). Oscillometry was performed to evaluate the central systolic blood pressure (cSBP), central pulse blood pressure (cPBP) and aortic augmentation index (Aix).

**RESULTS.** The patients were divided into 6 age groups. The first group included 25 patients aged from 20 to 29 yrs (mean age  $21.8 \pm 1.5$  yrs). The second group included 12 patients aged from 30 to 39 yrs (mean age  $35.6 \pm 2.6$  yrs). The third group included 16 patients aged from 40 to 49 yrs (mean age  $45.6 \pm 2.2$  yrs). The fourth group included 31 patients aged from 50 to 59 yrs (mean age  $54.4 \pm 2.6$  yrs). The fifth group included 34 patients aged from 60 to 69 yrs (mean age  $62.9 \pm 2.9$  yrs), and the sixth group included 22 patients aged over 70 yrs (mean age  $74.0 \pm 3.9$  yrs). The results of the study illustrate that both mitral annulus velocity and aortic root excursion decrease with age. The velocity of e' in first and second groups was normal –  $0.10 \pm 0.02$  m/sec and  $0.08 \pm 0.02$  m/sec, resp., and the amplitude of the

aortic root excursion was  $1.3 \pm 0.2$  m/sec и  $1.1 \pm 0.2$  m/sec, resp. The results in the following groups showed the progressive decrease of e' ( $p < 0.0001$ ): in the third and fourth groups, e' was  $0.07 \pm 0.1$  m/sec, in the fifth group –  $0.06 \pm 0.01$  m/sec, and in the sixth group –  $0.05 \pm 0.01$  m/sec. E/e' did not increase with age: in the first group, it was  $6.8 \pm 1.5$ , in the second group –  $10.7 \pm 2.5$ , in the third group –  $12.3 \pm 2.5$ , in the fourth group –  $10.6 \pm 2.9$ , in the fifth group –  $13.3 \pm 2.2$ , and in the sixth group –  $12.2 \pm 2.2$ . This may be explained by the fact that all patients had different stage of arterial hypertension. cSBP values progressively increased in all groups: in the first group, cSBP was  $125.3 \pm 11$  mmHg, in the second group –  $125.2 \pm 11$  mmHg, in the third group –  $127.6 \pm 8.0$  mmHg, in the fourth group –  $128.9 \pm 9.0$  mmHg, in the fifth group –  $132.6 \pm 7.0$  mmHg, and in the sixth group –  $131.9 \pm 7.5$  mmHg. There was no significant difference between cPBP values in different groups: in the first group, cPBP was  $53.6 \pm 8.3$  mmHg, in the second group –  $56.3 \pm 8.5$  mmHg, in the third group –  $57.5 \pm 5.9$  mmHg, in the fourth group –  $61.0 \pm 7.3$  mmHg, in the fifth group –  $63.3 \pm 6.3$  mmHg, and in the sixth group –  $73.5 \pm 6.9$  mmHg. Aortic Aix also progressively increased in each group. In the first group, it was  $-7.26 \pm 2.4\%$ , in the second group –  $-5.3 \pm 2.1\%$ , in the third group –  $-4.7 \pm 2.7\%$ , in the fourth group –  $-1.9 \pm 0.9\%$ , in the fifth group –  $-1.2 \pm 1.1\%$ , and in the sixth group –  $-0.1 \pm 1.2\%$  ( $p < 0.0001$ ).

**CONCLUSION.** The study shows that both central blood pressure and left ventricular myocardial stiffness increase with age.

## REFERENCES:

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