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Original Article

Dapagliflozin combined with sacubitril/valsartan promotes cardiac function recovery in elderly patients with acute myocardial infarction

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Abstract: Objectives: To investigate the clinical efficacy of dapagliflozin combined with sacubitril/valsartan for heart failure (HF) in elderly patients with Acute Myocardial Failure (AMI) post emergency Percutaneous Coronary Intervention (PCI) and their effects on patients' cardiac function recovery, inflammatory status, and prognosis. Methods: This retrospective study included 94 elderly AMI patients who developed HF after emergency PCI at Tangshan Gongren Hospital between May 2022 and March 2024. Based on their treatment regimen, the enrolled patients receiving sacubitril/valsartan only were categorized as the control group (n=43), and those who underwent sacubitril/valsartan plus dapagliflozin as the study group (n=51). Patients in both groups were all treated for 12 weeks. Their cardiac function indicators, such as left ventricular ejection fraction (LVEF), HF biomarkers, including B-type natriuretic peptide (BNP), inflammatory factors, such as interleukin-6 (IL-6), tumor necrosis factor-alpha and high-sensitivity C-reactive protein, ventricular remodeling measures, 6-minute walk test (6MWT), quality of life [measured by the scores of Minnesota Living with Heart Failure Questionnaire (MLHFQ)], major adverse cardiac events (MACEs), and adverse drug reactions were compared before and after treatment. Results: After 12-week treatment, the study group showed a marked increase in LVEF (60.3±6.2 vs 54.1±5.7, $P < 0.001$), a significant reduction in BNP level (23.20±5.12 vs 27.64±4.66 pmol/L, $P < 0.001$) and in levels of inflammatory factors including (IL-6: 113.25±40.55 vs 142.72±31.20 pg/L, $P < 0.001$), better performance in 6MWT (447.11±34.08 vs 406.24±31.77 m, $P < 0.001$), as well as a significant decrease in MLHFQ scores (38.04±4.30 vs 45.51±5.12, $P < 0.001$) in comparison to the control group. Additionally, patients in the study group demonstrated lower rate of MACE occurrence compared to the control group (9.80% vs 25.58%, P=0.043). However, no significant differences were observed in adverse drug reactions between the two groups (9.80% vs 6.98%, P=0.906). Conclusion: Dapagliflozin combined with sacubitril/valsartan can significantly facilitate cardiac function recovery, reduce inflammatory response, enhance exercise tolerance and quality of life, and lower the risk of MACE in elderly AMI patients who developed HF following emergency PCI. The regimen had a favorable safety profile, suggesting good clinical implications.

Keywords: Acute myocardial infarction, elderly patients, dapagliflozin, sacubitril/valsartan, percutaneous coronary intervention, heart failure

Introduction

Acute myocardial infarction (AMI) is a common acute cardiovascular condition in the elderly. As the most critical cardiovascular disorder, it is characterized by high incidence rates coupled with significant disability and mortality among the elderly. AMI patients primarily manifest with retrosternal crushing pain, palpitations, fatigue, and dyspnea. If not treated promptly, it may lead to severe complications such as shock or cardiac arrest [1]. In recent years, emergency Percutaneous Coronary Intervention (PCI) has been widely employed in the treatment of elderly AMI patients. This procedure rapidly removes intracoronary thrombi, restores coronary blood flow, and prolongs patient survival, demonstrating significant clinical efficacy with widespread recognition [2, 3]. However, clinical observations have shown that PCI may impair myocardial structure and function in some elderly AMI patients, leading to incomplete recovery of blood perfusion into infarcted myocardial tissue. This can further compromise cardiac function, increasing the risk of heart failure (HF) and worsening progno-

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sis [4, 5]. Therefore, effectively preventing and managing HF in elderly AMI patients following emergency PCI remains a key focus for future research.

Sacubitril/valsartan is an angiotensin receptor-neprilysin inhibitor that can exert therapeutic effects (such as improving cardiac function, reducing myocardial injury, and inhibiting ventricular remodeling) through simultaneously blocking the renin-angiotension system but enhancing the natriuretic peptide system. In recent years, it has been increasingly used for HF treatment in AMI patients post-PCI. However, clinical practice suggests that the efficacy of sacubitril/valsartan monotherapy still has room for improvement, indicating the need for combining the monotherapy with others to optimize its efficacy [6, 7]. Recently, sodium-glucose cotransporter 2 (SGLT2) inhibitors have demonstrated significant advances in the treatment of cardiovascular disorders. Dapagliflozin, as a representative SGLT2 inhibitor, has gained growing clinical application in HF patients due to its unique metabolic mechanisms (e.g., promoting ketone utilization, improving myocardial energy metabolism) and hemodynamic effects (e.g., osmotic diuresis, reduced cardiac preload) [8]. Notably, the cardioprotective benefits of dapagliflozin are independent of its glucose-lowering effects, providing theoretical support for its use in non-diabetic AMI patients. Based on this evidence, this study innovatively combined dapagliflozin with sacubitril/valsartan for the treatment of HF in elderly AMI patients following emergency PCI, aiming to evaluate the therapeutic efficacy and clinical outcome with this regimen.

