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Editorial

Ablation of the WPW Syndrome in the Pediatric Population Using Irrigated-tip Catheters

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Radiofrequency (RF) catheter ablation is now the treatment of choice in the pediatric population with the Wolff-Parkinson-White (WPW) syndrome.

Even though these procedures have been performed for over 20 years and results have been widely published there are still some issues regarding challenging cases. Location and the depth of some accessory pathways (AP), can lead to longer procedural times, procedural failure, and recurrence of APs.

Recent technological developments were aimed to overcome technical difficulties, an important aid was the development of irrigated-tip catheters which allow the delivery of greater energy to tissues and have been proven to be safe and effective in eliminating AP conduction resistant to conventional catheters in adult patients. However, there are persistent concerns regarding the safety of irrigated catheters in the pediatric population. Our group has focused its attention on the use of such catheters in children and adolescents and we now use them regularly for WPW ablations.

Acute success rates for RF ablation of WPW are reported to be very high in the pediatric population (around 95%), with higher success rates in the cases of left free-wall pathways (97.8%) compared to right free-wall pathways (90.8%). The recurrence rate for manifest APs 1 year after the initial successful ablation seems to be relatively high (11.3%), with the lowest recurrence rate for left lateral and left septal accessory pathways and the highest recurrence rate for right lateral and septal accessory pathways. Diverse reasons for failure have been reported such as catheter manipulation, non optimal mapping, or insufficient lesion size. The latter could satisfactorily be resolved by using irrigated-tip catheters, which provoke deeper and wider lesions based even on experimental studies. In fact, use of open irrigated catheters constitutes the established treatment of choice for the ablation of cavotricuspid isthmus or for the ablation of atrial fibrillation as well as of the arrhythmic substrate in cases of ventricular tachycardia. In the setting of adult patients with WPW, irrigated-tip catheters have been periodically used after a prior failed ablation. Specifically, secondary use of irrigated technology was accompanied by procedural success in adult patients with left lateral AP, in cases of right posteroseptal APs (with applications in the coronary sinus), or even in paraseptal APs.

Even though solid tip catheters are still considered the first choice in the pediatric population, we believe that irrigated catheters should be used as first line of therapy regardless of the AP location.

Up to now we have performed over 100 procedures, with a high success rate (95%) after the first procedure at a 2 year follow-up and no additional complications compared to standard catheters.

Reasons for ablation failure (catheter stability and proximity to atrioventricular node) were not related with catheter characteristics.

Regarding complications, one could argue that the use of irrigated-tip catheters is associated with increased risk of damage to tissue outside the target region and perforation, however we believe that with adequate monitoring of temperatures such risks can be avoided; moreover, open irrigation system reduces the temperature of the ablation electrode as well as the temperature at the tissue interface, limiting the risk of thrombus formation and charring. Furthermore we observed that RF time using irrigated catheters is lower compared to that using solid tip catheter, this probably because tissue damage is more effective.

Generally, complications of both electrophysiologic study and RF ablation in the pediatric population with WPW are infrequent, while the occurrence of atrioventricular block (3.0%) is related closely to ablation of septal APs. In our experience we had no such complications, and we believe that they can be avoided by the consistent implementation of a power-controlled conservative protocol (20 W inside the coronary sinus, 30 W in right-sided AP, 40 W in left-sided APs).

One of the main challenges, are septal accessory pathways and in some centers cryoablation is considered as the first line in this subset. Although the use of cryoablation is supposed to enhance the safety of the procedure in case of septal APs in close proximity to the atrioventricular node, cryoablation procedures are characterized by increased procedural and fluoroscopy times, as well as significantly increased recurrence rates despite the similar acute success rate with RF ablation. Radiation exposure during fluoroscopy constitutes an important concern when recommending catheter ablation therapy in young patients. Indeed, fluoroscopy times can be particularly lengthy during technically challenging procedures, such as those involving a right lateral free wall AP. Open irrigated-tip catheters have been reported to be accompanied by shorter procedure times and reduced fluoroscopy. In our experience we have short fluoroscopy times (12 minutes), irrespective of the AP localization, considering that large registries, where solid tip catheters were used, have reported much longer fluoroscopy times (35–40 minutes). Furthermore, we believe that pediatric patients should be referred to high-volume centers with highly experienced operators in order to shorten both procedure and fluoroscopy time while maintaining a high safety profile.

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In our opinion, RF ablation using open irrigated-tip catheters can be safely performed in children and adolescents with a high acute and long-term success rate, very short procedure times, and acceptable fluoroscopy times. Consistent implementation of a power-controlled conservative protocol along with operator experience may assure for the absence of complications in this sensitive age group.

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