Results

This study included 30 patients with manifest and concealed septal accessory pathways (7 anteroseptal, 4 Midseptal, and 19 posteroseptal) as proved electrophysiologically, who have been referred for EPS and potential RF catheter ablation.

The patients were electrophysiologically subdivided into 3 groups :

Group 1: Anteroseptal APs (ASAPs)

Group 2: Midseptal APs (MSAPs)

Group 3: Posteroseptal APs (PSAPs)

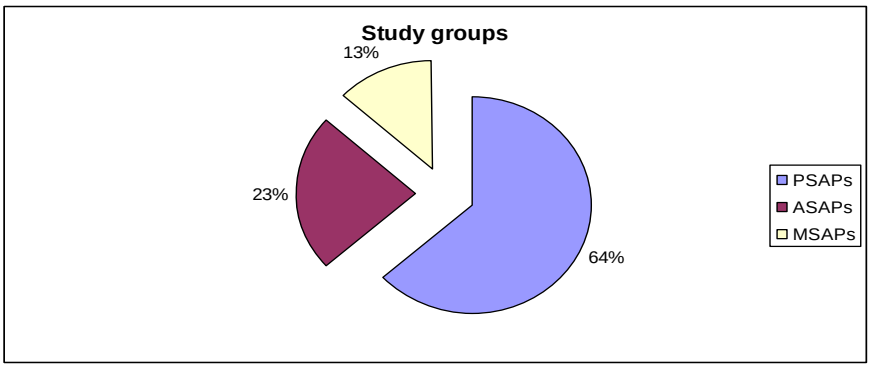


Figure (13) : Groups of the study population

Demographic data

This study included 21 males (70%) and 9 females (9%).The mean age was 28.56±10.84 years among females, and 22.38±8.37 among males. The distribution among the three groups is shown in **table (1)**

Table (1) : Demographic data of the study population.

	Midseptal APs	Anterosepta APs	Posteroseptal APs	P value
Age (mean±SD,years)	20.3±7.4	23.7±8.4	25.6±10.3	NS
Sex (M/F ratio)	75%	71%	68%	NS

Clinical evaluation

Symptoms

Palpitation was the major symptom (90%) among the study group. Only 3 patients (10%) were asymptomatic. Presyncope was evident in 6 (2 ASAP and 4 PSAPs) patients (20%) and a history of true syncope in only 2 (1 ASAPs and 1 PSAPs) patients (6.6%).Only 1 (PSAP) patient (3.3%) survived a cardiac arrest due to VF.

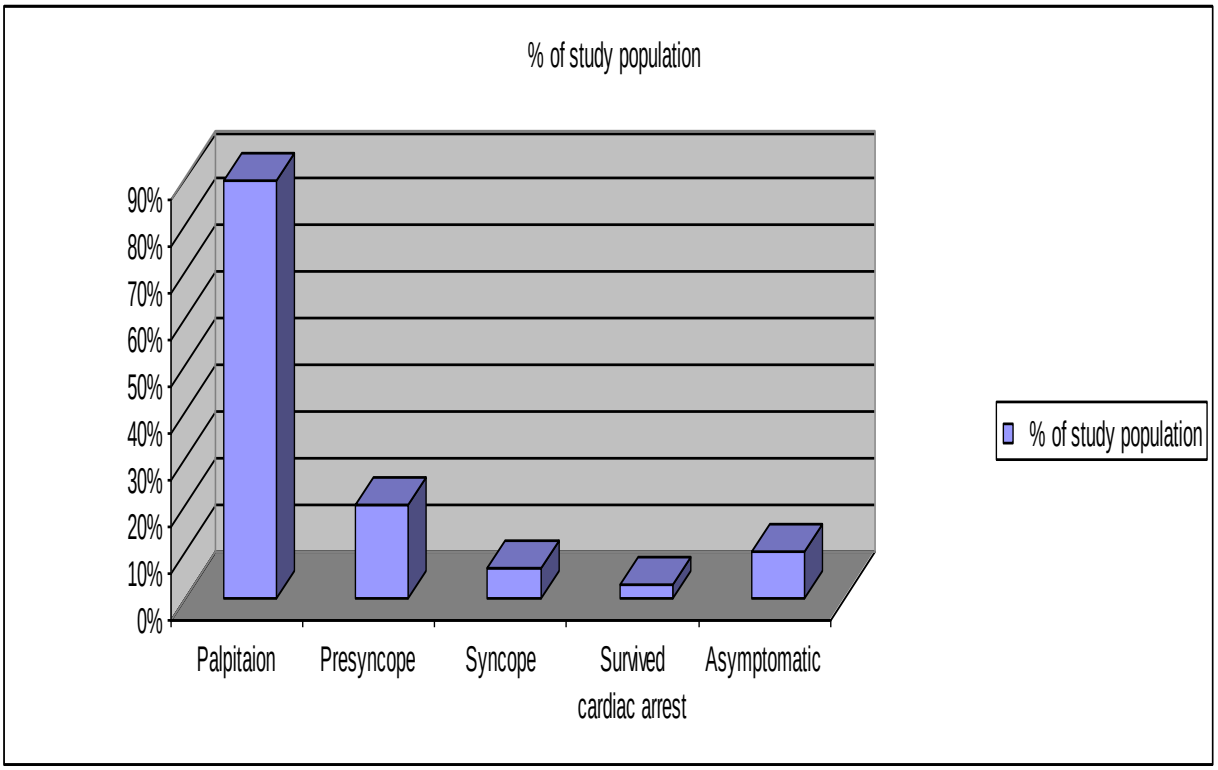


Figure (14): Frequency of symptoms among the study population

Tachycardias

A history and documentation of atrial fibrillation was evident in 8 patients (26.7%), 2 of them (6.6%) were pre-excited. The majority of these patients (n=7) had PSAPs. Evidence of ORT was documented in 22 patients (73.3%) while antidromic tachycardia was evident in only 1 patient (3.3%).In 4 patients (13.3%) with palpitation, the mechanism of tachycardia was unknown.

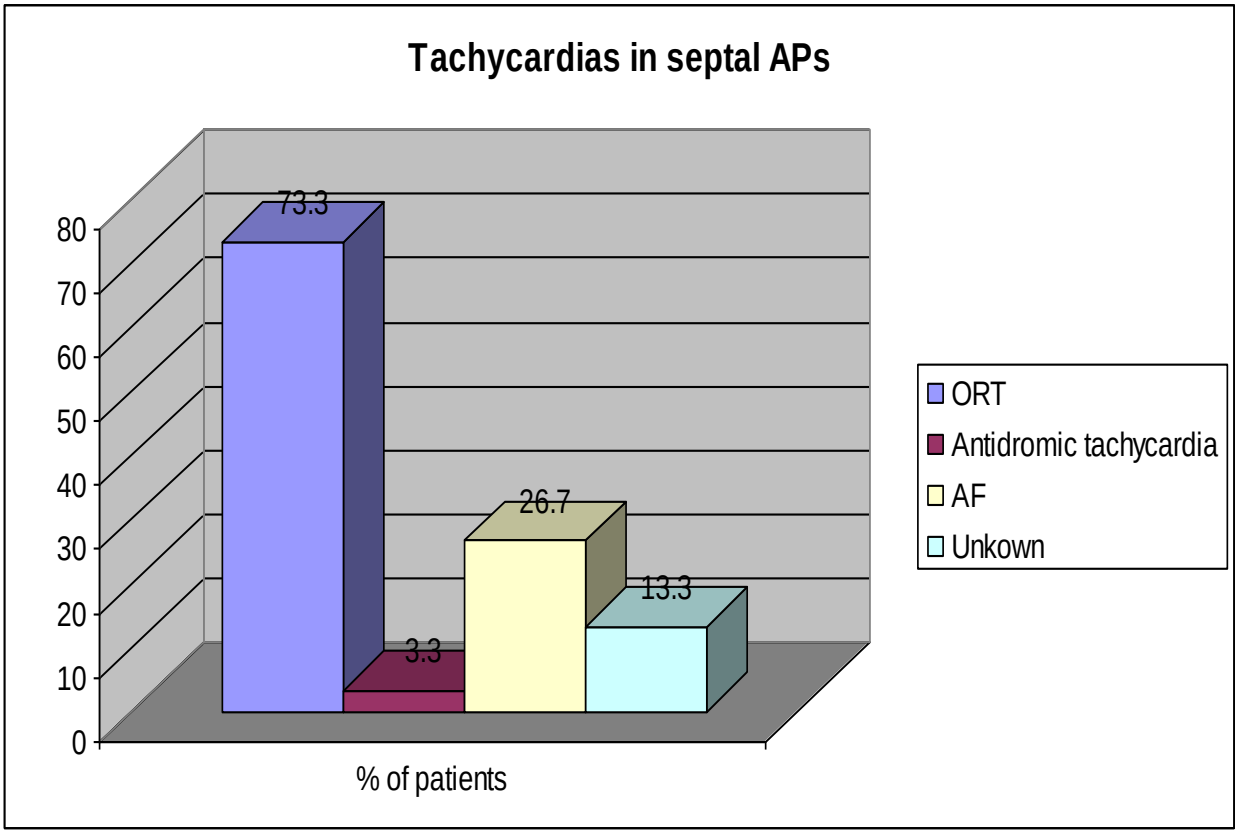


Figure (15): ORT is the most common tachycardia in all septal APs. AF is not uncommon. Antidromic tachycardia is rare.

Symptomatic episodes

In the symptomatic patients, the onset of the first attack of palpitation before the ablation procedure ranged between 1 and 288 months (mean 35.2±57.7) with great variation in the frequency of attacks in the last month before the ablation procedure (from 1 to 48 attack monthly). Among the symptomatic patients (n=27), acute arrhythmia termination occurred spontaneously in 6 patients (22.2%),with vagal maneuvers in 2 patients (7.4%),with iv drugs in 14 patients (51.8%),and with DC shock ,initially or as a final resort, in 5 patients (18.5%).

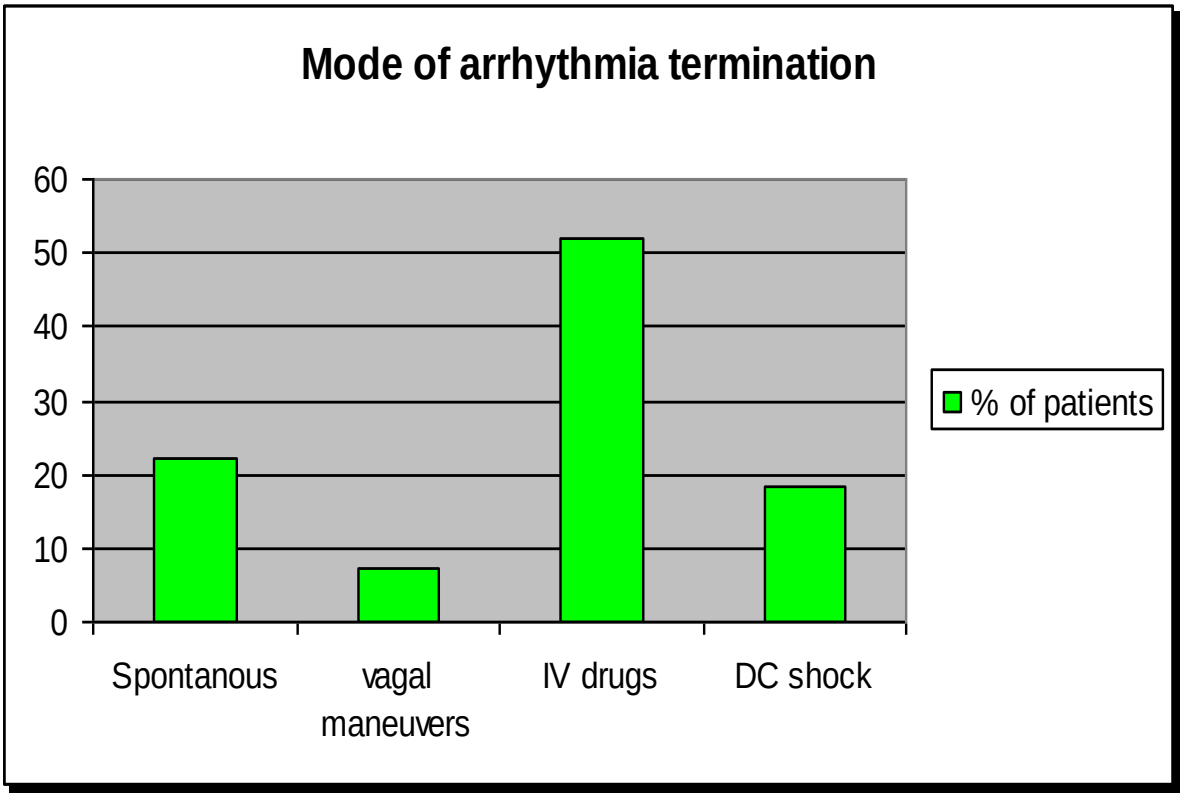


Figure (16): Mode of tachycardia episodes termination.

Antiarrhythmic drug therapy

Among the study population, 17 patients (56.6%) received a trial of one or more (1 patient) unsuccessful antiarrhythmic drug therapy .In 4 patients (13.3%), antiarrhythmic drugs were successful in prevention of recurrent episodes but the patients preferred to proceed for catheter ablation. Propafenone was tried in 9 patients (30%), amiodarone in 5 patients (16.6%), Verapamil in 6 patients (20%), beta blocker in 1 patient (3.3%), and combination of beta blocker and propafenone in 1 patient (3.3%).

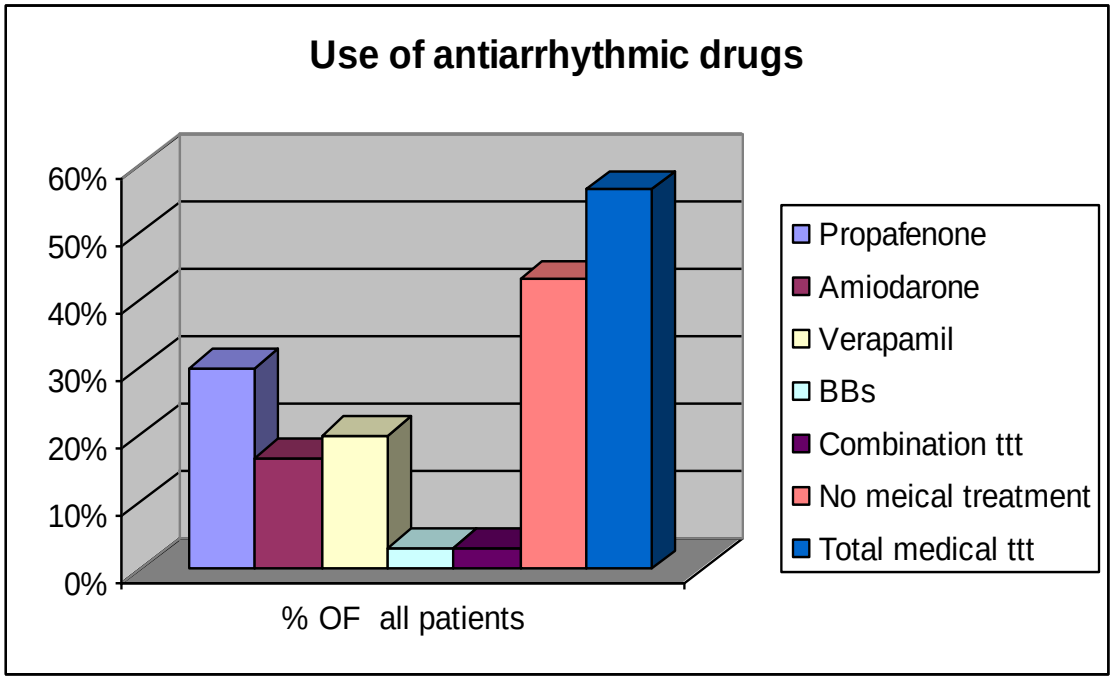


Figure (17):Use of antiarrhythmic drug therapy in the study population.

