An Unusual Diagnosis of Aortic Coarctation in a Patient with Atrial Tachycardia

Hicaz Zencirkıran Ağuş[1], İsmail Gürbak[1], Serkan Kahraman[1], Özgür Sürgit[1], Cemil Can[1], Mustafa Yıldız[1]

[1] İstanbul Mehmet Akif Ersoy Chest and Cardiovascular Surgery Training and Research Hospital, Department of Cardiology, İstanbul, Turkey

ABSTRACT

In the present report, we describe a rare coexistence of atrial tachycardia (AT) in a patient with aortic coarctation (AoC). Adults with undiagnosed AoC are usually asymptomatic or may present with hypertension. A 45-year-old female presented to the emergency department with acute onset supraventricular tachycardia. While ablating AT, we diagnosed AoC. Radiofrequency catheter ablation and implantation of a stent across the coarctation segment was successfully performed. Thus, a young patient with resistant hypertension and cardiac murmur should be a sufficient clue for the suspicion of AoC.

Key Words: Aortic coarctation; atrial tachycardia; radiofrequency catheter ablation

Atriyal Taşikardi ile Başvuran Hastada Aort Koarktasyonu Tanısı

ÖZET

Bu olguda atrial taşikardi ve aort koarktasyonunun birlikte görüldüğü nadir bir olguyu sunduk. Tanısı henüz koyulmamış aort koarktasyonu olan yetişkinler genellikle asemptomatiktir ya da hipertansiyonla gelebilirler. Kırk beş yaşında kadın hasta acil servise akut başlangıçlı supraventriküler taşikardi ile başvurdu. Atrial taşikardi ablasyonu yapılırken hastada aort koarktasyonu olduğu teşhis edildi. Radyofrekans kateter ablasyonu ve koarktasyon segmentine stent implantasyonu başarılı bir şekilde gerçekleştirildi. Dirençli hipertansiyonu ve kardiyak üfürümü olan genç bir hastada aort koarktasyonu olabileceği akla gelmelidir.

Anahtar Kelimeler: Aort koarktasyonu; atriyal taşikardi; radyofrekans kateter ablasyonu

INTRODUCTION

Aortic coarctation (AoC) in adults is often asymptomatic, and it can be detected because of a cardiac murmur or hypertension. It is a relatively common congenital anomaly. Herein, we describe a rare coexistence of narrow QRS atrial tachycardia (AT) in a patient with AoC.

CASE REPORT

A 45-year-old female presented to the emergency department with acute onset palpitation. Electrocardiography revealed AT with a heart rate of 200 beats per minute (Figure 1). Routine blood chemistry and urine analysis were unremarkable. The patient had a medical history of

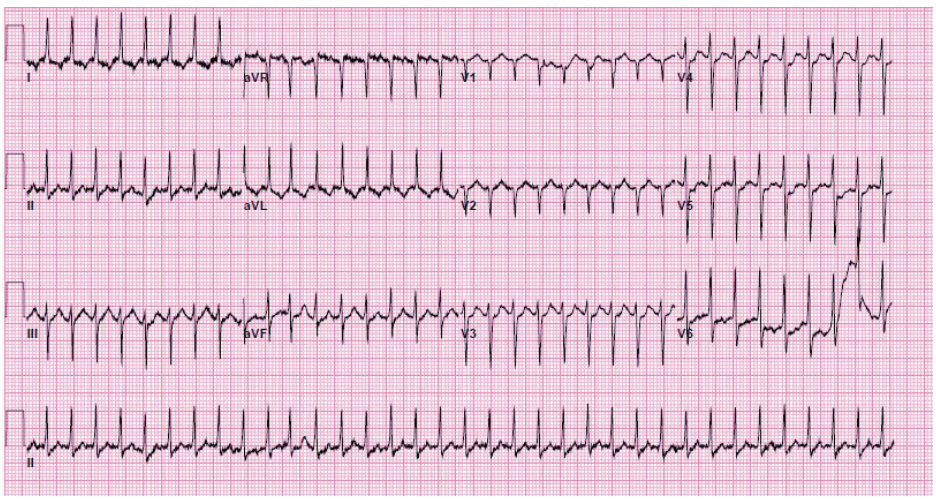

Figure 1. ECG displaying AT.