Materials and methods

Patient selection

This was a single-center study that retrospectively analyzed the clinical data of 94 elderly AMI patients who developed HF post emergency PCI at Tangshan Gongren Hospital between May 2022 and March 2024. Based on their treatment regimens, patients receiving sacubitril/valsartan monotherapy were categorized as the control group (n=43), and those undergoing sacubitril/valsartan combined with dapagliflozin as the study group (n=51). This study was approved by the ethics committee of Tangshan Gongren Hospital.

Inclusion and exclusion criteria

Inclusion criteria: Patients were eligible for the study if they met the diagnostic criteria for HF following emergency PCI for AMI, with left ventricular ejection fraction (LVEF) ≤40% [9]; their cardiac function was graded as III-IV according to New York Heart Association (NYHA) criteria; they were no less than 60 years old; their clinical data were available and complete; they had no cognitive impairment; and they underwent emergency PCI within 12 hours of symptom onset.

Exclusion criteria: Patients were excluded from the study if they had a history of cardiac surgery; they were complicated with other cardiovascular diseases; they presented malignancy or severe dysfunction of other major organs; they were allergic to dapagliflozin, sacubitril/valsartan, or related drugs; they were complicated with coagulation disorder and severe infection; they had cardiogenic shock and uncorrected severe valvular heart disease; or they were involved in other clinical trials during the study period.

Based on preliminary retrospective data and relevant literature, the estimated difference in LVEF improvement between the study group and the control group at 3 months post-treatment was approximately 5%, with an estimated standard deviation of 6%. Using a two-sided test with significance level α=0.05 and power of 80%, the G*Power software calculated a sample size of 36 patients per group. Accounting for an anticipated 10% follow-up loss rate, a minimum of 40 patients in each group was recommended. At last, the control group enrolled 43 patients, and the study group included 51 patients, meeting the statistical requirements for overall sample size.

Treatment methods

Treatment regimens were designed by the director and attending physicians of the Department One of Cardiology at Tangshan Gongren Hospital in accordance with *the Chinese Guidelines for the Diagnosis and Management of Acute Myocardial Infarction*. All patients received standard therapy, including antihypertensive, lipid-lowering, antiplatelet aggregation, and anticoagulant treatments. The control group additionally received sacubi-

Table 1. Comparison of baseline data between the two groups

Group	Gender (male/female)	Age (year)	NYHA grading (III/IV)	BMI (kg/m^2)	Smoking history (yes/no)	Time from symptom onset to hospital presentation (h)
Control group (n=43)	25/18	70.65±6.33	23/20	23.23±2.03	22/21	4.92±1.33
Study group (n=51)	29/22	71.06±5.76	28/23	23.05±1.94	24/27	4.68±1.26
χ^2/t	0.016	0.329	0.019	0.439	0.157	0.897
P	0.901	0.743	0.891	0.662	0.692	0.372

Note: NYHA, New York Heart Association; BMI, body mass index.

tril/valsartan (Beijing Novartis Pharmaceutical Co., Ltd., CFDA approval number HJ20170363) at an initial oral dose of 50 mg twice daily, with adjustments to dosage based on patients' condition. The maximum dose did not exceed 200 mg twice daily. The study group received treatment regimen the same as the control group did plus fixed-dose dapagliflozin (Beijing Fuyuan Pharmaceutical Co., Ltd., CFDA approval number H20213836) at 10 mg once daily. All patients were treated for a duration of 12 weeks.

Data collection

Patients' data were extracted from the electronic medical record system and laboratory information system of the hospital, including: (1) Demographics: sex, age, body mass index (BMI), smoking history; (2) Clinical diagnosis and treatment regimen; (3) Cardiac function parameters before and after treatment, which include LVEF, left ventricular end-diastolic dimension (LVEDD), left ventricular end-systolic dimension (LVESD), E/A ratio; (4) HF biomarkers, such as B-type natriuretic peptide (BNP), N-terminal pro-BNP (NT-proBNP), troponin (Tn); (5) Ventricular remodeling indicators, such as left ventricular posterior wall thickness (LVPWT), interventricular septal thickness (IVST), left ventricular mass index (LVMI); (6) Inflammatory markers, such as interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF-α), high-sensitivity C-reactive protein (hs-CRP); (7) Vascular endothelial function indicators, which included nitric oxide (NO) and endothelin-1 (ET-1); (8) The results of 6-minute walk test (6MWT) and Minnesota Living with Heart Failure Questionnaire (MLHFQ); (9) Major adverse cardiovascular events (MACEs) and adverse drug reactions. All data were collected and cross-checked independently by two researchers to ensure accuracy and completeness of the study.

