



October 16 - 18
14th EDITION **2015**



**NO CONFLICT OF
INTEREST TO
DECLARE**

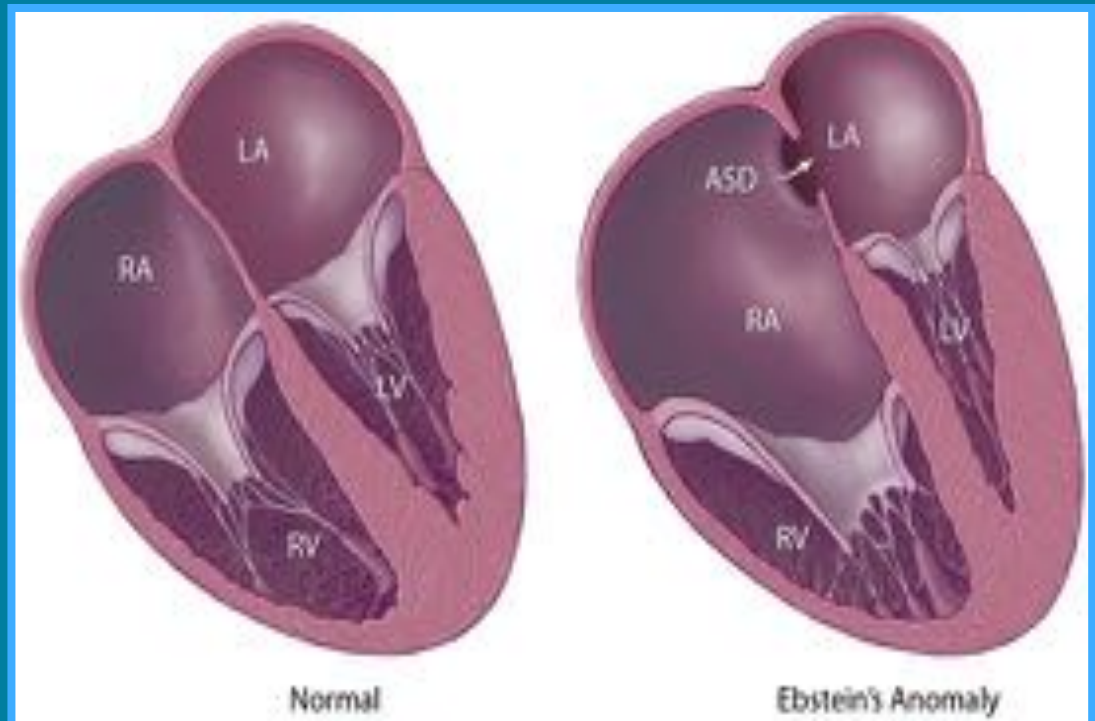
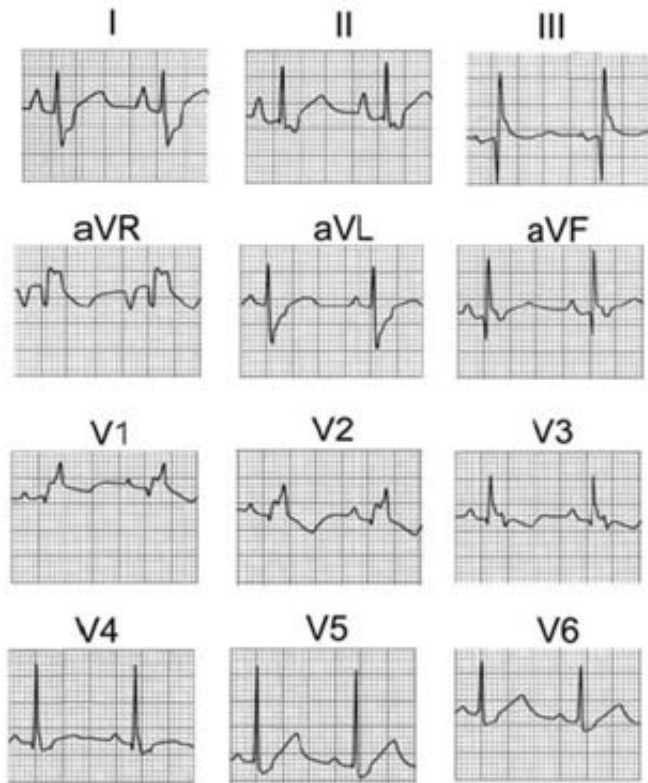
Electrocardiographic characteristics of patients with Ebstein's anomaly before and after ablation of accessory pathways

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Instituto Nacional de Cardiología
"Ignacio Chávez"

ECG in Ebstein's and AP

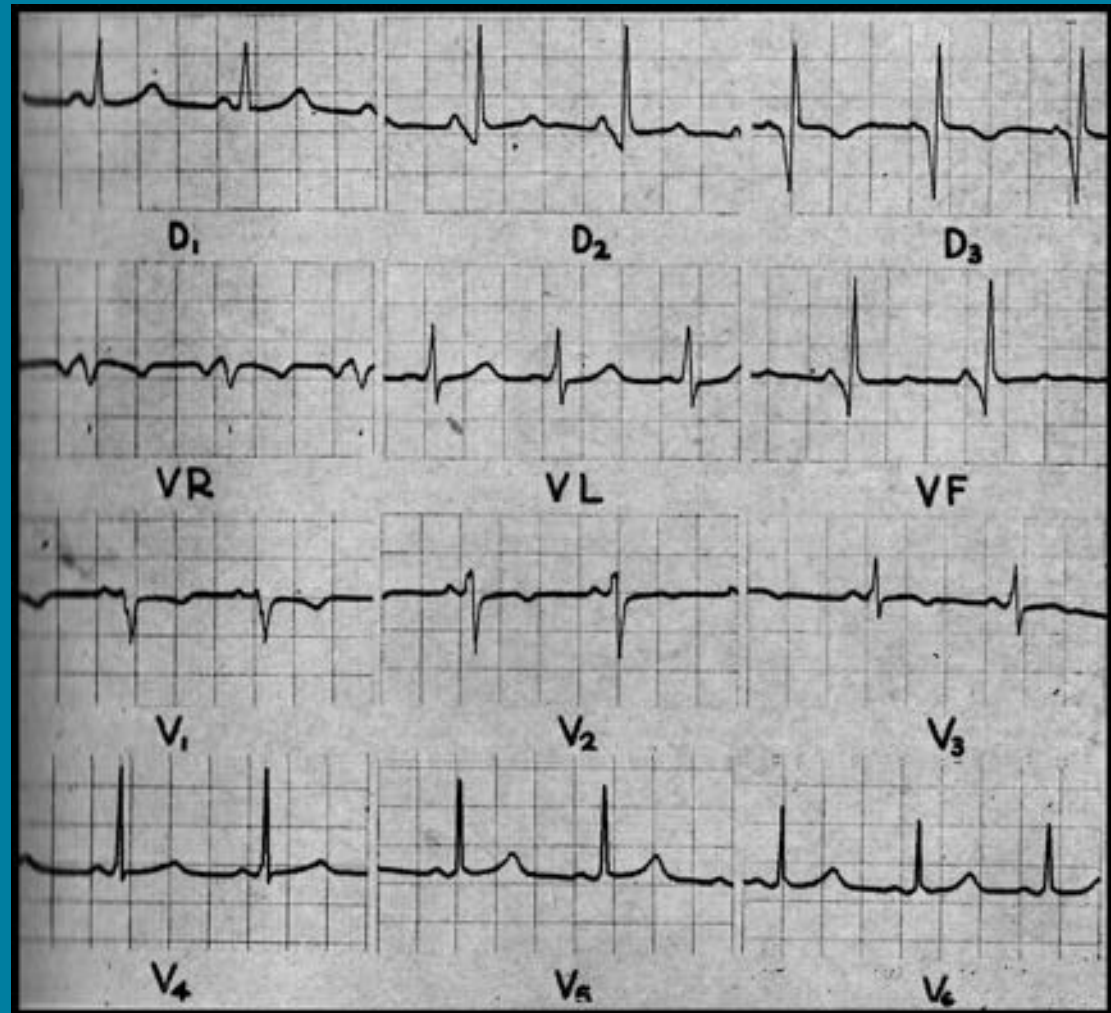
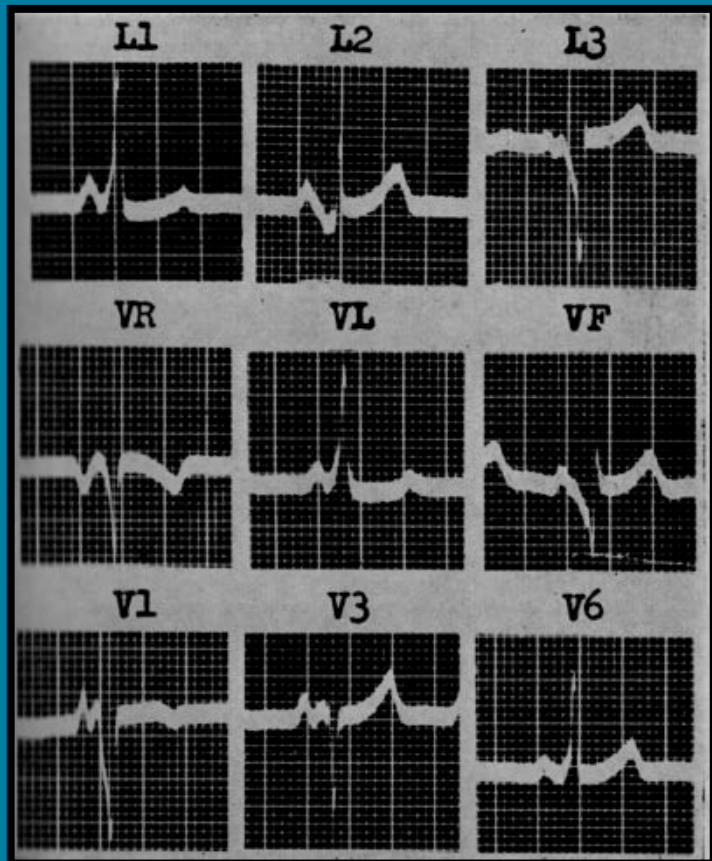
- EA accounts for less than 1% of congenital heart diseases.
- Arrhythmias are the leading cause of symptoms in adolescents and adults.
- 30% have accessory pathways, mainly right-sided.

