

Images In Cardiology Cardiovascular

Correlation of VPCs Localization on Surface ECG and 3D Mapping

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A 43-year-old patient, an Iraqi national with no comorbidities, presented with recurrent episodes of palpitations. 12-lead electrocardiogram revealed frequent Ventricular premature complex (VPC) [Figure 1ab]. VPC morphology was positive QRS in leads II and III (suggestive of inferior axis), positive in lead I (likely origin from right side of midline), negative in lead aVL with QRS transition in lead V3 (in favor of posterior right ventricular outflow tract [RVOT] or Right coronary cusp (RCC) origin). The QRS amplitude of the VPC was more in lead II when compared to lead III (suggestive of more superior origin). The VPC width (160 ms) was suggestive of an origin away from midline. The origin of VPC was localized to the posterior RVOT in accordance with the algorithm by Enriquez *et al.*^[1] The study by Prisecaru *et al.*^[2] suggested that there are no significant differences ($P = 0.99$) in terms of accuracy, specificity, and sensitivity of algorithms like Ito, Dixit, Joshi, and Wilber scheme, Zhang algorithm, and Pytkowski scheme for RVOT VPC localization. His symptoms persisted despite optimum medical treatment. 24 h Holter monitoring was done which revealed persistence of VPCs with a significantly high burden (19%).

Clinical examination and baseline laboratory parameters were normal. He was taken for electrophysiological study + 3-D mapping with CARTO Biosense Webster. An activation and pace map of both RVOT and left ventricular outflow tract (LVOT) was created [Figures 2ab and 3]. VPCs were localized to the posterior RVOT. To demonstrate the proximity of RCC and posterior RVOT, an angiogram of the aortic root was done with a pigtail catheter positioned in the aortic root [Figure 4a and b]. Subsequently, three lesions were given with the Navistar thermocool ablation catheter in post RVOT with 30-watt power, each lesion for a duration of 40 s [Figure 5]. VPCs disappeared during the first lesion. The procedure was successful and uneventful. He was

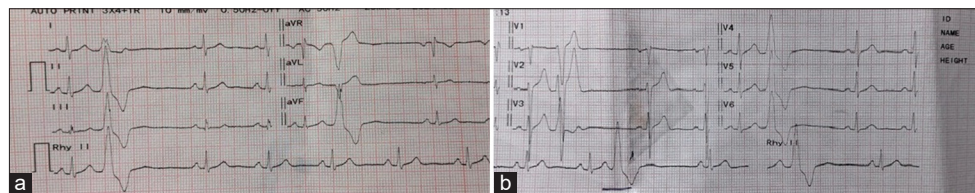


Figure 1 a and b: The baseline electrocardiogram (ECG) was suggestive of right ventricular outflow tract (RVOT) ventricular premature complexes (VPCs). The leads II and III were positive (inferior axis), lead I was positive (origin from right of midline), and negative lead aVL with transition lead V3 (posterior RVOT or right coronary cusp (RCC)). The QRS amplitude was more in lead II when compared to lead III. The width of 160 ms is suggestive of post-RVOT rather than RCC. The origin of VPC was localized to the posterior RVOT.

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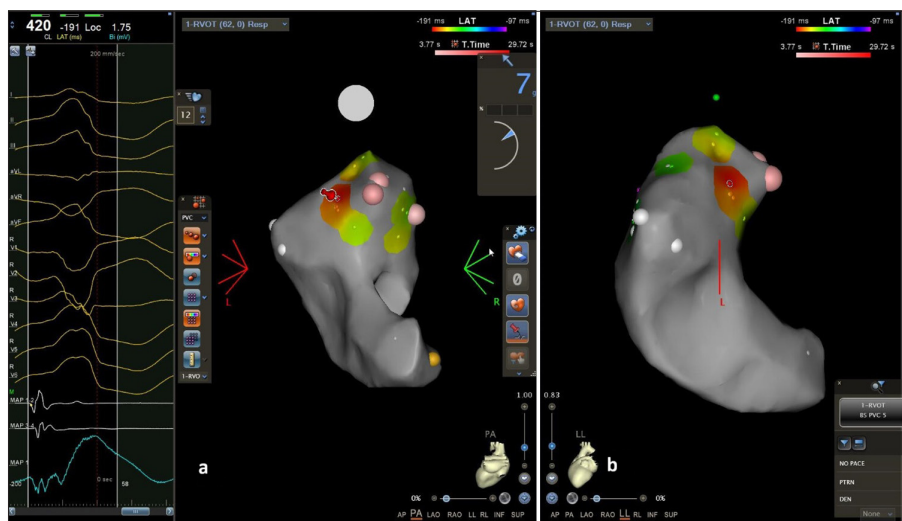


Figure 2: (a and b) Early signal was localized in the post right ventricular outflow tract by 35 ms as indicated by unipolar electrogram from the ablation catheter.