Outcome measures

Primary outcome measures encompassed: (1) Cardiac function recovery degree (LVEF change level); (2) MACE occurrence rate. Secondary outcome measures include: (1) Changes in HF-related biomarkers (BNP, NT-proBNP and Tn); (2) Ventricular remodeling degree; (3) Alterations in inflammatory levels; (4) Exercise tolerance (6MWT) and quality of life (MLHFQ); (5) Occurrence rate of adverse drug reactions.

Statistical analysis

Statistical analyses were performed using SPSS version 25.0. Categorical variables, including MACEs, adverse drug reactions, and clinical efficacy rates, were expressed as n (%) and analyzed using Pearson's chi-square (χ^2) test. Continuous variables, such as cardiac function data, HF biomarkers, inflammatory cytokines, exercise tolerance, and quality of life scores, were presented as mean ± standard deviation ($\overline{X} \pm S$) and compared using independent samples t-test. Independent samples t-test was also employed for between-group comparison and paired samples t-test for within-group comparison before and after treatment. A *p*-value less than 0.05 was considered significant.

Results

Comparison of baseline data between the two groups

Both groups demonstrated comparable baseline characteristics ($P > 0.05$). See **Table 1**.

Comparison of clinical efficacy between the two groups

The total effective rate for the treatment regimen in the study group was 94.12%, which was

Table 2. Comparison of clinical efficiency between the two groups

Group	Significantly effective (n, %)	Effective (n, %)	Ineffective (n, %)	Total Efficiency rate (n, %)
Control group (n=43)	20 (46.5%)	14 (32.6%)	9 (20.9%)	79.03%
Study group (n=51)	30 (58.8%)	18 (35.3%)	3 (5.9%)	94.12%
χ^2/t				4.744
P				0.029

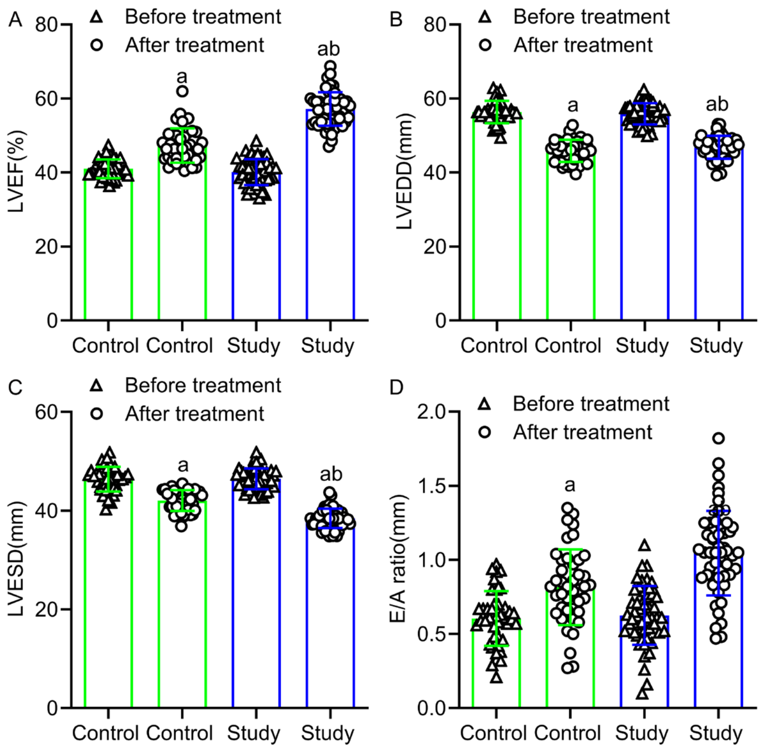

Figure 1. Comparison of cardiac function indicators between the two groups. After 12-week treatment in the study group, the improvement degrees of (A) LVEF, (B) LVEDD, (C) LVESD and (D) E/A values were all significantly better than those in the control. Compared to the control group before treatment, [a]P < 0.05; compared to the study group before treatment, [b]P < 0.05. LVEF, left ventricular ejection fraction; LVEDD, left ventricular end-diastolic dimension; LVESD, left ventricular end-systolic dimension.

significantly higher than that of the control group (79.03%) (P < 0.05). See **Table 2**.