The abnormal development of the tricuspid valve in patients with Ebstein's anomaly results in several activation abnormalities including delayed intra-atrial conduction, right bundle branch block (RBBB) in 75-95% and ventricular preexcitation in 5-25% of the population.

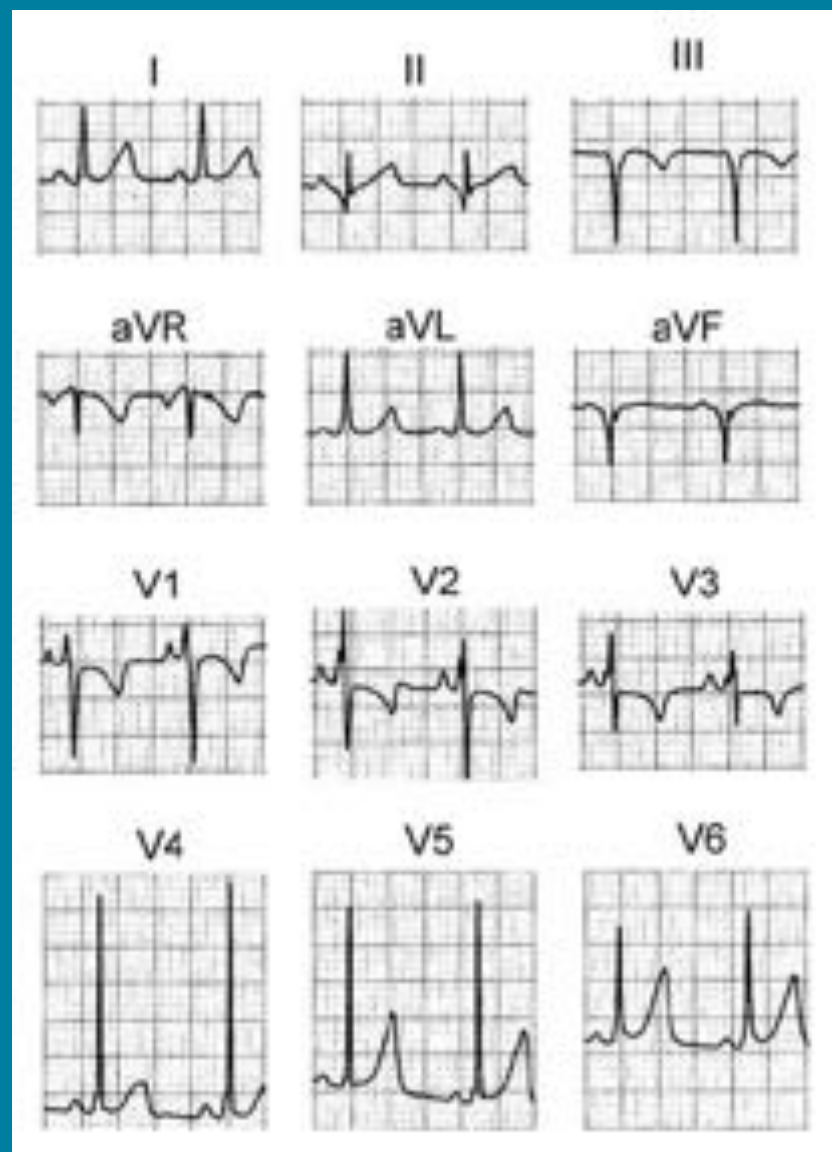
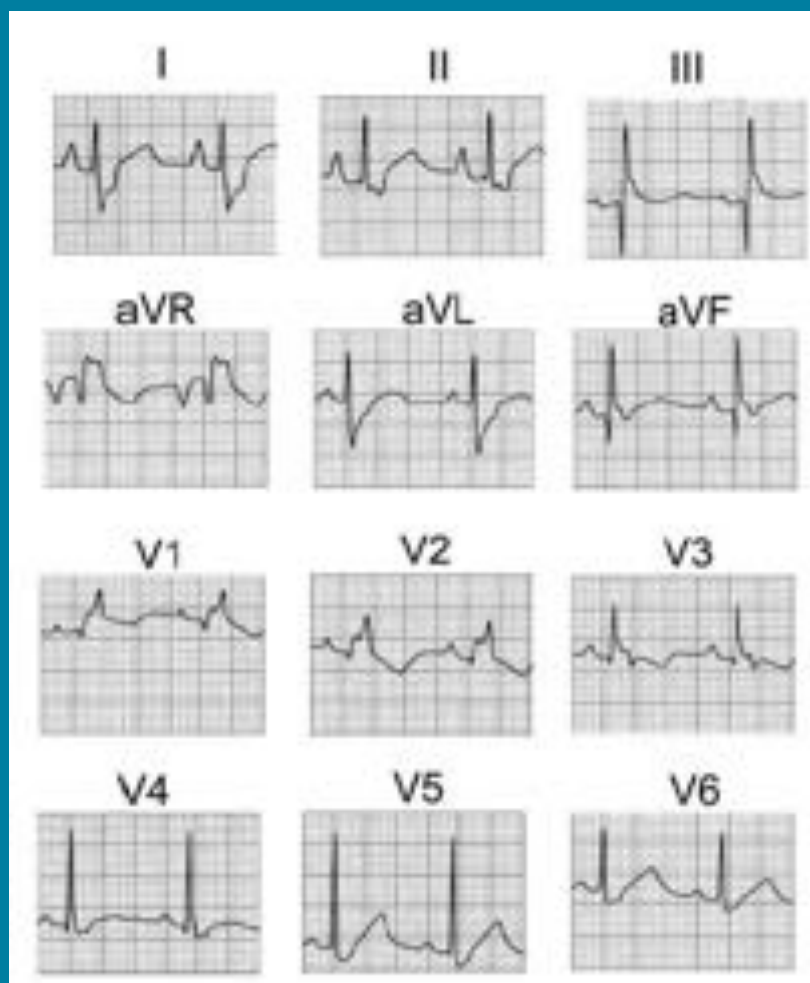


ECG in Ebstein's and AP

- ECG identification of pre-excitation may be misleading.
 - Delayed activation of RV through the RBB can be masked by an ipsilateral AP.
 - Intratrial conduction delay can alter the typical ECG features of ventricular preexcitation.
- Catheter ablation of APs is challenging and with lower success rate.
 - AV junction is less well demarcated and with abnormal Egs.
 - Markedly dilated RA and impaired catheter stability. Multiple or broad Aps.



Sodi Pallares D, Arch Inst Cardiol
Mex, 1955;25:17-34





Electrocardiographic Characteristics of Patients with Ebstein's Anomaly Before and After Ablation of an Accessory Atrioventricular Pathway

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(J Cardiovasc Electrophysiol, Vol. 17, pp. 1332-1336, December 2006)

The present study reports our experience in 226 consecutive patients with Ebstein's anomaly who were seen at Instituto Nacional de Cardiología "Ignacio Chávez" in México City from January 1985 to November 2005.

The purpose of this study was to analyze, in a large series of patients with Ebstein's anomaly, the electrocardiogram in sinus rhythm before and after AP ablation.