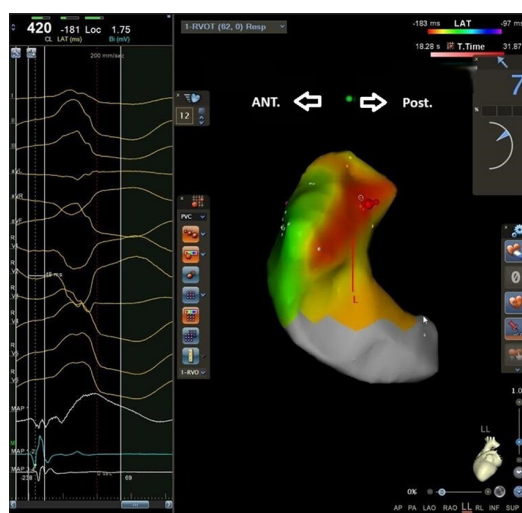


Figure 3: Activation map localized ventricular premature complex to the posterior right ventricular outflow tract (RVOT).

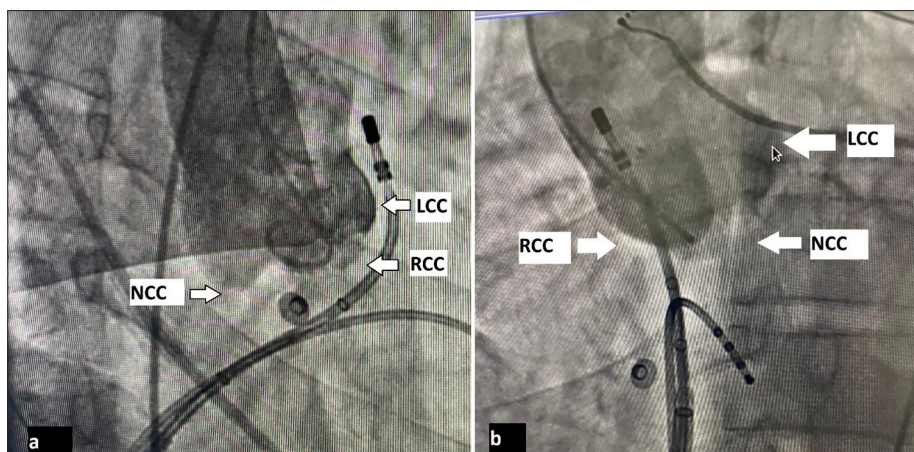


Figure 4: (a) Aortogram in RAO 30°. (b) Aortogram in LAO 60°. (RCC: Right coronary cusp, LCC: Left coronary cusp, NCC: Non-coronary cusp.)

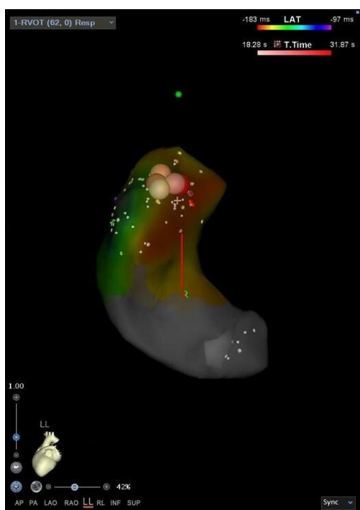


Figure 5: Radiofrequency lesions were given in the posterior Right ventricular outflow tract (RVOT).

asymptomatic and had no VPC burden on 24-h Holter on follow-up at 2-, 6-, and 8-week post-procedure.

Hence, we suggest that understanding the morphology of VPCs on surface ECGs not only helps in localizing the site of origin but also helps in choosing the appropriate access during its ablation if performed.

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