To cite this article: Korkmaz A, Celik C, Gursoy HT, Basyigit G, Guray U. Successful cryoablation of junctional tachycardia in an elderly patient: A case report. Turk J Clin Lab 2019; 10: 537-540.

Case Report

Successful cryoablation of junctional tachycardia in an elderly patient: A case report

Yaşlı bir hastada junctional taşikardide başarılı kriyoablasyon: Olgu sunumu

Ahmet KORKMAZ*, Cihat CELIK, Havva Tugba GURSOY, Funda BASYIGIT, Umit GURAY

Ankara Numune Training and Research Hospital, Department of Cardiology, Ankara/TURKEY

Abstract

Junctional tachycardias(JT) are rare supraventricular tachyarrhythmias observed mainly in infants and children.JT is rare in adult patients, and it is associated with poor outcomes. In general, these supraventricular tachycardias respond insufficiently to pharmacological treatment.In this report, we present the case of a 72-year-old patient with incessant tachyarrhythmia in whom cryoablation of the para-Hisian ectopic focus was successfully performed.

Keywords: Cryoablation; junctional tachycardia

Öz

Junctional taşikardiler (JT), çoğunlukla bebeklerde ve çocuklarda görülen nadir görülen supraventriküler taşiaritmidir. JT erişkin hastalarda nadirdir ve kötü sonuçlarla ilişkilidir. Genel olarak, bu supraventriküler taşikardiler farmakolojik tedaviye yetersiz cevap verirler. Bu yazıda, para-hisian ektopik odağının kriyoablasyonunun başarıyla yapıldığı, sürekli taşiaritmili 72 yaşında bir olguyu sunuyoruz.

Anahtar kelimeler: Kriyoablasyon; junctional taşikardi

Corresponding Author*: Ahmet Korkmaz, Ankara Numune Training and Research Hospital, Department of Cardiology, Ankara/TURKEY
E-mail: drahmtkrkmz07@gmail.com
ORCID: 0000-0003-2672-5109
Recevied: 24.04.2019 accepted: 16.08.2019
Doi: 10.18663/tjcl.613856

Volume 10 Number 4 p: 537-540

Introduction

Automatic tachycardia from the atrioventricular (AV) junction is a rare form of narrow QRS arrhythmia [1]. Junctional tachycardias (JT) are rare supraventricular tachyarrhythmias and observed mainly in infants and children [2]. JT is usually a self-limited rhythm, associated with acute myocardial infarction, digitalis toxicity, acute rheumatic carditis, previous cardiac surgery, or acute electrolyte imbalance [3-5]. In general, these supraventricular tachycardias respond insufficiently to pharmacological treatment. Although JT is rare among adult or elderly patients, it is associated with poor outcomes, including heart failure and complications of tachyarrhythmia. Recently, selective radiofrequency ablation of the ectopic focus in such cases has had a reasonably good success rate, despite the possibility for the development of a complete AV block as a potential complication [6-7]. We present the case of a 72-year-old patient with incessant tachyarrhythmia in whom cryoablation of the para-Hisian ectopic focus was successfully performed.

Case

A 72-year-old male patient was admitted with palpitation to our clinic. He had no history of angina, myocardial infarction, valvular heart disease or hypertension. Chest X-ray, echocardiogram and coronary angiography were normal.

All resting 12-lead ECGs obtained during hospitalization showed nonparoxysmal junctional tachycardia, with rates ranging from 100 to 110 beats/min (Figure 1). Usually there was 1:1 retrograde atrial capture with a constant interval between QRS complexes and retrograde P waves (Figure 1).