Comparison of cardiac functions between the two groups

Before treatment, no significant differences were observed in cardiac function indices (LVEF, LVEDD, LVESD, and E/A ratio) between the two groups (all P > 0.05). After 12-week treatment, both groups showed significant increases in LVEF and E/A ratio, with greater improvements in the study group. Conversely, LVEDD and LVESD decreased markedly in both groups, with more pronounced reductions observed in the study group as well (P < 0.05). See **Figure 1**.

Comparison of HF biomarkers between the two groups

Prior to treatment, baseline levels of HF biomarkers showed no significant difference between the two groups. Following 12-week treatment, HF biomarkers decreased in both groups, with a significantly greater reduction in the study group, leading to markedly lower HF biomarker levels in contrast to the control group (P < 0.05). See **Table 3**.

Comparison of ventricular remodeling indicators between the two groups

After 12 weeks of treatment, both groups showed marked reductions in ventricular remodeling indicators. The study group demonstrated more substantial decreases compared to the control group (P < 0.05), with all measured indicators lower than those in the control group. See **Table 4**.

Comparison of inflammatory cytokines levels between the two groups

Before treatment, the levels of inflammatory cytokines were comparable between the two groups. After 12 weeks of interventions, inflammatory cytokines were reduced in both groups, with a significantly greater reduction observed in the study group compared to the control

Table 3. Comparison of heart failure biomarkers between the two groups ($\overline{X}\pm S$)

Group	BNP (pmol/L)		NT-proBNP (ng/L)		Tn (μg/L)	
	Before treatment	After 12 weeks of treatment	Before treatment	After 12 weeks of treatment	Before treatment	After 12 weeks of treatment
Control group (n=43)	36.12±5.17	27.64±4.66*	451.55±53.40	253.11±42.20*	0.64±0.18	0.53±0.12*
Study Group (n=51)	37.10±6.53	23.20±5.12*	455.82±62.82	216.85±63.77*	0.68±0.22	0.46±0.09*
t	0.796	4.363	0.351	3.185	0.953	3.227
P	0.428	0.000	0.726	0.002	0.343	0.002

Note: Compared to that before treatment in this group, *$P < 0.05$. BNP, B-type natriuretic peptide; NT-proBNP, N-terminal pro-BNP; Tn, troponin.

Table 4. Comparison of ventricular remodeling indicators between the two groups ($\overline{X}\pm S$)

Group	LVPWT (mm)		IVST (mm)		LVMI (g/m^2)	
	Before treatment	After 12-week treatment	Before treatment	After 12-week treatment	Before treatment	After 12-week treatment
Control group (n=43)	10.12±2.10	8.77±1.26*	11.37±1.40	9.54±1.40*	118.33±7.12	106.22±5.13*
Study Group (n=51)	10.51±1.83	7.36±1.12*	11.12±1.52	8.04±1.37*	119.70±6.23	101.55±6.36*
t	0.962	5.743	0.823	5.236	0.995	3.869
P	0.339	0.000	0.412	0.000	0.322	0.000

Note: Compared to that before treatment in this group, *$P < 0.05$. LVPWT, left ventricular posterior wall thickness; IVST, interventricular septal thickness; LVMI, left ventricular mass index.

Table 5. Comparison of inflammatory cytokines ($\overline{X}\pm S$)

Group	IL-6 (pg/L)		TNF-α (pg/mL)		hs-CRP (mg/L)	
	Before treatment	After 12 weeks of treatment	Before treatment	After 12 weeks of treatment	Before treatment	After 12 weeks of treatment
Control group (n=43)	211.14±42.05	142.72±31.20*	172.32±31.40	121.33±21.40*	151.09±27.33	57.22±12.13*
Study Group (n=51)	218.53±31.77	113.25±40.55*	176.55±25.12	103.20±21.55*	157.46±21.12	41.77±9.33*
t	0.969	3.891	0.726	4.077	1.274	6.975
P	0.335	0.000	0.470	0.000	0.206	0.000

Note: Compared within group before treatment, *$P < 0.05$. IL-6, interleukin-6; TNF-α, tumor necrosis factor-alpha; hs-CRP, high-sensitivity C-reactive protein.

group ($P < 0.05$), indicating better improvement for patients in the study group. See **Table 5**.

Comparison of exercise tolerance and quality of life scores between the two groups

Following 12-week treatment, both groups showed improvements in exercise tolerance as measured by 6MWD test compared to baseline, with a more pronounced increase in the study group in contrast to controls ($P < 0.05$). Additionally, both groups experienced reductions in MLHFQ scores, indicating improved quality of life; the decrease was more significant in the study group compared to the control group ($P < 0.05$), suggesting superior improvement. See **Table 6**.

