

## Abstract

**Introduction:** Heart damage in essential hypertension (EH) is one of the most serious consequences of high blood pressure. However, in the case of secondary hypertension, multiple pathophysiological effects may apply. For example, pheochromocytomas (PHEOs), which are tumors arising from the chromaffin cells of the adrenal medulla, have the ability to produce, metabolize, and secrete catecholamines. Overproduction of catecholamines leads to cardiac and other impairments by many mechanisms. The aim of our work was to verify this fact and at the same time to investigate whether global longitudinal strain (GLS), measured using speckle tracking echocardiography, can detect this damage earlier and also determine the adjustment of function after adrenalectomy.

**Methods:** We analyzed 17 patients with PHEO and 18 patients with EH with the same hemodynamic parameters. Subsequently, we managed to increase the number of patients with PHEO to 24, and they were also examined 1 year after adrenalectomy.

**Results:** Patients with PHEO did not differ in echocardiographic parameters including left ventricular ejection fraction compared to EH ( $0.69 \pm 0.04$  vs.  $0.71 \pm 0.05$ ; NS), however, they had significantly lower GLS ( $-14.8 \pm 1.5$  vs.  $-17.8 \pm 1.7$ ;  $p < 0.001$ ). One year after adrenalectomy, the GLS parameter improved ( $-14.3 \pm 1.8$  vs.  $-17.7 \pm 1.6$ ;  $p < 0.001$ ). The most significant difference in improvement was present in the apical segments of the left ventricle compared to the middle and basal segments ( $-5.4 \pm 5.0$  vs  $-1.9 \pm 2.7$  vs  $-1.6 \pm 3.8$ ;  $p < 0.01$ ).

**Conclusions:** Patients with PHEO have lower GLS than patients with EH, suggesting that catecholamines induce an early subclinical decline in LV systolic function. Adrenalectomy results in improvement of this subclinical damage. This effect is most evident in the apical segments of the left ventricle.