Letter to the Editor

Ivabradine for junctional ectopic tachycardia in post congenital heart surgery

A R T I C L E   I N F O

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We report two cases of malignant junctional ectopic tachycardia (JET), in infants following congenital heart surgery. After the failure of conventional therapy the arrhythmia was controlled by oral Ivabradine, a drug which is routinely used to lower heart rate in angina and heart failure in adult practice. © 2017 Cardiological Society of India. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Reports

Case 1. A 8 month old male infant underwent intracardiac repair for tetralogy of fallot. Following surgery, he was extubated on table and shifted to ICU on infusion dopamine @ 5 μg/kg/min and adrenaline @ 0.05 μg/kg/min. Two hours later the patient developed narrow QRS tachycardia and ECG showed AV dissociation (Fig. 1). However, the blood pressure was maintained. The infant was euerthemic and was on minimal ionotropes. As a general measure sedation was optimized and injection dexmedetomidine was started at 1 μg/kg/h. Body cooling was done to around 33–34 °C centigrade using cooling blankets and arterial blood gases (ABG) and electrolytes were sent. The latter showed marginally low serum magnesium and calcium, both were corrected over 10 min. In next half hour heart rate increased further, so intravenous amiodarone was loaded at 10 mg/kg followed by infusion @15 μg/kg/min. Inspite of all these measures heart rate soar further to 190–200/minute, at this rate AV sequential pacing was not possible so esmolol was added @50 μg/kg/min after a bolus of 100 μg/kg. At this juncture the infant started showing early compromise in blood pressures. Central venous pressures were 8 cm of water, so a normal saline fluid bolus of 10 ml/kg was given over 30 min. The blood pressure (BP) improved but JET rate did not decrease. This improvement was transient and the blood pressures dipped again. It was decided to stop esmolol and give a trial of oral Ivabradine @ 0.1 mg/kg/day in BD dosing. Heart rate in next two hours reduced to 170/min and in next 24 h it settled to 136/min. This was accompanied with improving BP trend. Ionotropes were reduced and amiodarone was reduced to 5 μg/kg/min and finally stopped. He achieved Sinus rhythm after two days.

Case 2. Similar situation happened in a seven month old male infant, who was operated for a large perimembranous ventricular septal defect. One hour ensuing surgery he developed JET with heart rate >180/min and hemodynamic compromise. He was appropriately sedated, cooled and ionotropes were reduced after titration with blood pressures. Amiodarone was started at 15 μg/kg/min after an appropriate bolus. His ABG and electrolytes were absolutely normal, so no correction was given. He did not respond to esmolol infusion so a trial of oral ivabradine was instituted. His rate settled to 150/min after three hours and reverted to normal sinus rhythm after 24 h. However after 48 h he showed features of sepsis with Chest Xray showing features of pneumonia. The infant deteriorated in next two days and succumbed to his illness.

2. Discussion

JET happening in a postoperative setting, has an incidence ranging from 5 to 10%. Multiple factors are implicated for its causation, and it includes young age, longer cardiopulmonary bypass (CPB) time, surgery near AV node, ischemia, hypoxia, electrolyte disturbance and higher dose ionotropes.1 It is generally controlled with sedation, body cooling, correcting electrolyte abnormalities, optimizing ionotropes and sometimes using amiodarone. Ivabradine, which is a known drug used for lowering heart rate in angina and heart failure,2 was used successfully by Saleh et al.3 and Jana et al.4 in combination with amiodarone to control heart rate in congenital JET. It works by inhibiting cardiac pacemaker current in normal sinus node as well as in AV node and bundle of His.2 Taking previous instances,3,4 we used ivabradine in our cases when the arrhythmia became resistant to standard treatment and started inducing hemodynamic compromise. The
successful treatment of postoperative refractory JET in our patients opens up a potential new therapeutic option, though it needs a large randomized study to scientifically prove it.

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Vivek Kumar*
Gaurav Kumar
Sajan Joshi
Vipul Sharma

Army hospital R&R, India

* Corresponding author at: Army Hospital R&R, Dhaula kuan, New Delhi, 110010, India.

E-mail address: Vk3532@gmail.com (V. Kumar).

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