Underlying heart disease

*The majority of patients (n=25, 83.3%) had structurally normal heart based upon detailed clinical examination and Echo-Doppler study..4 patients (13.3%) had mitral valve prolapse, and 1 patient (3.3%) had essential hypertension***.**

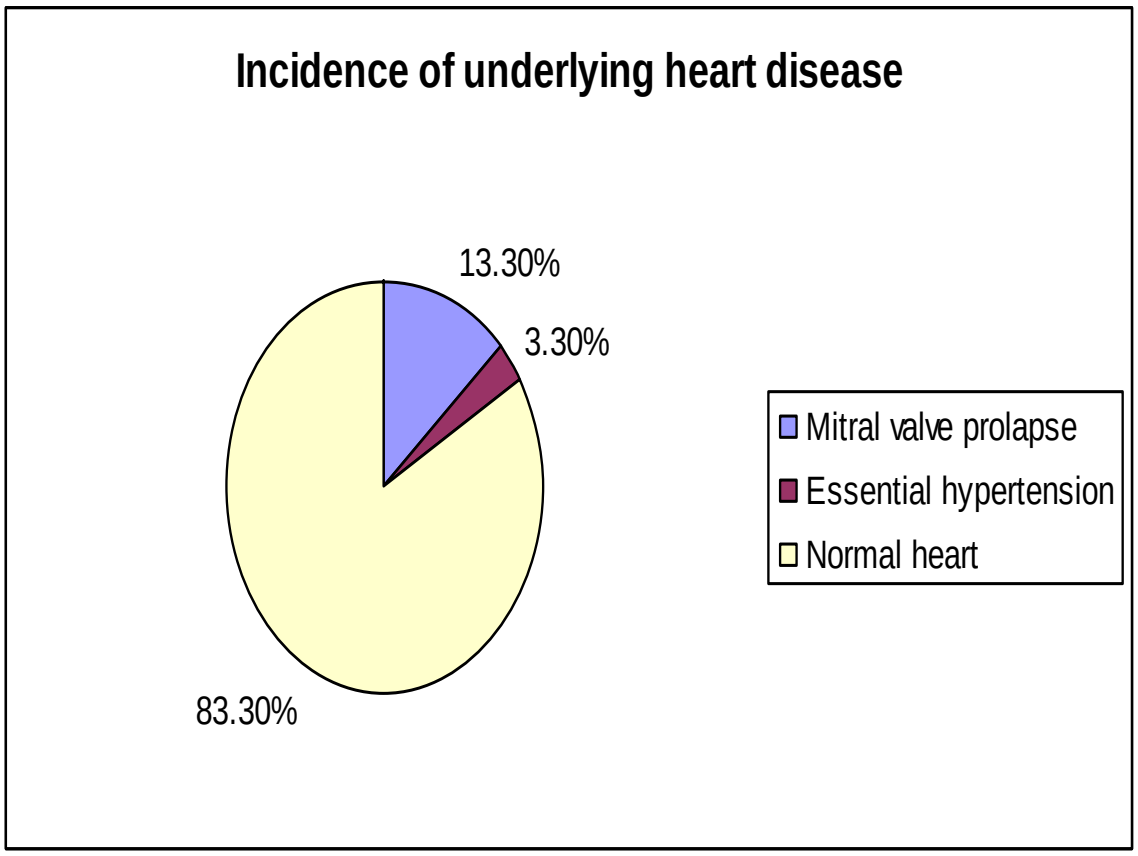


Figure (18): Incidence of associated heart disease in the study population.

Electrocardiographic characteristics

Manifest vs Concealed preexcitation (Figure 6)

The majority of patients (no=20, 66.6%) presented with baseline persistent preexcited ECG, while 3 patients (10%) had intermittent preexcitation at presentation and during holter monitoring. The remaining 7 patients (23.3%) had a normal baseline resting ECG at presentation (concealed pathways).All patients with anteroseptal and Midseptal pathways had manifest preexcitation while all patients with normal resting ECG proved to be concealed posteroseptal ones (figure)

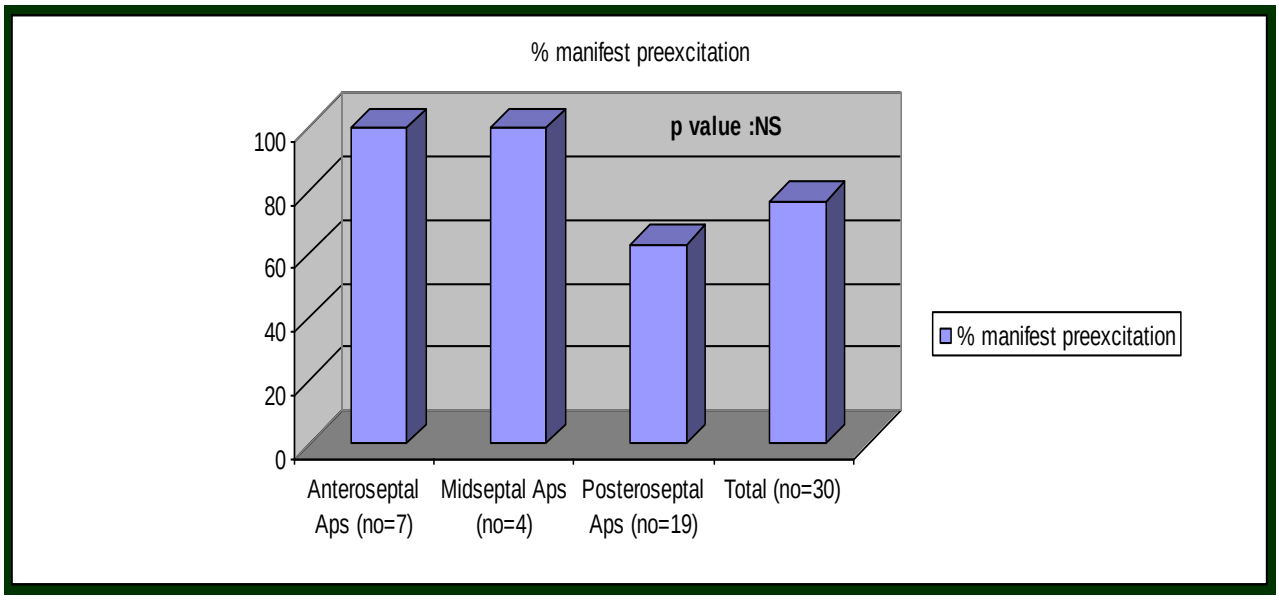


Figure (19): Frequency of basal pre-excitation in the resting ECG

ECG characteristics

Anteroseptal APs (n=7)

All 7 patients with anteroseptal APs had manifest pre-excitation. All patients showed positive delta wave in leads I, II, aVL, aVF, and from V2 to V6.All patients showed negative delta wave in aVR .A positive delta wave in leads V1 and III was observed in 5 patients (71.4%) while it was negative in the remaining 2 patients (28.6%) .Precordial R wave transition occurred by lead V3 in 5 patients and in V2 and V4 in the remaining 2 patients. The mean duration of P wave and QRS duration was 87.2±8.2 and 131.7±9.1 ms respectively.

Table (2): Preexcitation patterns in anteroseptal APs.

N	Manifest	lead I	lead II	lead III	aVR	aVL	aVF	V1	R transition
1	Y	positive	positive	positive	negative	positive	positive	positive	V3
2	Y	positive	positive	positive	negative	positive	positive	positive	V2
3	Y	positive	positive	positive	negative	positive	positive	positive	V3
4	Y	positive	positive	isoelectric	negative	positive	positive	negative	V3
5	Y	positive	positive	positive	negative	positive	positive	positive	V4
6	Y	positive	positive	positive	negative	positive	positive	negative	V3
7	Y	positive	positive	isoelectric	negative	positive	positive	positive	V3

Midseptal APs (n=4)

All 4 patients with Midseptal APs had manifest pre-excitation. All patients showed positive delta wave in leads aVL, and from V2 to V6 and negative delta wave in aVR.3 patients (75%) showed negative delta wave in V1, and aVF and positive delta wave in II .One patient showed negative delata wave in II. .A negative delta wave in lead III was observed in 3 patients (75%) while it was positive in the remaining patient .Precordial R wave transition occurred by lead V3 in 2 patients (50%),and in V2 in the remaining 2 patients (50%). The mean duration of P wave and QRS duration was 84.2±4.3 and 130.5±7.4 ms respectively (Table 4).

Table (3): Preexcitation patterns in midseptal APs.

Manifest	lead I	Lead II	lead III	aVR	aVL	aVF	V1	R transition
Y	positive	positive	negative	negative	positive	isoelectric	negative	V2
Y	positive	positive	positive	negative	positive	negative	positive	V3
Y	Isoelectric	positive	negative	negative	positive	negative	negative	V3
Y	positive	Negative	negative	negative	positive	negative	negative	V2

Posteroseptal APs (n=19)

Out of 19 patients with posteroseptal APs(7 left), 12 patients (63.1%) had manifest pre-excitation (2 left PS APs) while the remaining 7 patients (36.9%) were concealed .2 patients (10.5%) showed intermittent pre-excitation. In all patients, the delta wave polarity was negative in aVR, positive in lead I, aVL, and from V2 to V6. A negative delta wave in lead III, II and aVF in all 12 patients (63.3%), 9 patients (47.4%), and 11 patients (57.9%) respectively. An isoelectric delta wave in 1 patient (5.3%) in lead aVF and 3 patients (15.9%) in lead II. V1 showed negative delta wave in 10 patients (52.6%) and positive in 2 patients (52.6%).

All manifest left posteroseptal APs (2 patients) and 8 patients with right posteroseptal APs had R wave transition in lead V2 while the remaining 2 manifest posteroseptal APs had R wave transition by lead V3. Delta wave polarity was similar in both right and left posteroseptal APs. The mean duration of PR interval and QRS interval was 108.94±31.5 ms and 112.7±21.5 ms respectively. The ECG was not helpful in differentiating right from left posteroseptal APs.

Table (4): ECG preexcitation patterns in patients with posteroseptal APs.

Manifest		Intermittent	lead I	lead II	lead III	aVR	aVL	aVF	V1	R transition
Case 8	Y	NO	positive	negative	negative	negative	positive	isoelectric	negative	V2
Case 9	Y	NO	positive	negative	negative	negative	positive	negative	negative	V2
Case 10	Y	NO	positive	negative	negative	negative	positive	negative	negative	V2
Case 11	Y	NO	positive	negative	negative	negative	positive	negative	positive	V3
Case 12	Y	NO	positive	isoelectric	negative	negative	positive	negative	negative	V3
Case 13	Y	Y	positive	isoelectric	negative	negative	positive	negative	negative	V2
Case 14	Y	NO	positive	positive	negative	negative	positive	negative	negative	V2
Case 15	Y	NO	positive	negative	negative steep	negative	positive	negative	negative	V2
Case 16	Y	Y	positive	isoelectric	negative	negative	positive	negative	negative	V2
Case 17	Y	NO	positive	negative	negative	negative	positive	negative	negative	V2
Case 18	Y	NO	positive	negative	negative	negative	positive	negative	positive	V2
Case 19	Y	NO	positive	negative	negative	negative	positive	negative	negative	V2

Comparison between the three subgroups

There was no statistically significant difference between the three subgroups (manifest APs) regarding the mean duration of PR interval and QRS interval before ablation (P >0.3,and p >0.7 respectively).A positive delta wave in leads II and aVF could easily differentiate anteroseptal AP from both Midseptal and posteroseptal APs (specificity 100% and sensitivity 100%).A considerable overlap in QRS transition in chest leads exists between the 3 groups and it was not helpful in differentiation between them.

Table(5) : Delta wave polarities in ECG leads in all groups.

ECG lead	Anteroseptal	Midseptal	Posteroseptal
I	+	+,+/-	+
II	+	+,+/-	-,+/-
III	+,+/-	-,+	-
aVR	-	-	-
aVL	+	+	+,+/-
aVF	+	-	-,+/-
V1	-,+	-,+	-,+
V2	+	+	+
V3	+	+	+
V4	+	+	+
V5	+	+	+
V6	+	+	+

The electrophysiological properties

Among the study group, 7 patients had only retrograde conduction (concealed APs), 3 patients had only antegrdae conduction, and 20 patients showed both antegrade and retrograde conduction.23 patients had inducible ORT, 3 patients had inducible AF, and only 1 patient had inducible antidromic tachycardia.

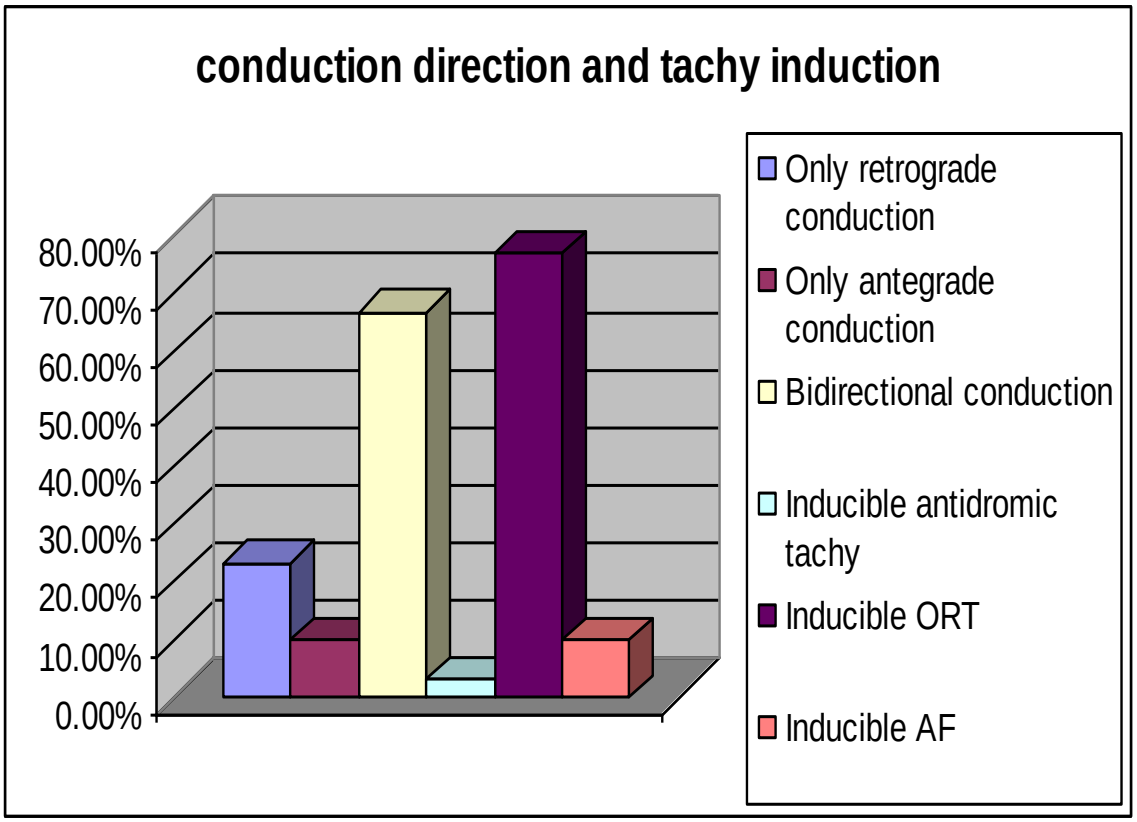


Figure (20): Conduction properties and tachycardia induction in septal APs.

Anteroseptal APs

6 patients (85.7%) had bidirectional conduction and 1 patient (14.3%) had only antegrdae conduction. The mean AH and HV intervals were 68.3±9.4 ms and 12.4±5.06 ms respectively. The mean antegrdae and retrograde ERPs were 331.6±99.6 ms and 315±84.1 ms respectively. 4 patients (57.2%) had a history of ORT, 1 patient (14.3%) with a history of antidromic tachycardia and 1 patient (14.3%) with a history of pre-excited AF, and 1 patient (14.3%) was totally a symptomatic.

There was inducible ORT in only 3 patients (42.85%), antidromic tachycardia in 1 patient (14.3%) ,and none of these patients had inducible atrial fibrillation .In the other patients there was no inducibility or trial to induce. The mean TCL was 310±17.3 ms.

