

Title: Are Arabs wired differently? Variation in the anatomic location of accessory pathways in Middle Eastern patients with the WPW syndrome undergoing ablation; possible clinical implications

Category: Arrhythmias and Clinical EP

Abstract

Background: Normal conduction of electrical impulses between the atria and ventricles occurs via the atrio-ventricular node (AVN). A small percentage of persons maintain accessory conduction pathways (AP) that represent remnants of the fetal developmental period. Those APs may allow for anterograde atrio-ventricular (AV) conduction that appears on the ECG as manifest pre-excitation [also referred to as the Wolff-Parkinson-White pattern (WPW)]. A proportion of APs may be “concealed” not demonstrating any abnormalities on the resting ECG but allowing for retrograde (and sometimes even anterograde) conduction in many individuals. The presence of anterograde AP conduction is associated with increased incidence of supra-ventricular tachycardia (SVT), elevated risk of sudden cardiac death and possibly increased incidence of atrial fibrillation. Elimination of such APs appears to return the risk of such events to levels similar to those noted in persons without APs. The anatomical location of APs has been described in many studies from around the world. Those studies indicate a predominance of the left free (LL) wall location [estimated between 46-60%] with lower incidence of postero-septal (PS) [25%], para-Hisian (PH) [2%] and right atrial (RA) free wall locations [13-21%]. Anecdotal evidence from many electrophysiologists involved in AP ablation in the Arabian Gulf region indicates a different pattern of AP anatomic distribution in that region with a much higher incidence of right PS (RPS) and overall RA locations. The goal of this study is to investigate the actual anatomic location of APs in a relatively large number of patients presenting for ablation at two large centers. There are important clinical implications to the location of APs including the ease of reaching such locations during ablation attempts and the type of possible complications that have to be anticipated.

Methods: we performed a retrospective chart review at two large Middle Eastern hospitals (Cleveland Clinic Abu Dhabi in the UAE and the Mohamed Bin Khalifa Cardiac Centre in Bahrain) of all patients who underwent ablation procedures for either WPW syndrome or SVT involving an accessory pathway mediated mechanism. We included all patients for whom an AP was identified, localized and ablated. All details relevant to the procedure were recorded.

Results: procedures were conducted between May 2015 and June 2019. A combined total of 125 patients with APs were included in this analysis. This included 88 patients with manifest pre-excitation/WPW and 37 with concealed pathways (causing orthodromic SVT). The average age of the group was 30 years (29 years for the WPW group and 33 for the concealed pathway group). Patients of Arab ethnicity constituted 110 of the 125 patients (88%). Six patients were of Western background and 5 originated from the Indian subcontinent. The overall group included 79 males (63%) and 46 females (37%), with similar gender proportions for both the WPW and concealed AP groups.

For the WPW group, 58 AP (66%) were located and ablated from the right atrium. Those included 41 right postero-septal (RPS), 3 right mid-septal (RMS) and 11 along the right anterior, right antero-septal and right lateral areas. There were also 3 para-Hisian (RPH) APs. A total of 30 APs (34%) were localized to, and ablated from, the left atrium (LA). Those included 3 left PS APs, and the other 27 along the left lateral (LL), left anterior, left antero-lateral, and left postero-lateral (LPL) areas. The combination of the RPS, RMS and LPS represented 47 of the 88 AP (53%). There were no cases that had a patient with clearly demonstrated multiple distinct APs.

For the concealed AP patients, the vast majority (33 of 37, 89%) had APs that were localized to, and ablated from, the LA. The other four included 2 RPS and 2 RPH AP. Of the 33 left sided APs, 29 had LL or LPL locations.

Ablation was performed in 124 cases (5 with cryo-energy due to AP location near the His Bundle region and 119 with radio-frequency energy). Decision was made not to perform ablation on one patient with a para-Hisian AP. There were no significant procedural complications. Acute ablation success was achieved in all 124 patients. On follow-up, recurrence of the WPW pattern was noted in 3 patients (one had successful re-ablation and two are being re-evaluated). One case of concealed AP-mediated SVT recurred and was successfully re-ablated.

Conclusion: our study suggests that the anatomic distribution of APs in a Middle Eastern population of patients with WPW is quite different compared to the one found in mainly Western WPW populations. In our study population, a distinct majority of APs with manifest pre-excitation were located within the right atrium (66%) and mostly in PS locations. Very few of those APs were in para-Hisian positions. Such combination of RA locations without increased proximity to the His Bundle indicates easier access for ablation attempts (no need for trans-septal access into the LA) and minimal risk of iatrogenic AV block from delivery of ablation energy (sufficient distance away from the AV node and His Purkinje system). In contrast, our data for concealed APs demonstrates that the vast majority of those APs reside in LL positions consistent with studies from other regions of the world.

Our data, if validated in a larger number of patients from the region may indicate the presence of ethnic/genetic differences relative to the location of APs. This will have important clinical implications when offering ablation therapy to WPW patients in our region.