**Ebstein's
anomaly
(n=226)**

**EPS
n=64 (28%)**

**Without
Tachycardia
n=162 (72%)**

**One accessory pathway
Successful ablation
n=33 (51%)
Study Group
GROUP A**

**Exclusion
n=31 (49 %)**

**Control Group
n=30
GROUP B**

**Multiple AP
n=13 (20 %)**

**Unsuccess
ful Ablation
n=12 (18 %)**

**Concealed
AP
n=5 (8%)**

**Left AP
n=1 (1.5%)**

**Another
AP
n=11**

**Mahaim
Fibers
n=2**

Results

Ebstein's Anomaly
(n=226)

EPS
n=64 (28%)

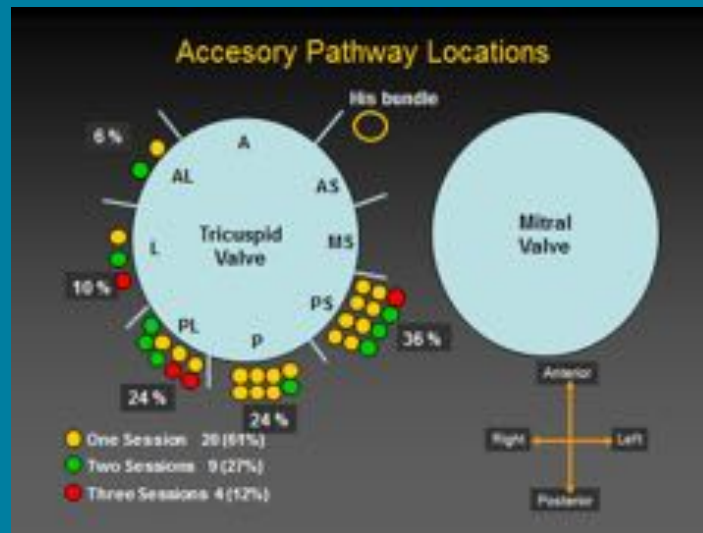
Without Tachycardia
n=162 (72%)

GROUP A 33 PATIENTS

21/33 (62%) had a typical ECG pattern of WPW
None of the patients had RBBB

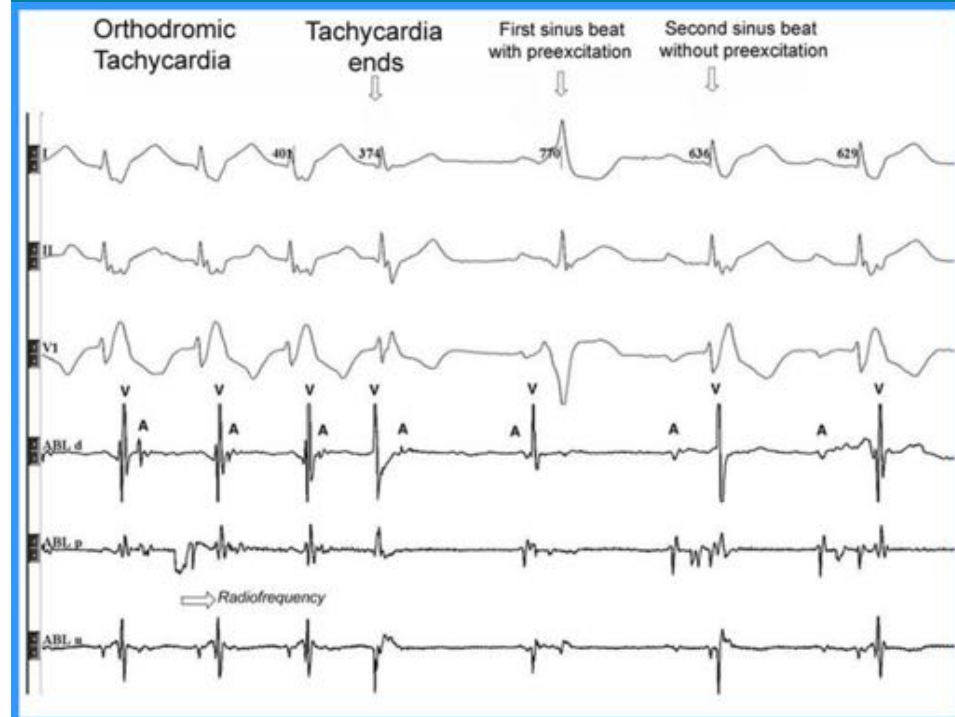
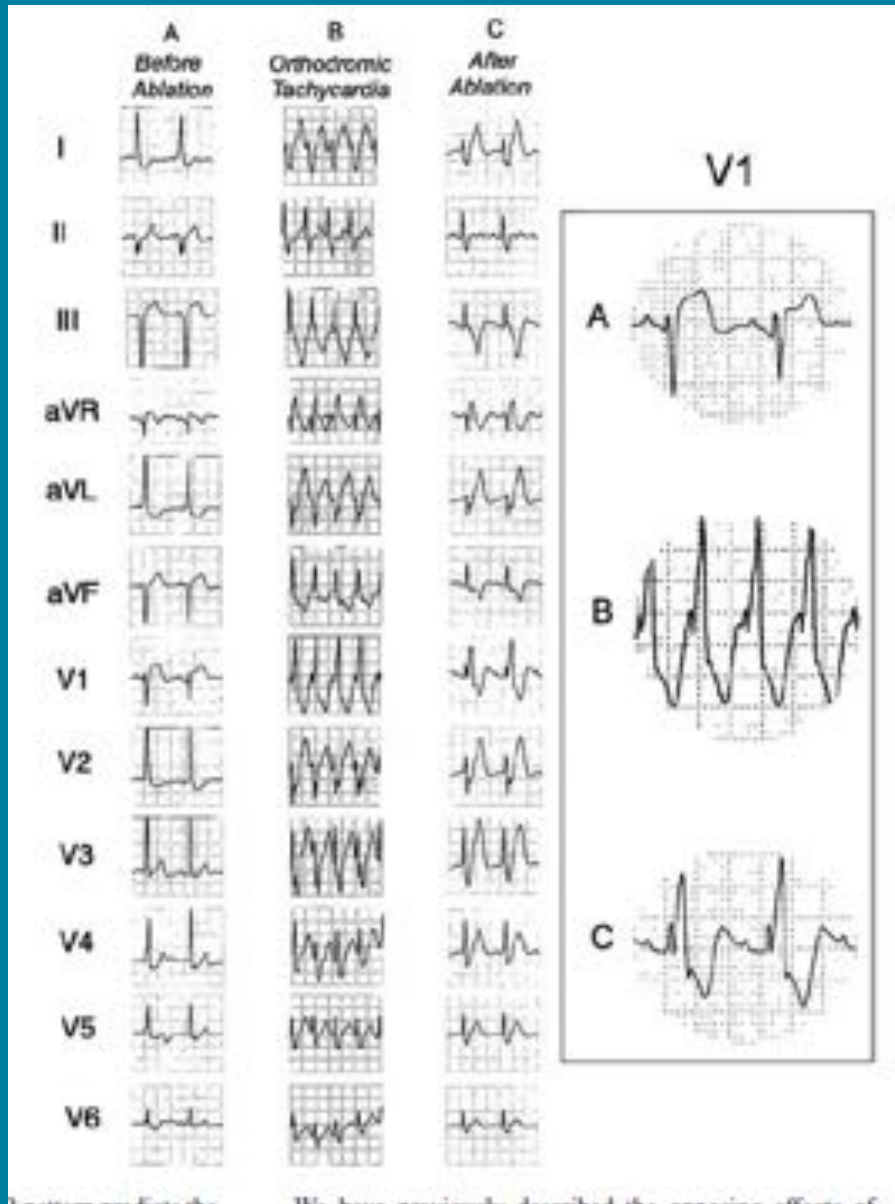
27/33 (82%) developed RBBB during orthodromic AVRT