Midseptal APs

All patients had bidirectional conduction. The mean AH and HV intervals were 67.5±5.25 ms, and 11.75±5.67 ms respectively .The mean antegrdae and retrograde ERPs were 346.6±25.16 ms, and 336.6±15.3 ms respectively. ORT was inducible in all of these patients, but no inducible AF or antidromic tachycardia. Only 3 patients (75%) had prior a known ORT before the procedure. The mean TCL was 388.8±10.3.

Posteroseptal APs

12 patients (63.15%) proved to be right PSAPs while the remaining 7 patients (36.85%) proved to be left sided ones. 10 patients (52.6%) had bidirectional conduction,7 patients (36.85%) had only retrograde conduction (5 are left sided), 2 cases (10.5%) had only antegrdae conduction. 2 patients (10.5%) showed intermittent pre-excitation.

A history of ORT was evident in 12 patients (79%) with one case showed aberrant conduction, 6 cases (31.6%) had a history of AF, 2 of which were pre-excited .None of these cases had a history of antidromic tachycardia.

***ORT** was induced in 16 patients (84.2%), **AF** was induced in 3 patients (15.8%), and there was no induction of **antidromic** tachycardia. The mean AH and HV intervals were 70.7± 14.02 ms and 12±7 ms respectively. The mean antegrdae and retrograde **ERPs** were 272±42.6 ms and 267.64±41.46 ms respectively.*

The mean TCL was 348±30.5 ms. There was no statistically significant difference between right or left PSAPs regarding antegrdae ERP (272±39.8 vs 270±70.7 ms, p >0.4), retrograde ERP (258±28.2 vs 281.4±54.9 ms ,p>0.08) ,and TCL (343.75±34.6 vs 352.85±26.9 ms, p >0.5).

Comparison between the 3 groups

There was no significant difference between the three groups in induction rate of tachycardia or TCL (p >0.05) during the entire procedure. Although AF induction could be only observed in cases with PSAPs (3 cases, 15.8%), this did not reach statistically significant difference (p =0.3).

Both the mean AH and HV intervals did not show any significant difference (p >0.15,and >0.7 respectively). Although the mean antegrdae and retrograde ERPs of the PSAPs (272±42.6 ms and 267.64±41.46 ms respectively)were shorter than that of both ASAPs (331.6±99.6 ms and 315±84.1 ms respectively) and MSAPs (346.6±25.16 ms, and 336.6±15.3 ms respectively),but this did not reach statistical significance (p >0.05, and =0.05 for antegrade and retrograde ERP respectively).

Table (6) : Comparison between electrophysiological properties of different septal APs.

AP / Parameter	ASAPs	MSAPs	PSAPs	P value
Mean AH (ms)	68.3±9.4	67.5±5.25	70.7±14	**NS**
Mean HV (ms)	12.4±5.1	11.75±5.7	12±7	**NS**
Antegrade ERP (ms)	331.6±99.6	346.6±25.3	272±42.6	**NS**
Retrograde ERP (ms)	315±84.1	336.6±15.3	267.6±41.5	**NS**
Mean TCL (ms)	310±17.3	388±10.3	348±30.5	**NS**

No significant difference in the main electrophysiologic parameters between the three groups.

Results of RF catheter ablation

RF catheter ablation was successful in 25 patients (92.6%) out of 27 patients in whom RF energy was applied (83.3% of all patients).26 patients (96.3%) required 1 procedure while only 1 patient required 2 procedures. Conventional RF ablation was the role except in 4 cases (14.8%) with PSAPs in whom irrigated tip ablation was used. There was no attempt of ablation in 3 patients.

The range of energy used was 20 to 40 W. Hematoma was reported in 4 patients and none of our patients experienced cardiac tamponade. Complete AV block was seen in only 1 patient (3.7%) and RBBB in another patient (3.7%) out of 27 patients in whom RF energy was delivered (Both were anteroseptal APs)..

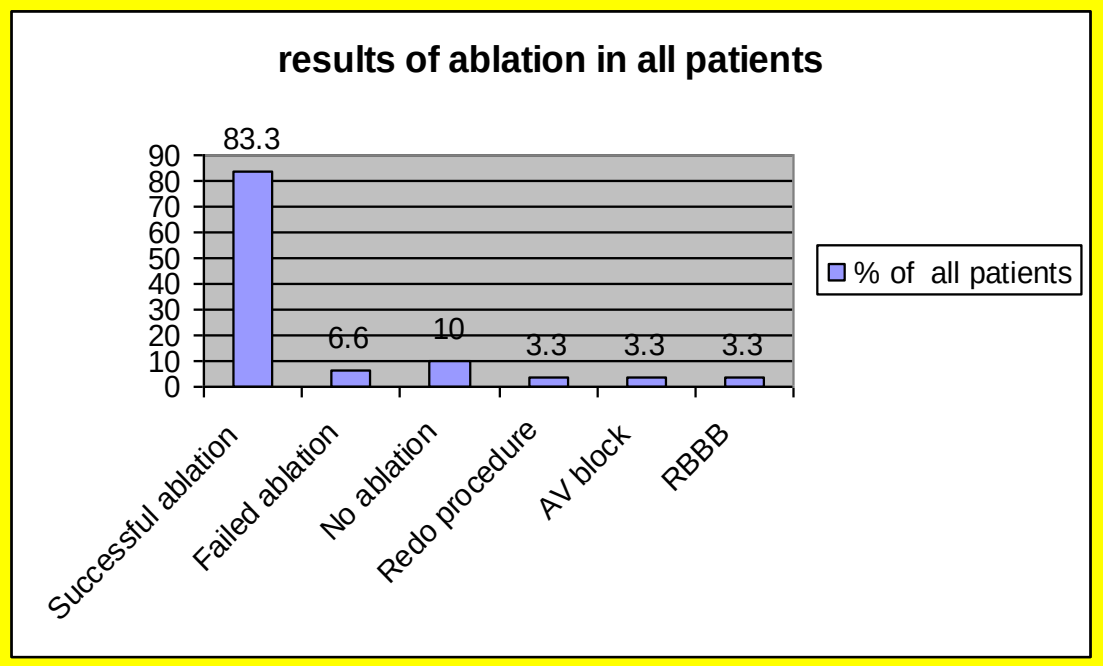


Figure (21) : Success and major complications in all patients

Anteroseptal APs (n=7)

There was no attempt for RF ablation in 3 patients (42.8 %), failed ablation in 1 patient (14.3%), and the remaining cases (n=3 , 42.8 %) were successfully ablated from trans-femoral vein approach with subsequent non-inducibility of any tachycardia .

The mean duration of ablation was 50±20 s and the mean power was 21.25±2.5 ms.1 patient (14.3%) developed RBBB and another patient (14.3%) was complicated with CHB with subsequent pacemaker implantation. In 1 patient (14.3%) ,the pathway was bumped with the ablation catheter which precluded subsequent mapping and ablation .

Table (7): Results of RF catheter ablation in ASAPs.

Results of ablation (n=7)	***Value***
Mean power (Mean±SD)	21.25 ± 2.5 ms
Mean duration of ablation (Mean ±SD)	50 ± 20 sec
Successful ablation (%)	42.8 %(n=3)
Failed ablation (%)	14.3 % (n=1)
No attempt of ablation (%)	42.8 % (n=3)
RBBB (%)	14.3 % (n=1)
CHB (%)	14.3 % (n=1)

Midseptal APs (n=4)

*All MSAPs were successfully ablated (100%) from the first procedure using conventional ablation in the right Midseptal area. The mean duration of ablation was 90±60 s with a mean power of 26.25±2.5 W. No cases of AVN or bundle branch block. No tachycardia or AF was inducible after successful ablation***.**

Table (8): Results of RF catheter ablation in MSAPs.

Results of ablation (n=4)	***Value***
Mean power (Mean ±SD)	26.25 ± 2.5 W
Mean duration of ablation (Mean ±SD)	90 ± 60 sec
Successful ablation (%)	100 %(n=4)
RBBB (%)	0 %
CHB (%)	0 %

Posteroseptal APs (n=19)

All but one PSAPs were successfully ablated (94.7%) with no induction of any tachycardia thereafter. Only 1 case (5.3%) required a redo procedure.3 patients (15.8%) were ablated successfully via retrograde aortic approach, 4 patients (21%) via trans-septal approach and the remaining 11 patients (57.9%) were ablated via the transfemoral venous approach.

Only 4 cases required irrigated tip catheter ablation. CS angiography was needed in 2 patients (10.5%) to define a successful ablation site in the CS venous system.2 patients (10.6 %) were ablated in a proximal CS pouch.

The mean duration of RF application was 154.5±97.2 s and the mean power was 29.7 ± 3.5 W. No cases of AVN block or BBB. 2 cases (10.5%) developed inguinal hematoma.

Table (9): Results of RF catheter ablation in PSAPs.

Results of ablation (n=19)	***Value***
Mean power (Mean ±SD)	*29.7 ± 3.5 W*
Mean duration of ablation (Mean ±SD)	*154.5±97.2 s*
Successful ablation (%)	94.7 %(n=18)
Epicardial ablation	10.6% (n=2)
Irrigated tip ablation	21 % (n=4)
RBBB (%)	0 %
CHB (%)	0 %
Inguinal Hematoma	10.6% (n=2)

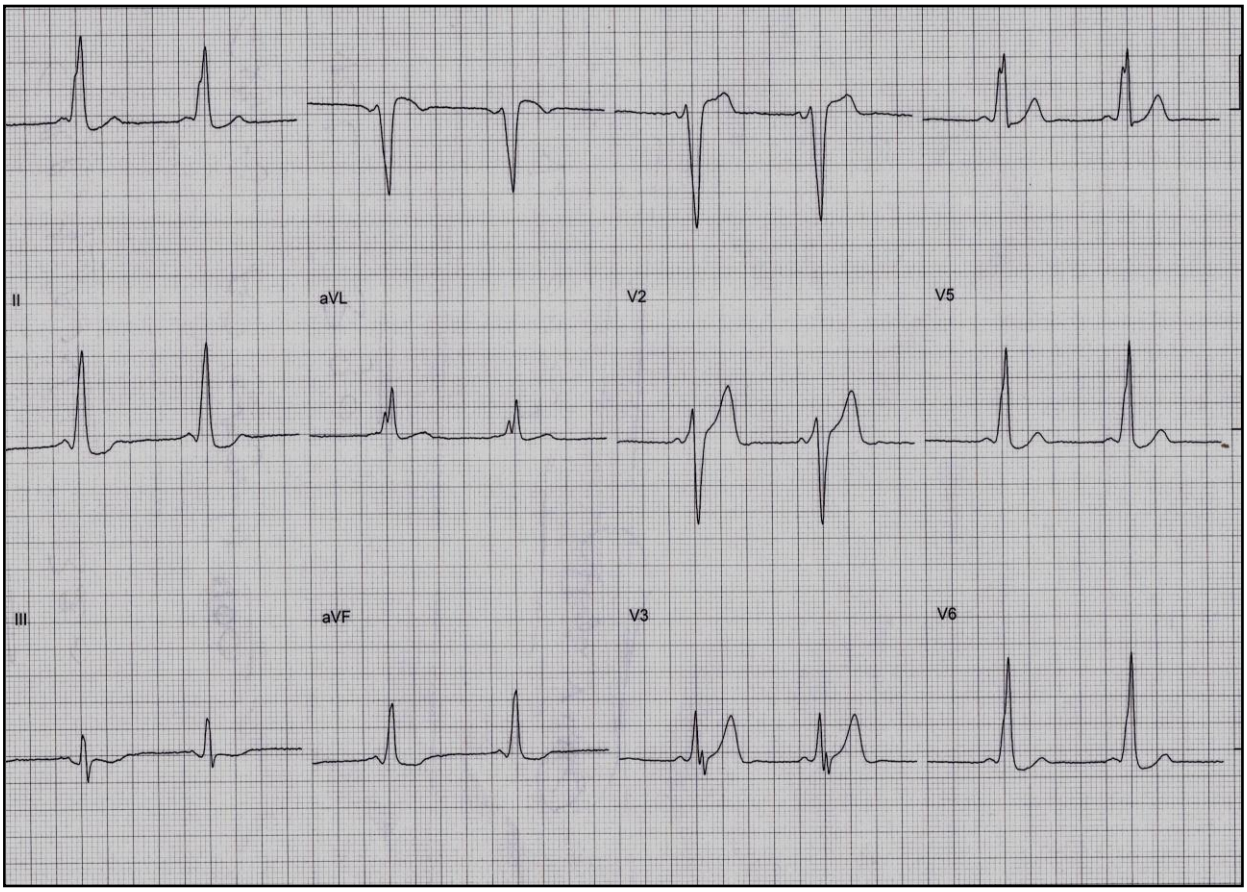
Comparison between the 3 groups regarding results of catheter ablation.

We could not find significant difference in success rate, and total duration of RF application among the patients with anteroseptal, Midseptal, and posteroseptal APs. AV block (complete AV block and RBBB) , and fear to attempt ablation was significantly higher in patients with anteroseptal APs than the other 2 groups (p <0.05).

Table (10): Results of catheter ablation in the three groups:

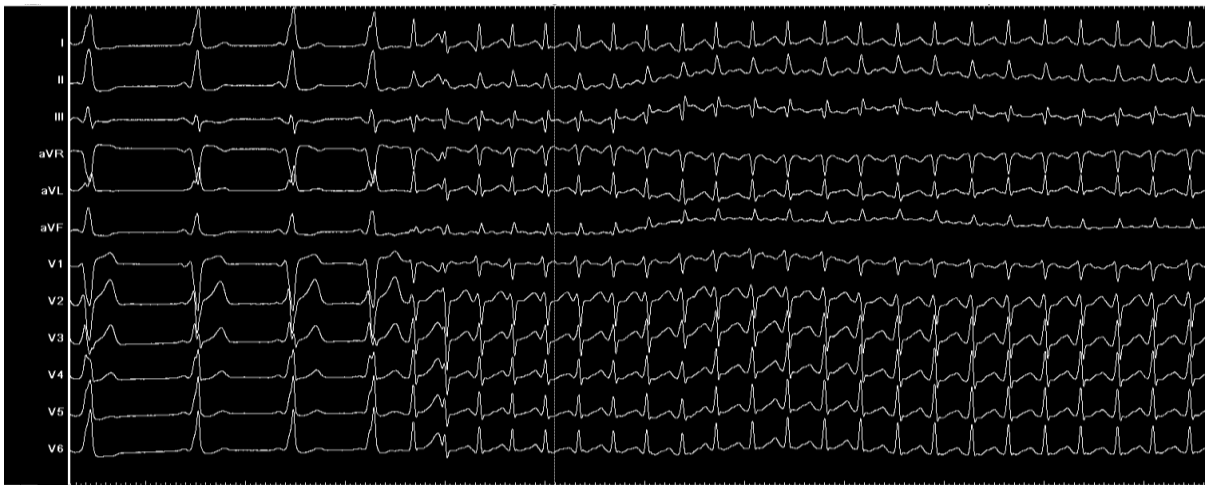
Parameter	**ASAPs (n=7)**	**MSAPs (n=4)**	**PSAPS (n=19)**	**P .value**
Success rate	75 %	100%	94.7%	NS
RF total duration	50 ± 20 sec	90 ± 60 sec	*154.5±97.2 s*	NS
CHB	25 %	0 %	0 %	<0.05
No attempt to ablate	**42.8 %**	**0 %**	**0 %**	<0.05

Case studies



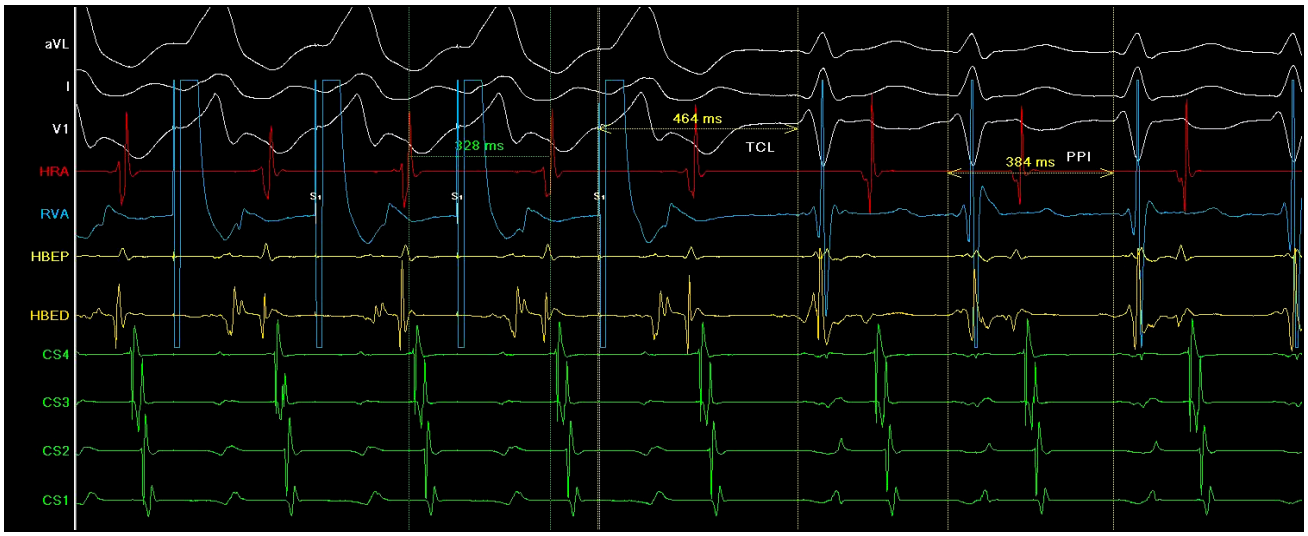
(1) : Resting ECG in patient no (27) with anteroseptal AP location . Note the positive delta wave in V1 and almost isoelectric delta wave in lead III. This was a male patient, 25 years old, who presented with syncope and rapid atrial fibrillation . He was successfully ablated.

