

Management of Unstable Paroxysmal Supraventricular Tachycardia in a Rigid Patient

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Abstract

The most common presentation of cardiac patients in the emergency room is myocardial infarction, followed by arrhythmia. The most common in arrhythmia is atrioventricular arrhythmia, AVNRT (atrioventricular nodal reentrant tachycardia) being the most common. The treatment for undifferentiated narrow complex QRS, (not for all narrow complex tachycardia) based on the current ACLS guidelines is vagal maneuvers and adenosine. In an unstable narrow complex, synchronized cardioversion is the preferred method for treatment. In this case report, we discuss a patient who, along with his attendants, refused for shock therapy for unstable supraventricular tachycardia, its management and further course.

Keywords: Digoxin; Unstable paroxysmal supraventricular tachycardia; Cardioversion.

INTRODUCTION

The American Heart Rhythm Society estimates that millions of people worldwide experience some abnormal heart beat during their lifetime. Some heart rhythms occur in healthy individuals which is safe, but some heart rhythms are fatal and can be life-threatening. The heart beat which is fast and sustained in the atrioventricular hub is called paroxysmal supraventricular tachycardia (PSVT). Paroxysmal supraventricular tachycardia (PSVT) includes atrioventricular reciprocating tachycardia (AVRT), atrioventricular nodal reentrant tachycardia (AVNRT), atrial tachycardia (AT). The

most common form of PSVT is AVNRT followed by AVRT.^{1,2} Based on the electrocardiogram findings and patient's vital status, the mode of treatment is decided in tachyarrhythmia patients. Patients with unstable tachyarrhythmia and unstable vitals need under synchronized cardioversion and further cardiac evaluation, once the rhythm is settled down to address the underlying cardiac status of the patient.

CASE

A 62-year-old healthy male patient was shifted from a nearby district to our hospital in our ambulance service. The patient was accompanied by his son and daughter-in-law along with emergency ambulance technician and ambulance doctor on duty. The patient was diagnosed with acute coronary syndrome and was being referred to our center for further care. (details of the initial ECG finding and vitals is important) During the transit, the patient suddenly developed tachycardia as shown in the ambulance cardiac monitor.

During the initial period, the patient's vitals were stable (blood pressure, oxygen saturation, respiratory rate), 2 lead electrocardiogram (EKG)

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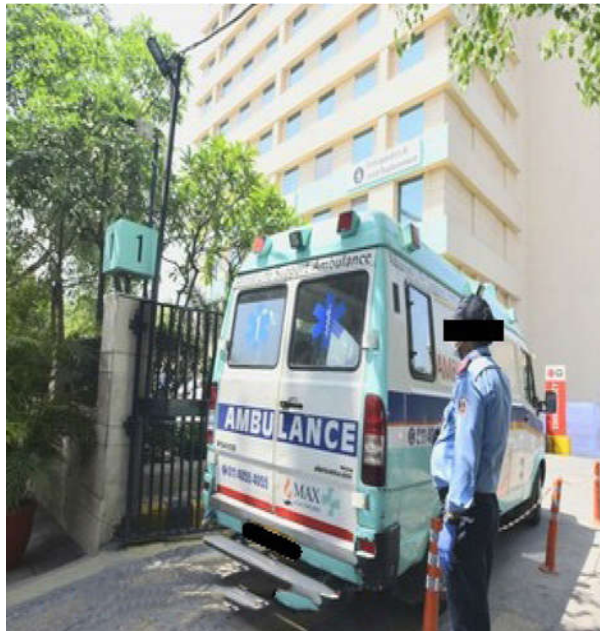
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on cardiac monitor in the ambulance showed PSVT. The patient was treated with injection adenosine (6mg, followed by 12mg, then 18 mg, as per recent ACLS guidelines) but the rate and rhythm did not change. The patient's condition started deteriorating, accompanied by chest pain, giddiness and reduction in blood pressure. As per current ACLS guidelines, the patient was an ideal candidate for synchronized cardioversion. All along, the ambulance was running through the national highway, but now, looking at the severity, the ambulance was brought to a halt. The attendants were counseled regarding the cardioversion process and were asked to sign the informed consent. But to a surprise, both the patient and his attendant refused to sign the consent.