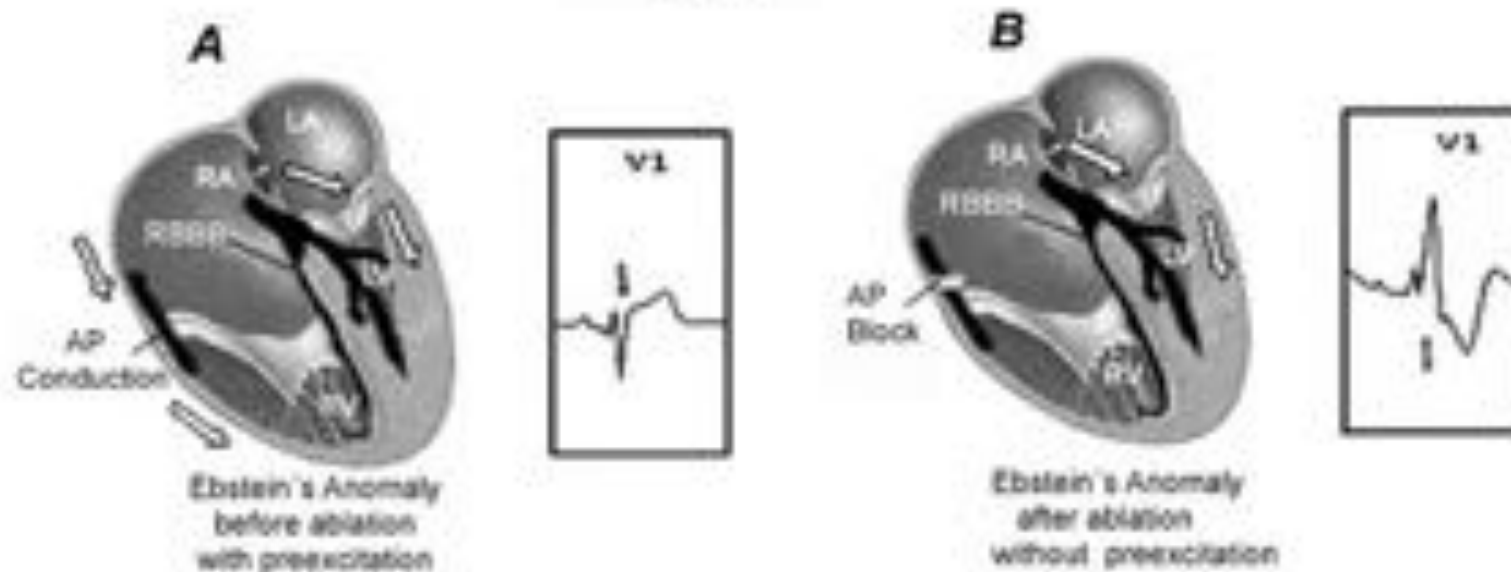
After-ablation RBBB pattern appeared in 31/33 patients (94%)



GROUP B
28/30 (93%)
with RBBB pattern

ECG, Ebstein's and AP





The absence of RBBB in patients with Ebstein's anomaly and recurrent tachycardia had 98% sensitivity and 92% specificity for the diagnosis of an AP. The positive predictive value was 91% (0.77,0.97 CI 95%) and the negative predictive value was 98% (0.85,0.99 CI 95%)

ECG, Ebstein's and AP

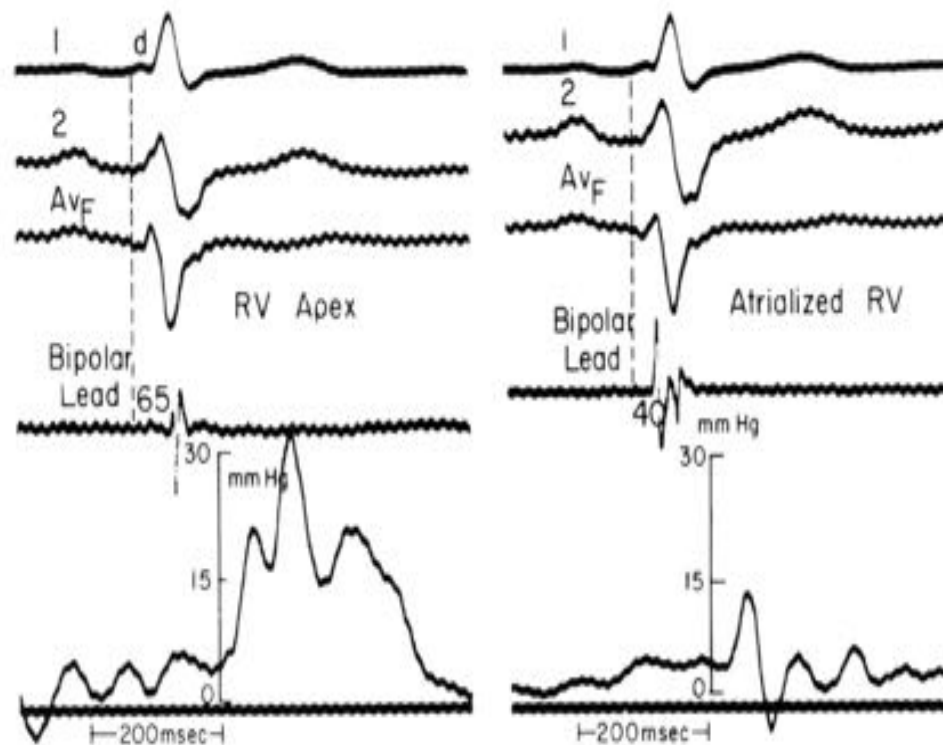
- Pearl:
 - If you have a patient with EA and NO RBB on the ECG.... You should consider WPW as your diagnosis.

INTRODUCCION

Electrophysiologic characteristics of Ebstein's anomaly of the tricuspid valve

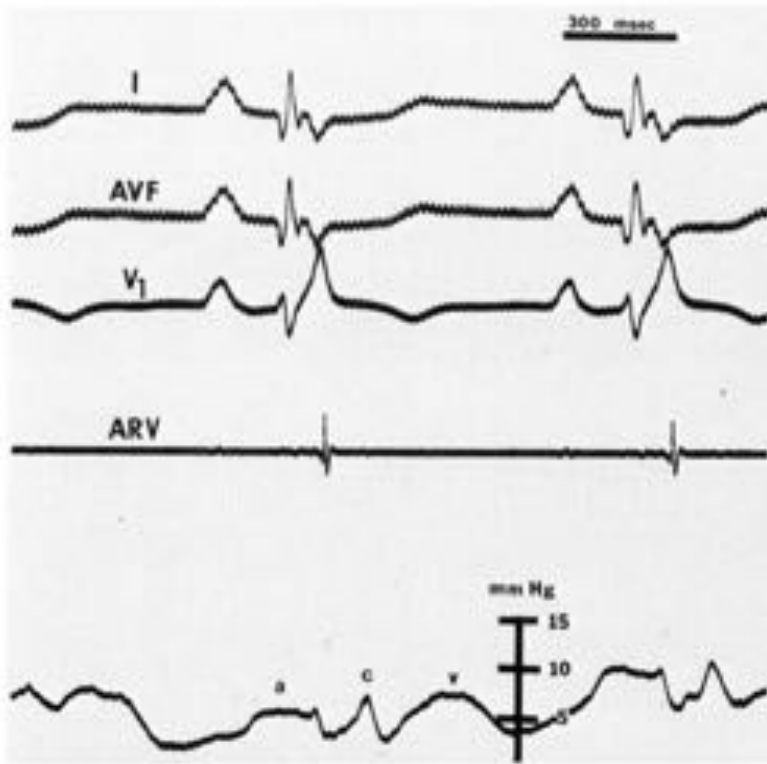
JA Kastor, BN Goldreyer, ME Josephson, JK Perloff, DL Scharf, JH Manchester,
JC Shelburne and JW Hirshfeld, Jr
Circulation 1975;52;987-995

ELECTROPHYSIOLOGY OF EBSTEIN'S ANOMALY

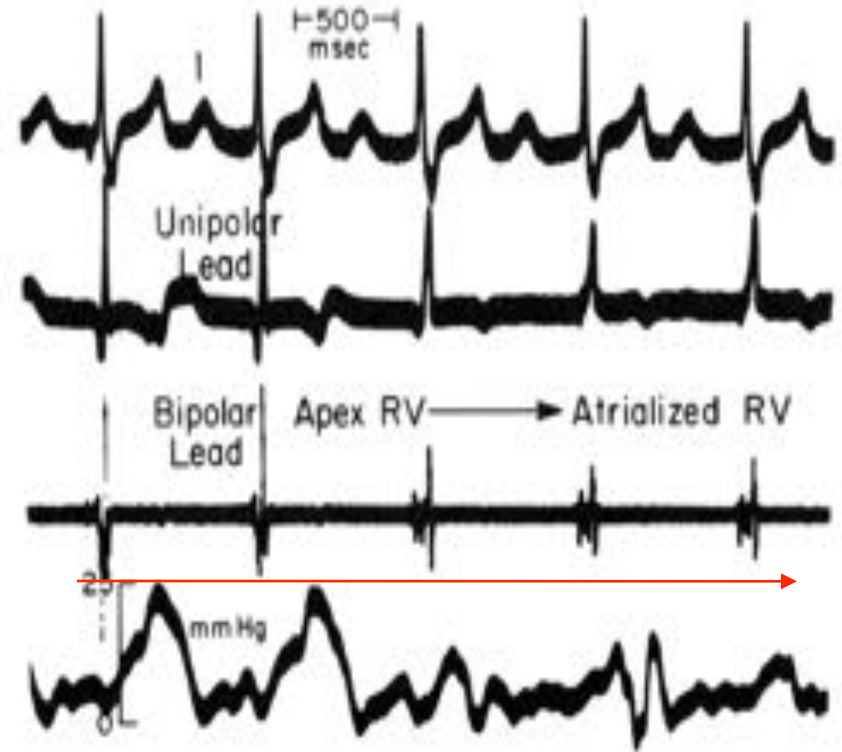


- Left: pressure recording at the RV, 65ms after the onset of QRS.
- Right: catheter is pulled back to the atrialized portion of the RV.