Comparison of vascular endothelial function between the two groups

Following 12-week treatment, patients in both groups showed increased NO levels compared to baseline, with a more pronounced elevation observed in the study group. Additionally, patients in both groups demonstrated reduced ET-1 levels compared to pre-treatment level, with greater reduction observed in the study group compared to the controls ($P < 0.05$). See **Table 7**.

Table 6. Comparison of exercise tolerance and quality of life scores between the two groups before treatment and after 12-week treatment ($\bar{X}$±S)

Group	6MWT (m)		MLHFQ scores (points)	
	Before treatment	After 12-week treatment	Before treatment	After 12-week treatment
Control group (n=43)	236.55±22.10	406.24±31.77*	77.12±8.45	45.51±5.12*
Study Group (n=51)	240.11±19.56	447.11±34.08*	78.35±7.12	38.04±4.30*
t	0.828	5.974	0.766	7.690
P	0.410	0.000	0.446	0.000

Note: Compared within group before treatment, *P < 0.05. 6MWT, 6-minute walk test; MLHFQ, Minnesota Living with Heart Failure Questionnaire.

Table 7. Comparison of vascular endothelial function between the groups before treatment and after 12-week treatment ($\bar{X}$±S)

Group	NO (nmol/L)		ET-1 (ng/L)	
	Before treatment	After 12-week treatment	Before treatment	After 12-week treatment
Control group (n=43)	15.79±3.65	35.25±5.12*	52.23±4.44	40.37±3.85*
Study Group (n=51)	16.08±3.42	47.88±6.05*	52.81±4.62	31.06±3.02*
t	0.397	10.808	0.617	13.133
P	0.692	0.000	0.539	0.000

Note: Compared within group before treatment, *P < 0.05. NO, nitric oxide; ET-1, endothelin-1.

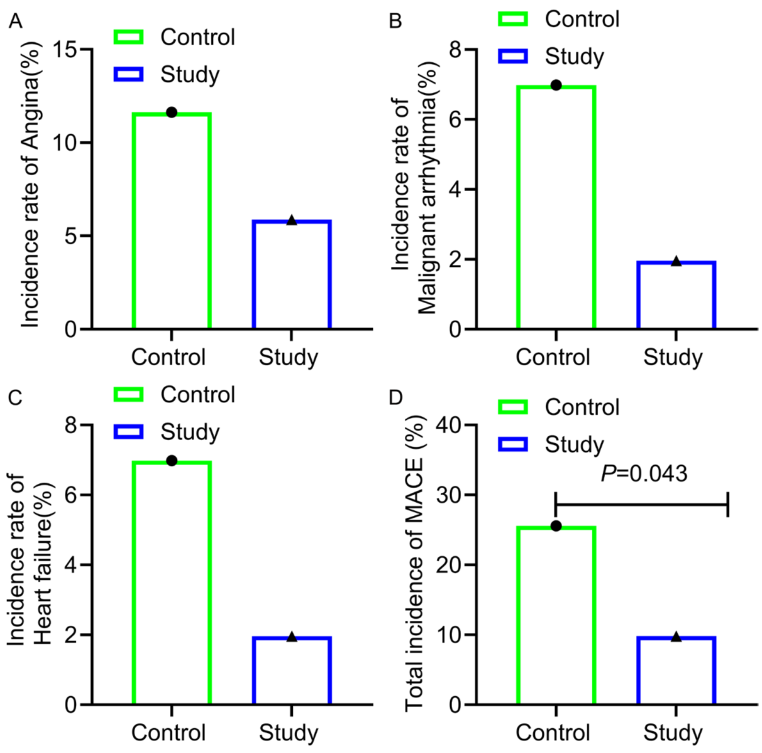

Figure 2. Comparison of MACE incidence between the two groups [n (%)]. A: Incidence of angina pectoris; B: Incidence of malignant arrhythmia; C: Incidence of heart failure; D: The total incidence of major adverse cardiovascular events was compared between the two groups (P=0.043). MACEs, major adverse cardiac events.

Comparison of incidence rates of MACEs between the two groups

The study group demonstrated a significantly lower incidence of MACEs compared to the control group (9.80% vs. 25.58%, P < 0.05). See **Figure 2**.

Comparison of adverse drug reactions between the two groups

No significant differences were observed in the incidence of adverse drug reactions between the two groups (9.80% vs. 6.98%, P > 0.05). See **Table 8**.

