CASE REPORT

Eastern Journal of Medicine

East J Med 23(2): 121-123, 2018
DOI: 10.5505/ejm.2018.47955

Topical Minoxidil Treatment and Sinus Node Dysfunciton in a Child Patient

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ABSTRACT

Minoxidil is a drug being widely used in alopecia topically and systemically. Various cardiovascular side-effects corresponding to this drug has been reported in the adults, and leastwise in the pediatric patients. A 9 year old girl, having been using topical minoxidil for 2 years due to alopecia; was directed to our clinic for cardiac assessment prior to commencing systemic minoxidil treatment. No meaningful finding was attained neither in the received history of the patient, and in her physical examination. In the holter examination of the patient with normal echocardiography and electrocardiography, 6 seconds long asystolia attack accompanied by syncope was observed. Since such cardiac side-effects as tachycardia, pericardial effusion, myocardial infarction corresponding to minoxidil usage have been reported in the literature, and due to the presence of sinus arrest having developed in the introduced case likely in correspondence with minoxidil, cardiac attention has to be paid to the patients using minoxidil.

Key Words: Minoxidil, alopecia, sinus pause

Introduction

Sinus node dysfunction occurs quite rarely among children (1). It may be seen in congenital heart diseases such as atrial septal defect and left atrial isomerism, in neuromuscular diseases such as Friedreich's Ataxia, in various other conditions such as cardiomyopathy, neonatal hypoxia, central neural system diseases, surgically treated congenital heart diseases, hypervagotonia, hemochromatosis and amyloidosis, and quite rarely in the normal heart (2). Apart from the temporary sinus node dysfunction, being seen either as drug-induced or under conditions such as hypothyroidism; treatment of symptomatic sinus node dysfunction is permanent pacemaker implantation (3).

In this case report, we introduce a child with symptomatic sinus node dysfunction that developed due to the topical use of minoxidil because of alopecia.

Case report

A 9-year-old girl, who had been using topical minoxidil for two years due to alopecia, was directed to our clinic for cardiac assessment prior to commencing systemic minoxidil treatment. There was no feature detected other than alopecia in the physical examination of the patient, and she had no complaints other than alopecia, and syncope once upon giving blood. The case was investigated in the pediatric rheumatology department regarding systemic inflammatory diseases, and she was determined to have no signs of such diseases. Electrocardiography, echocardiography, complete blood count, tests for liver and kidney functions, and analyses of thyroid hormones revealed normal results. No specific features were detected in the family history of the patient, who had been receiving topical minoxidil treatment for the last one year. She was not using any other medication other than minoxidil. In the 24-hour long Holter monitorization applied to the patient for the advanced assessment, asystolic attacks were determined to last for four to six seconds, accompanied by syncope only once (Figure 1).

Summary of this manuscript has been presented in 14th National Congress of Pediatric Cardiology and Cardiovascular Surgery Congress (15-18 April 2015, Pamukkale) as a poster in Turkish

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Received: 15.07.2016, **Accepted:** 03.03.2017

Fig. 1. Sinus arrest accompanied by syncope in the morning hours observable in the 24 hours long holter examination.

The patient, for whom topical minoxidil treatment was terminated, was hospitalized and monitored, and she was scheduled for the implantation of permanent pacemaker. Chronotropic incompetence was not observed in the patient having undergone effort test, and she showed normal tension and pulse in response to exercise. Plans were made to assess the patient's sinus node functions by means of electrophysiological study, and the patient was applied with transesophageal electrophysiological study for being less invasive (4). Sinoatrial node recovery time and adjusted sinoatrial node recovery time calculations were detected as normal by means of transesophageal electrophysiological study. (Figure 2) Upon the non-occurrence of sinus arrest after quitting minoxidil, the detection of sinus node functions as normal, and the elimination of the cause of the sinus node dysfunction, only close monitoring of the patient was performed in consideration of the morbidity of the implantation of a permanent pacemaker. The case was monitored in our clinic as a symptom-free outpatient.

