

# A rare arrhythmia in the newborn: posterior fascicular ventricular tachycardia

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## ABSTRACT

Arrhythmias are most frequently seen in the neonatal period. Left posterior fascicular ventricular tachycardia is quite rarely seen in children and infants. In this case report, we present a newborn patient and management of left posterior fascicular ventricular tachycardia.

**Keywords:** Arrhythmia, fascicular ventricular tachycardia, cardioversion, neonate

The left posterior fascicular VT, which was firstly defined in 1979 by Zipes *et al.* [1], is an important cardiac arrhythmia with specific electrophysiological characteristics. This arrhythmia, which usually occurs in young adults who do not have a structural cardiac problem, is quite rarely seen in children and infants. In this case report, we present a patient with left posterior fascicular VT, and its management in the neonatal age group.

## CASE PRESENTATION

The patient in our case report is a male infant born from a 29-year-old mother, and was admitted on postnatal 6<sup>th</sup> day due to tachycardia. In the electrocardiogram (ECG), the heart rate was 201-208/min, QRS: 85 ms, right bundle branch block and superior axle pattern were revealed, P waves could not be selected, and the posterior fascicular ventricular tachycardia was considered (Fig. 1). Patient's vital

signs, other systemic examinations, blood electrolytes and thyroid function values were normal except for tachycardia. There was no response to parenterally-administered 0.75 mg adenosine. When the ejection fraction (EF) of the patient, whose heart rate could not be controlled despite the propranolol treatment, decreased to 56% in repeated echo, and normal sinus rhythm was obtained by performing synchronized cardioversion as 1 j/kg (Fig. 2). The patient was discharged by prescribing oral propranolol (4×0.25 mg/kg/day, max 3.5 mg/kg/dose); but was admitted to another pediatric clinic with a new tachycardia after 3 days. Because of not obtaining sinus rhythm despite 3 synchronized-cardioversions with 1 j/kg electrical dose, he was transferred to our clinic where amiodarone (5mg/kg/dose loading after 7-15 mcg/kg/min IV, 2×5-10 mg/kg/dose oral) was started for pharmacological cardioversion. The amiodarone treatment of the patient whose heart rhythm returned to normal within 45 minutes was discontinued. Oral sotalol (2×1 mg/kg/day, max 4 mg/kg/dose) treatment

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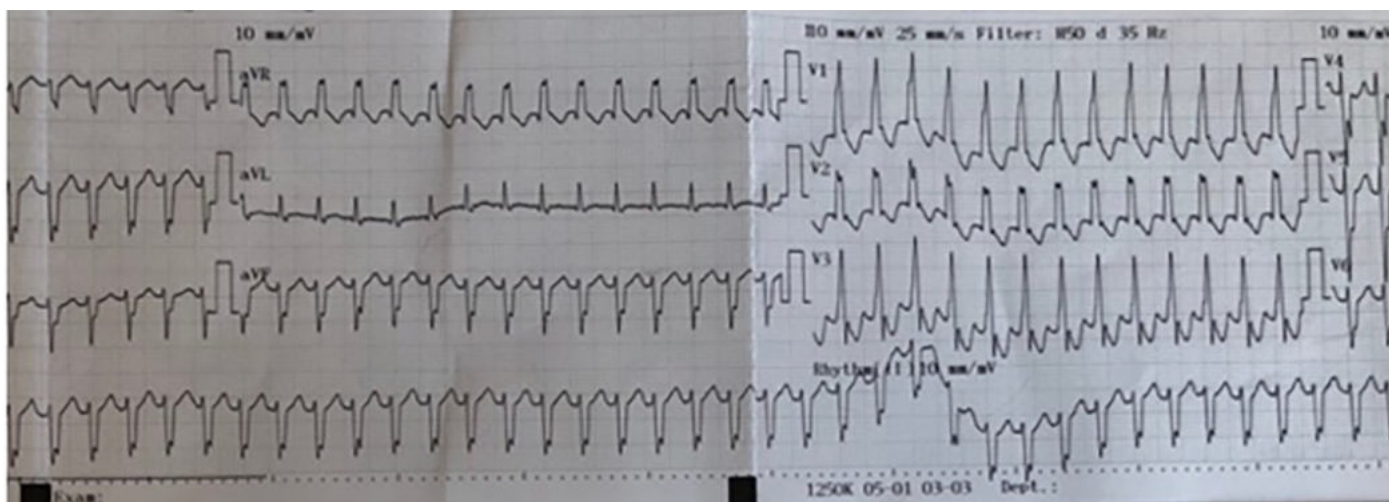