Case presentation

Case 1: A 62-year-old female patient underwent emergency PCI with coronary stent implantation due to acute inferior myocardial infarction. After

Table 8. Comparison of adverse drug reactions between the two groups [n (%)]

Group	Low blood pressure	Diarrhea	Urinary tract infection	Total
Control group (n=43)	2 (4.65)	1 (2.33)	0 (0.00)	3 (6.98)
Study Group (n=51)	2 (3.92)	2 (3.92)	1 (1.96)	5 (9.80)
χ^2				0.014
P				0.906

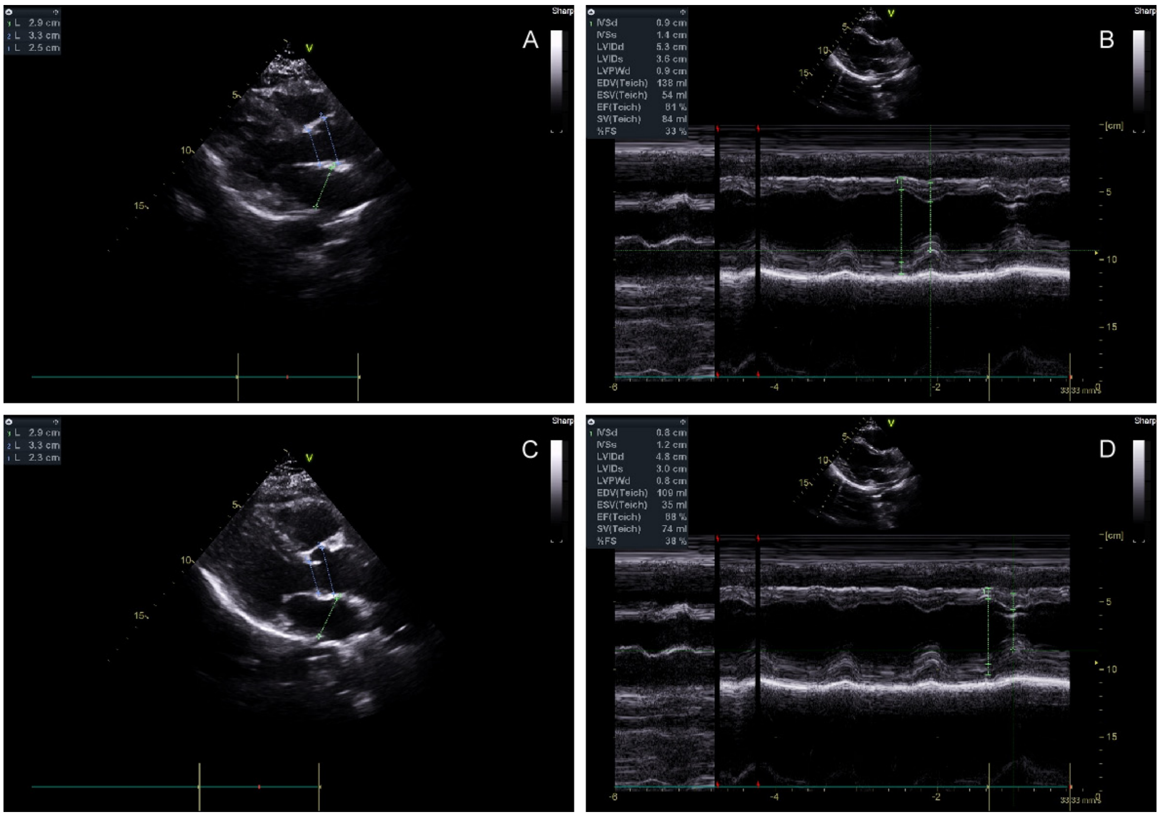

Figure 3. Representative echocardiographic changes before and after treatment in a patient with heart failure post-acute myocardial infarction and Percutaneous Coronary Intervention. A, B: Pre-treatment echocardiography; C, D: Post-treatment echocardiography following 3-month combined dapagliflozin and sacubitril/valsartan therapy.

intervention, she developed chronic HF, accompanied by symptoms such as dyspnea, fatigue, and reduced exercise tolerance. Initial echocardiography examinations in May and December 2019 showed left ventricular dilation [left ventricular end-diastolic diameter (LVIDd) increased from 4.8 cm to 5.3 cm; left ventricular end-systolic diameter (LVIDs) increased from 3.0 cm to 3.6 cm], LVEF decreased from 68% to 61%, stroke volume (SV) decreased, and fractional shortening (%FS) declined to 33%. Doppler assessment revealed mild mitral and aortic regurgitation and impaired diastolic function (E peak < A peak). After 3 months of standard HF therapy combined with dapagliflozin (10 mg once daily) and sacubitril/valsartan (50-100 mg twice daily), follow-up echocardiography showed improvements: LVIDd decreased from 5.3 cm to 4.8 cm, LVIDs from 3.6 cm to 3.0 cm, LVEF increased from 61% to 68%, SV increased from 74 ml to 84 ml, and %FS rose to 38%. The severity of mitral and aortic regurgitation was reduced, and tissue Doppler imaging demonstrated better diastolic function with the E peak exceeding A peak (see **Figure 3**). No significant adverse events occurred during treatment, and the patient's clinical symptoms were markedly relieved.