(2): ORT in patient no (25) with anteroseptal AP (note the short RP tachycardia and the inferior axis of P wave in the inferior leads). This was a male patient,31 years old , presented with palpitation and Presyncope .The procedure in this patient was complicated with complete heart block .

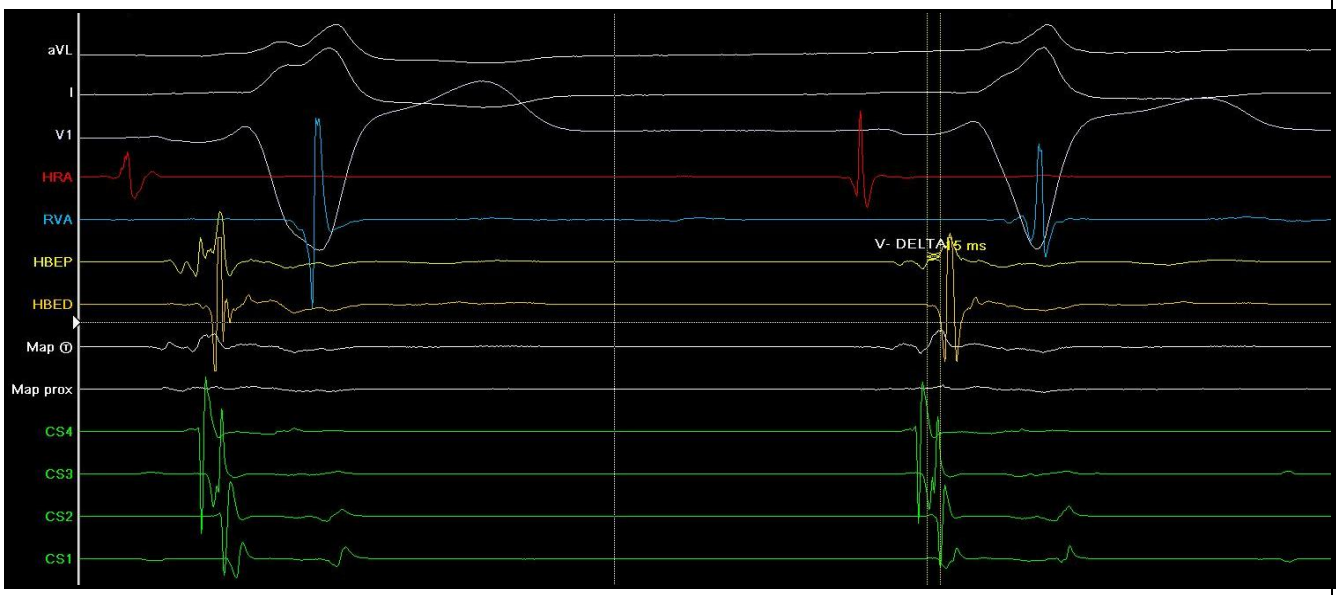


(3):Initiation of ORT in the same patient (no 25) with anteroseptal AP by an atrial extra stimulus during EP study. Note that an earlier atrial premature beat blocked in the AP and conducted solely via AVN and then retrogradely along the pathway. (paper speed 25mm/sec).

(4):Intracardiac recordings during ORT in patient no (24) with ASAP. This was a male patient,26 years old,presented with palpitation . He had a successful procedure. Note the earliest retrograde atrial activation at the His electrogram (AVNRT should be differentiated). (paper speed 100 mm/sec).

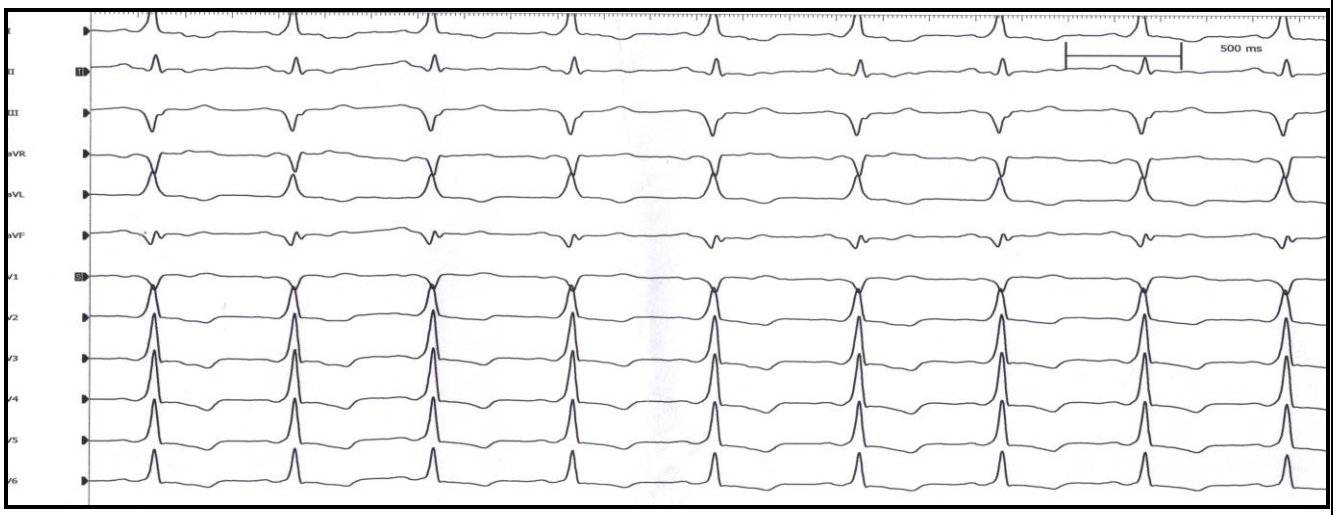


(5): Confirmation of ORT mechanism (same patient no 24) by entrainment from the right ventricle. Note that post pacing interval (PPI: 464 ms) is longer than the tachycardia CL (TCL: 384 ms) by less than 100 ms and the returning pattern in VAV response.(paper speed 100 mm/sec)

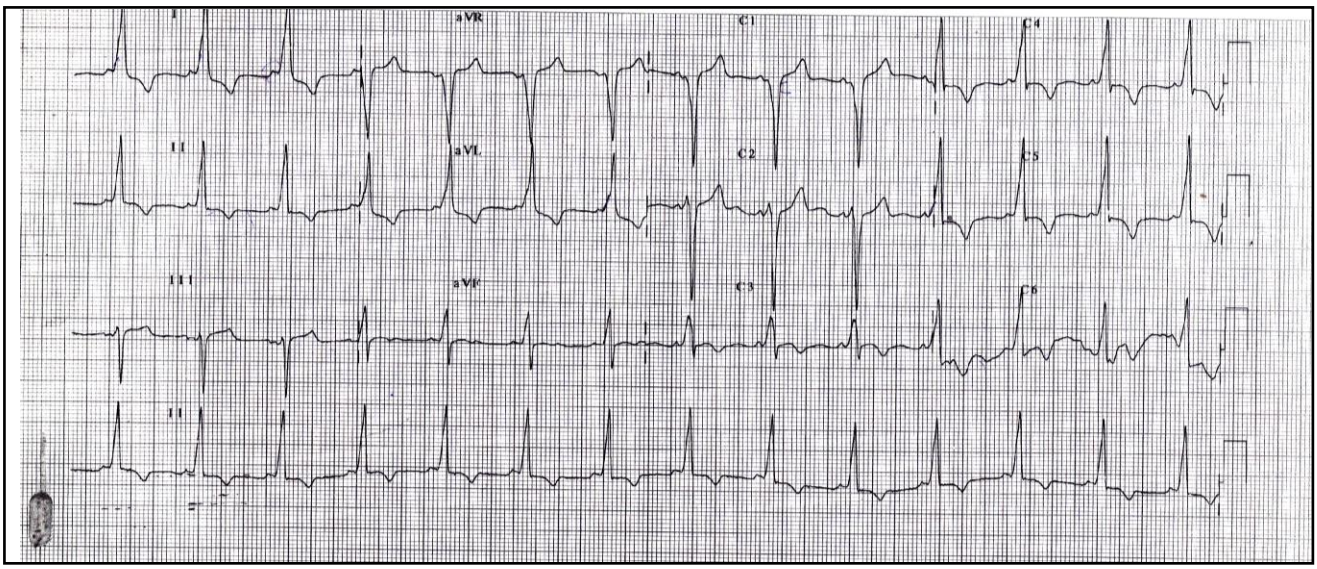


(6): Mapping for anteroseptal APs (same case no 25). V to delta is 15 ms which advocate further mapping for earlier ventricular activity .(paper speed 200 mm/sec)

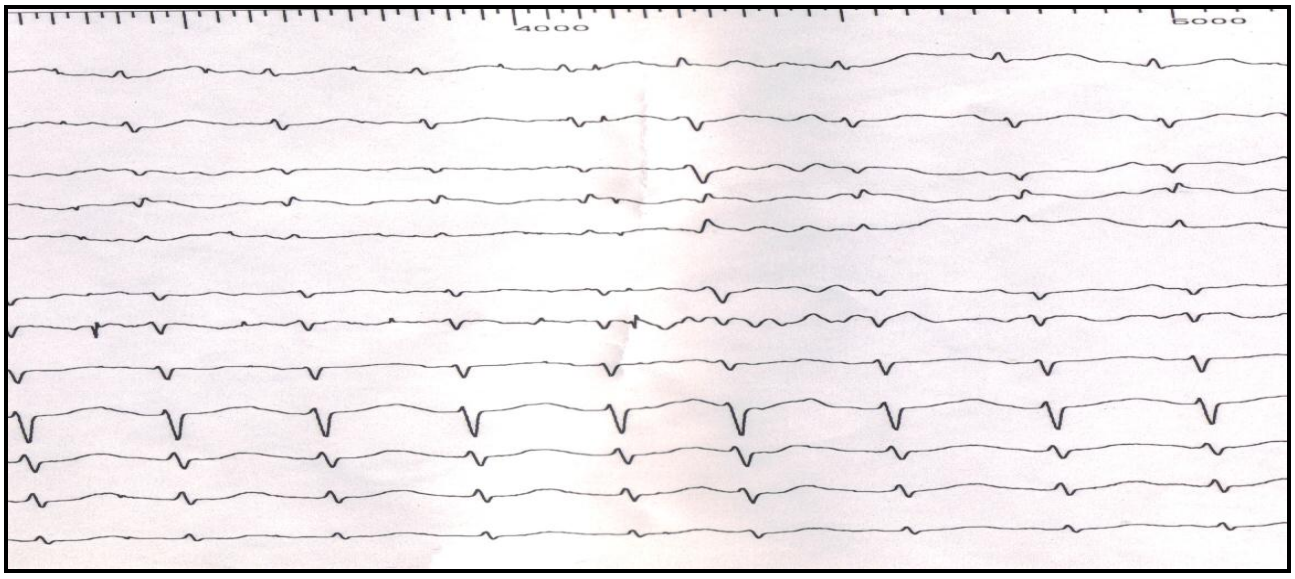
(7): RBBB after ablation of anteroseptal AP ablation(case no 30). This was a female patient,17 years old .She presented with palpitation and had a successful procedure (paper speed 100 mm/sec).



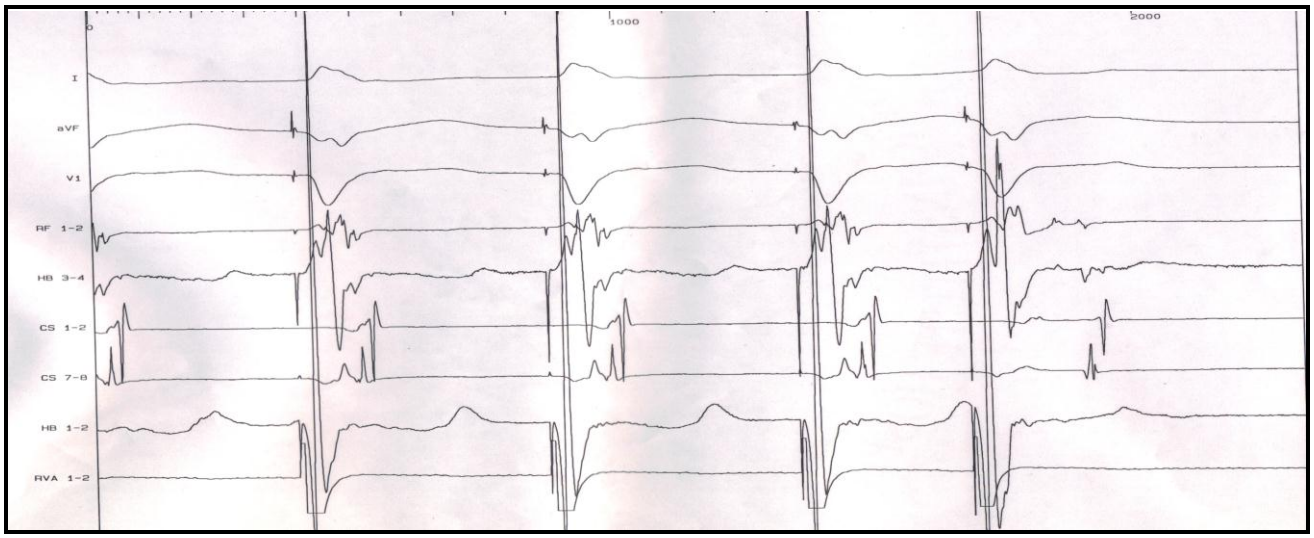
(8): Resting ECG in a patient with Midseptal AP (case no 23). This was a male patient who was a symptomatic .He had a successful procedure .Note the negative delta wave in all inferior leads and in V1.Note the early R wave transition in V2



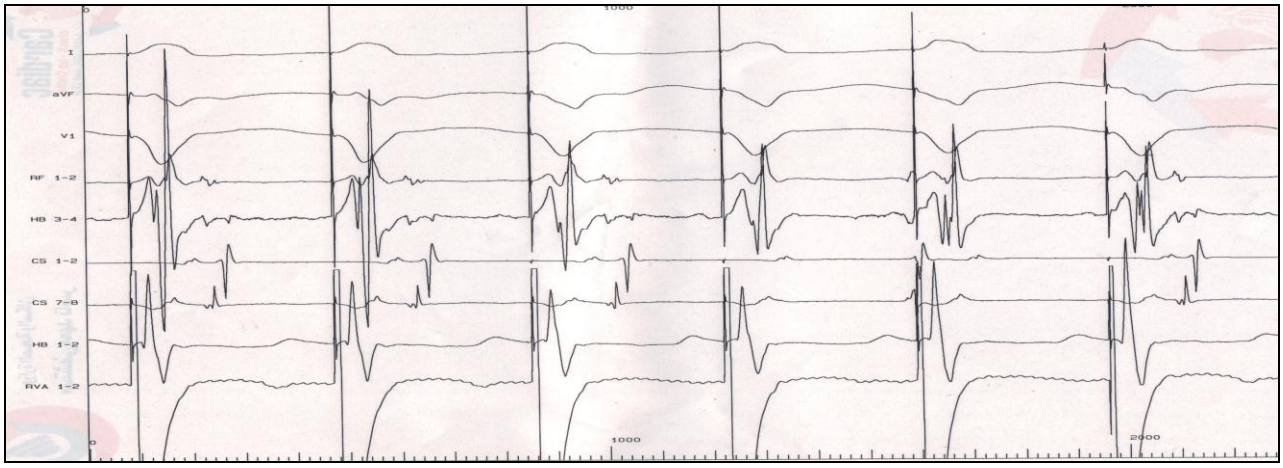
(9): Another resting ECG in a patient (case no 20) with Midseptal AP .This was 19 years old female presented with palpitation. She had a successful procedure without any complication.Note the positive Delta wave in lead II ,negative in III , and almost isoelectric in aVF .Note also the negative delta wave in V1 ,and R wave transition in V3.



