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**EXTRACORPOREAL CARDIAC SHOCK WAVE THERAPY
IN TREATMENT OF ISCHAEMIC HEART FAILURE**

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Objectives Prognosis of ischaemic heart disease (IHD) patients with contraindication of percutaneous coronary intervention or coronary artery bypass grafting remains poor. Extracorporeal cardiac shock wave therapy (CSWT) was reported to improve outcome of IHD in previous short-term studies. We aimed to evaluate the safety and efficiency of CSWT in patients with ischemic heart failure.

Methods Thirty-two patients with ischaemic heart failure and decreased left ventricular ejection fraction (LVEF) (<50%) were

randomised to CSWT (200 shots/spot at 0.09 mJ/mm^2 for 9–16 spots, 9 times within 3 month/series, $n=18$) and control group (exactly same procedures without shock wave energy, $n=14$). Dual isotope simultaneous acquisition single-photon emission CT with $^{99\text{m}}\text{Tc}$ -sestamibi/ ^{18}F -fluorodeoxyglucose was performed before randomisation and at 3 month after CSWT/control to locate and evaluate viable myocardium region. Follow-ups were performed at 0, 3 and 12 months after the therapy. Canadian cardiovascular society classification (CCS), New York Heart Association classification (NYHA), Seattle Angina Questionnaire, 6-min walk test, LVEF, left ventricular end-diastolic dimension (LVEDD), the dosage of nitroglycerin use and the changes of plasma level of brain natriuretic peptide (BNP) were compared between two groups at each time point. Study design was approved by the hospital Ethical Committee and consent forms were obtained from all patients.

Results Among 32 patients enrolled, 30 (94%) completed 12-months' follow-up (1 died from sudden death at 1 month, another withdrew because of unwillingness). No procedural complications or adverse effects were noted. At 3 months after CSWT, compared the control group, summed perfused score (-1.93 ± 0.11 vs -0.54 ± 0.09 , $p=0.02$) and summed metabolic score (-1.37 ± 0.07 vs 0.14 ± 0.05 , $p=0.01$) were much better in CSWT group. At 3 and 12 months after the therapy, patients in CSWT group experienced more improvement in symptoms compared to control group: NYHA (-0.48 ± 0.03 vs 0.06 ± 0.02 , $p<0.001$; -0.52 ± 0.02 vs -0.22 ± 0.01 , $p=0.03$, at 3 and 12 months respectively), CCS (-0.82 ± 0.01 vs 0.16 ± 0.03 , $p<0.001$; -0.75 ± 0.04 vs -0.12 ± 0.02 , $p=0.01$), Dosage of nitroglycerin ($-1.10 \pm 0.03/\text{week}$ vs $-0.11 \pm 0.02/\text{week}$, $p=0.02$; $-1.30 \pm 0.01/\text{week}$ vs $0.06 \pm 0.01/\text{week}$, $p<0.001$) and 6-min walk test (m) (18.23 ± 2.13 vs 8.16 ± 1.05 , $p=0.01$; 20.03 ± 3.33 vs -1.85 ± 2.10 , $p<0.001$). Changes in Seattle Angina Questionnaire were much better in CSWT group (4.27 ± 0.76 vs 1.16 ± 0.48 , $p=0.01$; 5.22 ± 0.59 vs -1.04 ± 0.52 , $p<0.001$). More improvements of LVEF (%) (3.72 ± 0.36 vs -0.29 ± 0.06 , $p=0.01$; 4.03 ± 0.74 vs 0.13 ± 0.05 , $p=0.01$) and BNP (-62.88 ± 12.55 vs -23.28 ± 7.45 , $p=0.02$; -69.51 ± 9.87 vs -19.09 ± 5.12 , $p=0.01$) were also observed.

Conclusions CSWT improved symptom, cardiac function, quality of life and exercise tolerance in ischaemic heart failure patients compared to control group in our study. This new therapy could be considered as a new, non-invasive, safe and efficient strategy for patients with stable ischaemic heart failure.