INTRODUCCION

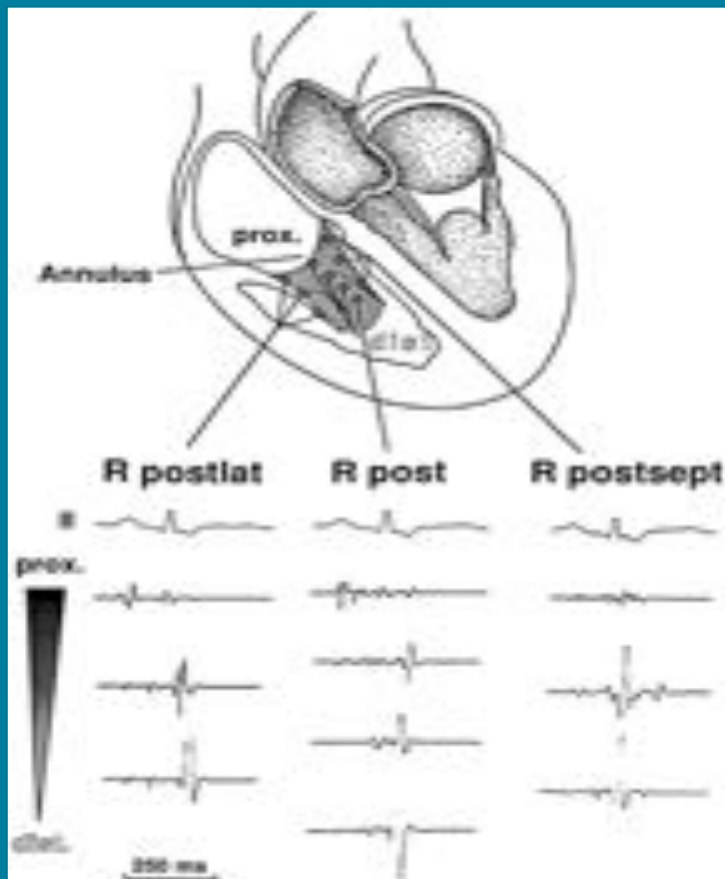


* Despolarización tardía en el VD, apenas distal a la VT, curva de presión auricular.



Retiro del catéter desde el ápex del VD hacia la porción atrializada del mismo. La actividad ventricular coincide con el complejo QRS.

ECG, Ebstein's and AP



- 21 pts EA and AP
- Abnormal fragmented Egs in 52% pts.
- 100% success of ablation in pts with normal Egs but only in 6 out of 11 in pts with abnormal EGs

Riccardo Cappato, M.D; Michael Schluter, PhD; Christian Weib, et al. Radiofrequency current catheter ablation of accessory atrioventricular pathways in Ebstein anomaly. Circulation 1996

ECG, Ebstein's and AP

- N= 26 pts
- 20 pts with a Single AP: 20 AP
- 4 with 2 AP= 8 AP
- 2 pts with 3 AP : 6 AP.
- Total of : 34 APs.

LOCALIZACIÓN	Frecuencia	Porcentaje	Porcentaje acumulado
Posteroseptal derecha	9	26.5%	26.5%
Posterior derecha	8	23.5%	50.0%
Posterolateral derecha	9	26.5%	76.5%
Lateral derecha	3	8.8%	85.3%
anterior derecha	2 (1 oculta)	5.9%	91.2%
Izquierda	1	2.9%	94.1%
Mahaim	2	5.9%	100.0%
Total	34	100.0%	

Gravedad de la Enfermedad	Frecuencia	Porcentaje válido	Porcentaje acumulado
Leve	6	23.1%	23.1%
Moderado	5	19.2%	42.3%
Grave	15	57.7%	100.0%
Total	26	100.0%	

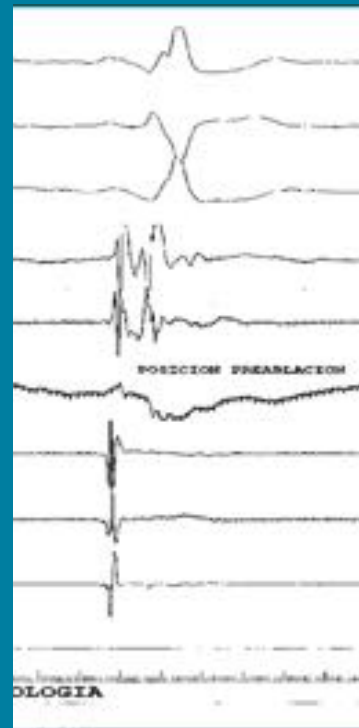
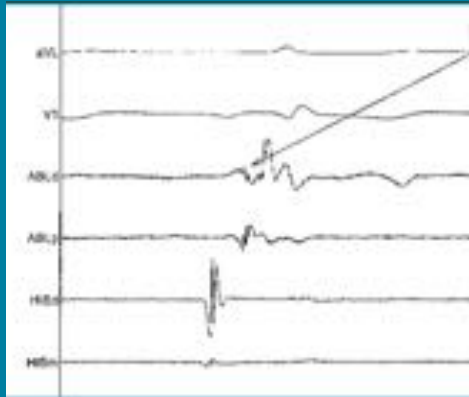
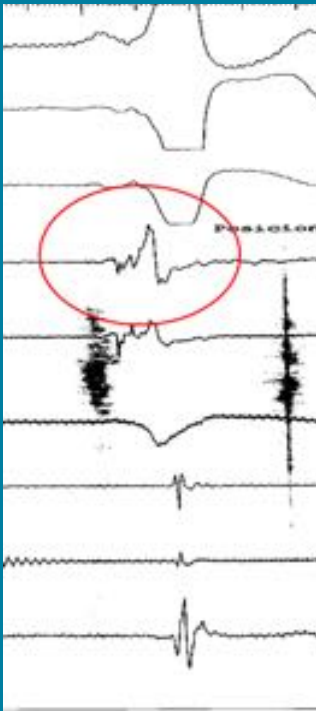
GRAVEDAD	Independiente	Fraccionado	Continuo	Total
Leve	2 (25%)	6 (75%)	0	8
Moderado	1 (25%)	3 (75%)	0	4
Grave	1 (6.7%)	4 (26.7%)	10 (66.7%)	15
Total	4 (14.8%)	13 (48.1%)	10 (37%)	27 (100%)
Chi cuadrada de Pearson: 0.013 * <i>Significancia estadística.</i>				