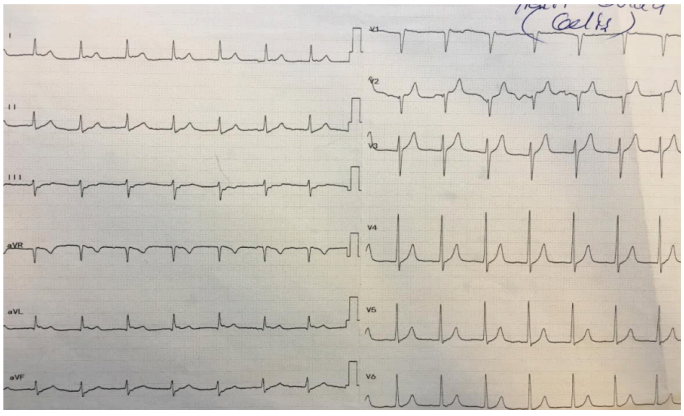

Figure 1. Twelve-lead electrocardiogram showing a narrow QRS complex tachycardia with retrograd atrial activity.

The patient's symptoms and electrocardiographic records dating back to earlier years revealed the presence of similar rhythm abnormalities. Twenty-four-hour ambulatory electrocardiography demonstrated the presence of non-paroxysmal junctional tachycardia as the dominant rhythm. Ablation was planned due to the failure of many antiarrhythmic treatments previously taken by the patient.

For the procedure, antiarrhythmic drugs were discontinued and after an adequate amount of time the patient was taken to the cardiac electrophysiology laboratory. Multipolar catheters were placed in the coronary sinus, right atrium, and right ventricular (RV) apex. The rhythm or tachycardia cycle length was variable (430-570 ms) (Figure 2).

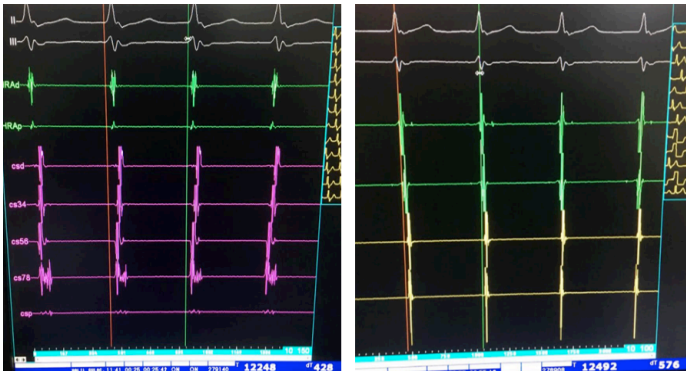

Figure 2. Multipolar catheters were placed in the coronary sinus, right atrium, and right ventricular (RV) apex.The tachycardia cycle length was variable (430-570 msn).

Preablation PR duration was 260 ms. His potentials preceded each ventricular activation. The tachycardia was almost incessant and re-initiation was spontaneous, without requirement for critical AH or AV delay. During ventricular overdrive pacing from the RV apical catheter or ventricular premature contractions was demonstrated retrograde His activation (without conduction to the atrium) and on cessation of pacing there was a VAV response. The intracavity recordings showed that there was a VA linking with a VA interval of ≤70 ms, but when overdrive atrial pacing was performed and during catheter induced atrial tachycardia with clear AV dissociation apparent, however our initial tachycardia continued (Figure 3).

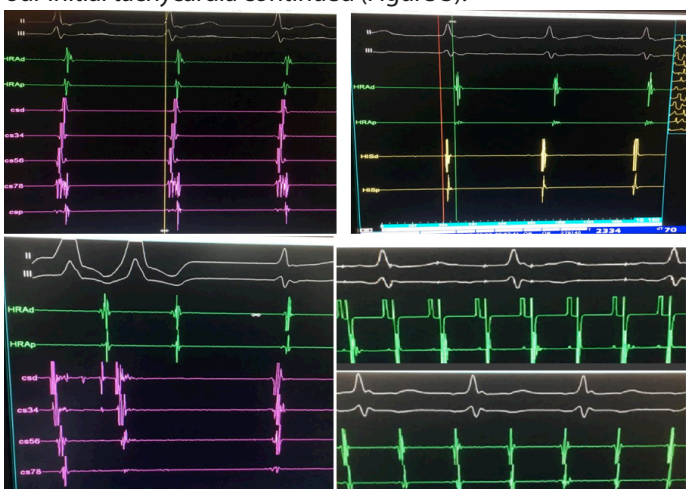

Figure 3. The intracavity recordings showed that there was a VA linking and VA interval ≤70 msn, when overdrive RV pacing or spontaneous ventriculary premature contractions showed VAV response and atrial overdrive pacing performed and during atrial tachicardia with clear AV dissociation apparent, however our initialtachycardia continued.

