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tDue to the increase in the number of patients waiting for heart transplantation and shortage of heart donors, both the use of mechanical assist devices and their associated complications increase. Here we present the case of a stenosis occurring in a patient at aortic outflow graft anastomosis for whom we applied a left ventricular assist device, followed by a discussion of the diagnosis, approach, and the treatment we offer in our clinic.

Key words: Circulatory support device, Obstruction

Introduction

The use of mechanical assist devices for the heart is a rapidly evolving field because of the increased number of patients waiting for heart transplant and the decreased number of donors.1 Parallel to the increased use of ventricular assist devices are the increased number of complications.2,3

Stenosis that forms in the outflow graft is one adverse effect of left ventricular assist device (LVAD) implantation. In this case report, we aimed to discuss the diagnosis and treatment of an outflow graft stenosis that occurred in a patient with an LVAD.

The study was conducted according to the guidelines of the Declaration of Helsinki, and the study protocol was approved before the beginning of the study by the Ethics Committee of our University.

Case Report

As a bridge to heart transplant, the Heartware ventricular assist system (Heartware Inc., Framingham, MA, USA) was implanted in a 59-year-old male patient who had been diagnosed with dilated cardiomyopathy and who had been having visits to our hospital’s routine LVAD follow-up program after discharge. Five months after LVAD implant, the patient was admitted to our clinic with temporary memory loss and inability to speak. Our preliminary diagnosis was transient ischemic attack. The LVAD log file analyses showed a slight but significant decrease in both power consumption and the flow parameters during the previous 15-day period. A slight increase in left ventricular volume was determined during the patient’s echocardiographic evaluation. The patient underwent computerized tomographic angiography, and a stenosis at the anastomosis of LVAD outflow graft was detected (Figure 1).

Figure 1. Stenosis at Aortic Anastomosis of the Outflow Canula

It was decided to place a stent into the outflow graft. An angiography catheter was advanced into the stenotic area via the right femoral artery, and a 10-mm-stent was placed into the stenotic segment, as
a short section remaining in the aorta. The stenosis that was observed had resolved completely after the procedure (Figure 2). Power consumption and the flow parameters of the LVAD returned to normal levels after stenting. The patient’s pre- and post-procedural echocardiographic parameters are shown in Table 1, and LVAD parameters are shown in Table 2.

Discussion

Patients with end-stage heart failure are increasingly being treated by application of ventricular assist devices; however, adverse effects can occur. Stenosis at the distal anastomosis of the outflow graft was the unlikely finding in our case. We initially surmised that the transient ischemic attack in this patient was a result of emboli of small thrombosis formation occurring in the stenotic region.

Our group had also initially surmised that a technical error may have occurred during the surgical procedure, such as stitches taken from the opposite wall of the aorta or graft, leading to the stenosis. However, the patient’s LVAD log records over the 5 months since implant showed changes during the past 15 days before hospitalization. These changes eventually returned to the baseline device levels after stent placement, showing that a technical error probably did not occur.

Another reason as cause of the stenosis could have been the long neck of the outflow graft, which allowed kinking formation at the distal anastomosis line. This may occur due to the long length of an outflow graft during a surgical procedure. However, for the reasons mentioned above, this was also not the case for our patient.

During review of the literature, we found no similar cases. Other publications were those related to usual thrombosis inflow and/or outflow cannula. For these cases, medical therapy (heparin, tissue plasminogen activator, eptifibatide), device exchanges, and transplant were used as treatment solutions. In our case, because of the lack of thrombosis (in the stenotic segment if any), we had 2 treatment choices. The first was to refresh the distal anastomosis with open surgery, and the second was placing a stent into the stenotic segment. We thought it would be less risky to choose the second option.

The method described here has not been documented previously. We believe that this method is preferable in those who may encounter obstruction or detect stenosis at the outflow cannula of an LVAD in the future as it has a lower risk to these patients.

References