Cite this arcticle as: *Zencirkıran Agus H, Gürbak İ, Kahraman S, Sürgit Ö, Can C, Yıldız M. An unusual diagnosis of aortic coarctation in a patient with atrial tachycardia. Koşuyolu Heart J 2019;22(2):130-3.*

Correspondence

Hicaz Zencirkıran Ağuş

E-mail: hicazincir@yahoo.com

Submitted: 27.04.2019
Accepted: 02.05.2019

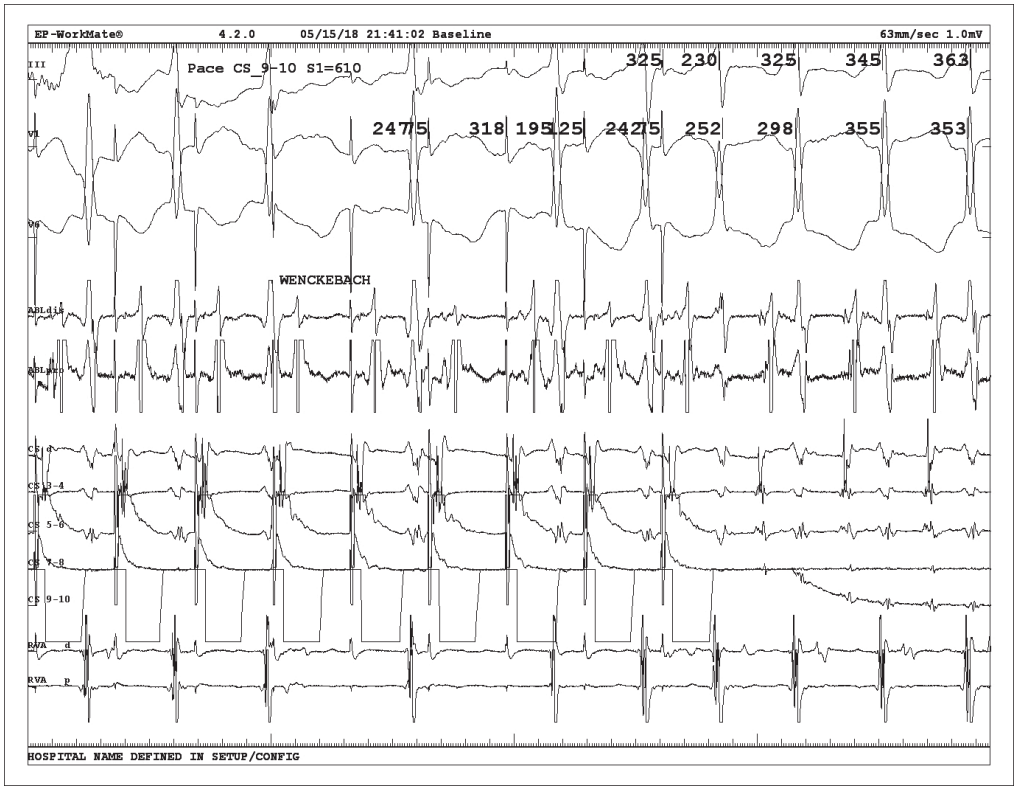

Figure 2. Intracardiac electrograms from the CS distal (CS 1/2) to proximal (CS 7/8) and right ventricular apex (RVA) at a sweep speed of 100 mm/s. During programmed atrial stimulation, narrow QRS tachycardia was induced. Ventricular overdrive pacing induced a VAAV response, revealing AT as the underlying mechanism.

hypertension, for which she took a regular medication of perindopril and metoprolol. Outpatient transthoracic echocardiography revealed left ventricular hypertrophy and ascending aortic aneurysm of 43 mm. Because catheter ablation is an effective treatment for symptomatic focal AT, an electrophysiological study (EPS) was performed with two quadripolar catheters placed at the His bundle and right ventricular apex and a decapolar catheter in the coronary sinus (CS). Basic intervals were noted as follows: basal cycle length (CL): 960 ms; AH: 75 ms; HV: 42 ms. During programmed atrial stimulation, narrow QRS tachycardia was induced (CL: 300 ms) with a distal to proximal CS activation sequence and ventriculoatrial interval of 140 ms. Ventricular overdrive pacing resulted in a VAAV response. Thus, we presumed AT as the underlying mechanism (Figure 2). Three-dimensional (3D) geometry was created using the EnSite NavX mapping system (EnSite NavX Velocity, St. Jude Medical, Inc., MN, USA). In the RA-neighboring superior vena cava, early signaling was observed; radiofrequency ablation was directed toward this region (Figure 3A). Because of non-terminating AT, we