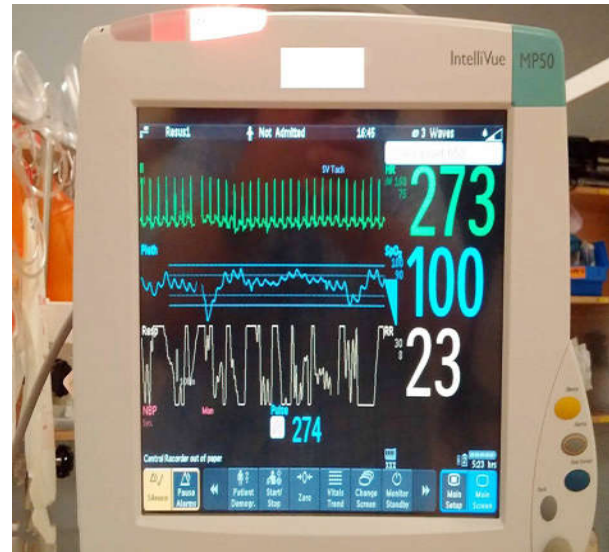


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Looking at the critical condition and with no help around, the cardiologist's opinion was sought but to surprise, there was no other way for management of the patient other than shifting the patient to hospital.

On discussion and immediate review from previous literature, digoxin was found to be helpful in some cases. The patient and attendants were counseled about the use of digoxin that it is a "trial and error" method as they have not given consent for synchronized cardioversion. Medicolegally this statement can't be considered as the literature for management of narrow complex arrhythmias with supporting evidence has been laid down by various agencies like the American heart society. After informed consent by patient and attendant, injection digoxin 0.25mg IV was given. After 15

minutes of administration of injection digoxin, the heart rate dropped to 86 per minute, and his chest discomfort was relieved. The ambulance was again rushed through on the highway and on reaching the hospital, the patient was immediately shifted to the cardiac care unit.



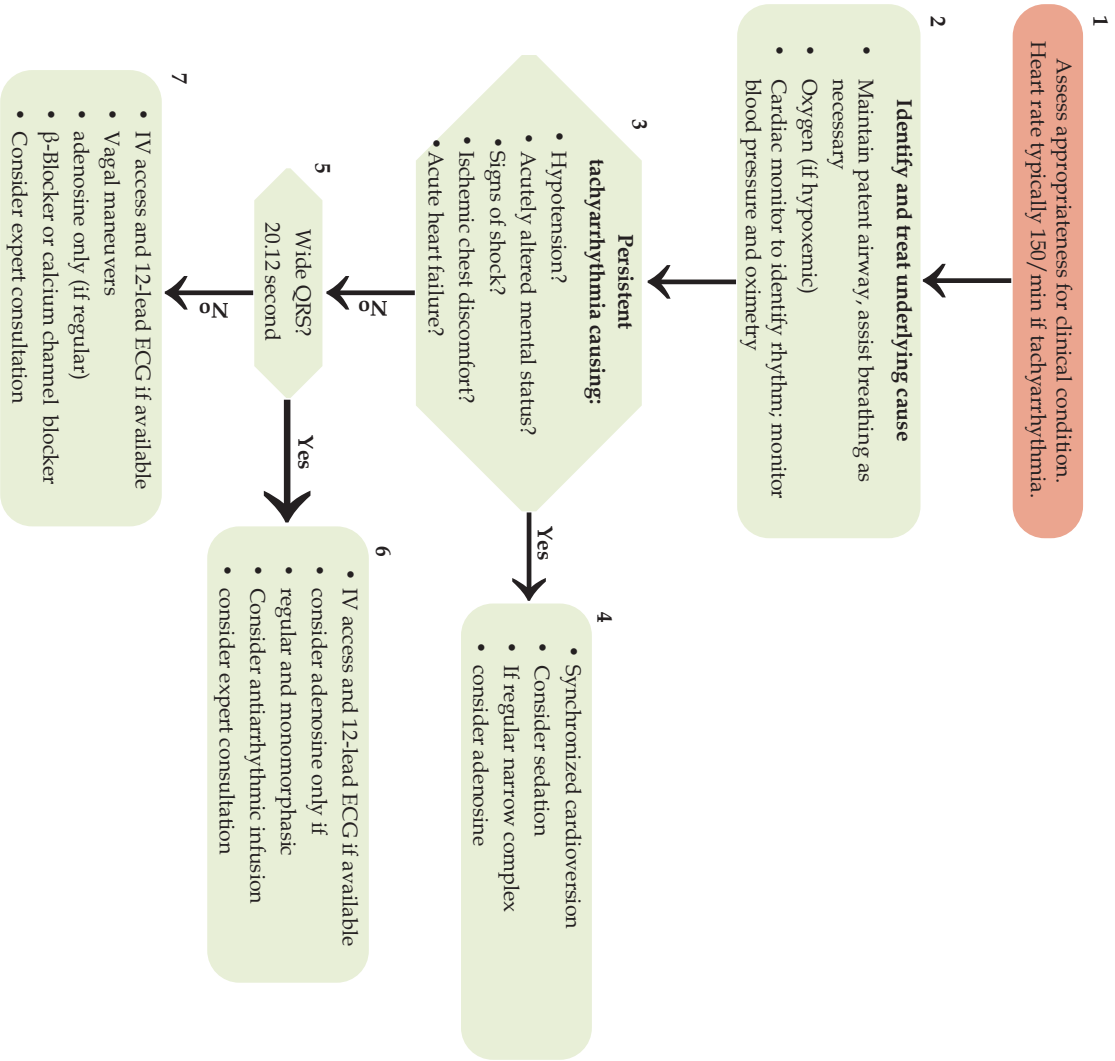
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The following day, the patient attendant was counseled for the need of a coronary angiography study, which revealed 60% blockage in the right coronary artery. The patient and attendant refused for coronary stenting and requested medical management. The patient was started on tablet metoprolol 12.5mg orally once a day along with medications for coronary syndrome. The patient was discharged on the 3rd day of admission in stable condition but the future course of the patient is still doubtful.