Fig. 1. Electrocardiogram before cardioversion of the patient.

was started. At the 72<sup>nd</sup> hour of the sotalol treatment, he had normal 24-hour rhythm Holter analysis, normal ECG (QTc: 320 ms), and was then discharged.

### DISCUSSION

Arrhythmias during the neonatal period can easily

escape from the eye due to the conditions seen in some arrhythmias such as the absence of clinical symptoms, difficulty in diagnosis, and improvement over time. In initial 10 days in life, 1-5% of the newborns have arrhythmia, which is generally a result of the continuation of fetal arrhythmia [2]. The clinical symptoms depend on the rate and duration of arrhythmias, which are categorized as benign or non-

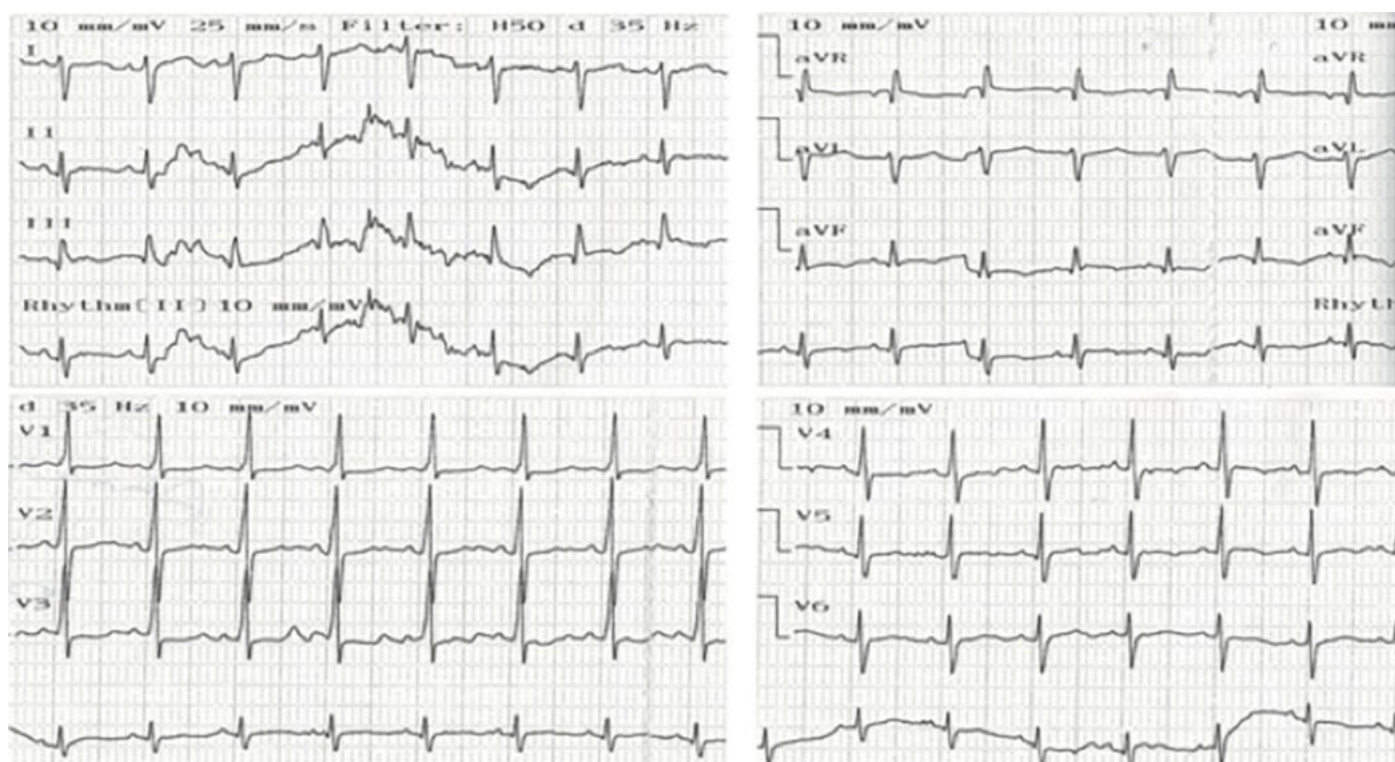


Fig. 2. Electrocardiogram after cardioversion of the patient. Normal sinus rhythm.

benign. Non-benign ones involve supraventricular tachycardia (SVT), atrioventricular conduction system disorders, ventricular tachycardia and fibrillation, long QT syndrome and electrolyte disturbance arrhythmias [3].

The left posterior fascicular VT is an important cardiac arrhythmia, which usually occurs in young adults who do not have a structural cardiac problem, is quite rarely seen in children and infants [1]. Arrhythmias are classified into three subtypes according to origin locations. Left posterior fascicular VT is manifested by right bundle branch block and left axis deviation. Left anterior fascicular VT is seen together with right bundle branch block and right axis deviation, and upper septal fascicular VT is associated with narrow QRS complex and normal axis. The most common type is posterior fascicular VT, which covers approximately 90% of cases, and our case was also in this type. The VT's ECG characteristic indicates widening of QRS with a bundle branch block pattern and atrioventricular dissociation. VT must be differentiated from other mechanisms that appear rarely in infants that also have wide QRS tachycardia; SVT/ atrial fibrillation included with bundle branch block, Mahaim tachycardia, aberrant SVT, SVT with anterograde conduction