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## Supraventricular tachycardia in a child with varicella myocarditis

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## CASE REPORT

# Supraventricular Tachycardia in a Child with Varicella Myocarditis

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**Abstract:**

A 9 year-old boy was admitted to the hospital with stomachache, vomiting and rash. Tachypnea, tachycardia, hypotension, gallop rhythm, and typical skin eruption of varicella were noted on the physical examination. An electrocardiogram showed ST depression and supraventricular tachycardia. Echocardiography revealed slight enlargement of the left ventricle with normal ejection fraction, but no valve regurgitation or pericardial effusion. Varicella zoster virus serum immunoglobulin M antibody was positive. The arrhythmia resolved with digoxin. He was discharged home without sequela.

**Keywords:** Arrhythmia; Chickenpox; Children

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## Introduction

Varicella is one of the most common childhood contagious diseases. Although it is usually a benign and self-limiting childhood illness, it can cause mortality and serious complications in both immunocompetent and immunocompromised persons [1-3]. Varicella zoster is one of cardiotropic viruses [4]. The diagnosis can usually be made according to the typical rash of varicella. The detection of serum immunoglobulin M antibody is sometimes needed in the differential diagnosis of skin eruptions. Varicella can cause complications that are potentially serious, such as cardiac, respiratory, neurological, and hematological complications [3]. Cardiac complications are extremely rare, but can be life-threatening, and may include pericarditis, myocarditis,

endocarditis, and significant arrhythmia [1,2,4]. Our patient presented with eruption of varicella, myocarditis and supraventricular tachycardia. Cardiac complications of varicella may be more common and severe in childhood than reported previously.

## Case Report

A healthy 9-year-old boy, with no history of varicella immunization, presented to our emergency department with fever, headache, stomachache, and vomiting for two days. Five days prior to admission, the patient had admitted to a local hospital with skin eruptions and fever and was diagnosed with varicella. He had no significant medical or family history related to heart diseases.

The patient was admitted to our hospital for care and management. On his physical examination,

tachypnea, tachycardia, hypotension, gallop rhythm, and typical eruptions on his skin indicative of resolving varicella were noted. He appeared in mild distress. His vital signs were as follows: heart rate 163 beats/minute, respiratory rate 40/minute, body temperature 37.3°C, blood pressure 76/40 mmHg, and oxygen saturation level 94% on air room. Peripheral pulses were palpable. The lungs were clear, and there was no cardiac murmur or hepatosplenomegaly.

An electrocardiogram revealed supraventricular tachycardia with regular narrow QRS complex at 164 beats/minute, and ST-segment changes in leads I, II, aVR, and V1 through V6 (Fig. 1). No pathologic changes were shown on chest radiography. Echocardiography showed slight enlargement of the left ventricle with normal ejection fraction (75%), but no valve regurgitation, pericardial effusion or thrombus. No congenital defects were noted. Laboratory tests revealed the following: leukocyte count 16 300 cells/mm<sup>3</sup>, erythrocyte sedimentation rate 19 mm/hour, C-reactive protein 32.1 mg/L (normal range, 0-10 mg/L), serum glucose 102 mg/dL, alanine aminotransferase 52 IU/L, aspartate aminotransferase 183 IU/L, creatinine kinase-MB fraction 112 IU/L (normal range, 0-24 U/L), troponin T negative, blood urea nitrogen 18 mg/dL, creatinine 0.6 mg/dL, and lactic dehydrogenase 1072 IU/L; varicella zoster virus serum immunoglobulin M antibody was positive. Electrolytes and abdominal ultrasonography were normal.

All data suggested that the patient had supraventricular tachycardia associated with acute myocarditis due to varicella. Therefore, he was admitted to our intensive care unit for close monitoring and management. The patient was digitalized with oral digoxin for supraventricular tachycardia. The patient's rhythm returned to normal sinus rhythm within the first 2 hours (Fig.2), but his alterations on electrocardiogram continued for several days. Hypotension and the clinical picture of the patient resolved rapidly after achievement of normal sinus rhythm. He did not require inotrope therapy or antiviral agents. No new varicella skin lesions were noted after hospitalization. On the 5th day, he was

discharged without sequela. At the 6th month examination, he was doing well, and digoxin was discontinued.



**Fig 1** An electrocardiogram shows supraventricular tachycardia, ST-segment changes on admission (at 25 mm/sec).



**Fig 2** An electrocardiogram shows normal sinus rhythm after digoxin therapy (at 25 mm/sec).

### Discussion

Varicella myocarditis was initially described in 1953 [5]. Varicella zoster virus is cardiotropic and a rare cause of viral myocarditis [4]. Myocarditis in children is usually associated with a viral illness. It is an inflammatory process of the heart that can lead to temporary or permanent damage to the myocardial structure and conduction system. The histopathological findings of varicella myocarditis are similar to those of other viral myocarditis. Clinical presentations of myocarditis range from nonspecific systemic symptoms to sudden death [6].

Mortality and morbidity of varicella are commonly observed in immunocompromised and unvaccinated children [1, 7]. Approximately half of varicella fatalities are secondary to pneumonia and neurologic complications. Cardiac complications are even rarer, but when present may cause significant morbidity and mortality [2]. A review of the current literature

(PubMed) from 1966 to the present regarding cardiac-related mortality and morbidity identified 13 deaths associated with, or attributable to, direct involvement of the myocardium or conducting system [7]. The clinical findings in this case, including myocarditis and supraventricular tachycardia, are distinct from the other cases. Treatment of acute myocarditis is largely supportive. The arrhythmia of the patient resolved with digoxin. The findings recovered rapidly after achieving normal sinus rhythm. Patients may present with heart failure secondary to myocardial dysfunction, effective endocarditis, myopericarditis, death due to myocarditis, supraventricular tachycardia, complete atrioventricular block, ventricular tachycardia, and ventricular fibrillation [1, 2, 4, 5, 7-10]. Myocarditis and arrhythmia can coexist. To the author's knowledge, supraventricular tachycardia associated with acute myocarditis has been reported in only a few cases in the English literature as a cardiac complication of varicella [8, 9]. The current case presented with supraventricular tachycardia associated with acute varicella myocarditis.

The frequency of significant varicella myocarditis is uncertain. Subclinical involvement of the myocardium may be more common than estimated. One study reported that transient subclinical electrocardiographic changes suggestive of myocarditis are seen in 5.6% of the children and adults hospitalized with varicella [7]. However, in a new study, 824 children were hospitalized for varicella over a 2-year period, and none was hospitalized due to cardiac complications [3]. Diagnosis of varicella in this patient was confirmed by positive serum immunoglobulin M antibody in addition to the typical eruptions on his skin indicating resolving varicella. Echocardiography is the most valuable means of detecting decreased ventricular function. No impairment in the left ventricular ejection fraction was noted in this case. His electrocardiogram revealed ST alterations and supraventricular tachycardia.

Varicella is common among children in Turkey [3]. When evaluating patients with varicella;

clinicians should consider the rare cardiac complications. Reported studies suggest that varicella vaccine should be added to the routine immunization schedule [1, 3, 7].

In conclusion, an electrocardiogram may be helpful in the diagnosis of cardiac damage due to varicella. In our country, the varicella vaccine is optional in previous years. Recently, it entered into in routine immunization program. Severe complications of varicella and death may decrease with proper vaccination in childhood.

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