CASE REPORT

Discontinuation of anticoagulant therapy for a month in a patient with HeartMate III continuous-flow left ventricular assist device without thromboembolic events

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The recommended anticoagulation regimen for continuous-flow left ventricular assist device (LVAD) systems is warfarin and aspirin with a targeted international normalized ratio (INR) of 2.0–3.0. Our patient is a 58-year-old male who underwent surgical HeartMate III continuous-flow LVAD implantation 3 months ago outside the country. The patient mistakenly stopped taking warfarin for 1 month prior to presenting to our center for a routine visit. Luckily, the patient was doing very well without any complication despite the fact that his INR was 1.0.

Keywords: Anticoagulation, Continuous flow LVADs, Heart Mate III

Introduction

Left ventricular assist devices (LVADs) are increasingly being used as a bridge to heart transplantation and as a destination therapy for certain patients with advanced heart failure. Continuous-flow (CF) LVADs carry fewer complications and have better durability than the old pulsatile-flow LVADs. Nevertheless, anticoagulation with warfarin and aspirin is mandatory in all kinds of LVADs [1,2]. We describe a case in which HeartMate III was implanted in a patient with dilated nonischemic

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cardiomyopathy 3 months ago, and we discovered accidentally that the patient has mistakenly stopped taking warfarin for 1 month. It is our hope that this case presentation will help open the door for more research on the optimum anticoagulation for patients with new CF LVADs.

Case report

The patient is a 58-year-old male with dilated non-ischemic cardiomyopathy and atrial fibrillation. He was implanted with cardiac resynchronization therapy-defibrillator (CRT-D) 3 years ago. He also had LVAD (HeartMate III) implanted in India as a destination therapy for his advanced heart failure 3 months prior to presentation to our institution. The patient is an ex-smoker; he quit smoking 18 years ago and had diagnostic coronary angiography 5 years ago, which yielded normal results. The patient presented to our clinic for a routine visit for the first time after LVAD implantation. He was in a good general condition with almost no symptoms of heart failure and was euvolemic. After reviewing his medications, we found that he had mistakenly stopped taking warfarin for 1 month because of confusion between generics. However, he continued taking aspirin (at a dose of 100 mg once daily). We requested a stat international normalized ratio (INR), which was found to be 1.0. The patient was admitted to our institution, and heparin infusion was started for a target activated partial thromboplastin time of 1.5- to 2-fold of normal values. The patient was stable from the cardiac point of view with no significant dyspnea, orthopnea, paroxysmal nocturnal dyspnea, palpitation, syncopy, or presyncopy. The patient looked comfortable on the bed, and was conscious, well oriented, and cooperative. There was no sign of respiratory distress, and he had a main arterial blood pressure of 80 mmHg (as assessed by Doppler), heart rate of 75, and an O_2 saturation of 98% in room air. His jugular venous pressure was 5 cm above the sternal angle with no lower limb edema, and his chest was clear by auscultation. Cardiac examination revealed continuous machinery hum-like sounds heard all over the precordium (LVAD sound). The external drive line was clean with no evidence of infection. The lactic dehydrogenase was 262 μ/L (within normal range). His echocardiography yielded the following results: the left ventricle was dilated with global hypokinesia and an ejection fraction of 25%; the right ventricle was normal in size and function; inflow and outflow cannulas were seen with no evidence of any masses related to them or intracavitary mass. He showed no evidence of thromboembolic disease and was discharged home after 4 days with an INR of 2.1 and was prescribed warfarin at a dose of 2 mg daily. He was also provided with information regarding his condition and a plan for close follow-up (Fig. 1A and B).

Discussion

Complications related to LVADs are mainly related to thromboembolism, bleeding, and infections. Lifelong oral anticoagulation with vitamin K antagonists with a target INR of 2–3 plus low dose aspirin is the recommended regimen [1]. The rate of stroke after CF LVADs was generally reported to be around 15%, but only one-third are embolic in origin and the other two-thirds were hemorrhagic [2]. Recent LVADs with smaller size, CF, magnetic levitation of the rotating impeller and the textured inner surface of the inflow and outflow cannulas may also help reduce the throm-

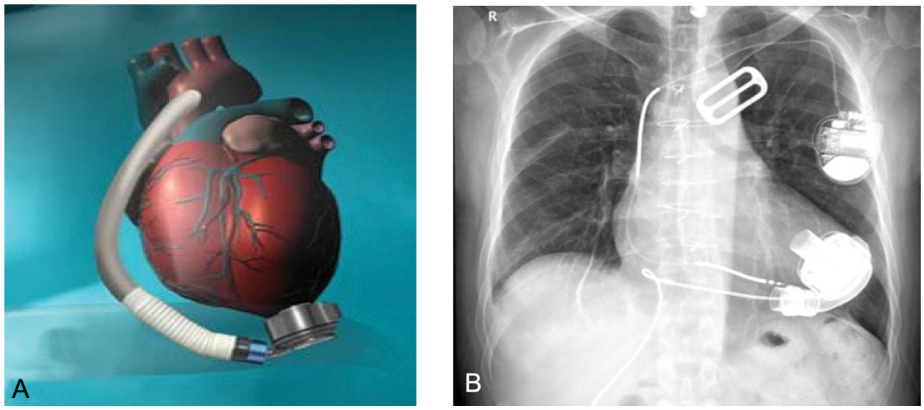

Figure 1. (A) HeartMate III continuous flow left ventricular assist device (LVAD) with the inflow cannula in the left ventricular apex and the outflow cannula in the ascending aorta. (B) Chest X-ray, posteroanterior view of our patient, showing the HeartMate III in place with the inflow and outflow cannulas and the driveline. The cardiac resynchronization therapy-defibrillator (CRT-D) device and the leads are shown.

bogenicity of these new devices [2]. Bleeding complications, by contrast, were a major cause of death in the HeartMate II destination therapy trial [3]. Gastrointestinal bleeding has been reported in single-center experiences, occurring in 15–40% of HeartMate II patients [4]. Given the fact that bleeding complications are much more often reported than embolic complications, adopting a lower INR recommendation may be sought in future research on CF LVADs. In a study of 331 patients discharged on HeartMate III, the rate of thromboembolism was low and the low numbers of thrombotic events were offset by a greater number of hemorrhagic events. The study recommended an appropriate target INR of be 1.5 to 2.5 in addition to aspirin therapy [5].

Reports about discontinuation of anticoagulant therapy in LVAD patients are very limited. Pereira et al [6] reported two cases of recurrent gastrointestinal bleeding during LVAD support, which necessitated discontinuation of antithrombotic medications for at least 1 year; despite this, however, neither patients developed thrombotic complications. Our patient has atrial fibrillation in addition to LVAD, and despite these two major indications for being on oral vitamin K antagonists anticoagulants, he luckily did not have any thromboembolic events after he stopped taking warfarin for 1 month.

Conclusion

We emphasize, by reporting this case, that oral anticoagulation for patients with modern CF LVADs may require more research with randomized studies on the ideal INR targets to balance the higher incidence of bleeding complications.

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