Source: Google Image for representation only

Adult Tachycardia with a Pulse Algorithm



Doses/Details
<p>Synchronized cardioversion: Initial recommended doses: Narrow regular: 50-100 J Narrow irregular: 120-200 J biphasic or 200 J monophasic Wide regular: 100 J Wide irregular: defibrillation dose (not synchronized)</p> <p>Adenosine IV dose: First dose: 6 mg rapid IV push; follow with NS flush, Second dose: 12 mg if required.</p> <p>Antiarrhythmic Infusions for Stable Wide-QRS Tachycardia</p> <p>Procainamide IV dose: 20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases >50%, or maximum dose 17 mg/kg given. Maintenance infusion: 1-4 mg/min. Avoid if prolonged QT or CHF</p> <p>Amiodarone IV dose: First dose: 150 mg over 10 minutes, Repeat as needed if VT recurs. Follow by maintenance infusion of 1 mg/min for first 6 hours.</p> <p>Sotalolol IV dose: 100 mg (1.5 mg/kg) over 5 minutes. Avoid if prolonged QT.</p>

Source: 2015 American Heart Association

DISCUSSION

With recent advancement in intracardiac monitoring devices and pacing techniques, it has been recorded that majority of the cases are due to re-entry within the atria, AV node and sinus node.² Supraventricular tachyarrhythmias are triggered by premature beats leading to conduction in two pathways, allowing the development of circulating electrical activity within the atria and ventricular myocardium.³ The most common reentrant phenomenon encountered by the emergency physicians worldwide is AVNRT (atrioventricular nodal reentrant tachyarrhythmia).⁴

As the atrium and ventricle gets activated roughly at the same time in AVNRT, it is difficult to detect “p-waves” on the electrocardiogram (ECG) strip. P-waves are generally masked and either appear as a “pseudo-s” deflection in inferior leads or a “pseudo-r” wave in lead V1.⁵ Another ECG abnormality is an “aVL notch” which appears as a positive deflection at the end of the Q-wave, R-wave, and S-wave (QRS) complex during tachycardia but is absent in regular sinus rhythm.⁵

According to the recent AHA/ACLS update 2022, the first line of management in stable SVT's is vagal maneuvers and adenosine.⁶ When adenosine and vagal maneuvers fails to convert PSVT's to normal sinus rhythm, long acting AV nodal blocking agents like calcium channel blockers (verapamil, diltiazem), beta-blocker (metoprolol) are employed, diltiazem being the best in conversion of PSVT to normal sinus rhythm.^{7,8}

Synchronized cardioversion is the treatment of choice in unstable PSVT patients. Starting from the least amount of energy (50 joules) and then doubling it if the shock is ineffective is the safest and simplest advice.⁹

Digoxin is useful in preventing AVNRT episodes in about 50% of instances.¹⁰ It can be administered alone or in conjunction with beta-blockers. Digoxin treatment should be avoided in patients with accessory pathways and antidromic tachycardia or atrial fibrillation that are conducted via an accessory pathway because these medications may augment the conduction properties of the accessory pathway and cause an increase in ventricular rate or even ventricular fibrillation.¹⁰ Our patient and his attendants refused for electrical cardioversion even in unstable condition, hence digoxin was used for her treatment, which proved beneficial in this case.

CONCLUSION

Tachyarrhythmia is generally non-life threatening but may sometimes be fatal to life. Immediate evaluation should be done in patients with tachyarrhythmia. PSVT is usually life-threatening. Treatment is usually medicine correction in stable PSVT but electrical cardioversion is treatment of choice in unstable PSVT patients. Digoxin, though studied in literature, has very few supportive documents for its use in unstable PSVT patients, hence, a brief review and systematic study approach should be carried out for usage of digoxin as pharmacotherapy in PSVT patients.

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