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Transient left ventricular dysfunction after flow reduction therapy for high-flow fistula in a hemodialysis patient: a case report

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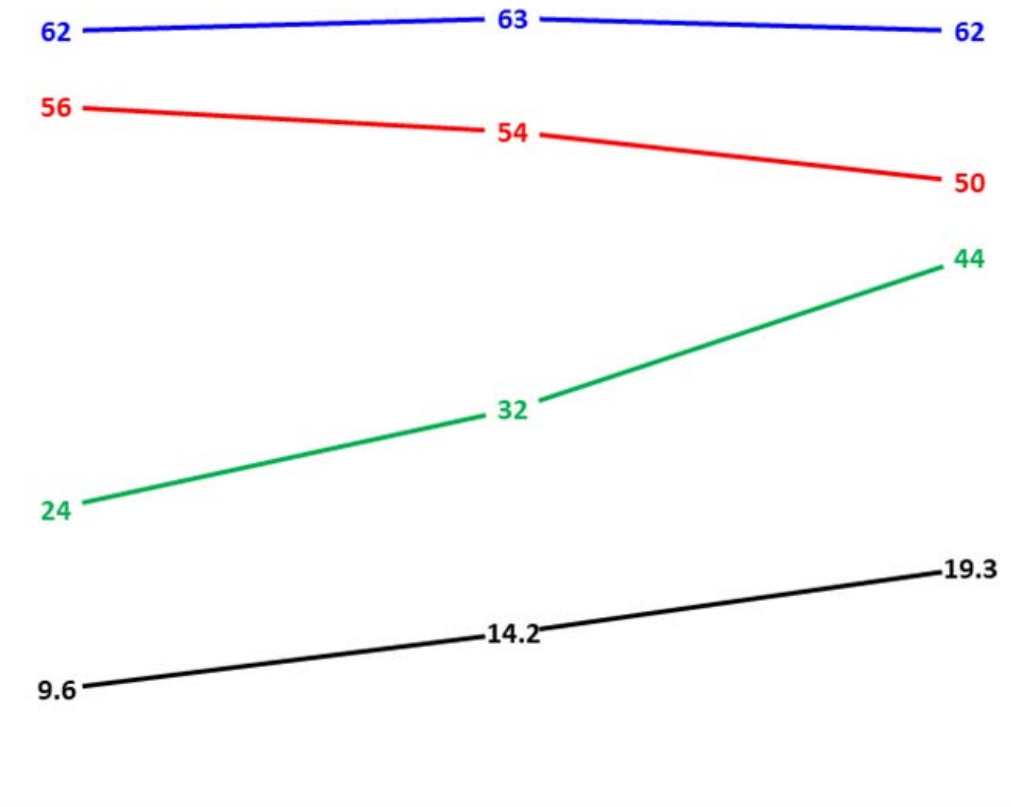
Case Study

A 65-year-old hemodialysis (HD) patient visited a vascular access center for flow reduction therapy due to a high-flow fistula. The flow volume (FV) of arteriovenous fistula (AVF) was 4,450 ml/min, and it was reduced to 1,114 ml/min via surgical repair. After 12 hours of the procedure, dyspnea of the New York Heart Association class IV occurred, although no signs or symptoms of heart failure were present prior to the procedure. The ejection fraction (EF) was 24% in transthoracic echocardiography (TTE), which was markedly decreased compared to EF (≥ 50%) of the TTE examined before the surgical revision. The symptoms and radiologic findings were improved by increasing ultrafiltration during HD and reducing afterload with angiotensin receptor antagonists. The EF gradually restored to 32% and 44% in the followed TTE at 2 months and 1 year after (Figure 1). At present, the patient maintains HD via the AVF of reduced FV without any signs of heart failure.

Because a prolonged high-flow AVF eventually results in high-output heart failure, updated guidelines recommend a flow reduction therapy. However, there has been a concern that transient left ventricular (LV) dysfunction may occur immediately after the flow reduction therapy. Especially, a large amount of flow reduction results in an abrupt decrease in the LV preload and increment in the afterload, which can promptly lead to LV systolic dysfunction with significant EF reduction. However, structural changes in the LV myocardium may impair recovery, while the favorable effect by reduced FV gradually progresses even more than 1 year. In this patient, deterioration in EF was noted shortly after a flow reduction of more than 3L/min, and it was gradually restored for the next 12 months. It is necessary to monitor LV systolic function and study postprocedural LV dysfunction risk factors in the flow reduction therapy for high-flow AVF.

Figure 1. Serial changes of echocardiographic parameters after flow reduction



EF, Ejection fraction;
LVEDD, Left ventricular end-diastolic diameter;
LVESD, Left ventricular end-systolic diameter;
FS, Fractional shortening