Discussion

Minoxidil is a pyrimidine analogue first produced in the 1970s, and its use as an antihypertensive drug was approved by the FDA in 1979. Upon determination of the development of hypertrichosis in response to the increase of its use among the patients with hypertension, this drug, which brings about vasodilatation in line with opening ATP-sensitive K channels, was started to be used in the treatment of the male-type alopecia, due to the aforementioned side-

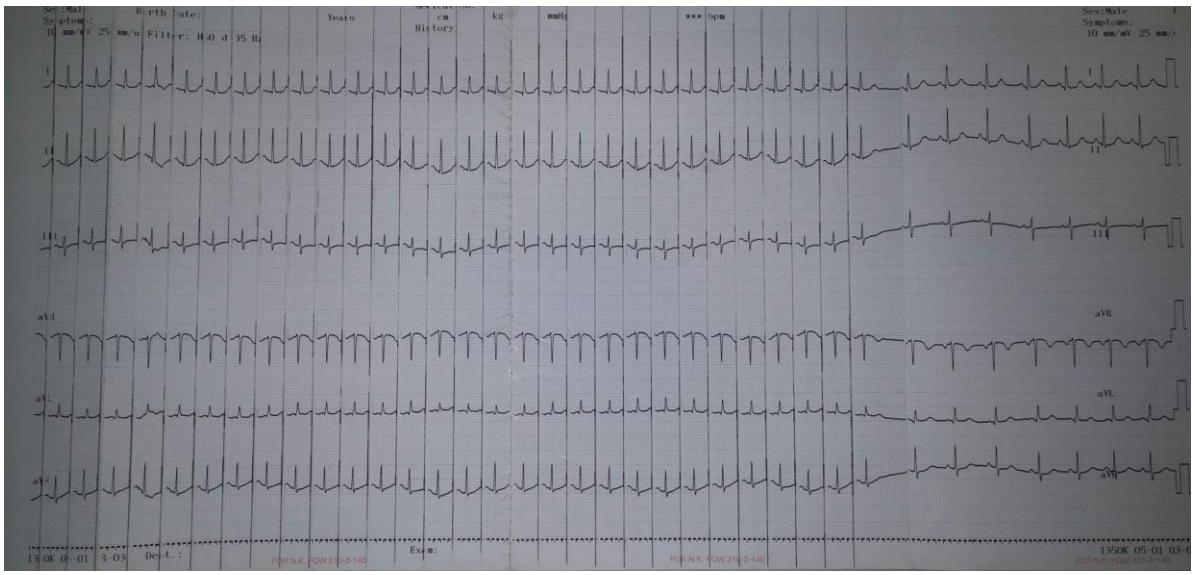

Fig. 2. Transesophageal electrophysiological study shows normal corrected sinus node recovery time.

effect. The 2% topical formula by was brought into use in 1986, and the 5% formula in 1993 for this purpose (5). The side-effects corresponding to the use of this drug, which has been being used ever-increasingly also in the pediatric cases, have been identified as tachycardia corresponding to the sympathetic nerve system activation, water and salt retention, pericardial effusion, pericarditis, thrombocytopenia, and congestive cardiac failure. Its topical use has further systemic side-effects upon its absorption (6). Although only one sinus arrest in an adult patient was reported due to the use of minoxidil, this patient had coronary artery disease, which may cause sinus node dysfunction, and the patient had myocardial infarction (7). To date, no symptomatic sinus arrest due to the use of minoxidil among the pediatric cases has been reported. The sinus node dysfunction experienced in this case was categorized as likely related to minoxidil (score 5), as assessed by the Naranjo adverse drug reaction probability assessment tool (8). Although symptomatic sinus bradycardia as a sinus node dysfunction constitutes an indication for permanent pacemaker implantation due to the non-recurrence of sinus arrest, the normality of sinus node functions in the transesophageal electrophysiological study and presence of the chronotropic competence with effort test in our patient, and also due to the morbidity of permanent pacemaker in pediatric patients, permanent pacemaker implantation was not performed in our case, and close follow-up was planned instead. We believe that each child who needs pacemaker therapy should be considered individually, like our patient. It should be kept in mind that minoxidil application to pediatric patients may bring about serious side-effects, so attention should be paid to such patients.

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