across an accessory pathway. We also administered adenosine to our patient in order to exclude both SVT differential diagnosis and adenosine-responsive VTs. Hypoxia, electrolyte disorders, acidosis, harmful substances used by mother, drugs given to the infant, myocarditis can be predisposing factors for neonatal arrhythmias. When an identifiable predisposing condition is absent, VT is often a finding that is benign. We could not detect a predisposing cause in our case, so we considered it as idiopathic VT. Treatment and prognosis of it are based on VT mechanism and pattern, the hemodynamic impact, and relevant conditions [4]. Performing synchronized cardioversion with electrical dose of 1 j/kg is necessary in cases which has high heart rate, prolonged arrhythmia and hemodynamic instability. In initial hospital admission of the patient, we also preferred synchronized cardioversion in our patient who did not respond to oral propranolol whose EF value was seen as decreased in echocardiography performed at early period, and we received reply.

However, cardioversion was not effective at the patient's second admission. In clinically stable cases, adenosine may be administered to exclude possible branch block and aberrant SVT. If clinical signs are stable, intravenous lidocaine, esmolol and their combination with oral propranolol and flecainide, respectively, may be preferred. Calcium channel blockers are contraindicated in newborns.

## CONCLUSION

If there is no response to treatment, the best choice is amiodarone. Discharge with beta-blockers is appropriate approach for patients whose attacks are under control. In the management of fascicular VT, catheter ablation is a curable treatment in fascicular even in infancy when the presence of medical treatment resistance [5].

### *Informed consent*

Written informed consent was obtained from the patient's family for publication of this case report and any accompanying images.

### *Conflict of interest*

The authors declared that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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