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CASE REPORT

Transvenous extraction of a 26-year-old Accufix atrial lead using TightRail rotating dilator sheath

Yirmi altı yıllık Accufix atriyal elektrodun TightRail dönen genişletici kılıf kullanılarak transvenöz çıkarılması

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Summary– With the increasing number of implanted pacemakers and implantable cardioverter defibrillators, removal is required more frequently. Presently described is the transvenous extraction of a 26-year-old Accufix atrial lead using a mechanical dilator sheath. A 50-year-old male patient was admitted to the clinic with a pacemaker pocket infection. The atrial lead was an Accufix Bipolar J-Atrial active fixation lead, a model that was recalled in 1994, after reports of 2 deaths and 2 nonfatal injuries related to protrusion of the J retention wire. Both the atrial and ventricular leads were extracted using a mechanical dilator sheath. The Pacemaker Lead Extraction with the Excimer Sheath (PLEXES) Trial reported that of the 57 Accufix leads randomized to a non-laser approach, only 47% were removed successfully, compared with 96% of laser-randomized cases. Since laser sheaths are not available in Turkey, use of a mechanical dilator sheath was required. To our knowledge, this is the oldest Accufix lead extracted with a non-laser sheath. During the extraction of the ventricular lead, the tip of the lead broke off inside the right ventricle and the residual part was left inside the heart. During 3 months of follow-up, no signs of infection or any other undesirable events were encountered.

Özet– İmplante edilebilen kardiyoverter defibrilatör ve kalp pillerinin yaygınlaşması ile birlikte çıkarma gereksinimi de artmaktadır. Biz 26 yıllık Accufix atriyal elektrodun mekanik genişletici kılıf kullanılarak çıkarıldığı bir olguyu sunuyoruz. Elli yaşında erkek hasta kliniğimize pil cebi enfeksiyonu ile başvurdu. Hastadaki atriyal elektrot, 1994 yılında J tutma telinin yerinden çıkmasına bağlı iki ölüm ve iki ölümcül olmayan yaralanma olgusunun bildirilmesinden sonra geri çağrılan Accufix Bipolar J atriyal aktif fiksasyon elektrodu idi. Atriyal ve ventriküler elektrodların her ikisi de mekanik genişetici kılıf kullanılarak çıkarıldı. The Pacemaker Lead Extraction with the Excimer Sheath (PLEXES) çalışmasında lazer kılıf ile %96 oranında başarıya karşın, lazer dışı kılıflar kullanılarak çıkarılan 57 Accufix elektrodların sadece %47'si başarılı şekilde çıkarılabilmiştir. Lazer kılıfların Türkiye'de ulaşılabilir olamaması nedeniyle, mekanik kılıf kullanılmak zorunda kalındı. Bizim bilgimize göre bu mekanik kılıf kullanılarak çıkarılan en yaşlı Accufix elektrottur. Ventriküler elektrodun çıkarılması sırasında elektrot ucu koptu ve kalp içerisinde bırakıldı. Üç aylık takip sırasında, enfeksiyon bulgusu ve herhangi istenmeyen olay gözlemlemedik.

With the increasing number of implanted pacemakers and implantable cardioverter defibrillators, removal is required more frequently. Transvenous lead extraction (TLE) is defined as the removal of leads that have been implanted for more than 1 year, the removal of a lead, regardless of duration of implant requiring the assistance of specialized equipment, and/or the removal of lead using a route other than via the implant vein.[1] This report is a description of a transvenous extraction of pacemaker leads that were implanted 26 years earlier.

Abbreviations:

TLE *Transvenous lead extraction*

CASE REPORT

A 50-year-old male patient was admitted to the clinic with a pacemaker pocket infection presenting as pu-

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rulent drainage from the pacemaker pocket accompanied by pain and erythema.

In 1990, the patient had been diagnosed with sick sinus syndrome, for which he underwent dual chamber permanent pacemaker implantation via the right subclavian vein. Two months prior to presentation, the patient had undergone a fourth generator replacement.

On admission, the patient was pacemaker-dependent and his basal ventricular rate was 40 to 45 beats per minute with third-degree atrioventricular block. Transthoracic and transesophageal echocardiographic examinations did not show signs indicating infection of the intravascular portion. After 6 weeks of antibiotic therapy, he underwent transvenous lead removal following temporary lead stimulation placed in the right ventricular apex. The procedure was performed in the electrophysiology laboratory under moderate sedation with an on-site cardiothoracic surgery team on standby. After dissection of the encapsulating fibrous tissue around the generator and tangled leads (Fig. 1a), an LLD #2 (Spectranetics, Corp., Colorado Springs, CO, USA) locking stylet was deployed for both leads and an 11-F TightRail (Spectranetics, Corp., Colorado Springs, CO, USA) rotating mechanical sheath was advanced over the right ventricular lead. During the extraction, the locking stylet broke off due to high traction forces. A Needle's Eye Snare (Cook Medical, Inc., Bloomington, IN, USA) was advanced through the right femoral vein and the lead was extracted (Fig. 1b). During the transfemoral extraction, the tip of the lead broke off inside the right ventricle (Fig. 1c). A 9-F TightRail sheath was advanced over the Accufix J-Atrial active fixation lead (Telectronics Pty Ltd., Sydney, Australia) and it was extracted without any residual parts left behind. No complications were observed during or after the procedure. Postprocedural blood and lead tip cultures were negative. After 3 days, a new pacemaker was implanted in the contralateral chest wall.