Corona A. Iturralde P, Nava S. INC 2009

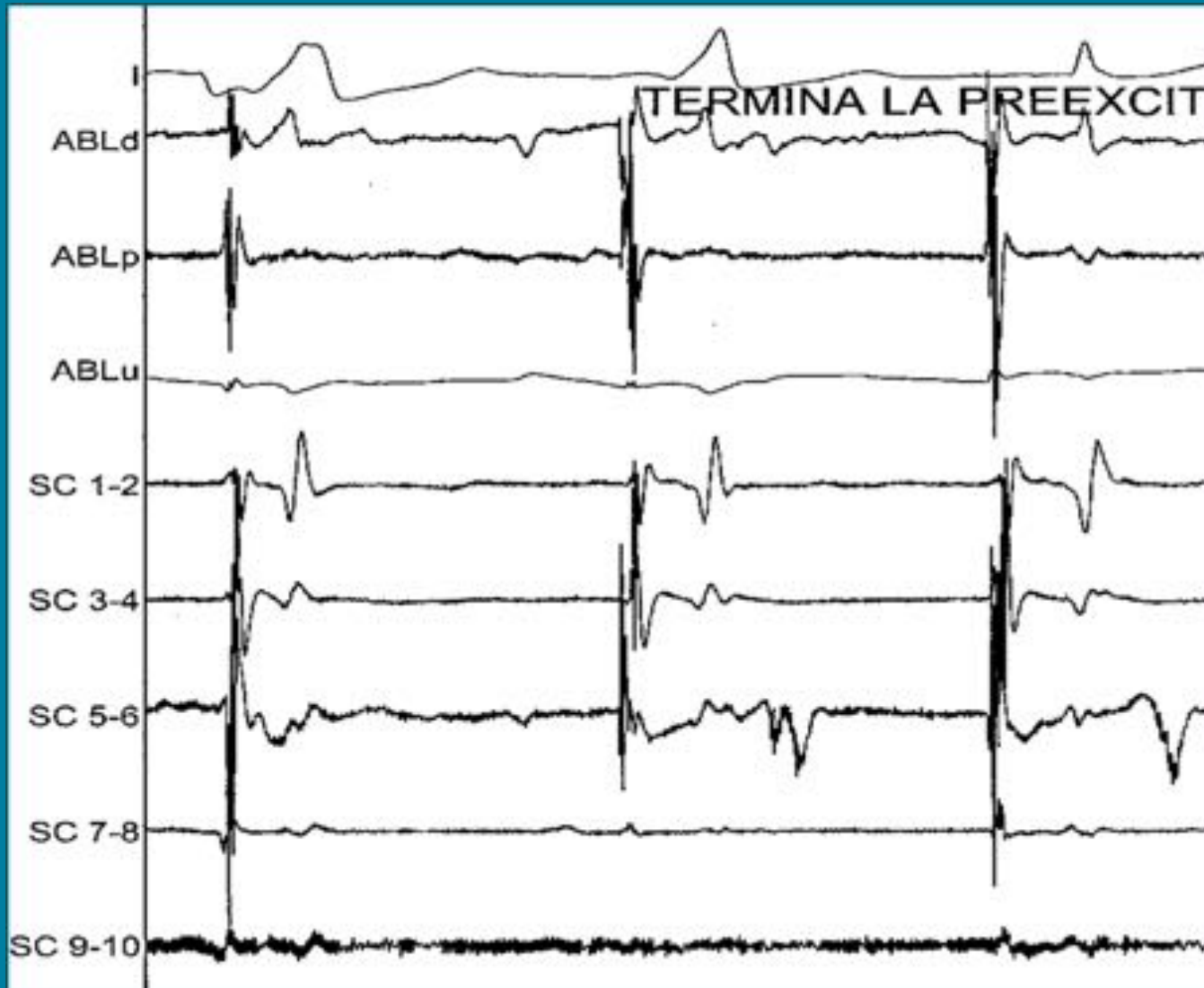
ECG, Ebstein's and AP

RELACION V/A	CASOS	FRECUENCIA	% EXITO
1	9	33.3%	100%
<1	4	14.8%	100%
>1	14	51.8%	64%

Chi cuadrada de Pearson: 0.02 * *Significancia estadística*



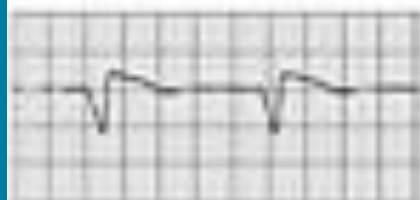
ECG, Ebstein's and AP



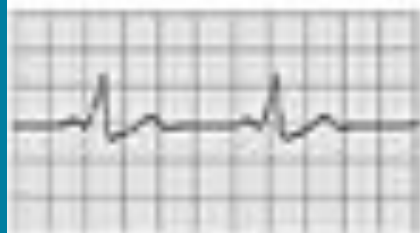
I



II



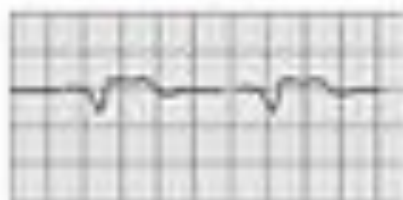
III



aVR



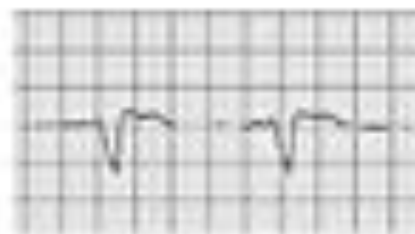
aVL



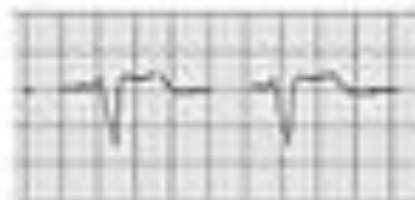
aVF



V1



V2



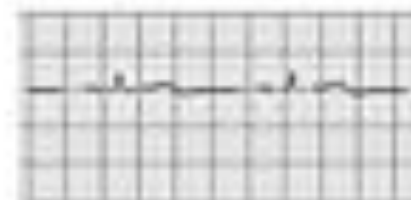
V1



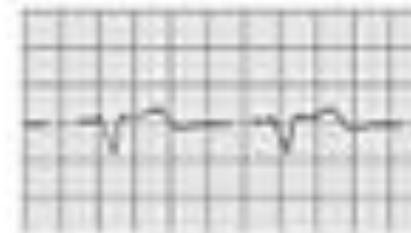
V4



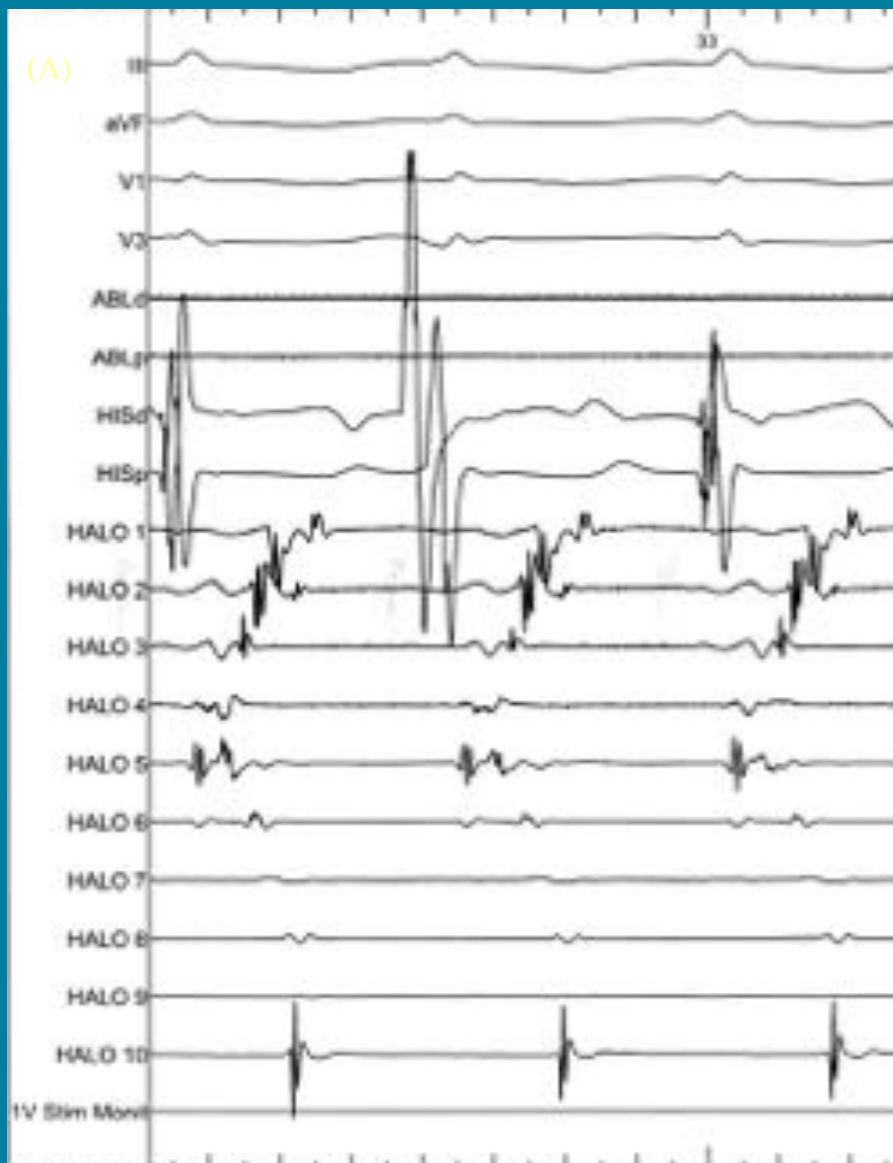
V5



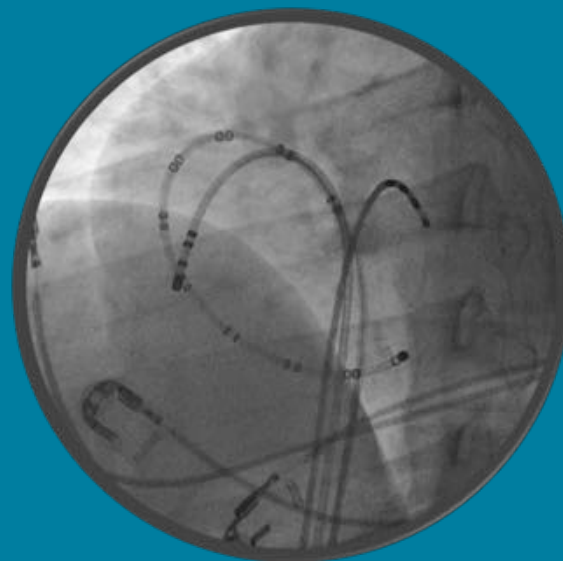
V6



(A)



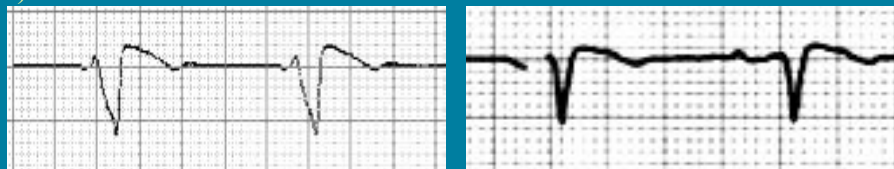
(B)



