

CASE REPORT

Successful radiofrequency pulmonary vein isolation in a patient with pneumonectomy

Pnömonektomili hastada pulmoner venlerin başarılı radyofrekans izolasyonu

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Summary– Among electrophysiologic procedures, catheter ablation of atrial fibrillation (AF) is challenging, requiring the isolation of all pulmonary veins (PVs). AF is associated with serious complications including PV stenosis. Presently described was a technically challenging case of PV isolation in a patient with left-sided pneumonectomy due to lung cancer.

Isolation of the pulmonary veins (PVs) is a cornerstone of catheter ablation of atrial fibrillation (AF), a challenging procedure. Serious complications such as PV stenosis may occur. Described in the present report was a technically challenging case of PV isolation in a patient who had undergone left-sided pneumonectomy due to lung cancer.

CASE REPORT

A 72-year-old man with complaint of palpitation and dyspnea was admitted. Twelve-lead resting electrocardiography revealed AF with an onset of 2 years prior. Physical examination was unremarkable. Echocardiogram revealed normal left ventricular systolic functions (ejection fraction of 65%) and enlarged left atrium (LA) of 44 mm. Medical history included chronic obstructive pulmonary disease, hypertension, chronic renal failure, coronary artery disease, ulcerative colitis, and left-sided pneumonectomy 10 years prior due to lung cancer. The patient was taking antihypertensive and antiarrhythmic agents. Due to high risk of thromboembolism (CHADS2 score >2), warfarin was administered. Ten years prior, complete

Özet– Atriyum fibrilasyonunun kateter ablasyonu invaziv elektrofizyoloji çalışmaları arasında zor bir işlemdir. Pulmoner venlerin izolasyonu tedavinin köşe taşıdır. İşlem pulmoner ven stenozu gibi bazı ciddi komplikasyonlarla eşlik edebilir. Bu yazıda, akciğer kanseri nedeniyle sol taraflı pnömonektomi olan hastada teknik olarak zor olan pulmoner ven izolasyonu yapılan olgu sunuldu.

left-sided pneumonectomy had been performed for resection of tumor. AF ablation was recommended due to recurrent symptomatic AF attacks, occurring in spite of antiarrhythmic treatment. Informed consent was obtained. LA thrombus was excluded with transesophageal echocardiography, and 64-slice computed tomography was performed to evaluate the PVs. Three-dimensional (3D) image of the LA and PVs showed PV stumps in the left-superior PV and left-inferior PV (Figure 1).

Ablation was performed under mild anesthesia without intubation. Steerable decapolar catheter was inserted into the coronary sinus for positional reference. Due to unusual postoperative cardiac rotation, only 1 transseptal puncture could be performed. EnSite NavX system (St. Jude Medical, Inc., Little Canada, MN, USA) was used for 3D mapping and catheter navigation, and 3D left atrial anatomy was reconstructed (Figure 2). Lasso catheter was inserted into the PVs, and PV signals including those of the stumps were recorded. Circumferential radio-

Abbreviations:

3D	Three-dimensional
AF	Atrial fibrillation
LA	Left atrium
PV	Pulmonary vein

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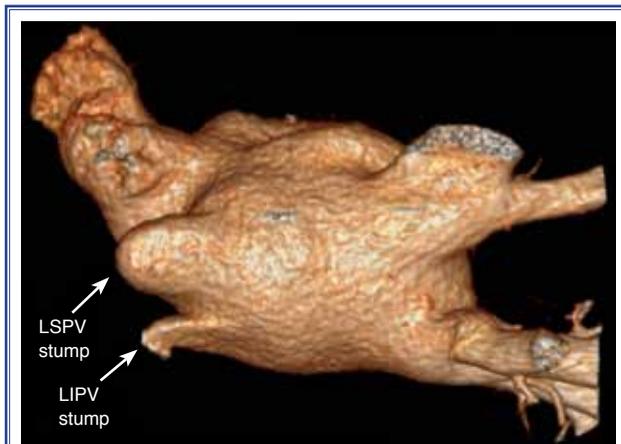


Figure 1. Three-dimensional reconstruction of the left atrium and pulmonary veins in posterior-superior view. Left superior and left inferior pulmonary vein stumps are shown (arrows).