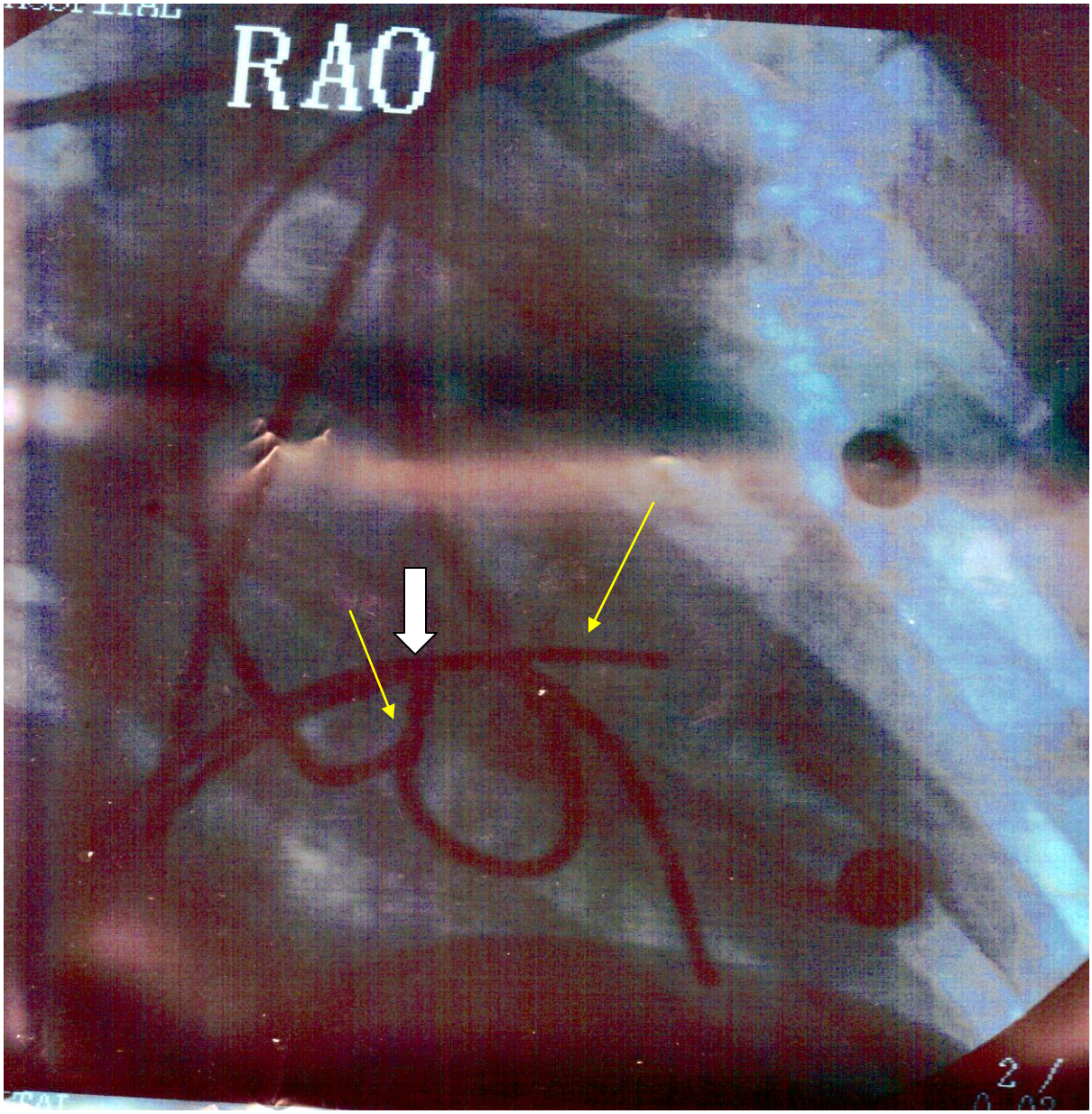
(10): ORT from the same previous patient (n 20) with Midseptal AP (p wave morphology is hard to discriminate).



(11): V pacing and extra-stimulation in a patient (no 23) with MSAP .The retrograde ERP of a Midseptal AP (330 ms) has been reached with block in the AP and retrograde conduction via the AVN. (paper speed 100mm/sec).

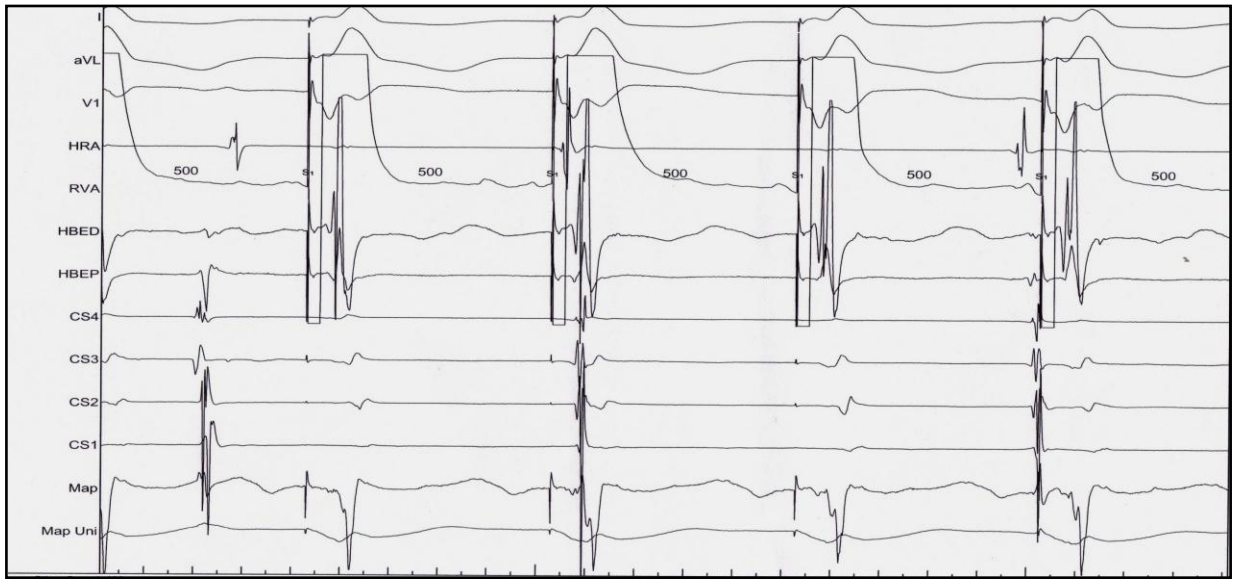


(12): V pacing in the same previous patient (no 23)with Midseptal AP with retrograde conduction. Note that retrograde atrial activation is almost simultaneous in both His and proximal CS (CS 7-8) catheters (meaning that the atrial insertion is equidistant from both sites i.e. Midseptal.(paper speed 100 mm/sec).

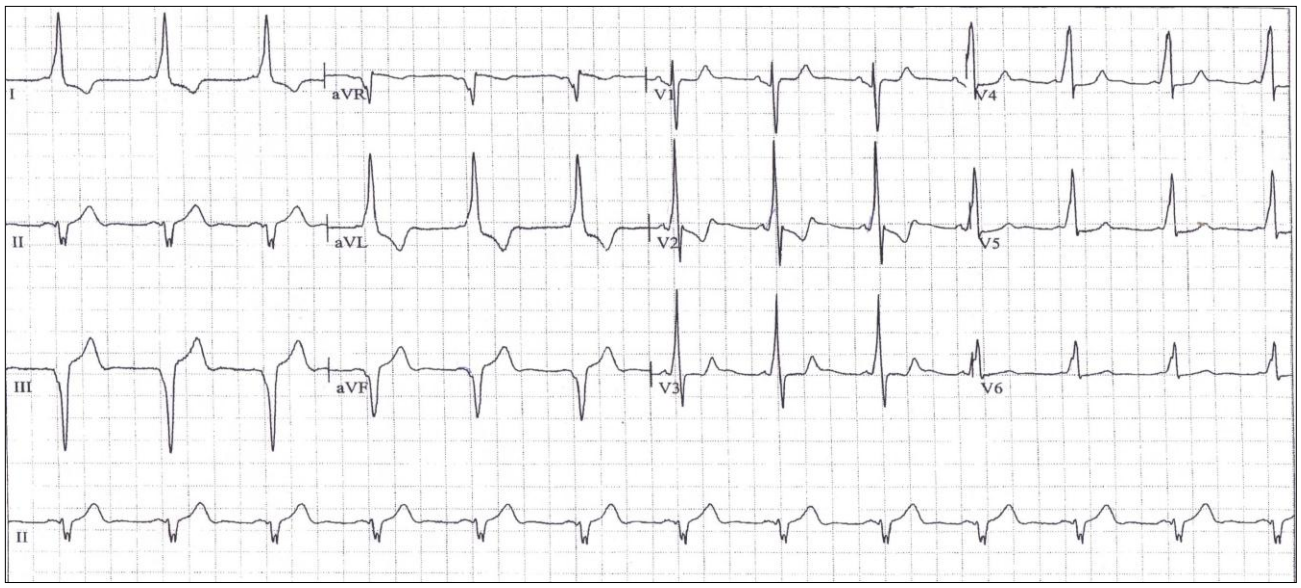


(13) : RAO view during mapping of Midseptal AP (same previous patient no 23) using retrograde approach. The ablation catheter (white thick arrow) between the His and CS catheter (yellow small arrows).The patient was successfully ablated from the right side and not from this a pproach.

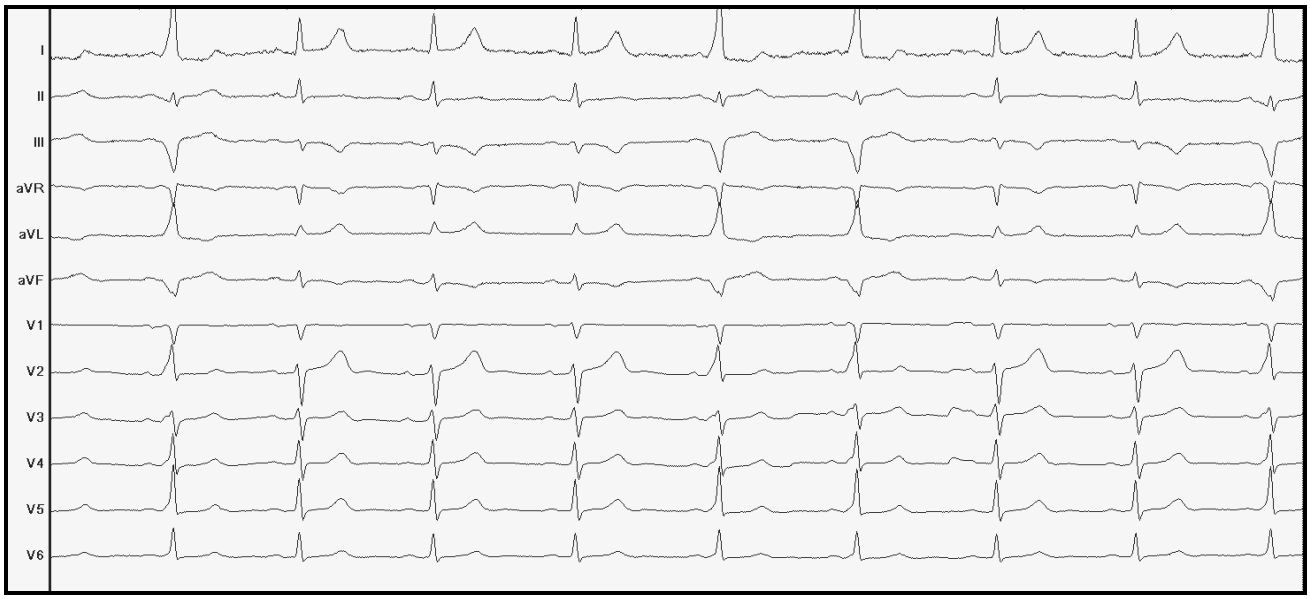
(14): Mapping during sinus rhythm of a Midseptal AP (same patient no 23) . Note the absence of His potential and the relatively small atrial signal (targeting the ventricular insertion of the pathway) on the RF catheter. (paper speed 100 mm/sec)



(15) : VA dissociation in after successful ablation of a MSAP (same patient no 20). (paper speed 100 mm/sec).

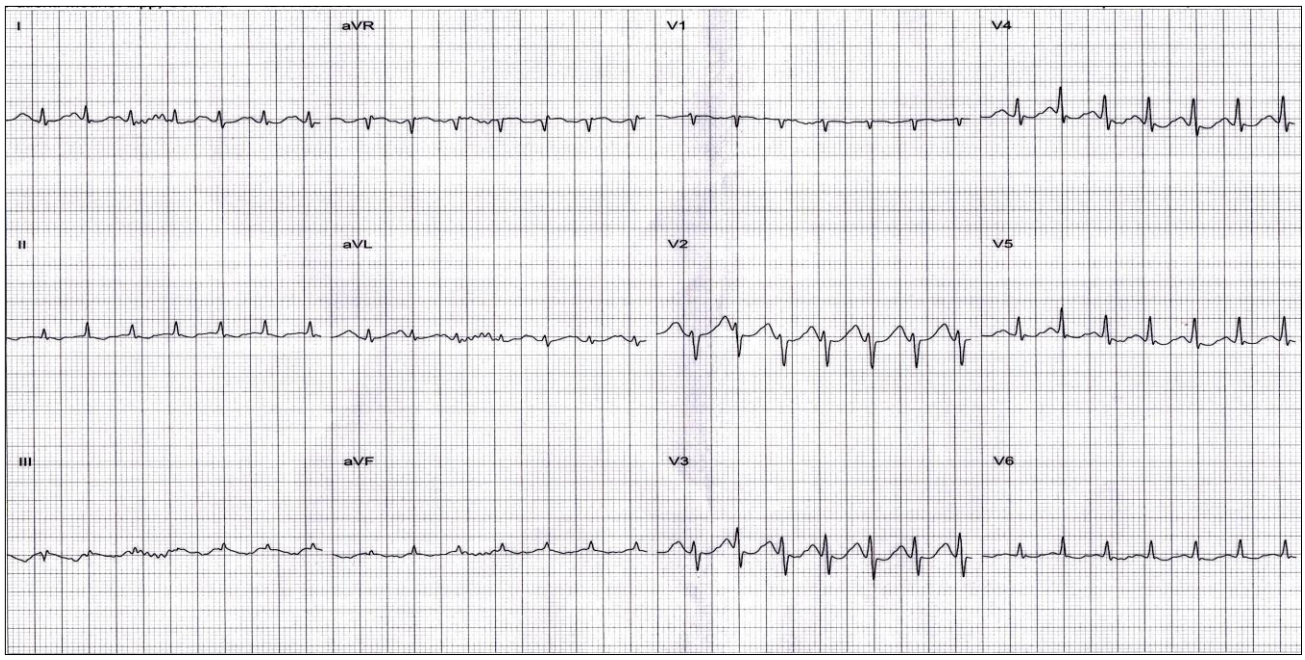


(16) : Resting ECG in patient no 9 ,with posteroseptal AP. This patient was 24 years old male with recuurent palpitation. He had successful ablation via the retrograde approach. Note the negative delta wave in inferior leads and in V1.

