



<https://doi.org/10.1016/j.jemermed.2017.10.003>

Clinical Review

ALTERNATIVE TREATMENT OPTIONS FOR ATRIOVENTRICULAR-NODAL-REENTRY TACHYCARDIA: AN EMERGENCY MEDICINE REVIEW

Sarah Brubaker, MD,* Brit Long, MD,* and Alex Koyfman, MD†

*Department of Emergency Medicine, San Antonio Military Medical Center, Fort Sam Houston, Texas and †Department of Emergency Medicine, The University of Texas Southwestern Medical Center, Dallas, Texas

Reprint Address: Brit Long, MD, Department of Emergency Medicine, San Antonio Military Medical Center, 3841 Roger Brooke Dr., Fort Sam Houston, TX 78234

Abstract—Background: Atrioventricular-nodal-reentry tachycardia (AVNRT) is a form of supraventricular tachycardia (SVT) that is relatively common in the emergency department (ED). It is rarely indicative of underlying electrical or structural pathology. **Objective:** This review evaluates the literature and controversies concerning treatment of AVNRT in the ED. **Discussion:** For treatment of narrow-complex tachycardia, Advanced Cardiovascular Life Support guidelines recommend the use of vagal maneuvers, followed by adenosine. Recent literature suggests that nondihydropyridine calcium channel blockers, such as verapamil and diltiazem, may be as effective as adenosine, without the negative short-term side effects. Multiple studies have demonstrated that although adenosine is rapid acting, there is no statistically significant difference in conversion rate between adenosine and calcium channel blockers. Both medications result in a conversion rate above 90%,

but there are significantly more minor adverse effects, such as flushing or chest discomfort, with adenosine. Calcium channel blockers are a viable option for treatment for AVNRT, especially in refractory states. Beta-blockers have been evaluated but should not be used routinely due to lower efficacy. AVNRT is the most common tachydysrhythmia in pregnancy, and vagal maneuvers and adenosine are first line. Electrical cardioversion should be utilized for hemodynamically unstable patients. Most patients with AVNRT may be discharged with appropriate follow-up. **Conclusion:** Several studies demonstrate that nondihydropyridine calcium channels (verapamil and diltiazem) are equally as efficacious as adenosine in converting AVNRT to sinus rhythm, without the negative (albeit short-lived) side effects. If given over 20 min, the risk for hypotension is low. Published by Elsevier Inc.

Keywords—atrioventricular-nodal-reentry tachycardia; supraventricular tachycardia; cardiology; dysrhythmia; Valsalva; adenosine; nondihydropyridine calcium channel blocker; beta-blocker

This manuscript did not utilize any grants, and it has not been presented in abstract form. This clinical review has not been published, it is not under consideration for publication elsewhere, its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. This review does not reflect the views or opinions of the U.S. government, Department of Defense, U.S. Army, U.S. Air Force, or the SAUSHEC EM Residency Program.

INTRODUCTION

Supraventricular tachycardia (SVT) is a broad term that encompasses tachydysrhythmias generated “supra” (above) “ventricular” (the ventricles), specifically from any point proximal to the bundle of His (1). The term “SVT” is commonly used synonymously with

atrioventricular-nodal-reentry tachycardia (AVNRT). However, SVT encompasses AVNRT, atrioventricular re-entrant tachycardia, atrial tachycardia, atrial fibrillation, atrial flutter, and multifocal atrial tachycardia (2). This review will focus on management of AVNRT.

AVNRT is a regular, narrow-complex tachycardia with a ventricular rate higher than 160 beats/min, but < 220 beats/min (2). It is the most common cause of palpitations in patients with structurally healthy hearts, and its presence alone is rarely indicative of underlying pathology (1,3). Patients with AVNRT typically present with rapid-onset, regular palpitations, sometimes with shortness of breath, anxiety, and light-headedness (3). Chest pain is not usually present, but it may occur in patients with underlying coronary artery disease or true ischemia (1). Although AVNRT can occur spontaneously, it is often provoked by physical activity, emotional stress, hyperthyroidism, or the use of stimulatory substances (e.g., caffeine, alcohol, amphetamines) (1,2).