Our clinical ,ECG , and EPS findings were consistent with JT.

In patients with spontaneous runs of junctional tachycardia, cryomapping (-30°C) was performed in the triangle of Koch, while closely monitoring for the termination of JT within 20 to 30 seconds after reaching -30°C. AV nodal function was also closely monitored by intermittent atrial pacing (higher than the JT cycle length) during cryomapping. Once JT terminated with 20 seconds of cryomapping and no change in AV nodal function was observed, cryoablation (-70°C) was delivered for 4 minutes. An additional 4-minute cryoablation lesion was delivered at the successful site. There was no return of the tachycardia during a 30-minute wait, including with administration of isoproterenol. Post-ablation AH was measured as 140 ms and HV was 48 ms (Figure 4).

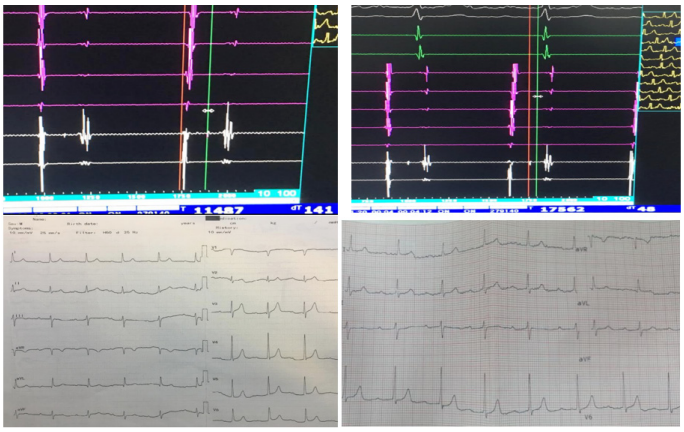

Figure 4. Post-ablation AH duration was measured as 140 msec, HV as 48 msec. PR interval at the control ECG after the procedure and 1 year later was 320 msec.

After the procedure and 1 year later, control ECGs showed that the interval was 320 ms and the patient was asymptomatic.

Discussion

Non-paroxysmal junctional tachycardia of the AV junction is an infrequently occurring arrhythmia, initially described in children and infants, and constitutes less than 1% of all tachycardias. [2,8] It is caused by foci within or proximal to the AV junction with abnormal automatism or it may be due to triggered activity, albeit less frequently. [4,9] Heart rate is usually between 120–220 beats/min. Subtypes of this condition include, idiopathic chronic JT, congenital JT and postoperative JT types. [10] JT may also be associated with acute MI, digital toxicity, acute rheumatic carditis, heart surgery, or acute electrolyte imbalance.[3-5]

The literature is limited in terms of data describing non-paroxysmal junctional tachycardia in adults as it is very rare in older patients. However, in adults, it is known that this condition often presents with non-paroxysmal characteristic and causes lower heart rate (70—130/min). Junctional tachycardia can present with an incessant tachycardia and is usually resistant to usual drug therapies. According to current guidelines, patients are recommended to be started on beta-blockers, diltiazem or verapamil (IIa), flecainide or propofenon (IIb), and when these drugs are ineffective or contraindicated, catheter ablation (IIb) is suggested (Figure 5). [10]