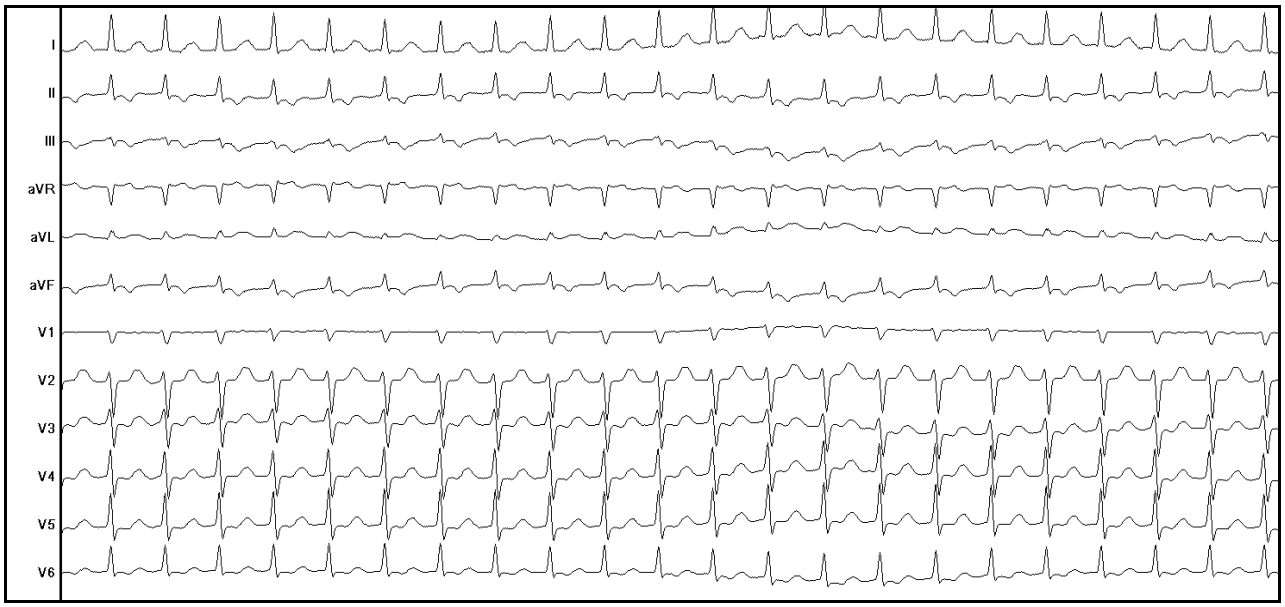


(17): Intermittent pre-excitation in PSAP (case no 13).This was 18 years old female with frequent palpitation. She was successfully ablated at CS ostium .Note the negative delta wave in all inferior leads.

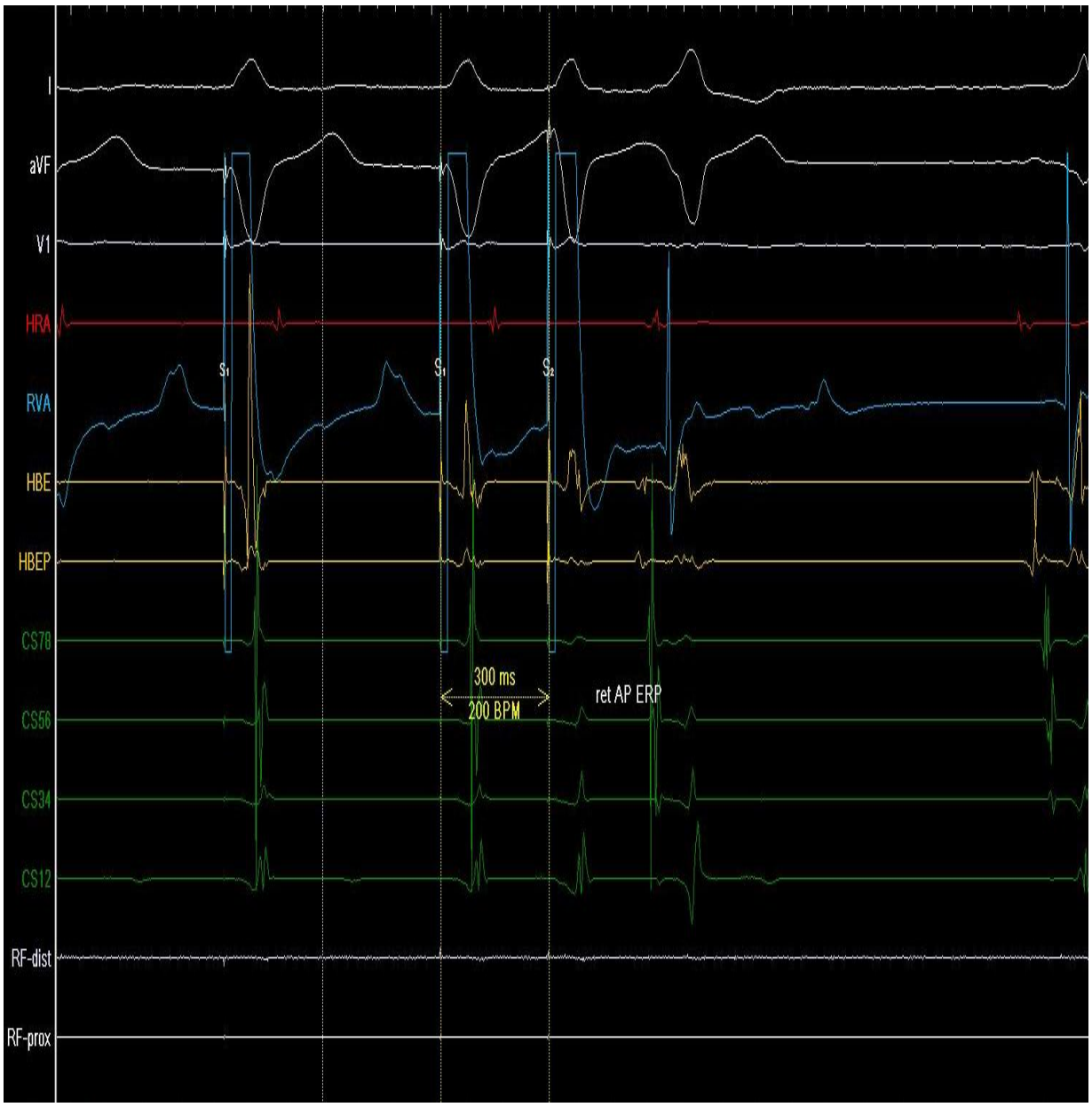
(18): ECG from patient no 18, with epicardial posteroseptal AP. This was a 34 years old female with recurrent palpitations. She was successfully ablated from a proximal CS pouch.Note the deep negativity of delta wave in leads II, and III and the positivity of delta wave in V1.



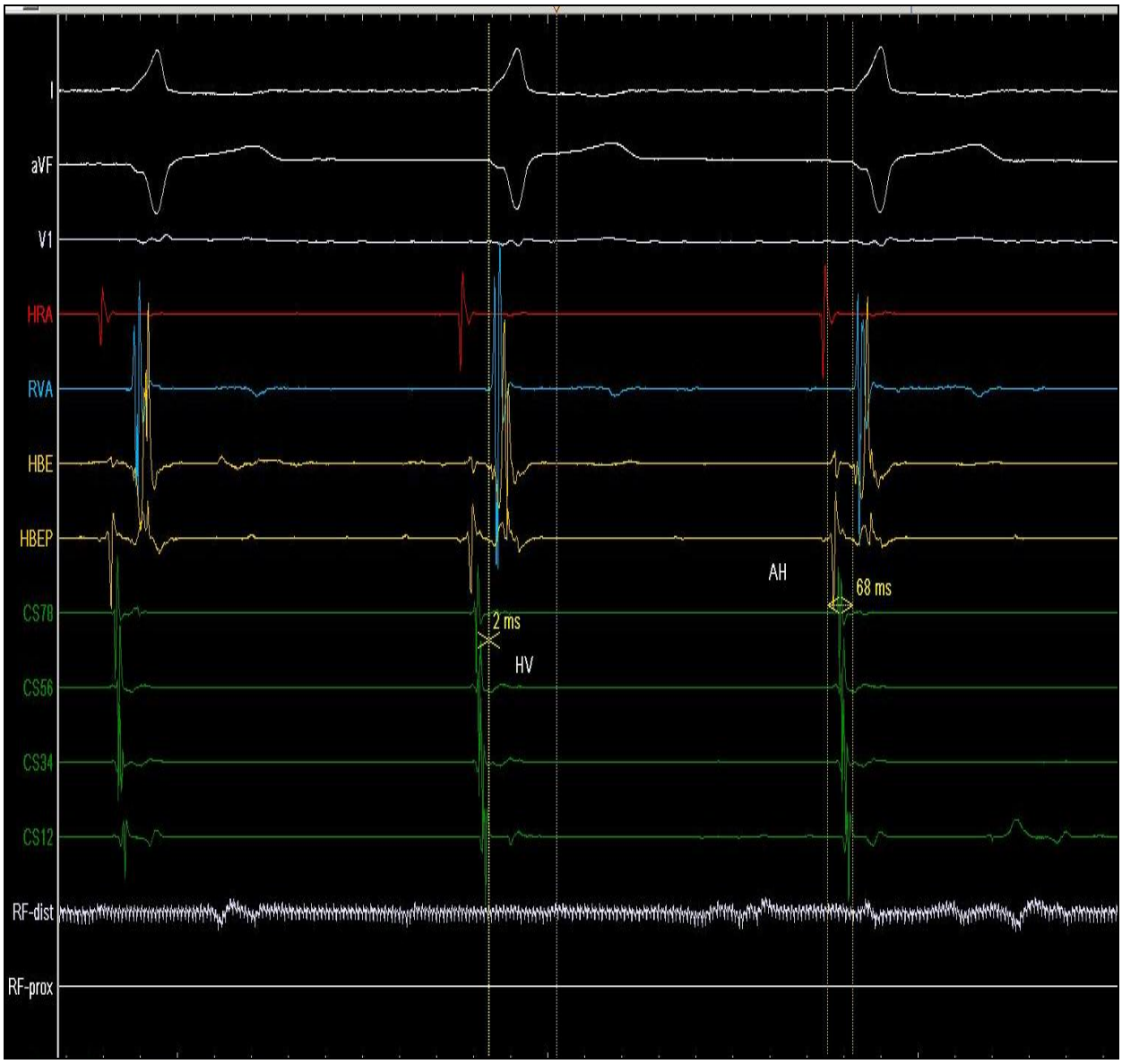
(19): ORT in a patient with posteroseptal AP (same case no 9) .Note the short RP tachycardia and the superior axis of p wave in the inferior lead II .



(20): ORT in another patient (case no 6) with right PSAP. This was 28 years old male with recurrent palpitation .He underwent a successful ablation procedure. Note the negative P wave in inferior leads

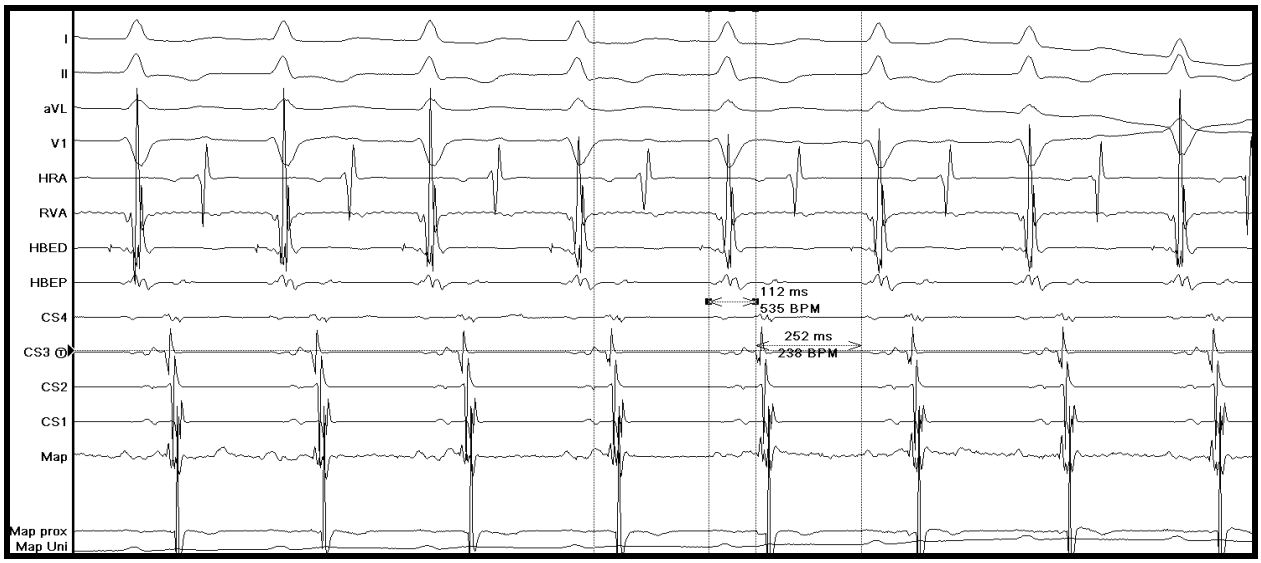


(21): Measurement of retrograde ERP during V extra-stimulation in patient no 7 with left posteroseptal AP. This was a female ,34 years old female with recurrent palpitation .She underwent a successful uncomplicated procedure. ERP is 300 ms.(paper speed 100 mm/sec)



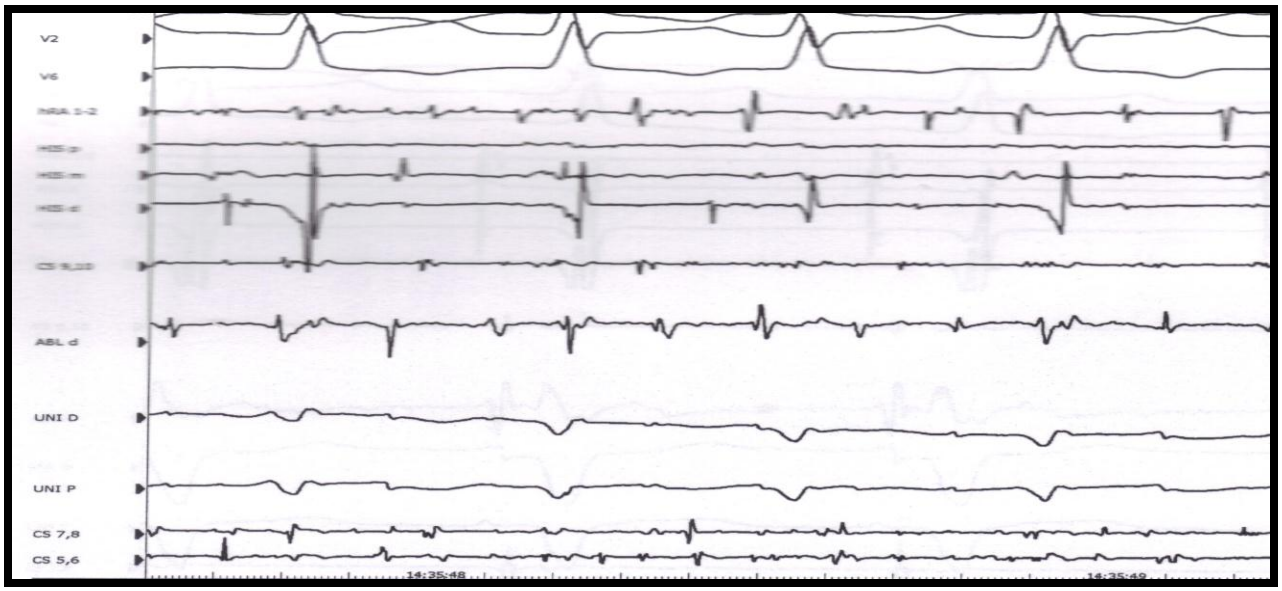
(22): Baseline Intracardiac intervals during sinus rhythm in patient no 15 ,with right posteroseptal AP. This was a 27 years old male with recurrent palpitation and Presyncope .He had also AF. This patient was successfully ablated at CS ostium. Within normal AH and very short HV (2 ms).(paper speed 100 mm/sec)

(23): ORT with aberrancy changing to narrow complex ORT after a PVC (peeling effect) in patient no 1 , with concealed left posteroseptal AP. This was a male patient 20 years old with recurrent palpitation and AF. He was successfully ablated without any major complication.Note that the earliest retrograde activation is seen in CS 3 (mid CS) .

