

Left ventricular global longitudinal peak strain deterioration in patients undergoing endovascular repair of abdominal aortic aneurysms: the effect of arterial stiffness

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Purpose: Invasive abdominal aortic aneurysm (AAA) replacement with an endograft interposes between the normal arterial tree which may acutely reduce overall systemic compliance and increase the input impedance. We evaluated the impact of aortic reconstruction, using currently available grafts and endografts, on pulse wave velocity (pwv) and its effect on early cardiac systolic function indices in these patients.

Methods: A total of 73 men, mean age 70 ± 8 years, were evaluated. Of these, 61 underwent endovascular repair (EVAR) and 12 open repair (OS). All patients underwent an assessment with a standard conventional transthoracic and a two-dimensional speckle tracking echocardiography at baseline, at 1 and 6 months after the intervention. Carotid - femoral (c-f) artery waveforms were measured and pwv was determined in all participants on each follow up visit.

Results: No significant changes in blood pressure were observed during the study period. Notably, our findings revealed a significant reduction in global longitudinal peak strain (GLPS) during the 6 months follow-up (from $-19.7 \pm 5.9\%$ at baseline to $-17.1 \pm 5.9\%$ at 6 months, $p=0.03$). C-

r pwv showed a significant increase 6 months after the procedure (from 10.7 ± 2.9 m/sec at baseline to 13.9 ± 3.3 m/sec at 6 months, $p<0.001$). A significant time effect was found on cf-pwv, which showed an increase at 1 month and remained thereafter ($p=0.007$). Additionally, a deterioration in GLS values was revealed, with a significant increase at 1 month that persisted 5 months later ($p<0.001$). No significant group effect was observed between EVAR and open repair ($p=0.98$) and there was no significant interaction ($p=0.96$). Notably, the difference of global longitudinal strain (Δ GLS) between baseline and 6 months significantly correlated with the corresponding changes in cf-pwv ($r=0.494$, $p<0.0001$).

Conclusions: AAA repair not only leads to an increase in aortic stiffness, as measured by the increase in pwv, but also reduces cardiac systolic function. Our findings highlight the need a more intense cardiac surveillance program after aortic reconstruction. Further studies are needed to investigate how this may translate into long-term manifestations of cardiovascular complications and symptomatology.