A 5 years old boy has been referred to our institution because of ECG evidence of ventricular pre-excitation and recurrent episodes of supraventricular tachycardia. Physical examination on admission was unremarkable and an echocardiogram showed a normal heart. Baseline ECG showed minimal ventricular pre-excitation with positive delta wave in aVL and negative delta wave in DIII, aVF, this pattern is consistent with a postero-septal location of the accessory pathway (AP). (Fig. 1, panel a).
After discussion of possible alternatives, an informed consent was obtained for electrophysiological study and ablation. During general anesthesia an EP study was performed. Four quadripolar catheters were introduced through left subclavian and right femoral veins and placed respectively in CS, His bundle region, high right atrium and right ventricle (Fig., panel b).
Baseline recordings on proximal CS catheter showed a small potential between atrial and ventricular electrograms and quite early local ventricular activation suggesting a close proximity of the recording electrodes to the AP.
Fig 1: Baseline 12 leads ECG on the left (panel a) and endocavitary tracing on the right (panel b) are shown. Panel b: from top to bottom are leads DI, aVL, aVF, V1, and electrograms from the high-right atrium (RA 1-2), proximal and distal His bundle area (HBE p and HBE d), proximal and distal coronary sinus (CS 3-4 and CS 1-2) and right ventricular apex (RV 3-4, RV 1-2). Of note a sharp potential is present between local atrial and ventricular electrogram on CS 3-4 as much as early ventricular activation.

Programmed atrial stimulation from the high right atrium easily induced short RP supraventricular tachycardia with very early atrial activation on the proximal CS bipole consistent with orthodromic AV reentrant tachycardia with postero-septal location of the accessory pathway. (see figure 2)
Figure 2: programmed stimulation from high right atrium with single extrastimulus and long coupling interval (8 beats at 450 msec drive cycle, S1 280 msec): the extrastimulus block into the AP and reaches the ventricles through AV node, retrograde conduction to the atria via accessory pathway is possible at this point. Right bundle branch block is evident during tachycardia. Same tracing as in figure 1.
The posterior region of tricuspid annulus was cautiously mapped during sinus rhythm and ventricular pacing until a sharp potential was found between local atrial and ventricular electrograms in a region close to CS os. Gentle torque of the ablation catheter determined disappearing of this potential and delta wave on surface ECG thus demonstrating his origin as true AP potential (fig.4).

Figure 3: surface ECG during orthodromic AV reentrant tachycardia exhibiting right bundle branch block.
Application of a two pulse of radiofrequency (max. 30 W, 30 sec.) determined disappearing of anterograde and retrograde conduction over the AP during a observation period of 30 min. Programmed atrial and ventricular stimulation protocols thereafter did not induce any arrhythmias. The patient has been discharged 36 h later without recurrence of ventricular pre-excitation.

Discussion: Although long term sequelae of placing ablation lesions on growing hearts is not well definite and it might raise concerns about scar size enlargement during growth, recurrent episodes of tachycardia has been associated to cardiomiopathy. Even if it has been reported that this kind of cardiopathy, if it would occur, tend to resolve after tachycardia treatment actually there are many other issues to take in account. To date we don’t know if recurrent episode of tachycardia in addiction to long term need for antiarrhythmic drugs and exclusion from sport participation may influence body
growth and psico-attitudinal development of young children. The long effective refractory period of the accessory pathway make it unlikely to induce malignant arrhythmias but in this patient we found participation of the AP as retrograde limb. Even if has been reported spontaneous abolition of anterograde conduction along AP during growth, very few has been reported about retrograde conduction properties. We placed a well localized RF lesion eliminating the substrate for AVRT, curing the patient and eliminating the need for long term antiarrhythmic drugs.