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ATYPICAL PRESENTATION OF RIGHT VENTRICULAR OUTFLOW TRACT VENTRICULAR TACHYCARDIA

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☐ **Abstract—Background: Ventricular tachycardia (VT) in the pediatric population is rare, has a wide differential diagnosis, and can present in numerous ways. In the absence of underlying heart disease, VT is considered idiopathic and is associated with an excellent prognosis. Right ventricular outflow tract ventricular tachycardia (RVOT-VT) represents the most common form of idiopathic VT. The differential diagnosis, mechanism, presentation, management, and prognosis of RVOT-VT in the pediatric population will be discussed. Case Report: We report a case of RVOT-VT that was incidentally discovered in an 11-year-old girl during an emergency department workup for severe headache. Why Should an Emergency Physician Be Aware of This?: It is essential for emergency physicians to have an approach to pediatric VT and appreciate the wide range of potential presentations. Differentiating idiopathic VT, such as RVOT-VT, from more malignant forms of VT can be challenging and requires expert consultation for further diagnostic workup and management.** © 2015 Elsevier Inc.

☐ **Keywords—ventricular tachycardia; right ventricular outflow tract; idiopathic; headache; pediatrics**

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INTRODUCTION

Ventricular tachycardia (VT) is rare in the pediatric population, with a reported incidence of 1.1 episodes per 100,000 childhood years (1). The initial presentation of pediatric VT is highly variable and, once identified, requires a thorough diagnostic evaluation, as the management and prognosis differs widely according to the underlying etiology (2). In contrast to adults, in whom VT is most often associated with myocardial pathology, the majority of pediatric VT is idiopathic, with no underlying heart disease identified (3). Approximately 70% of pediatric idiopathic VT is believed to originate from a region known as the right ventricular outflow tract (RVOT) (4). Here, we report a case of RVOT-VT that was incidentally discovered during an emergency department (ED) workup for severe headache.

CASE REPORT

A previously well 11-year-old girl presented to the ED with a sudden onset, severe, left occipital headache that began while she was eating a snack at home. Emergency Medical Services were called and found the patient to be alert and responsive but in discomfort and extremely anxious. While in transit to the ED, the patient's electrocardiogram (ECG) demonstrated frequent premature

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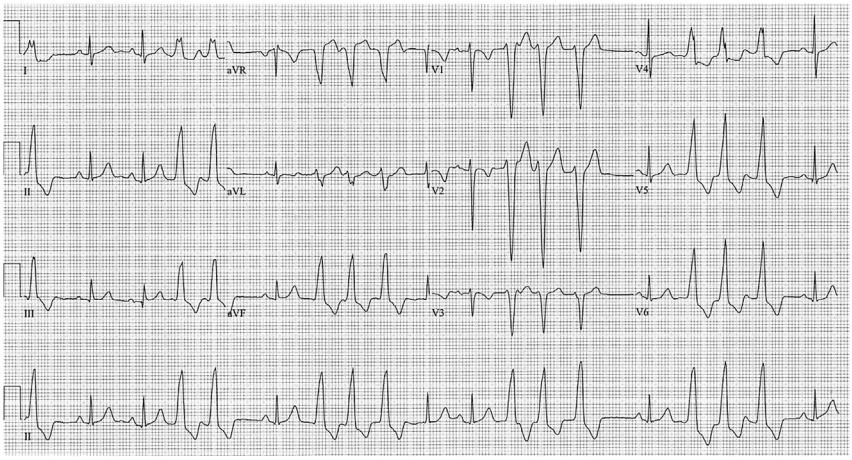

Figure 1. Initial 12-lead electrocardiogram demonstrating sinus rhythm with frequent and consecutive premature ventricular contractions in couplets and triplets.

ventricular contractions (PVCs). The patient's initial vital signs on arrival to the ED were temperature of 36.4°C, blood pressure of 122/73 mm Hg, heart rate of 127 beats/min, respiratory rate of 20 breaths/min, and oxygen saturation of 99% on room air. The initial 12-lead ECG showed sinus rhythm with frequent and consecutive PVCs in couplets and triplets (Figure 1). The patient continued to have frequent PVCs and runs of nonsustained ventricular tachycardia (NSVT) at a rate of 140 to 150 beats/min. During this period, she remained hemodynamically stable. Immediate management included oral acetaminophen 650 mg and ibuprofen 600 mg. Magnesium sulfate 500 mg i.v. was given in consultation with the pediatric cardiology service in an attempt to stabilize cardiac neuronal membranes and prevent possible progression to polymorphic VT. Despite these interventions, the patient continued to have a severe headache with frequent PVCs and runs of NSVT in the ED.

On history, she denied any palpitations, chest pain, shortness of breath, syncopal episodes, fever, or recent exertion. Her medical history was significant for a 2-year history of recurrent frontal tension-type headaches that resolved with ibuprofen. No allergies or current medications were reported. Her immunizations status was up to date. There was a history of migraines in her mother. There was no family history of dysrhythmia or sudden death. On general examination, the patient was appropriately grown and appeared anxious. She was alert and oriented to person, place, and time. Her physical examination, including detailed neurologic and cardiovascular examinations, was unremarkable. Initial laboratory studies, including complete blood count, electrolytes, extended electrolytes, thyroid-stimulating hormone, and high-sensitivity troponin-T were within a normal range. A chest x-ray study and high-resolution computed tomography of the head were also unremarkable.

The patient was admitted to the Pediatric Critical Care Unit (PCCU) for further workup and monitoring. While in the PCCU, the patient's headache resolved with repeat administration of acetaminophen 650 mg and ibuprofen 600 mg. During this time, she continued to have frequent PVCs and NSVT. An i.v. infusion of esmolol 100 μg/kg/min was started but was discontinued shortly afterwards due to development of hypotension. Additional cardiac evaluation included a transthoracic echocardiogram, which was normal. An exercise stress test following the modified Bruce protocol demonstrated NSVT at rest, a moderately decreased functional capacity, and the absence of VT at maximal exercise (heart rate >160 beats/min). The patient was fitted with a Holter monitor that confirmed the presence of frequent monomorphic PVCs, partially in runs, and again it was demonstrated that the dysrhythmia disappeared at rates >160 beats/min. A signal-averaged electrocardiography (SAECG) was normal and ruled out delayed after depolarizations. Based on the findings of a structurally normal heart, classic ECG pattern, and absence of delayed after depolarizations on SAECG, the diagnosis of benign RVOT-VT was made. The pediatric neurology service was also consulted and magnetic resonance imaging (MRI) of the head and neck with angiography and spectroscopy were completed with no significant abnormalities identified. The patient's severe headache at presentation was attributed to occipital neuralgia and she was discharged after a 2-day admission. At 6 months post discharge, repeat echocardiogram showed no evidence of cardiomyopathy. A repeat Holter study demonstrated a moderate PVC load and runs of NSVT. The patient has remained asymptomatic from a cardiac perspective and her headaches have returned to baseline. She will continue to be followed by the pediatric cardiology service every 6 months for routine surveillance.