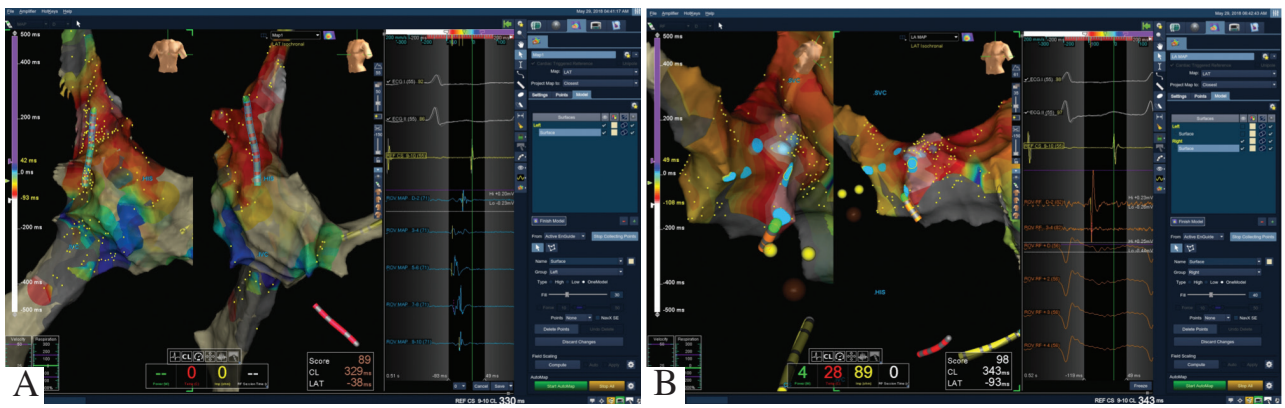

Figure 3. EnSite NavX mapping system. **(A)** Early signaling in the RA superior vena cava region. **(B)** Early signaling in the LA right superior pulmonary vein region.

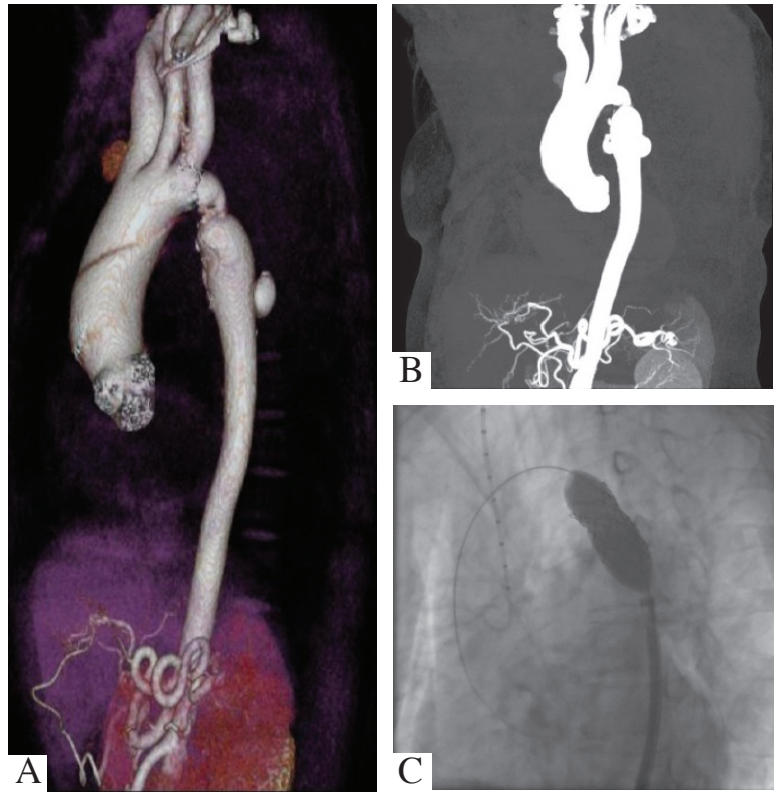

Figure 4. (A) Sagittal view of the computed tomography angiogram, showing severe AoC distal to the left subclavian artery. **(B)** Reconstituted image of the contrast-enhanced computed tomography. **(C)** Implantation of a covered stent at the coarctation segment.

passed the left atrium by septostomy. Because of the anatomic proximity of the right superior pulmonary vein to the superior vena cava, we proposed to ablate around the right superior pulmonary vein. While the pigtail catheter advanced through the descending aorta, resistance to the catheter was encountered, and it did not pass through the aortic obstruction. Aortography was performed because of suspected AoC, which was confirmed. The aorta was obstructed by injecting an opaque medium into the catheter. Consequently, radiofrequency catheter ablation was performed in the right superior pulmonary vein region, and tachycardia was terminated (Figure 3B).