Case 2: A 64-year-old male patient with a history of AMI underwent PCI. After intervention, he developed symptoms including reduced

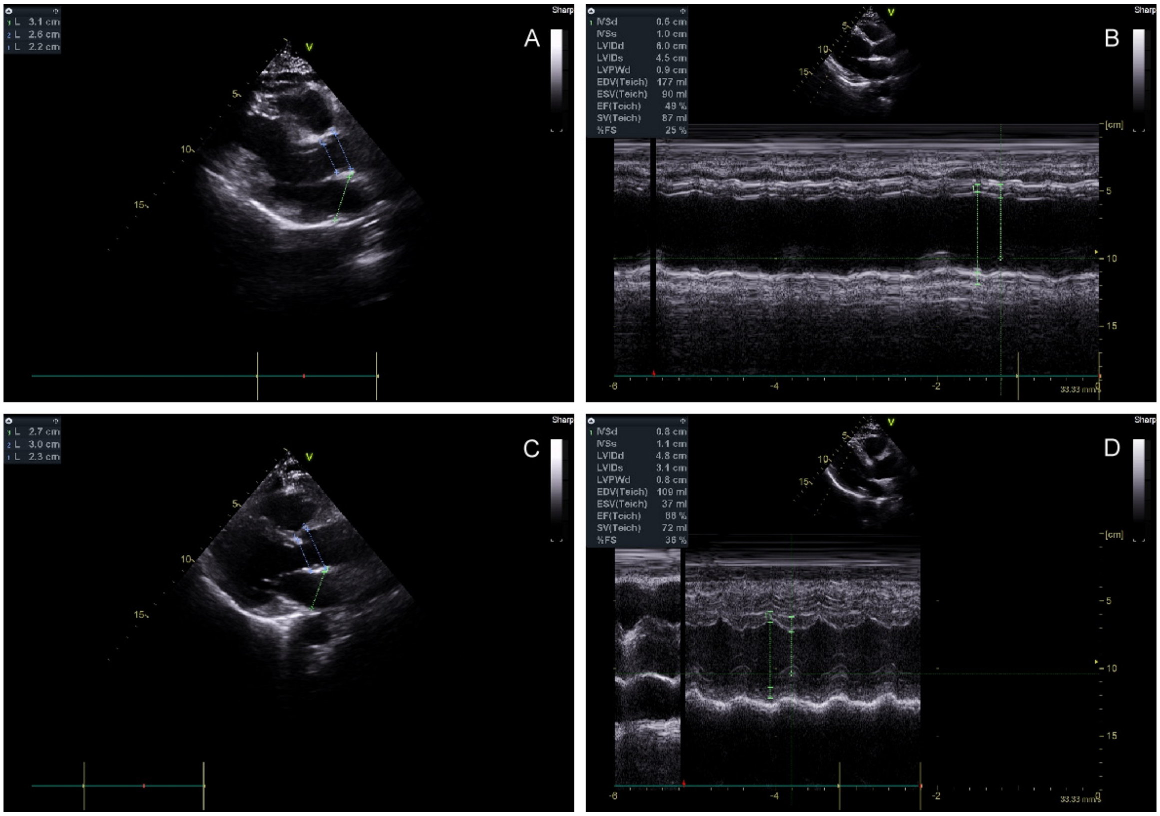

Figure 4. Echocardiographic changes before and after treatment in a patient with heart failure following PCI. A, B: Pre-treatment echocardiography (Dec 2019); C, D: Post-treatment echocardiography following 3-month combined dapagliflozin and sacubitril/valsartan therapy. PCI, Percutaneous Coronary Intervention.

exercise tolerance, dyspnea, and fatigue, and was diagnosed with HF. The initial echocardiographic examination showed a LVEF of 66%, SV of 72 ml, and LVIDd of 4.8 cm, indicating compensated cardiac function. However, mitral valve posterior leaflet annular calcification and mild mitral regurgitation were observed, along with mild aortic valve regurgitation. Subsequent follow-up revealed progression of left ventricular remodeling, with LVEF declining to 49%, LVIDd increasing to 6.0 cm, LVIDs reaching 4.5 cm, and %FS decreasing to 25%. Multiple abnormalities in segmental wall motion were detected. Clinical assessment indicated moderate mitral regurgitation and pulmonary artery systolic pressure of 66 mmHg, consistent with moderate pulmonary hypertension. Additionally, a small pericardial effusion was noted, indicating ongoing HF progression. After three months of treatment with dapagliflozin combined with sacubitril/valsartan on top of conventional therapy, follow-up echocardiography demonstrated significant improvement in left ventricular function: ejection fraction increased to 66%, LVIDd reduced to 4.8 cm, end-systolic volume markedly decreased, and %FS improved to 36%. Additionally, valvular regurgitation was alleviated, pulmonary artery pressure decreased, and pericardial effusion was absorbed. Clinically, the patient's symptoms were significantly relieved (see **Figure 4**). These findings indicated that the combination of dapagliflozin and sacubitril/valsartan can effectively improve left ventricular structure and heart pumping function in HF patients after PCI, and reduce valvular regurgitation and pulmonary hypertension. This suggests the regimen can reverse ventricular remodeling to aid comprehensive HF management.