(D)



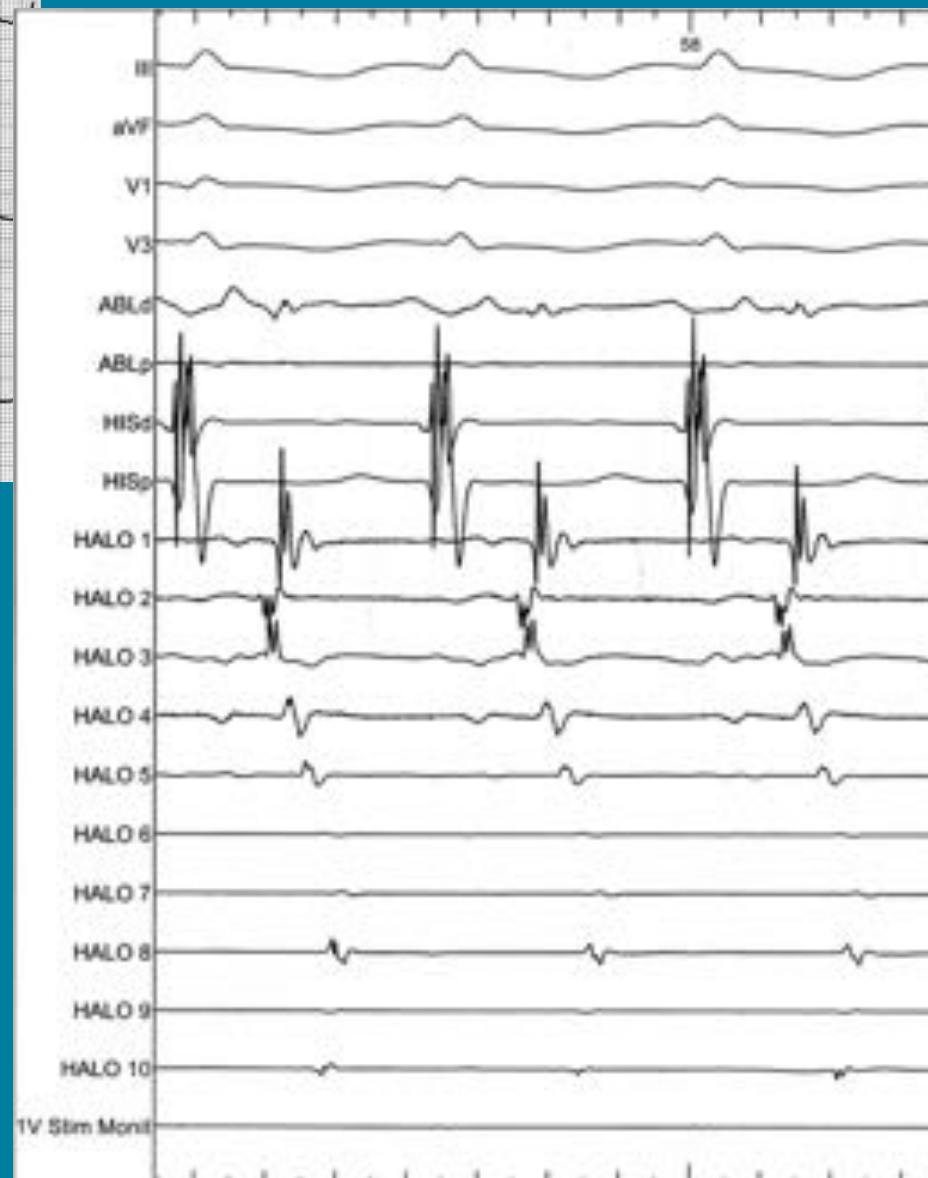
(C)



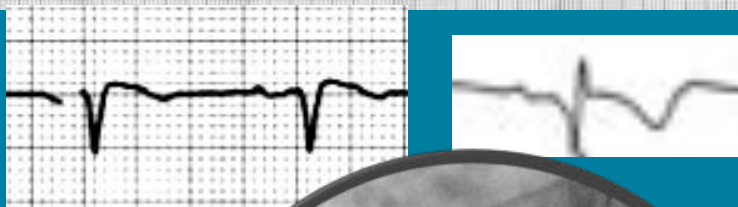
(A)



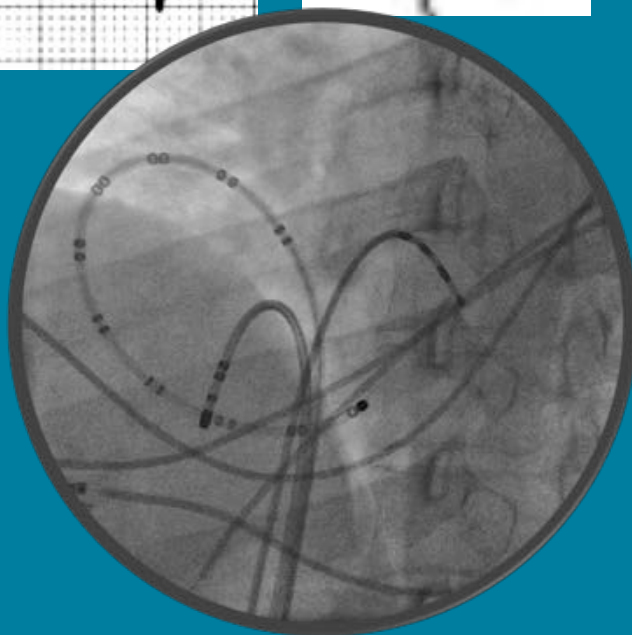
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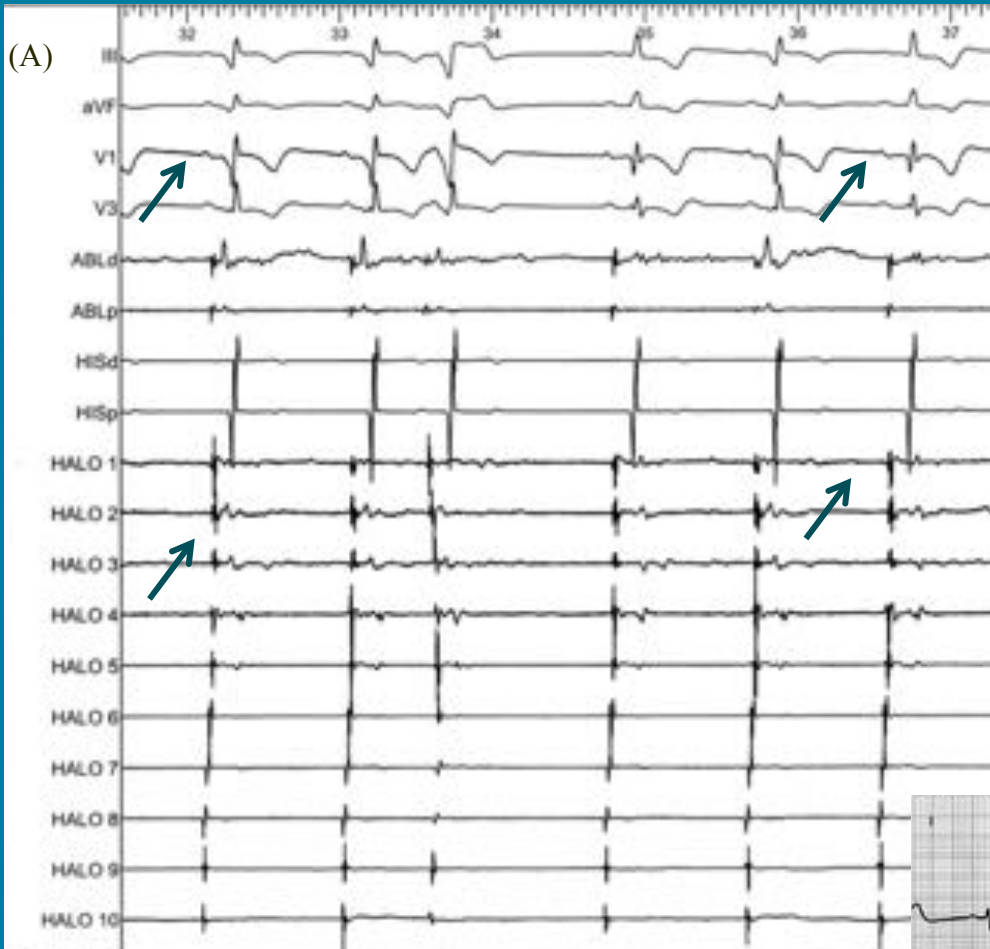
(C)