Furthermore, 3D CT scan demonstrated AoC distal to the left subclavian artery (Figures 4A and B). Later, a 14F sheath was advanced across the coarctation segment, and the direct implantation of a covered stent (size: 39 mm) loaded in an 18-mm balloon was accomplished (Figure 4C). After this procedure, hypertension was regulated without medication, and palpitation was healed. The follow-up period was uneventful.

DISCUSSION

We report an adult case of AoC with refractory palpitation. She had a long history of uncontrolled hypertension despite being on optimal antihypertensive medications. During the physical examination, the patient revealed a mild murmur because of tachycardia. Sometimes, patients with AoC present with no murmur, particularly in those with reduced cardiac functions and well-developed collateral pathways[1]. Due to recurrent AT, EPS was performed, but it was not successful. Because the catheter did not pass through the aorta, AoC was diagnosed. Thus, AoC should be considered if there is blockage in the advancement of guide wire or catheter within the aorta. A characteristic physical examination is useful for the diagnosis of this condition. If a murmur is heard during the physical examination when suspecting AoC, echocardiography should be suprasternally performed.

AoC accounts for approximately 5%-8% of all patients with congenital cardiovascular diseases; it more frequently affects males than females[2,3]. The life expectancy of patients with untreated AoC is 35 years, with a mortality rate ranging from 75% to 90% by the age of 50 years[4]. In case of long-term arterial hypertension, the vessels of the collateral circulation that interconnect the prestenotic and poststenotic thoracic aorta may develop aneurysmal dilatations because of deficiencies in the muscle and elastic tissues. Abnormally dilated arteries or collateral vessels may increase the risk of spontaneous hemorrhage. The indications for the thoracic endovascular repair

of AoC include hypertension, peak instantaneous pressure gradient across the coarctation (≥ 20 mmHg), or imaging evidence of collateral circulation[5].

Focal AT can originate from different sites of the atrium, such as CS, crista terminalis, left atrial appendage, superior vena cava, and pulmonary veins. In AoC, rhythm disorders, such as atrial fibrillation and left AT, may develop as a result of left ventricular hypertrophy and increased left atrial stretch or pressure with or without left atrial enlargement. Atrial stretch, resulting from elevated left atrial pressure, can be responsible in the pathogenesis of AT, such as atrial fibrillation[6]. Different types of supraventricular tachycardia have been reported in patients with AoC[7,8]. This case is important for diagnosing AoC while ablating AT.

CONCLUSION

Our case describes the diagnostic approach and successful management of AT in a patient with AoC. To the best of our knowledge, this is a rare case documenting the coexistence of AT in a patient with AoC. Consequently, AoC, which can cause short- and long-term problems, should be treated with stent implantation or surgery.

REFERENCES

1. Inoue T, Matsunaga K, Ishikawa K, Murakami K, Noma T, Horii T, et al. Adult aortic coarctation presenting with refractory heart failure and pulsation below the bilateral clavicle. J Cardiol Cases 2018;18:85-7.
2. Swan L, Wilson N, Houston AB, Doig W, Pollock JC, Hillis WS. The long-term management of the patient with an aortic coarctation repair. Eur Heart J 1998;19:382-6.
3. Talner CN. Report of the New England Regional Infant Cardiac Program, by Donald C. Fyler, MD, Pediatrics, 1980; 65(Suppl):375-461. Pediatrics 1998;102:258-9.
4. Campbell M. Natural history of coarctation of the aorta. Br Heart J 1970;32:633-40.
5. Warnes CA, Williams RG, Bashore TM, Child JS, Connoly HM, Dearani JA, et al. ACC/AHA 2008 Guidelines for the Management of Adults with Congenital Heart Disease: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (writing committee to develop guidelines on the management of adults with congenital heart disease). Circulation 2008;118: e714-833.
6. Kalifa J, Jalife J, Zaitsev AV, Bagve S, Warren M, Moreno J, et al. Intra-atrial pressure increases rate and organization of waves emanating from the superior pulmonary veins during atrial fibrillation. Circulation 2003;108:668-71.
7. Tzeis S, Deisenhofer I, Meierhofer C, Hessling G. Two types of narrow-QRS tachycardia in a patient with coarctation of the aorta and persistent left superior vena cava. Hellenic J Cardiol 2009;50:548-51.
8. Alpsoy S, Akyüz A, Akkoyun CD, Gürkan S, Değirmenci H. Coarctation of the aorta presented with atrial fibrillation: case report. Int J Basic Clin Med 2013;1:50-3.