METHODS

This review focuses on treatments for AVNRT. A literature search for studies including “supraventricular tachycardia,” “narrow complex,” “tachydysrhythmia,” “atrioventricular re-entrant tachycardia,” “atrial tachycardia,” “atrial fibrillation,” “atrial flutter,” “multifocal atrial tachycardia,” “Valsalva,” “adenosine,” “calcium channel blocker,” and “beta-blocker” was conducted of PubMed, EBSCO, and Google Scholar. Studies were included through author consensus.

DISCUSSION

Pathophysiology of AVNRT

Understanding the pathophysiology is essential to making an informed decision regarding AVNRT treatment. The name is descriptive, as the dysrhythmia arises secondary to a re-entry circuit within the atrioventricular (AV) node, generally in the presence of normal electrical conduction distal to the AV node. Because the ventricles are able to depolarize at a normal speed, the electrocardiogram (ECG) will demonstrate narrow complex QRS, with normal morphology (1). Wide-complex AVNRT can occur in patients with preexisting bundle branch blocks. On the ECG, P-waves are usually either buried in the QRS complex or appear retrograde to the QRS complex. Diffuse ST depressions may be seen; however, these depressions are rate-dependent and should resolve with reversion of AVNRT to normal sinus rhythm. If the ST depressions persist and are new (compared with previous ECG) after return to normal sinus rhythm, the

patient requires admission and further evaluation for cardiac ischemia.

To appropriately treat AVNRT, one must disrupt the cycle of refractory pathways that results in the re-entry circuit within the AV node. AVNRT is usually highly responsive to agents that either block or slow conduction through the AV node. Several agents are able to achieve this purpose.

Treatment Options

There are several treatment options, demonstrated in Table 1. Figure 1 displays an algorithm for AVNRT management. Per Advanced Cardiovascular Life Support (ACLS) and American Heart Association (AHA) guidelines, the first-line treatment for stable AVNRT includes vagal maneuvers, such as Valsalva or carotid sinus massage. These maneuvers effectively achieve cardioversion in approximately 28% of patients (5). However, performing “modified Valsalva maneuvers” greatly improves the efficacy of nonpharmacologic AVNRT treatment. The idea was first proposed and studied in 2010. A retrospective review found the conversion rate with the standard maneuver to be 5.3%. A prospective analysis of 19 patients with AVNRT was then conducted, in which participants were placed in the Trendelenberg position and instructed to blow into a syringe for 15 s (6). Per study results, patients who performed the modified maneuver demonstrate a 32% conversion rate, compared with 5.3% in the control group (6).

Efficacy further increases when using the “modified Valsalva” technique described in the REVERT trial (7). The REVERT trial was a randomized controlled, parallel-group trial that included 433 participants and compared the standard Valsalva maneuver with the “modified Valsalva maneuver.” In the modified maneuver, each patient was placed with the head of the bed at a 45° angle. After the patients performed a “standardized strain” (forced expiration into a syringe) for 15 s, they were laid flat, and their legs were raised to 45° for 15 s. They were then returned to a semi-recumbent position for 45 s. The initial study demonstrates successful conversion to sinus rhythm in 43% of patients (compared with 17% in the control group), with a number needed to treat of 3 (7,8). Since the REVERT trial was published in 2015, a limited number of case studies corroborate the results (9). In addition, one randomized control trial, which was performed in 2017 and included 56 patients, validates the findings of the original study (10).

If vagal maneuvers fail, current AHA guidelines recommend the use of adenosine, which slows conduction at the AV node (4,11). Adenosine is initially administered as 6 mg i.v. rapid-push bolus through a

Download English Version:

<https://daneshyari.com/en/article/8719611>

Download Persian Version:

<https://daneshyari.com/article/8719611>

[Daneshyari.com](https://daneshyari.com)