INTRODUCTION. Transcatheter cryoablation is an effective technique for the treatment of atrio-ventricular nodal reentry tachycardia (AVNRT) in children. Slow pathway conduction can be abolished by a single focus cryoablation or a linear cryo-lesion in the mid-septum performed from the ventricular side to the atrial side. Nevertheless, AVNRT may recur after a successful procedure. In this setting, 3-D mapping systems, besides reducing radiation exposure, can increase accuracy of a cryoablation, allowing to perform a real “focal cryoablation”, defined as a single-point cryo-aplication plus one or more cryo-bonus on the same spot, or a real “high density linear cryo-lesion”, defined as a linear lesion without any gap. At this regard, in this study, the outcome of “focal cryo-lesion” and “high-density linear cryo-lesion”, performed using EnSite Velocity™ 3D Cardiac Mapping System, in eliminating slow pathways conduction, was compared.

METHODS. We retrospectively reviewed the outcome of 67 consecutive pediatric patients (mean age 12.5 years; range: 5.4 to 17.8 years) who underwent cryoablation for AVNRT at our Institution from July 2013 to September 2014 using 3D Mapping System. Cryomapping was performed in the target site and when positive (i.e., no AH jump or non-inducibility of tachyarrhythmia), temperature was further lowered to create a permanent lesion. If a permanent result was not achieved after at least 3 focal cryoablations, a high-density linear lesion was performed delivering multiple (minimum of 4) and overlapped cryolesions from the ventricular side of the tricuspid annulus to the atrial side.

RESULTS. The acute success rate was 100%: 35/67 (52.2%) with focal cryoablation and 32/67 (47.8%) with high-density linear lesion. There were no permanent complications. During the follow-up (mean 9.8 months), AVNRT recurrence rate was 0% (0/35) in patients treated by a focal cryoablation and 12.5% (4/32 P<0.05) in those treated by a high-density linear lesion.

CONCLUSIONS. Our data seem suggest that the long-term success of 3D mapping-guided cryoablation for AVNRT in children are related to the cryoablation protocol (focal or high-density linear lesion) used to achieve the definitive elimination of the slow pathway conduction. In this setting a successful result obtained by a focal cryoablation seems to predict a better outcome.