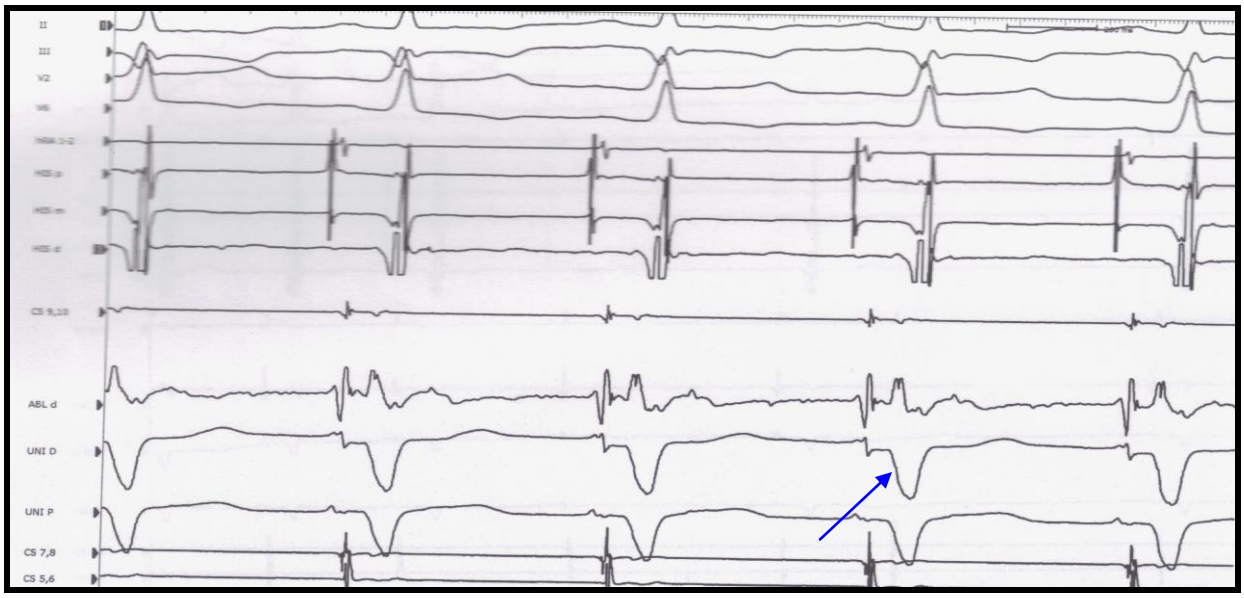


(24) : Intracardiac recording during ORT in the same previous patient (no 1)with left posteroseptal AP. Note the earliest atrial activation at CS 3 (mid CS).AV and VA are measured during tachycardia.(paper speed 100 mm/sec).

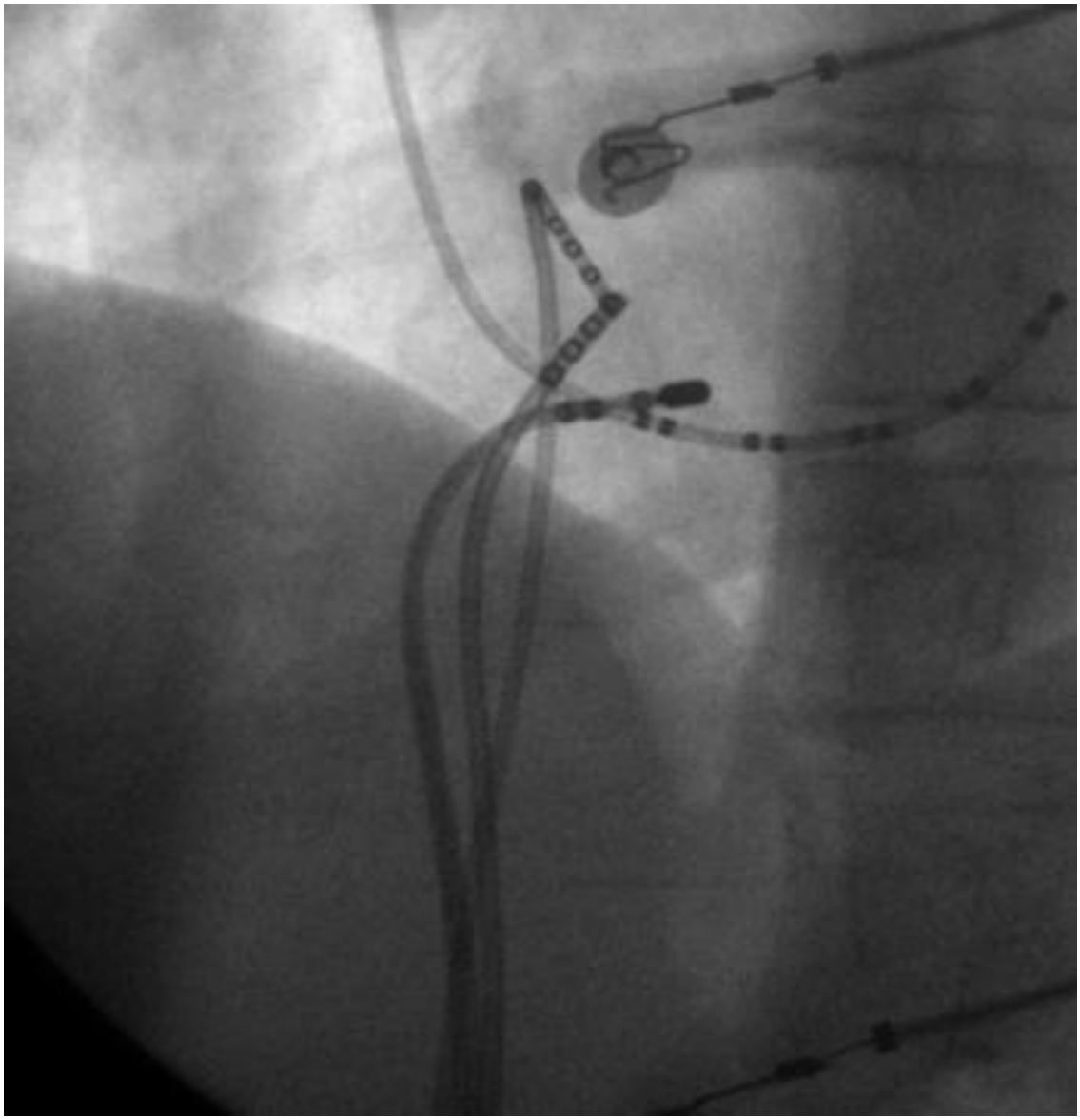
(25) : Measurement of local VA time on the ablation catheter before ablation during ORT in patient no 2 with concealed left posteroseptal APs. This was 24 years old male presented with recurrent palpitation and successful ablation.



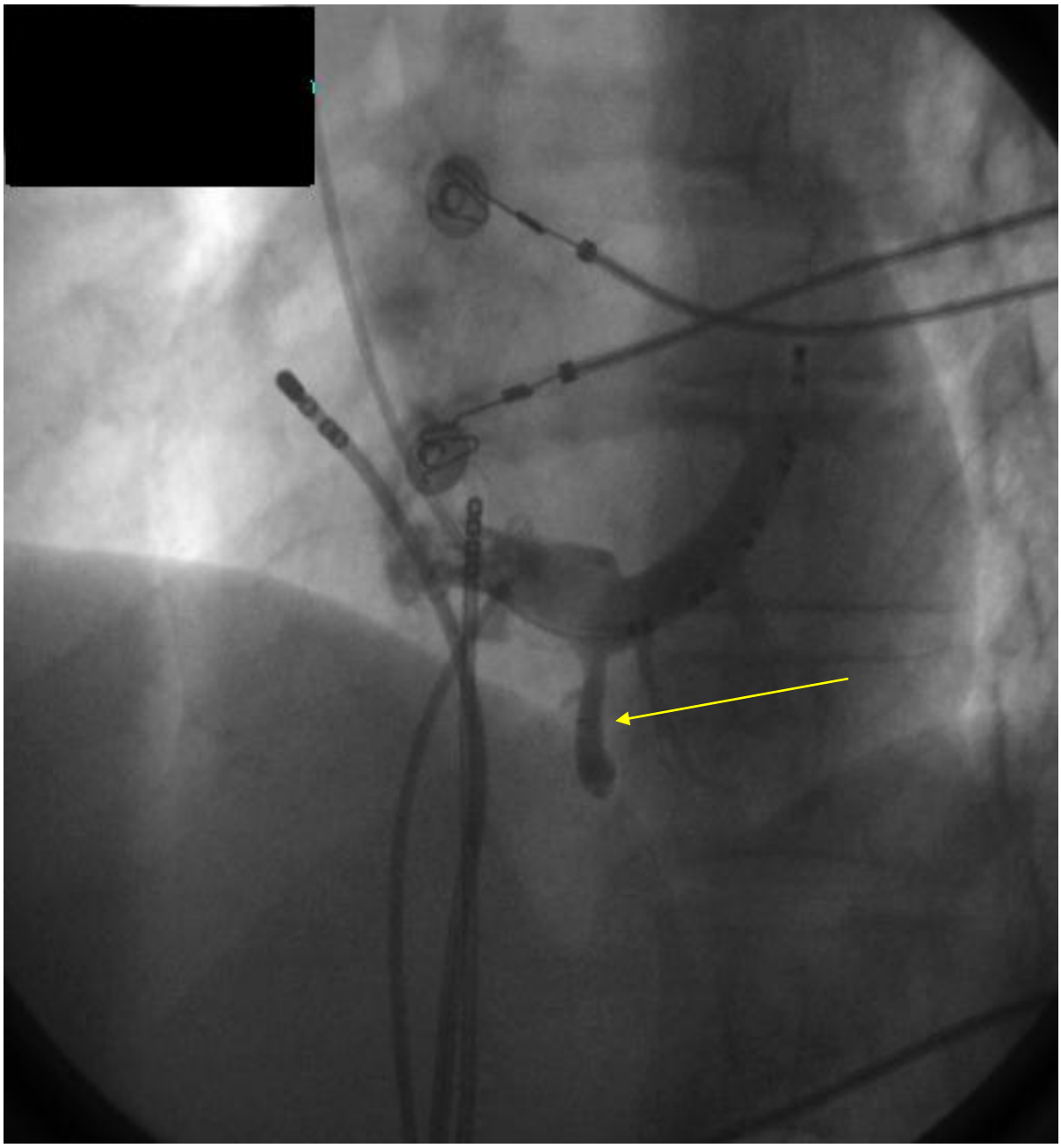
(26) : AF was induced during programmed atrial stimulation in patient no 14 with manifest posteroseptal AP .This was a male patient ,29 years old with recurrent palpitation .He had a successful uncomplicated ablation procedure.Note that it is not preexcited AF .(paper speed 100 mm/sec)



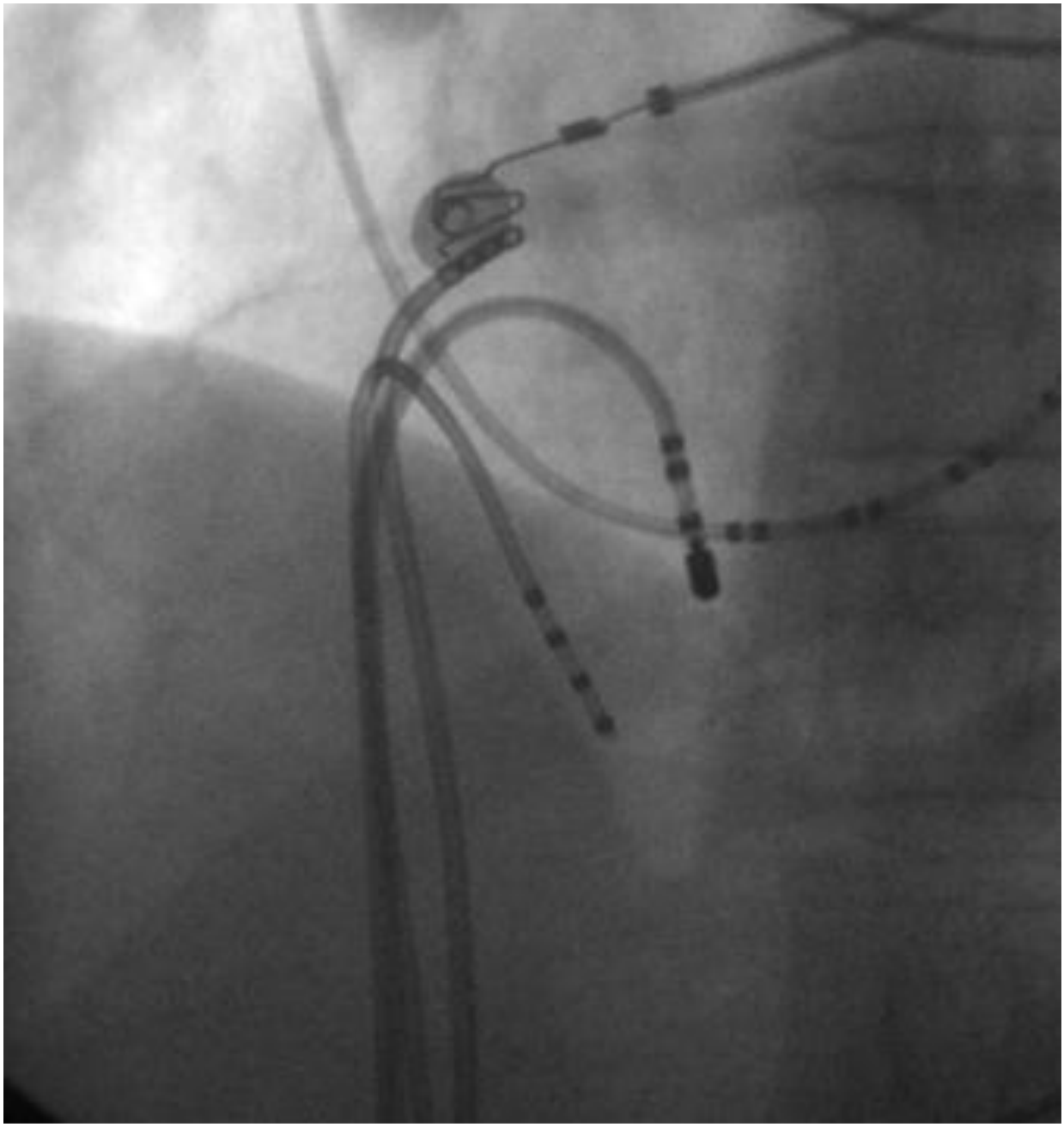
(27) : Recording at Successful ablation site (right posteroseptal area) in the same previous (no 14) with posteroseptal AP .Note the QS pattern in the unipolar recording (arrow) which correlate with the ventricular insertion of the AP .(paper speed 100 mm/sec).



(28): RF ablation site in the same previous case (no 14).The tip of the ablation catheter is at the right posteroseptal area very close to the CS ostium.