DISCUSSION

The adherence of pacemaker leads to adjacent tissue increases with time, so the extraction of old leads is particularly challenging; the length of time the leads have been in place is a predictor of minor and major complications.[2–4] These well known findings were also confirmed in the recently published, largest, prospective registry on TLE.[5]

Accufix Bipolar J-Atrial active fixation leads (Cat. No.: 330-801) were recalled in 1994, after reports of 2 deaths and 2 nonfatal injuries related to protrusion of the J retention wire. Following this recall, many of these leads have been extracted in procedures that were associated with a significant number of complications. The total procedural complication rate was 7.4% in the Accufix Multicenter Clinical Study.[6] Similar results were reported from the worldwide registry.[6] The Pacemaker Lead Extraction with the Excimer Sheath (PLEXES) Trial, which was the first randomized controlled trial of laser sheaths compared with mechanical dilator sheaths, reported that of the 57 Accufix leads randomized to the non-laser approach, only 47% were removed successfully compared with 96% of the laser-randomized cases.[3] Since laser sheaths are not available in Turkey, we were obliged

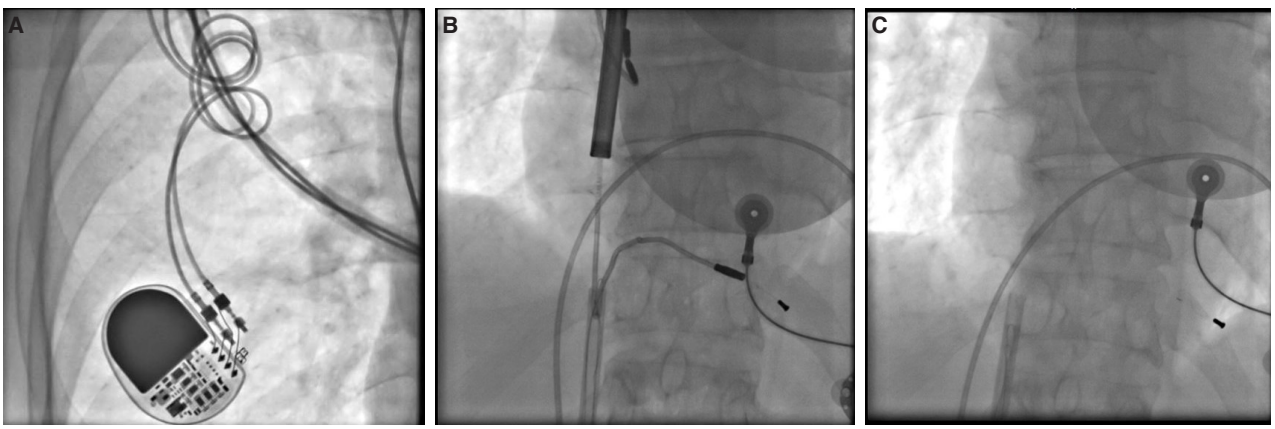

Figure 1. (A) Flouroscopic image of generator and tangled leads. **(B)** Snaring of the right ventricular lead with a Needle's Eye Snare. **(C)** Residual part of the right ventricular lead left after the extraction.

to use a mechanical dilator sheath. To our knowledge, this is the oldest Accufix lead to be extracted with a non-laser sheath.

The strongest indication for complete device and lead removal is cardiovascular implantable electronic device-related infection.[1] Though our procedure was not fully successful, it did not impact our clinical goals; therefore, we achieved complete clinical success. The Heart Rhythm Society's Expert Consensus document on TLE defined the clinical success of extraction as the removal of all targeted leads and lead material from the vascular space, or retention of a small portion of the lead that does not negatively impact the outcome goals of the procedure. This may be the tip of the lead or a small part of the lead (conductor coil, insulation, or the latter 2 combined) when the residual part does not increase the risk of perforation, embolic events, perpetuation of infection, or cause any undesired outcome.[1] The Cleveland Clinic series noted that recurrent infection developed in only in 3% of patients with incomplete extraction.[7] During a 3-month follow-up period, no signs of infection or any other undesired event was encountered in our patient.

It has been acknowledged that extraction from the right subclavian vein can be more difficult, since the route to the right ventricle is more torturous, and that the area where the subclavian vein and the superior vena cava meet at the right atrium can potentially rupture. Centella et al.[8] verified that the risk of complication increased significantly when the leads are placed via the right subclavian vein.

Re-implantation at the site of the extracted device can be associated with early or late recurrence of infection. Implantation of the new device on the contralateral side is recommended.[1] The timing for re-implantation varies according to the patient's characteristics and culture results. In the absence of intracardiac vegetation, and when there is no further evidence of systemic infection, early re-implantation (3 days) can usually be done without concern about infection recurrence.[1]

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Keywords: Accufix atrial lead; lead extraction; pacemaker pocket infection.

Anahtar sözcükler: Accufix atriyal elektrot; elektrot ekstraksiyonu; pil cebi enfeksiyonu.