The Utility of Exercise Testing and Adenosine Response for Risk Assessment in Children with Wolff-Parkinson-White Syndrome


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Objective: In Wolff-Parkinson-White (WPW) syndrome, rapid antegrade conduction of atrial tachyarrhythmias can result in ventricular fibrillation and sudden death. Antegrade conduction of accessory pathway (AP) can be assessed through noninvasive testing [exercise stress testing (EST) and adenosine responsiveness of AP] or invasive electrophysiology study (EPS). We aimed to determine the correlation between noninvasive testing and EPS.

Patients and Methods: This prospective, observational study enrolled 40 children (58% male, median age 13 years, and median weight 47.5 kg) with WPW syndrome and candidates for invasive EPS in one year period. EST was performed for all the study participants before EPS, and adenosine administered during the EPS. Conduction through the AP to a cycle length <250 msec was considered rapid or high risk; otherwise patients were non-rapid or low risk.

Results: The sudden disappearance of the Delta-wave was seen in 10 cases (25%) during EST. AP was found to be high risk in 13 cases (13/40, 32.5%) while the AP was identified to be low risk in 27 cases; however, six (15%) patients had blocked AP conduction with adenosine during EPS. Low-risk classification by EST alone to identify patients with non-rapid conduction on baseline EPS had a specificity of 93%, and a positive predictive value (PPV) of 90% (accuracy 54%). Blocked AP conduction with adenosine as a marker of non-rapid baseline AP conduction had a specificity 93% and a PPV 84%. Finally, AP was adenosine non-responsive in a majority of patients (28/30, 93%) with persistent Delta waves. 40% of those who had sudden disappearance of Delta wave had adenosine responsive AP (p value 0.028).

Conclusion: Abrupt loss of pre-excitation during EST and blocked AP conduction with adenosine had high specificity and PPV for non-rapid and low-risk antegrade conduction during baseline invasive EPS. Successful risk stratification of pediatric patients with WPW is possible through the use of EST and adenosine responsiveness of AP.