Discussion

Population aging and changes in lifestyle have contributed to a sustained increase in AMI incidence among the elderly in China, establishing AMI as a leading cardiovascular disease burden in this demographic [10]. Although emergency PCI can effectively unblock infarctrelated arteries, the occurrence of HF post-intervention is still a critical factor adversely affecting patients' prognosis [11, 12].

This study innovatively applied the combination of dapagliflozin and sacubitril/valsartan for HF in elderly AMI patients post-emergency PCI. The study results demonstrated that the combined therapy yielded significant advantages in improving cardiac function of patients and elevating their exercise tolerance and quality of life. These benefits are primarily attributed to following mechanisms: Sacubitril, a neprilysin inhibitor, is metabolized into an active neprilysin-inhibiting compound that suppresses neprilysin activity, thereby reducing the degradation of natriuretic peptides. Natriuretic peptides exert vasodilatory and natriuretic effects, which help alleviate cardiac preload and afterload and improve ventricular remodeling [13]. Valsartan is an angiotensin II receptor blocker that alleviates myocardial fibrosis, inhibits myocardial hypertrophy, and delays cardiac remodeling by antagonizing the effects of angiotensin II [14, 15]. The combined use of Sacubitril and Valsartan effectively reduces cardiac workload and reverses ventricular remodeling, playing a crucial role in the recovery of cardiac function. As a SGLT2 inhibitor, dapagliflozin acts on the proximal renal tubules to inhibit the reabsorption of sodium and glucose, promoting natriuresis and glucosuria. This osmotic diuretic effect helps prevent fluid retention, reduces cardiac preload, and facilitates the recovery of cardiac function. Additionally, dapagliflozin can improve myocardial contractile function by altering myocardial metabolic pathways to reduce glucose uptake in cardiac tissue and optimize myocardial energy use. Moreover, it alleviates cardiac mechanical load and promotes functional recovery by decreasing vascular stiffness and inhibiting myocardial fibrosis [16, 17]. Since sacubitril/valsartan and dapagliflozin exert their cardioprotective effects through distinct mechanisms, their combined use may produce a synergistic effect, further enhancing their therapeutic efficacy.

Berezin et al. reported that elderly HF patients exhibit significantly higher BNP and NT-proBNP levels compared to healthy individuals [18]. HF is a chronic progressive disease influenced by multiple factors, among which ventricular remodeling plays a crucial role in its pathophysiology [19]. In elderly AMI patients undergoing PCI, coronary reperfusion frequently triggers a substantial inflammatory response, resulting in the release of inflammatory cytokines such as IL-6, TNF-α, hs-CRP. This process not only exacerbates cardiomyocyte injury but also impairs vascular endothelial function, ultimately leading to further deterioration of cardiac performance and increased risk of HF occurrence [20]. Meanwhile, PCI is an invasive vascular procedure, which induces mechanical vascular injury that potentiates inflammatory response, resulting in ischemic cardiomyocyte necrosis and elevated HF incidence. Notably, the present study demonstrated that the combined therapy effectively ameliorated ventricular remodeling, attenuated inflammatory responses, and improved endothelial function. The underlying mechanism might lie in dapagliflozin's ability to inhibit inflammatory cell infiltration in myocardial tissue, thereby reducing myocardial injury. The two agents may act synergistically to suppress inflammatory responses and improve vascular endothelial function, thereby mitigating myocardial injury. Furthermore, the study results suggested that this combined treatment regimen did not increase the incidence of adverse reactions in patients. Patients receiving the combined therapy showed favorable prognoses.

In conclusion, the combined treatment regimen demonstrated definite efficacy in elderly patients with HF following emergency PCI for AMI. It effectively improved cardiac function, suppressed inflammatory responses, enhanced exercise tolerance, and improved quality of life, all while maintaining a favorable safety profile and prognosis. However, as this was a single-center retrospective study with a limited sample size, multivariate regression analysis was not performed. This may have allowed confounding factors to alter study results. Therefore, future large-scale prospective studies are warranted to further validate these findings and expand the therapeutic benefits to a broader patient population.

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Disclosure of conflict of interest

None.

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