Introduction: Postoperative Junctional ectopic tachycardia (JET) occurs in children after congenital heart surgery and is sometimes difficult to manage with amiodarone (AMD) or beta blocker, which would cause hypotension and bradycardia. Nifekalant (NIF) infusion: pure Ikr blocker with weak positive inotropic effect, and R-wave synchronized atrial pacing (RSAp) are the treatment options of postoperative JET. The RSAp contributes atrioventricular (AV) synchrony by the atrial pacing triggered by the QRS wave. We aim to analyze the efficacy of the combination of NIF and RSAp.

Methods: We enrolled four children with postoperative JET between 2015 and 2019, who were refractory to the usual treatment such as atrial overdrive pacing or AMD infusion. NIF infusion dose was 0.2 -0.4 mg/kg/hr while monitoring QT interval. The external temporary pacemaker (PACE 203, Osypka Medical GmbH, Germany) was used for RSAp. The atrial leads were connected to the ventricular ports of the pacemaker and the ventricular leads were connected to the atrial ports. The AV delay, post-ventricular atrial refractory period, max tracking rate were adjusted manually according to the heart rate to achieve maximum increase in their arterial pressure by optimal AV resynchronization in each patient. We evaluated the efficacy and adverse events of the combination therapy with NIF and RSAp.

Result: There were 1 boy and 3 girls with the age of 2 months to 1 year (median 2 months), who underwent the repair of AV septal defect (AVSD), AVSD with double outlet right ventricle, the LV-PA shunt with partial AVSD and hypo RV, and Norwood, RV-PA shunt with single ventricle. Their ventricular rates were 183-203 bpm. The RSAp was successfully applied in all patients and significant increased their systemic arterial pressure by mean 11mmHg (range 10 to 14mmHg). NIF decreased their ventricular rates by the mean 17 bpm (range 10 to 23 bpm) one hour after NIF infusion, by mean 32 bpm(range 10 to 45) three hours after NIF infusion. All patients was able to be managed with the usual atrial pacing (AAI mode) 12 hour (range 4 to 18 hour) after the initiation of RSAp. Though NIF was needed to be decreased due to mild prolongation of QTc (0.48 ms), they did not have any hemodynamic deterioration or arrhythmic events.

Conclusion: The Combination of RSAp and NIF Infusion was effective on the postoperative junctional ectopic tachycardia refractory to usual treatments.