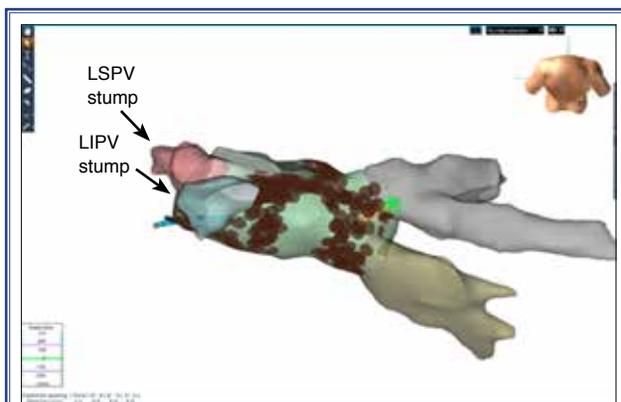


Figure 2. Three-dimensional reconstruction of the left atrium and pulmonary veins with electroanatomic mapping and circumferential ablation lines around the pulmonary veins. Left superior and left inferior pulmonary vein stumps are shown (arrows).

frequency ablation of the ipsilateral PVs was performed (30–35 W, 17 mL/min) with irrigated catheter (Sprinklr; Medtronic Inc., Minneapolis, MN, USA). Entrance and exit blocks were achieved following ablation. Interestingly, both left PV stumps were electrically active prior to ablation, and complete isolation was obtained following radiofrequency ablation. During ablation, weight-adjusted unfractionated heparin was administered to maintain activated clotting time of 300–350 seconds. The procedure was completed without complication. Fluoroscopy and procedure times were 21 minutes and 125 minutes, respectively. No recurrence of AF was observed during 6-month follow-up period, and no

PV stenosis was observed on computed tomography scan at the sixth month.

DISCUSSION

Catheter ablation is currently the most effective therapy for drug-refractory AF.^[1] Because the PVs play an important role as arrhythmia triggers of AF,^[2] PV electrical isolation has become a primary treatment strategy.^[3]

Pneumonectomy is defined as removal of the lung and distal section of associated PV. Thus, the segment of the PV attached only to the LA is referred to as the “stump.” The role, if any, of the PV stump in triggering AF is unclear. PV ligation after pneumonectomy should, logically, decrease or minimize the risk of AF, and it has been reported that PV ligation may eliminate and decrease causes of AF.^[4] However, results of both a report by Konstantinidou et al.^[5] and a very recent multicenter study that included 15 patients have demonstrated that PV stumps (remaining following pneumonectomy) were electrically active, and that the majority were sites of active firing or triggering.^[6] In addition, it was found that no PV stenosis followed ablation. It was likewise observed in the present patient that all PVs were electrically active, in spite of PV interruptions.

In general, AF ablation is a challenging procedure, with important related complications including PV stenosis, cardiac tamponade, stroke, and atrioesophageal fistula.^[7] As a complication of AF, PV stenosis is serious but rare, with a reported incidence of 2–4%, depending on the ablation technique.^[8] In patients with pneumonectomy, PV stenosis may result in detrimental consequences, even death. The procedure may also be technically difficult due to cardiac displacement and rotation.^[9] These changes may lead to difficult transeptal puncture and catheter movement in the LA and around the PVs. In the present patient, only 1 transeptal puncture could be performed due to the aforementioned causes, and intracardiac echocardiography was not available.

In spite of the technical challenges, AF ablation in patients with pneumonectomy is feasible and safe. It has been shown that PV stumps are electrically active and should be isolated in order to maintain long-term sinus rhythm.

Conflict-of-interest issues regarding the authorship or article: None declared.

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Keywords: Ablation; atrial fibrillation; pneumonectomy; pulmonary vein isolation.

Anahtar sözcükler: Ablasyon; atriyum fibrilasyonu; pnömonektomi; pulmoner ven izolasyonu.