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Successful Catheter Ablation of Right Atrial Tachycardia After Bilateral Lung Transplantation

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A 47-year-old woman underwent bilateral lung transplantation for pulmonary fibrosis in June of 2013. The early postoperative period was complicated by continuous atrial arrhythmias that proved unresponsive to antiarrhythmic agents (propafenon and bisoprolol). Therefore, in February 2014, we performed an electrophysiological study after adequate antibiotic and antimycotic prophylaxis. During the procedure, the clinical tachycardia was easily inducible with burst atrial pacing and programmed atrial extrastimuli. Tachycardia cycle length varied between 380 ms and 420 ms, and A-A-V response after ventricular burst pacing suggested atrial tachycardia. Entrainment mapping from the area of early activation failed to demonstrate reentry as the underlying mechanism of the tachycardia, thus ectopic atrial tachycardia was diagnosed. Electroanatomical mapping was performed with ENSITE NavX system (Endocardial Solutions Inc.) during ongoing arrhythmia (Figure 1). Activation map showed that earliest activation was in the right atrium, corresponding to a scar of the extracorporeal membrane oxigenator (ECMO) cannula during lung transplantation. To avoid paralysis of the diaphragm, we paced the high right atrial region with high energy to demonstrate and mark the location of right phrenic nerve. Subsequently, we performed RF ablation with 3.5 mm irrigated tip catheter (AlCath Flux Blue G eXtra) using 40 W energy and 43°C temperature limit. After the application of one RF ablation at the site of earliest activation (ablation time 46 seconds), the arrhythmia stopped immediately and was no longer inducible even after administration of isoproterenol. The total procedure time was 75 minutes with a fluoroscopy time of 2.3 minutes. No procedural complications occurred. Outpatient visits and 24-hour Holter electrocardiogram monitoring were scheduled every 3 months. The patient was free of symptoms and arrhythmia episodes without any antiarrhythmic medication during the 9-month follow-up period.

Atrial tachyarrhythmias are frequent after lung transplantation but the incidence of right atrial tachycardia is very low. Most commonly atrial fibrillation is observed in the early postoperative period and left atrial tachycardia occurs later in time.[1-4] Right atrial tachycardia might also be associated to the operation, during which an ECMO is implanted with cannulation of the right atrium and aorta. Damaging the anterior part of the high right atrium during this step might be the ground of arrhythmia substrate formation.

To the best of our knowledge, our case represents the first successful ablation of right atrial tachycardia after lung transplantation due to scarring of a passagere cannula of ECMO. Ablation of typical right atrial flutter and left atrial tachycardias originating from the donor pulmonary veins has been reported previously.[1-4] Atrial ablation in lung transplant recipients is rarely performed, in contrast to heart transplant recipients, where ablation of atrial arrhythmias has repeatedly been reported and arrhythmias are dominantly originating from the right atrium.[5]

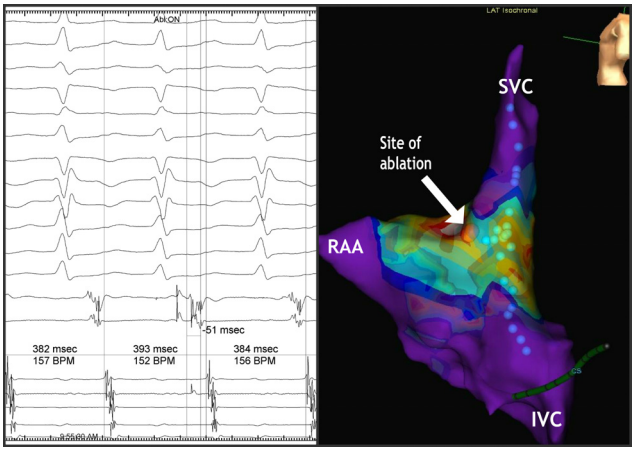

FIGURE 1. Left side: 12 lead surface electrocardiogram (paper speed 100 mm/sec) and intracardiac electrocardiogram (ablation catheter and coronary sinus catheter) during ongoing arrhythmia. Cycle length is changing from beat to beat. The local activation recorded from the ablation catheter precedes the beginning of surface P wave with 51 ms indicating that this is the site of earliest activation (see red dot on the right side). Right side: activation map of the right atrium during ongoing atrial tachycardia (left lateral view). Small blue dots show the points where phrenic nerve stimulation was observed, big red dot shows the site of successful ablation. IVC indicates inferior vena cava; RAA, right atrial appendage; SVC, superior vena cava.

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