Electrophysiology studies in a patient with an inferior vena cava filter

Vena cava inferiyor filtresi olan bir hastada elektrofizyolojik çalışmalar

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Introduction

Radiofrequency (RF) catheter ablation of atrial flutter or right atrial macro-reentrant tachycardias in patients who have pulmonary hypertension and a large right atrium requires careful endocardial mapping to localize the area of conduction critical for the maintenance of reentry (1).

The non-contact mapping system is able to detect far-field unipolar endocardial electrograms, generated by the endocardial surface. It presents an isopotential activation map of a virtually reconstructed endocardium, which allows analysis of the complete map from one tachycardia beat (2). Non-contact mapping catheters have a larger diameter, and safety and feasibility of use of these catheters through inferior vena cava (IVC) filters are not established.

Case Report

Forty-six year old woman with pulmonary hypertension and cor pulmonale due to chronic pulmonary embolism and had an operation (thromboendarterectomy) in 1997. In addition, because of the persistent deep venous thrombosis, a Günther Tulip™ IVC filter (Cook Incorporated Bloomington, USA) had been placed in 1996. She was referred to our department for recurrent atrial tachycardia and progressive dyspnea with reduction of quality of life. After discussions of the risks and benefits of an electrophysiology (EP) study with femoral venous access, the decision was made to proceed with non-contact cardiac mapping because of extensive enlargement of the right atrium (75mm in diameter). After explaining the risks and benefits of EP study, including the risk of dislodgment of the IVC filter, consent was obtained from the patient.

Test contrast injections proximal to the IVC filter were performed demonstrating no major filling defects or thrombi in the IVC prior to crossing the filter with either the guide wire or the catheters. During the intervention a 9 French (Fr) EnSite Catheter®, (St. Jude Medical, Minnesota, USA), a 7 Fr Ablation catheter (Medtronic RF Contactr,Medtronic Inc. Minneapolis, USA) and an Amplatz superstiff soft J type guidewire (Boston Scientific, Florida, USA) were used. The EnSite catheter was passed through the filter using the "over-the-wire" technique (Fig. 1). The ablation catheter was advanced across the filter under fluoroscopic monitoring to guard against filter migration and dislodgement. Due to hypercoagulability, the patient´s INR was maintained between 2.5 and 3.5 with oral anticoagulants. The activated clotting time (ACT) of the patient was between 300ms-350ms. During the intervention 10,000 units of intravenous heparin was given to guard against thromboembolic complications. Non-contact mapping of the right atrium revealed an isthmus dependent atrial flutter. Atrial flutter was terminated by catheter ablation. The guidewire and the EnSite Catheter were removed together under fluoroscopic monitoring. There were no complications such as migration or dislodgement of the IVC filter, guidewire entrapment or pulmonary embolism. The patient was seen as an outpatient every three months. Clinical history was obtained and Holter monitoring performed. Two years later, the patient was referred to us again for recurrent atrial tachycardia. This time conventional mapping was performed since a gap in the isthmus area was thought to cause the atrial tachycardia. An 8 mm tip ablation catheter (Medtronic RF Contactr, Medtronic Inc. Mineapolis, USA) and a multipolar diagnostic catheter (Biotronik ViaCath, Biotronik GmbH Berlin, Germany) were used. During mapping of the right atrium, a non-isthmus dependent macroreentrant tachycardia was observed. After the second intervention, there were also no complications. Ablation was planned for a future date using EnSite non-contact mapping system. Repeat mapping was performed using the same approach as in the first procedure. Mapping showed evidence of right atrial macroreentrant tachycardia. Catheter ablation resulted in termination of tachycardia. We performed three electrophysiology interventions using femoral approach in a patient with IVC filter. These included a diagnostic study using 7 Fr and 6 Fr catheters, and mapping and ablation using 9 Fr and 7 Fr catheters. One year later, the patient was evaluated and no clinical or documented arrhythmias were observed. There was no dislodgment of the filter and patient did not have any thromboembolic complications.