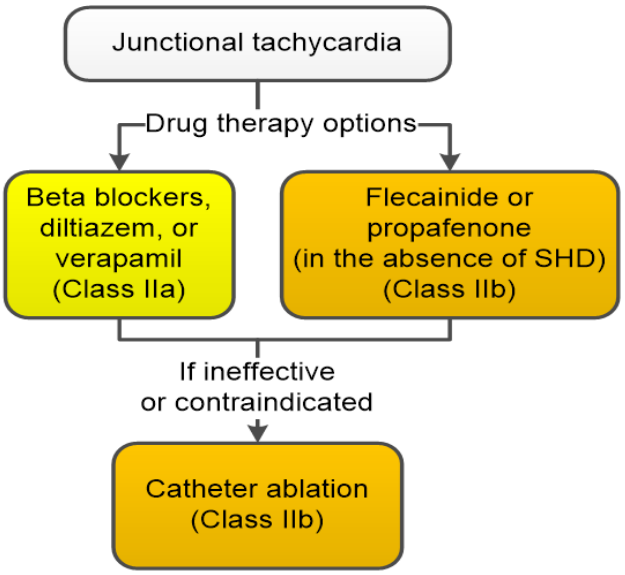

Figure 5. 2015 ACC/AHA/HRS Guideline for the Management of Adult Patients With Supraventricular Tachycardia

The JT can result in a narrow QRS complex rhythm on electrocardiogram. QRS morphology is similar to sinus or atrial conduction. It may also have a warm-up pattern. There may be a 1:1 VA relationship. The differential diagnosis for this rhythm includes atrioventricular (AV) node reentry tachycardia and orthodromic nodoventricular or nodofascicular reentry tachycardia. In the electrophysiology laboratory, maneuvers including the response to ventricular/atrial extrastimuli and overdrive pacing can be useful in the diagnosis. The presence of AV dissociation excludes AT and accessory pathway. Whereas, if retrograde VA dissociation is present, it may be an irregular rhythm. Adenosine may exclude atrial involvement with VA block. The first escape beat after the last atrial pacing can determine the origin of arrhythmias and the earliest retrograde conduction site should be targeted for ablation.

In cases where drug control cannot be performed, ablation therapy with electroanatomic mapping can be applied. Success with RF or cryoablation is reportedly > 80%. Given the risk of inadvertent AV block, cryoablation should be considered in such cases, although successful radiofrequency ablation has also been reported.

Conclusion

JT is very rare in adult or elderly patients. Cryoablation is a safe and effective treatment for junctional tachycardia resistant to antiarrhythmic therapy, especially when used in conjunction with a catheter navigation system.

*Informed constent was obtained from the patient

Declaration of conflict of interest

The authors received no financial support for the research and/or authorship of this article. There is no conflict of interest.

References

1. Law IH, Von Bergen NH, Gingerich JC, Saarel EV, Fischbach PS, Dick M II. Transcatheter cryothermal ablation of junctional ectopic tachycardia in the normal heart. Heart Rhythm 2006; 3: 903–907.
2. Sarubbi B, Musto B, Ducceschi V et al. Congenital junctional ectopic tachycardia in children and adolescents: a 20 year experience based study. Heart 2002; 88: 188 –90.
3. Konecke L, Knoebel S. Nonparoxysmal junctional tachycardia complicating acute myocardial infarction. Circulation 1972; 45: 367-74
4. Rosen K. Junctional tachycardia: mechanisms, diagnosis, differential diagnosis, and management. Circulation 1973; 47: 654-63
5. Haas NA, Plumpton K, Justo R, Jalali H, Pohlner P. Postoperative junctional ectopic tachycardia (JET). Z Kardiol 2004; 93: 371–80.
6. Hamdan M, Van Hare GF, Fisher W et al. Selective catheter ablation of the tachycardia focus in patients with nonreentrant junctional tachycardia. Am J Cardiol 1996; 78: 1292-97.
7. Wu MH, Lin JL, Chang YC. Catheter ablation of junctional ectopic tachycardia by guarded low dose radiofrequency energy aplication. Pacing Clin Electrophysiol 1996; 19: 1655-58.
8. Garson AJ, Gillette PC. Junctional ectopic tachycardia in children: electrocardiography, electrophysiology and pharmacologic response. Am J Cardiol 1979; 44: 298-302.
9. Liu CF, Ip JE, Lin AC, Lerman BB. Mechanistic heterogeneity of junctional ectopic tachycardia in adults. Pacing Clin Electrophysiol 2013; 36: 7-10.
10. Page RL, Joglar JA, Caldwell MA, et al; Evidence Review Committee Chair:2015 ACC/AHA/HRS Guideline for the Management of Adult Patients With Supraventricular Tachycardia: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. Circulation. 2016 Apr 5. 133(14):e471-505.