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Case report

Catheter ablation of incessant ventricular tachycardia in a patient with mechanical cardiac support: A case report

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ABSTRACT

In this study, we are presenting a patient with a combined heart issue – history of post-infectious cardiomyopathy and a myocardial infarction. HeartWare was implanted in this patient due to the advanced chronic heart failure. Afterwards, he had been suffering from recurrent episodes of ventricular tachycardia (VT), leading to right-sided heart failure even in the presence of functioning left ventricular assist device (LVAD). As a solution, catheter ablation was selected to achieve a decent hemodynamic stability and to bridge the patient to heart transplantation.

Introduction

Mechanical circulatory support serves as both short- and long-term aid for patients with chronic or acute heart failure. The aim of these devices is restoring sufficient cardiac output [1]. Despite the improvement of hemodynamic parameters and patients' clinical status, the institution of LVAD is associated with higher incidence of ventricular tachycardia [2]. Patients with advanced heart failure can experience this malignant arrhythmia before the LVAD implantation. After the device is instituted, the ventricular tachycardia usually originates from the vicinity of inflow cannula, most likely due to mechanical irritation by the cannula, sometimes combined with the presence of a scar that resulted from a remodeled ischemic myocardium [3,4].

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Case description

This article describes a case of a 50-year-old male with a history of post-infectious cardiomyopathy and heart attack. HeartWare was implanted in this patient due to the advanced chronic heart failure. Afterwards, the patient had been suffering from recurrent episodes of ventricular tachycardia (VT), leading to right-sided heart failure. A few treatment options were considered in this case – right-sided circulatory support, catheter radiofrequency ablation (RFA), or placement on the heart transplant ''urgent waiting list''. Eventually, the RFA was selected to bridge the patient to heart transplantation.

HeartWare is a type of left ventricular assist device (LVAD). The pump of the device is placed in the pericardium in the left ventricular apex. The blood comes through a short inflow cannula and is pumped to the ascending aorta [5].

The endocardial RFA performed in the left ventricle in a patient with this type of LVAD involves a risk of the catheter being sucked into the inflow cannula, resulting in a pump damage and a hemodynamic collapse of the patient. Another potential risk connected with this procedure is the interference of the HeartWare pump and the CARTO system used for electromagnetic mapping before and during the ablation (Fig. 1). In our case, the procedure was performed under local anesthesia via femoral vein. The transseptal puncture to the left atrium was guided by the intracardiac echocardiography (ICE) with the implementation of the steerable sheath.

Using a programmed ventricular stimulation, three forms of tachycardia were induced. One of them was VT consistent with the one repeatedly occurring in our patient, while the other two were very similar, differing only in frequency (109 min^{-1} or 165 min^{-1}).

By the means of the steerable catheter (Thermocool BW) and the mapping system (CARTO, BiosenceWebster, Israel),

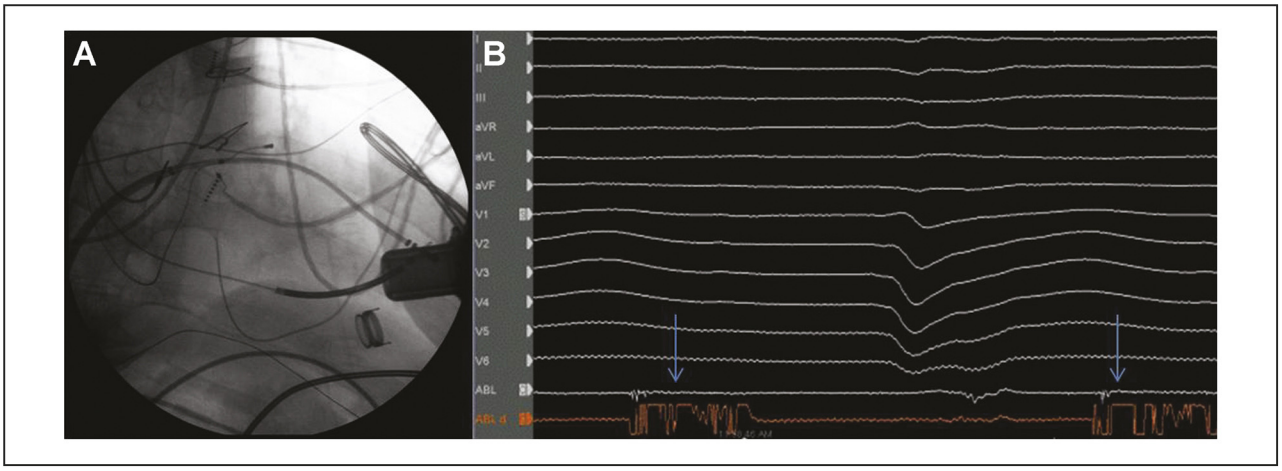

Fig. 1 – Interference (blue arrow) between mapping catheter and inflow cannula during contact (RAO).

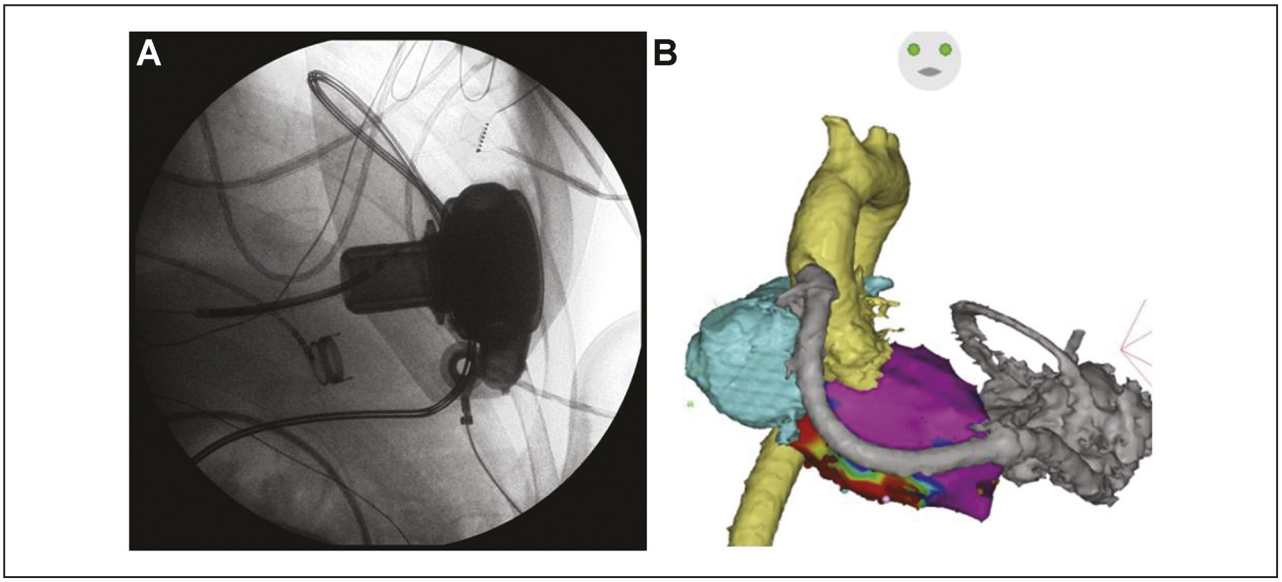

Fig. 2 – Comparison between skiagram (Panel A) and CARTO3 map (Panel B) in AP view. CARTO maps of LV (violet) and left atrium (blue) are merged with CT reconstruction of LVAD and outflow cannula (gray) and aorta (yellow).

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