

## Transjugular approach for radiofrequency ablation of permanent junctional reciprocal tachycardia in a newborn with bilateral femoral vein thrombosis

### İki taraflı femoral ven trombozu olan bir yenidoğanda sürekli kavşak resiprokal taşikardisinin transjuguler yol ile radyofrekans ablasyonu

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**Summary**– Although radiofrequency ablation is the first line therapy in some children with supraventricular tachycardia, its application in small children is still limited. Herein, we presented a premature newborn diagnosed as multidrug-resistant permanent junctional reciprocal tachycardia, and treated by radiofrequency ablation via the jugular vein approach because of bilateral femoral vein thrombosis. We think that when there is limited vascular access, the transjugular route for radiofrequency ablation might be considered as an alternative treatment in newborns with multidrug-resistant supraventricular tachycardia.

**P**ermanent junctional reciprocating tachycardia (PJRT) is a rare form of long R-P re-entrant supraventricular tachycardia and actually incessant at a rate ranging from 120 to 250 beats/minute. Inverted P waves in leads II, III and AVF can be seen during the tachycardia. Electrophysiological study shows slow retrograde conduction through the slowly-conducting accessory pathway and antegrade conduction through the atrioventricular node, and His-Purkinje system during the tachycardia.<sup>[1,2]</sup> Since the early 1990s, radiofrequency ablation (RFA) has been the first line therapy in some children with supraventricular tachycardia. It has a high success rate, and a low recurrence and complication rate.<sup>[3]</sup> However, clinical experiences of RFA by the transjugular route are limited in neonates and infants.<sup>[4]</sup>

#### Abbreviations:

PJRT Permanent junctional reciprocating tachycardia  
RFA Radiofrequency ablation

**Özet**– Radyofrekans kateter ablasyonu supraventriküler taşikardisi olan bazı çocuklarda ilk tercih edilen tedavi olmasına rağmen, küçük çocuklarda kullanımı sınırlıdır. Bu yazıda çoklu ilaç tedavisine yanıt vermeyen sürekli kavşak resiprokal taşikardisi olan ve her iki femoral vende tromboz olduğundan juguler ven yoluyla radyofrekans ablasyonu yapılan bir prematüre yenidoğan olgusu sunduk. Biz, damar yoluyla erişimi sınırlı olan tıbbi tedaviye yanıtız supraventriküler taşikardili yenidoğanlarda, alternatif bir tedavi olarak transjuguler yaklaşım ile radyofrekans ablasyonun uygulanabileceğini düşünüyoruz.

Herein, we present a premature newborn diagnosed with PJRT and treated using RFA via the jugular vein because of bilateral femoral vein thrombosis due to genetic thrombophilia.

#### CASE REPORT

An 11-day-old premature girl presented with a diagnosis of supraventricular tachycardia. Her mother had been on sotalol (160 mg daily) and digoxin (0.5 mg daily) treatment because of fetal tachycardia with the rate of 220 beats/minute since the 22nd week of gestation. She was started on amiodarone (10 mg/kg daily) and propranolol (3 mg/kg daily) treatment because the tachycardia was present postnatally. On physical examination, the patient's heart rate was 200 beats/minute. An electrocardiogram showed narrow QRS tachycardia with long R-P and inverted P wave in DII, DIII and aVF. Ejection fraction was 67%. Multiple drug

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therapy failed to completely control the tachycardia, and impaired ventricular function with 52% ejection fraction occurred within a few days, despite propafenone (10 mg/kg/day) being added to her medication. RFA was planned for when she reached 29 days old. We noticed clogged femoral veins with extensive collateral vessels, bilaterally due to thrombophilic risk factors including mutations in the methylenetetrahydrofolate reductase gene, PAI-1 gene, and Factor V Leiden. We inserted a 5 Fr deflectable 35 mm curve ablation catheter with a 4 mm tip into right atrium via the right jugular vein, and the tachycardia converted to sinus rhythm, with radiofrequency energy (5-10 watt) at a temperature of 50°C at the site recorded at the earliest atrial activation. The tachycardia recurred one week later while she was on drug therapy. When the patient was 56 days old, RFA with a 7 Fr ablation

catheter via the left jugular vein was performed again at the posterolateral area next to the coronary sinus ostium with radiofrequency energy (15-20 watt), and sinus rhythm was obtained (Figure 1). The patient has been followed up with no symptoms and medication for 18 months.

## DISCUSSION

Permanent junctional reciprocating tachycardia is usually resistant to medical treatment. Patients with PJRT are generally diagnosed by chance or present with tachycardia-induced cardiomyopathy because of tachycardia rate within almost normal limits and intermittent clinical course.<sup>[1]</sup> In small children, antiarrhythmic drugs are the treatment of choice. However, if medical treatment fails to control the tachycardia,



**Figure 1.** Inverted P waves before ablation (A) and positive P waves after the procedure (B) in leads II, III and AVF.

RFA therapy might be considered as an alternative option.<sup>[3-5]</sup>

Femenía et al.<sup>[4]</sup> reported a successful RFA in a premature newborn with PJRT. Vaksman et al.<sup>[5]</sup> determined 85 patient with PJRT, aged 0-20 years, with an average follow-up of 8.2 years. In this study, 57/85 (67%) patients had been admitted to hospital in the first year of life, 24/85 (%28) patients had heart failure at admission, 19/84 (22%) patients had improved spontaneously, 18/85 (21%) patients had undergone RFA, which was successful in 3 of 6 patients who underwent RFA before the age of 10 years. In our case, ineffectiveness of the first RFA might be attributed to the patient being a newborn, limited vascular access, the choice of a small size ablation catheter, and/or the use of a low level energy.

Akdeniz et al.<sup>[6]</sup> reported the effectiveness and safety of transcatheter cryoablation and RFA in infants with refractory supraventricular tachycardia. We did not elect to use cryoablation, as transcatheter cryoablation had less catheter steorage ability, affecting its usage in our case.

We think that RFA via the jugular route may be considered as an alternative treatment in newborns and infants with multidrug-resistant PJRT even when they have limited vascular access.

**\*Supplementary video files associated with this article can be found in the online version of the journal.**

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**Key words:** Catheter ablation/instrumentation; electrocardiography; newborn.

**Anahtar sözcükler:** Katater ablasyonu/enstrümantasyon; elektrokardiografi; yenidoğan.