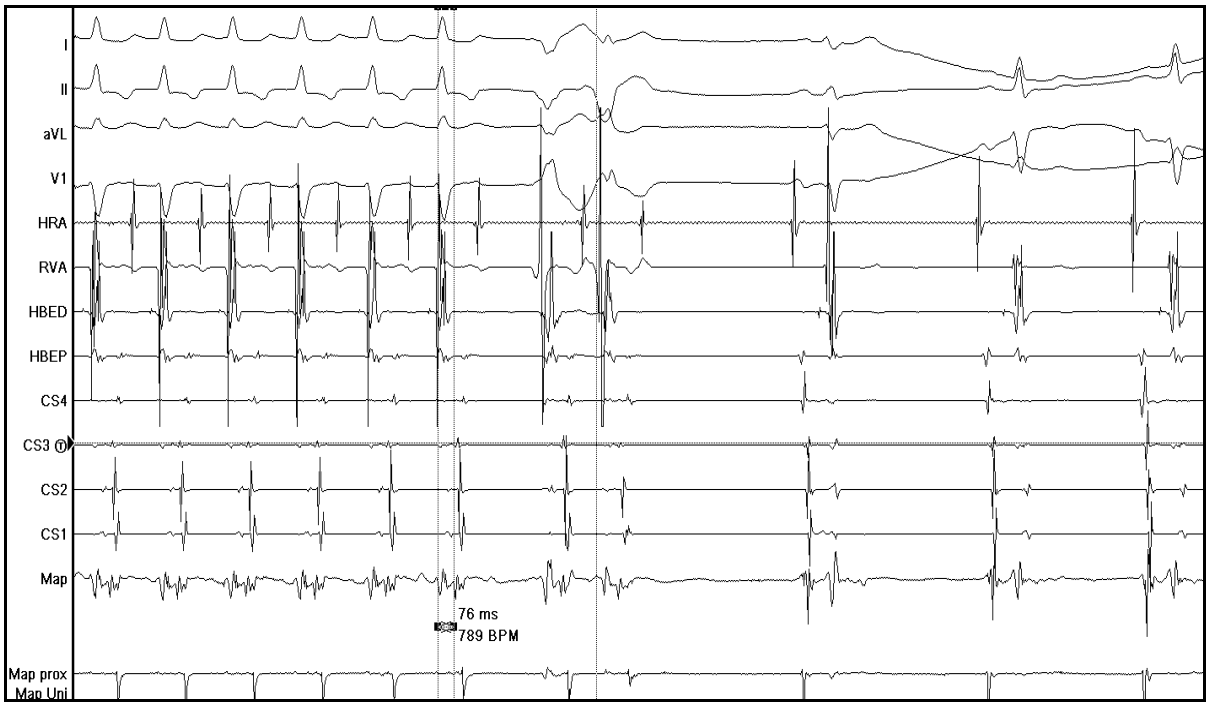


(29): CS angiogram showing proximal CS diverticulum (arrow.. successful ablation site) in th patient no 18 with epicardial PSAP.

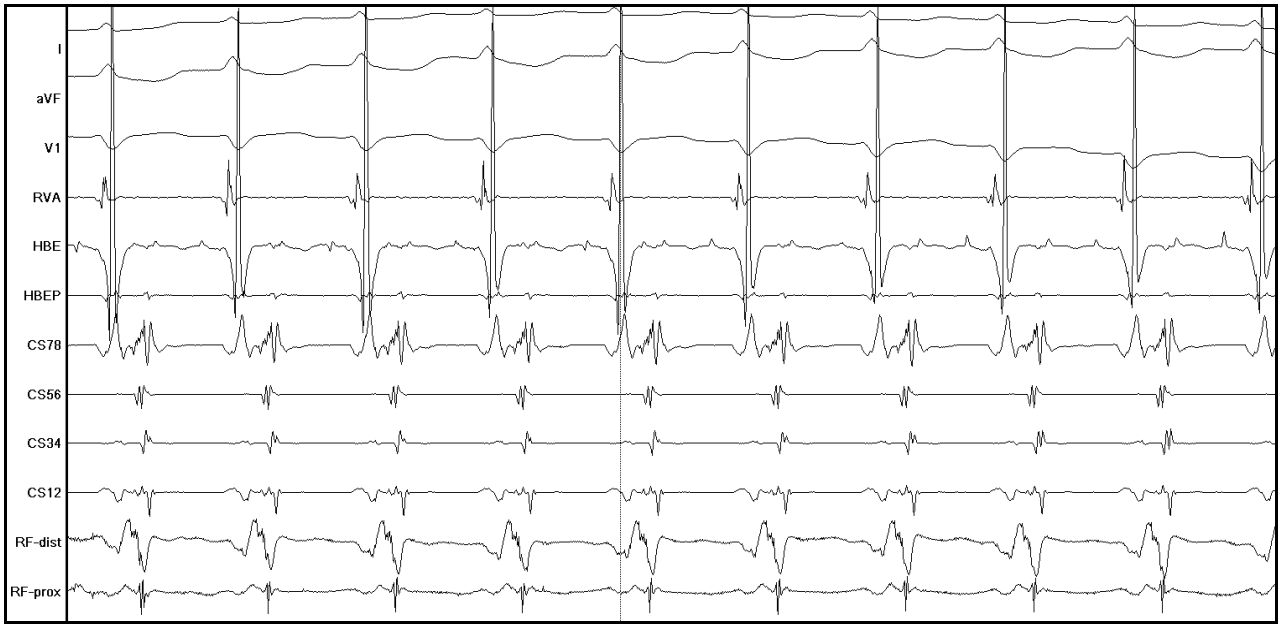


(30): Successful ablation site of an epicardial posteroseptal AP (same patient no 18). The tip of the ablation catheter (arrow) is in a CS diverticulum.

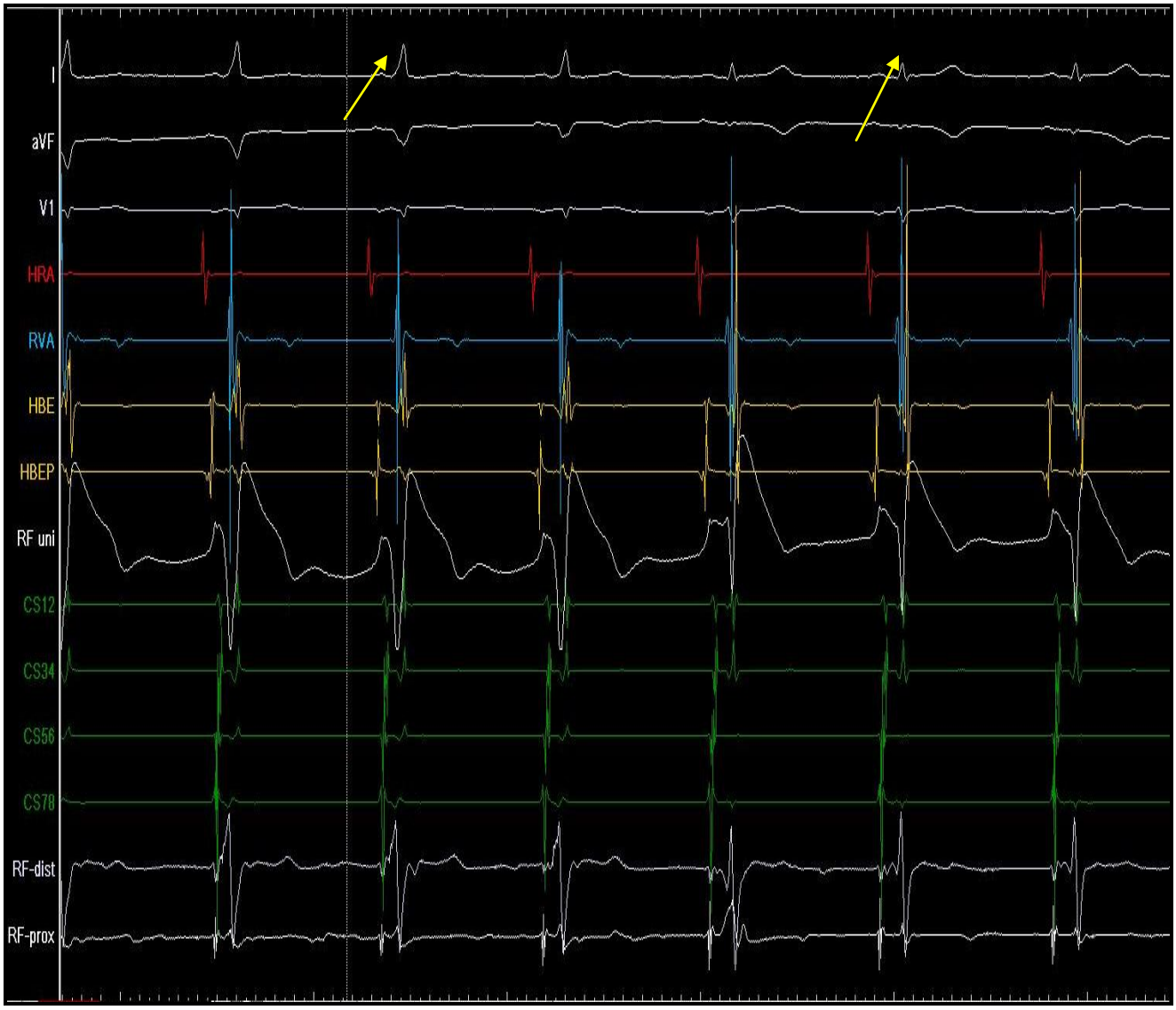
(31) :Recording at successful ablation site in patient no 15 with posteroseptal AP. Note the QS pattern on the unipolar recording



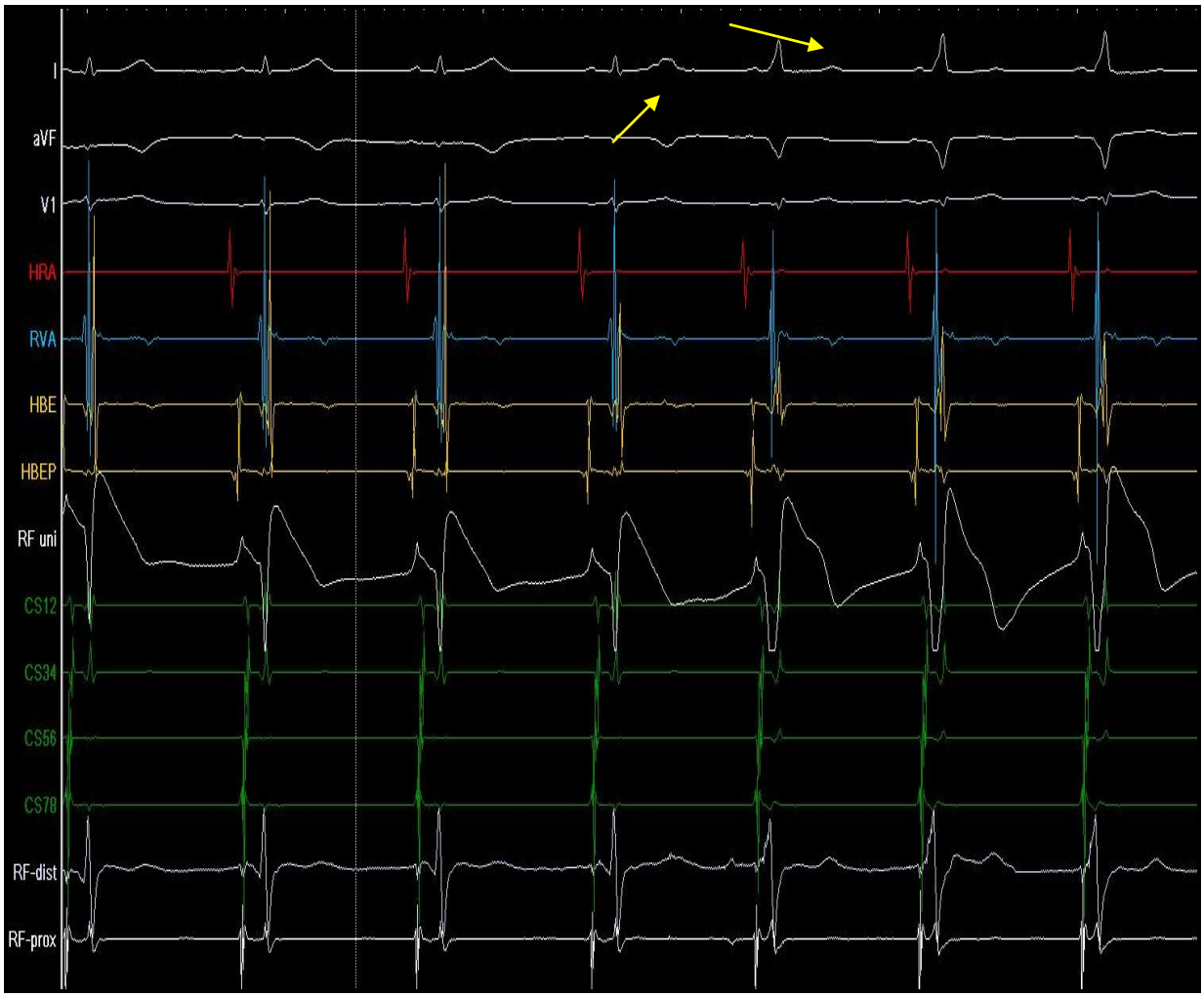
(32): Local VA time at successful ablation site in a patient no 1.



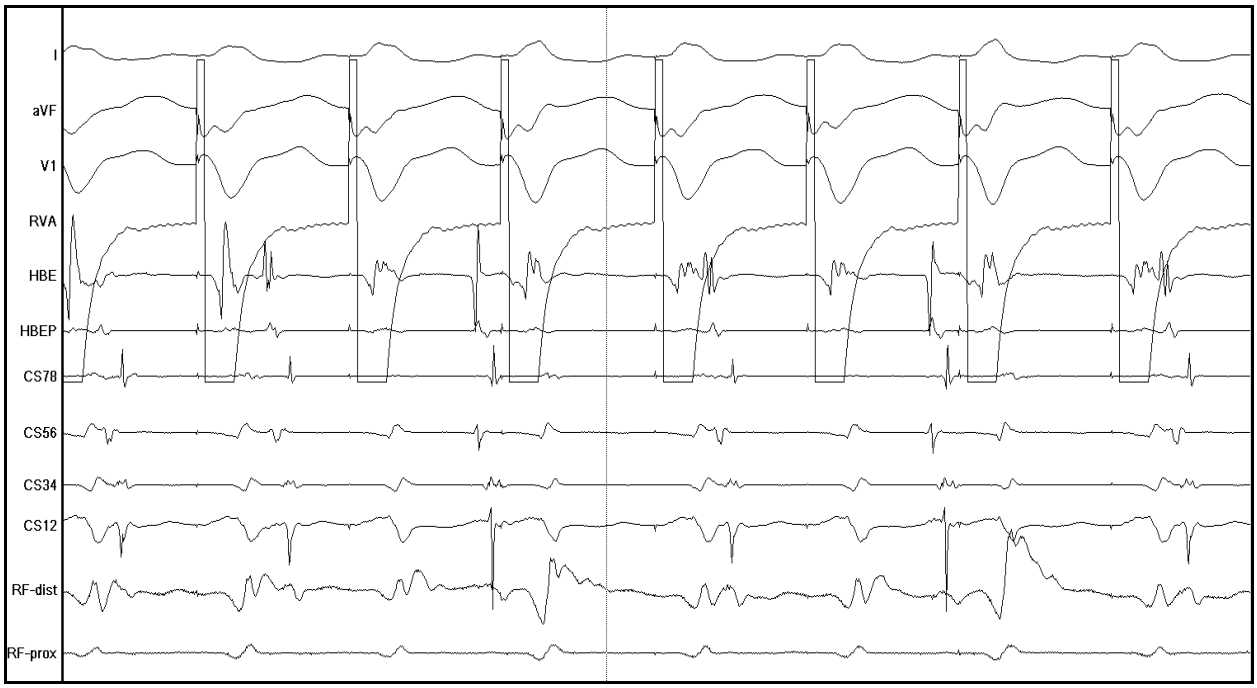
(33): Intracardiac recordings in patient no 2 with left posteroseptal AP immediately before ablation. Note the almost continuous electrical activity on the ablation catheter.



(34): Disappearance of preexcitation during RF ablation in PSAP (arrows). Case no (15)



(35) : Recurrence of preexcitation(arrows) after initial success during ablation (same previous case no 15).



(36):VA dissociation after successful ablation of left PSAP (same prior case no 2).