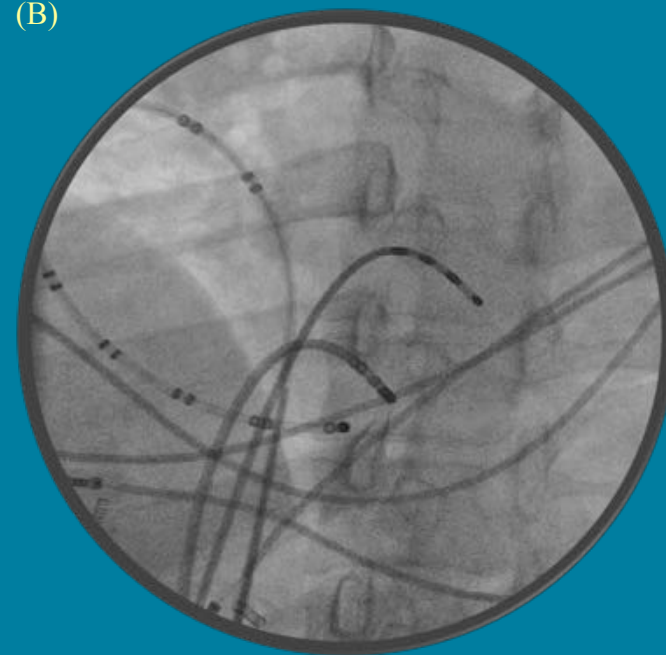
(D)



(A)



(B)

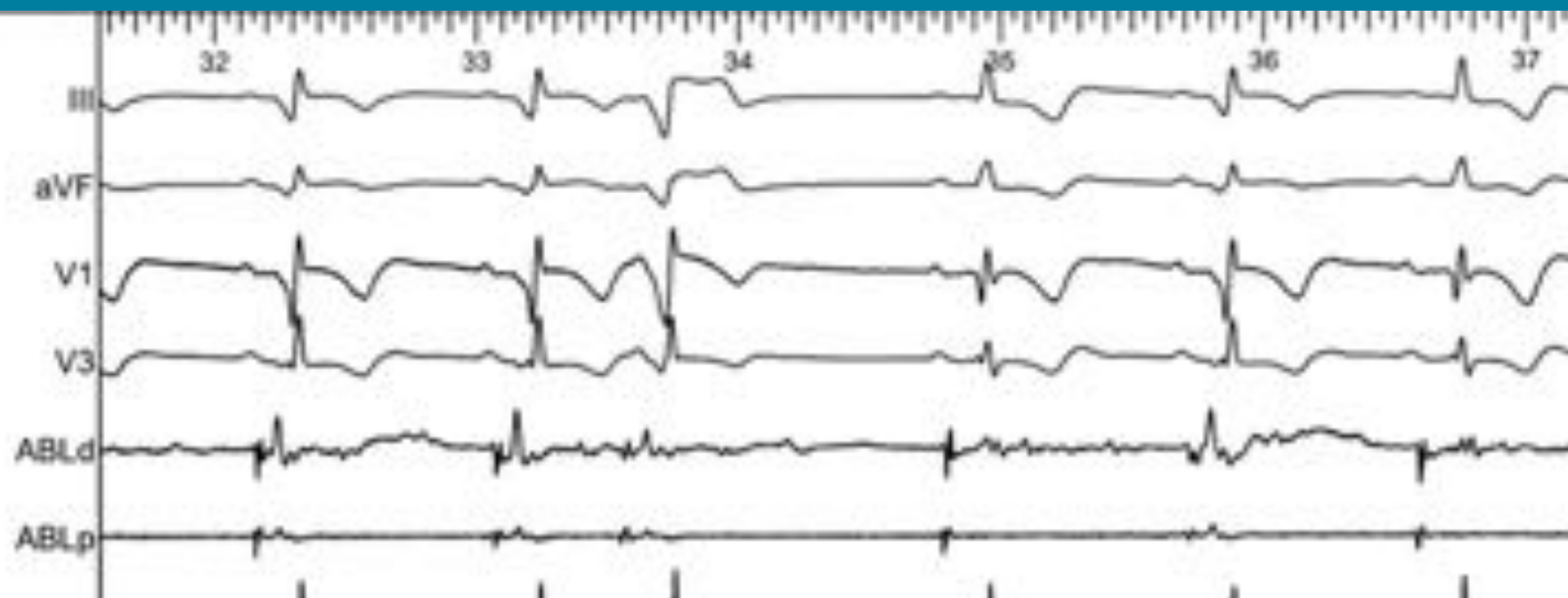


(D)



(C)





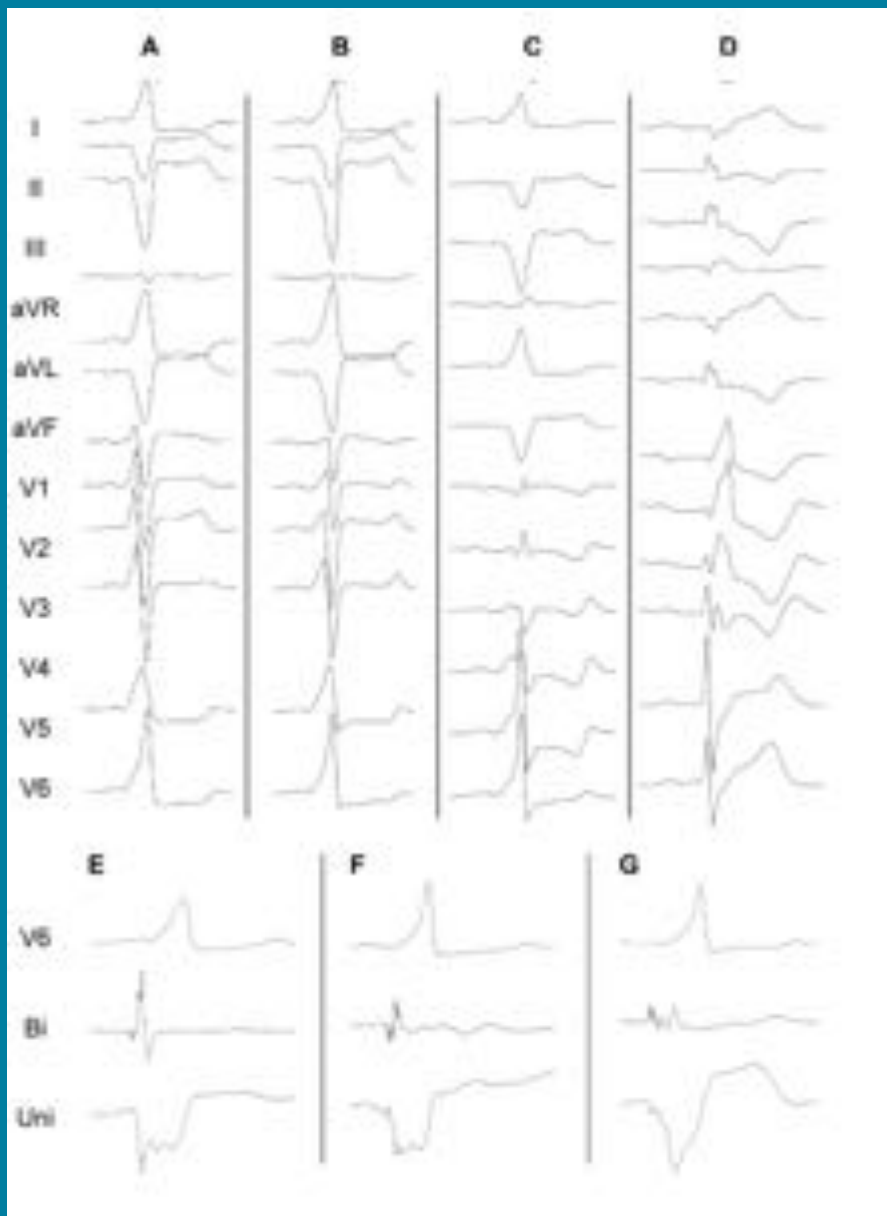


TABLE 3
Patient Characteristics and Procedural Outcomes

	AP or scAVC n = 25
Age at first arrhythmia (years)	10 (0, 29)
Cardioversion before ablation, n (%)	10 (40%)
Age at first ablation (years)	20 (5, 56)
Number of ablation targets	34
Number of interventions	39
First ablation, n (%)	25 (100%)
First redo, n (%)	10 (40%)
Second redo, n (%)	3 (12%)
Third redo, n (%)	1 (4%)
Procedural success	
First ablation, n (%)	20 (80%)
First redo, n (%)	8 (80%)
Second redo, n (%)	2 (67%)
Third redo, n (%)	0 (0%)
Long-term success, n (%)	16/20 (80%)

Roten L, Lukac P, et al. J Cardiovasc Electrophysiol 2011; 22

ECG, Ebstein's and AP

- Absence of RBBB in patients with EA predicts the presence of an AP.
- The atrialized portion of the RV has complex Egs and fractionation, were is difficult to differentiate atrial from ventricular potentials.
- Multiple accessory pathways should be consider if after ablation there is no a RBBB pattern in V1.
- Careful mapping is mandatory in patients were atrial and ventricular potentials are not well defined.