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Sacubtril/valsartan in HFpEF and Maintenance Hemodialysis

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Abstract The purpose of this report is to describe effectiveness and tolerability of medical treatment with sacubitril/valsartan in a patient treated with hemodialysis. We describe the case of a 68-year-old man with heart failure with ejection fraction more than 60%, that is HFpEF undergoing hemodialysis. He had several times heart failure due to diastolic dysfunction, he could tolerate a dose of 50/50mg, total 100mg daily. After initiation of sacubitril/valsartan, there was a symptomatic improvement with clear reduction NT-proBNP, left atrial dimension, E/e' as well as EF. In conclusion, in this patient with diastoric dysfunction undergoing hemodialysis, treatment with sacubitril/valsartan was effective, safe, and improved heart failure symptoms.

Keywords: *Sacubitril/valsartan, ARNI, heart failure, HFpEF, hemodialysis*

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1. Case Report

A- 68 year-old male treated with hemodialysis was evaluated for heart failure with diastolic dysfunction and a normal ejection fraction (EF). Two years prior, he had a brain infarction, but had no paresis.

His underlying diseases were hypertension and diabetes type II. He was started on hemodialysis twenty months ago.

He showed heart failure with slight volume overload; that is, he had less than 5% volume overload inter-hemodialysis. The left ventricular function was 62%; his E/e' on average was 15-20. The left atrial diameter was 37 mm, which was slightly elevated, His E/A was 0.48 (normal 1-2), and also had diastolic dysfunction. According to the Universal Definition and Classification (2021) [1], his heart failure was HFpEF. Ultrasound showed mitral valve calcification. His dry weight was 55 kg, his CTR was 44%, had no edema, and he had NYHA class II.

Additionally, during this time, he was admitted to the hospital for dyspnea, X-ray exam was completed, and he had 90% oxidation (room air).

He was treated with αβ broker and angiotensin receptor blocker (ARB), and his NTproBNP at that time was 14034 pg/ml. His renin level was 1.3 ng/ml, and aldosterone level was less than 4.0 pg/ml. E/e' was 19.6, LAD 37 mm, E/A 0.48, EF 62%.

We switched from ARB to sacubitril/valsartan treatment on this patient. The drugs were given every day, and the patient had a blood pressure of 140/80 mmHg before hemodialysis session. He tolerated a dose of 50/50 mg, for a total of 100 mg /day.

At 4 weeks follow-up consultation, his blood pressure was 136/ 76 mmHg, dry weight was the same as that of before sacubitril/valsartan treatment, 55kg. NTproBNP decreased to 6766 pg/ml, E/e' changed to 9.4, LAD 36mm, E/A 0.68, EF increased to 72%. He described a symptomatic improvement. The functional class improved from NYHA II to NYHA I.

Three months later, he showed more improvement. NTproBNP decreased to 4750 pg/ml, LAD 33 mm, E/e' 13.5, E/A 0.65, LVDd 55mm, and EF 77%. His blood pressure was 110/60 mmHg, and the dose of sacubitril/valsartan was decreased to 50/50 mg on non-dialysis day. After 6 months follow-up, NTproBNP was 3925pg/ml, LAD 33mm, E/e' 13, E/A 0.75, LVDd 47mm, and EF was maintained at 73%. During the period, little change in dry weight from 55kg to 54kg. Up now, 10 months after the initiation of sacubitril/valsartan, there have been no episodes of worsening heart failure. There were no side effects, such as hyperkalemia, lymphedema, or low blood pressure.

2. Discussion

HFpEF patients have a variety of factors, especially, end-stage renal failure, and the underling diseases of hemodialysis patients are diabetes mellitus, hypertension, and hyperuricemia.

We describe a patient undergoing hemodialysis with normal EF and diastolic dysfunction, HFpEF.

In a sub-study of Solomon [2], sacubitril/valsartan showed a better effect for females, who had a GFR < 60ml/min/1.73 m^2, and an EF < 58 %, that is, HFpEF patients According to universal definition and classification, this patient had diastolic dysfunction, elevated biomarker, and symptoms consistent with heart failure, stage C. In the Japanese guideline [3], sacubitril/valsartan is sited to class I.

Although there are several reports regarding sacubitril/valsartan for HFrEF pateints undergoing hemodialysis [4,5,6,7,8,9], there are no reports of hemodialysis patients with HFpEF.

There was symptomatic improvement with a change from NYHA Class II to NYHA Class I. The biomarker NTproBNP was impressive and concordant with the clinical improvement and echocardiographic parameters, LAD, E/e', E/A as well as EF.

3. Conclusion

This case shows in the patient with normal EF and diastolic dysfunction, HFpEF, undergoing hemodialysis, treatment with sacubitril/valsartan was effective, safe, and accompanied by symptomatic improvement.

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