Discussion

The presence of an IVC filter has been considered a contraindication to the performance of a right heart catheterization or an electrophysiology study from femoral the venous system. This is due to the risk of migration or dislocation of IVC filters and entrapment of guidewires in IVC filters (3). Therefore, an internal jugular vein, subclavian vein or transhepatic approaches were preferred for patients with IVC filters (4, 5). However, these access sites could cause many complications. Internal jugular vein and subclavian vein approaches have a risk of pneumothorax, inadvertent puncture of the carotid artery, resulting in neck hematoma and air embolism, and access in invasion of the neck area is unpleasant for most patients (6). The transhepatic approach has the risk of intraperitoneal hemorrhage (7). Recent reports have shown that electrophysiology studies or right heart catheterizations from femoral veins in patients with IVC filters is technically possible and can be safe with the appropriate precautions (4, 5, 8). Our case report shows that repeated electrophysiology interventions with placement of multiple catheters including mapping catheters, through an IVC filter are feasible and safe. However, certain precautions need to be taken. To avoid any thrombotic complications, the patient's INR should be kept between 2 and 3 starting three weeks before the intervention and

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during the intervention. The ACT should be between 300 ms and 350 ms. Inferior vena cava filters are usually endothelialized after 3 weeks of device deployment. Crossing IVC filters after three or more weeks is thus relatively safe if a careful technique is utilized (9). In our case report, the filter had been placed 8 years prior to the EP study. We felt that the filter was in a stable position, and potential risk for migration or dislodgment was low. Contrast injection before crossing the filter will ensure there is no significant thrombus that might be dislodged (10). Each time the catheters are passed through the filter strict fluoroscopic monitoring must be performed. The balloon of the EnSite catheter should be fully deflated. To prevent against guidewire entrapment, the EnSite catheter and guidewire should be removed together. Straight guide wires or guide wires with soft tips should be chosen (4).

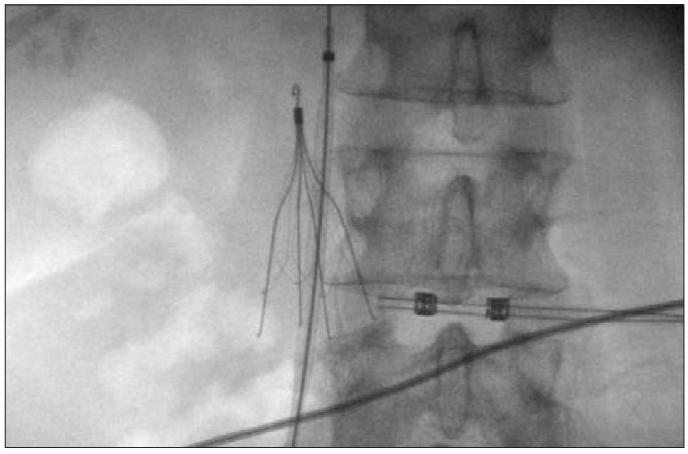

Figure 1. EnSite catheter with deflated balloon is being negotiated across the inferior vena cava filter

An EP study in a patient with an IVC filter system can be safely carried out from the femoral vein, even several times, without any complications if appropriate precautions are taken.

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Combined heterozygote factor V Leiden mutation and anticardiolipin antibody positivity in a young patient with spontaneous deep vein thrombosis

Kombine heterozigot faktör V Leiden mutasyonu ve antikardiyolipin antikor pozitifliği olan genç bir hastada derin ven trombozu

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Introduction

In this report, we present an interesting case of a combined heterozygote factor V Leiden mutation and anticardiolipin antibody positivity in a young patient with spontaneous deep vein thrombosis, which emphasizes importance of thrombophilia.

Case Report

A 21-year-old male was referred to our hospital because of an acute onset pain on his lower extremities. He had no previous medical history and no precipitating condition such as trauma, surgical procedure or immobility. Also he had no history of alcohol or cigarette consumption.

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