Acoustic Cardiographic Parameters Before and After Hemodialysis are Associated with Overall and Cardiovascular Mortality in Hemodialysis Patients

Tung-Ling Chung, Yi-Hsueh Liu, Szu-Chia Chen

Background: Audicor acoustic cardiography is a simple technique in which cardiac acoustic data is synchronized with electrocardiography recordings to provide a comprehensive assessment of both mechanical and electronic function of the heart. Our recent study investigated acoustic cardiographic parameters (ACP) before and after hemodialysis (HD) in HD patients, and found that the fourth heart sound (S4) and left ventricular systolic time (LVST) decreased and electromechanical activation time (EMAT) increased after HD. Whether the ΔACP after HD foretells a better cardiovascular (CV) prognosis remains to be determined. Therefore, the aim of this study is to assess whether the change in ACP before and after HD is associated with overall and cardiovascular (CV) mortality in HD patients.

Methods: This study enrolled 162 HD patients. Demographic, medical, and laboratory data were collected. Acoustic cardiography was performed before and after HD to assess parameters including third heart sound (S3), S4, systolic dysfunction index (SDI), EMAT and LVST.

Results: During the follow-up period (2.9 years), 25 of the 162 patients (15.4%) died, and 16 deaths due to CV cause. Multivariate analysis showed that high ΔSDI (per 1; HR, 1.482; 95% CI, 1.047-2.098; p = 0.026), high ΔEMAT (per 1%; HR, 1.320; 95% CI, 1.063-1.640; p = 0.012), and low ΔLVST (per 1 ms; HR, 0.979; 95% CI, 0.961-0.997; p = 0.021) were independently associated with increased overall mortality. Besides, high ΔEMAT (per 1%; HR, 1.333; 95% CI, 1.020-1.744; p = 0.036), and low ΔLVST (per 1 ms; HR, 0.976; 95% CI, 0.955-0.998; p = 0.031) were significantly associated with increased CV mortality.

Conclusion: ACP change before and after HD (ΔACP) is an useful clinical marker, and it is stronger than ACP before HD in predicting overall and CV mortality. Screening HD patients with acoustic cardiography may help to identify patients at high risk of mortality.

Key words: acoustic cardiography before and after HD; overall mortality; cardiovascular mortality; hemodialysis