

Asymptomatic WPW Syndrome; Observation or Ablation?

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박형욱

Let It Be?

Vs.

Just Do It?

Natural history of asymptomatic WPW

Authors	Number of Patients	EP Study	Induced Arrhythmias			SCD	Follow-up (yrs)
			AVRT	AF	SPRR		
Electrophysiology-Based Studies							
Klein (4)	29	yes	17%	31%	0	4.5*	
Satoh (5)	34	yes	18%	3%	0	1.3	
Beckman (6)	15	yes	20%	13%	0	7.5	
Leitch (7)	75	yes	16%	31%	0	4.3*	
Fukatani (8)	64	yes	n/a	n/a	0	6.6	
Brembilla-Perrot (9)	40	yes	7.5%	12.5%	0	1.8	
Population-Based Studies							
Berkman (10)	128	no	13.3% → symptoms		0	18	
Soria (11)	78	no	n/a		2	5.7	
Munger (12)	53	no	21% → symptoms		0	10.1	
Goudevenos (13)	77	no	4% → symptoms		0	4.6	
Fitzsimmons (14)	187	no	15% → symptoms		0	21.8	

Incidence of sudden cardiac death in natural history studies involving children and young adults

Author	Patients	Years studied	Age	Follow-up (y)	Died	SCD per patient-year	Comments
Berkman (1968) ¹⁵⁵	128	1933–1968	21	20	3	0.0039	
Leitch (1990) ⁸⁰	75	1980–1988	34 ± 13	4.3	0	0.0000	
Klein (1989) ²⁸	27	1981–1989	45	4.5	0	0.0000	
Munger (1993) ¹⁷	113*	1953–1989	33 ± 16	12	2	0.0015	Both SCD patients were symptomatic
Inoue (2000) ¹⁵⁶	57	1985–1993	10.2	8	0	0.0000	
Goudevenos (2000) ¹⁶	157	1990–1997	20	4.6	0	0.0000	
Fitzsimmons (2001) ⁴⁹	238*	1955–1999	34.3	21.8	1	0.0002	SCD patient had SVT and atrial fibrillation
Sarubbi (2003) ³⁰	98	1985–2001	5.4	4	1	0.0019	
Pappone (2003) ³⁸	212	1993–1996	36 ± 21	3.2	1	0.0150	2 patients had VF and were resuscitated
Santinelli (2009) ²⁹	184	1995–2005	10	4.6	0	0.0000	3 patients had VF and were resuscitated

PACES/HRS Expert Consensus Statement on the Management of the Asymptomatic Young Patient with a Wolff-Parkinson-White (WPW, Ventricular Preexcitation) Electrocardiographic Pattern

Developed in partnership between the Pediatric and Congenital Electrophysiology Society (PACES) and the Heart Rhythm Society (HRS). Endorsed by the governing bodies of PACES, HRS, the American College of Cardiology Foundation (ACCF), the American Heart Association (AHA), the American Academy of Pediatrics (AAP), and the Canadian Heart Rhythm Society (CHRS)

KEYWORDS Ablation; HRS/PACES Consensus Statement; Preexcitation; Wolff-Parkinson-White syndrome (Heart Rhythm 2012;9:1006–1024)

Recommendations for young asymptomatic patients (8–21 years) with WPW ECG pattern

- An exercise stress test, ambulatory ECG
- 1) **Persistent preexcitation** (Class IIA, Levels of Evidence B/C). In patients with **clear and abrupt loss of preexcitation at physiological heart rates**, the accessory pathway properties pose a **lower risk of sudden death**. In children with subtle preexcitation the ECG and exercise test may be difficult to interpret

Recommendations for young asymptomatic patients (8–21 years) with WPW ECG pattern

- **Ttransesophageal or intracardiac stimulation**

1) **To assess the shortest preexcited R-R interval in atrial fibrillation is reasonable** in individuals whose noninvasive testing does not demonstrate clear and abrupt loss of preexcitation (Class IIA, Levels of Evidence B/C).

Findings Identifying the Low-Risk Patient

Noninvasively

- Block in the AP during exercise
- Finding of intermittent pre-excitation
- Block in the AP after drug administration (ajmaline, procainamide)

Invasively

- An anterograde RP of the AP $>$ 270 ms during intracardiac or esophageal stimulation

Recommendations for young asymptomatic patients (8–21 years) with WPW ECG pattern

- **Young patients with a SPERRI \leq 250 ms in atrial fibrillation are at increased risk for SCD.**

1) It is reasonable to consider catheter ablation in this group, taking into account the procedural risk factors based on the anatomical location of the pathway (Class IIA, Levels of Evidence B/C).

Risk factors for cardiac arrest in patients with Wolff–Parkinson–White syndrome

- Probable (consensus of several authors)
 - Shortest pre-excited RR interval (SPERRI) <250 ms during atrial fibrillation (note that SPERRI cutoffs ranging from 220-270 ms have been proposed)
- Possible (not uniformly identified in risk stratification studies)
 - Presence of symptoms
 - Inducibility of supraventricular tachycardia (SVT)
 - Multiple pathways/septal pathways

Recommendations for young asymptomatic patients (8–21 years) with WPW ECG pattern

- **Young patients with a SPERRI > 250 ms in atrial fibrillation are at lower risk for SCD**

1) **it is reasonable to defer ablation** (Class IIA, Level of Evidence C). **Ablation may be considered** in these patients at the time of diagnostic study if the location of the pathway and/or patient characteristics **do not suggest that ablation may incur an increased risk of adverse events, such as AV block or coronary artery injury** (Class IIB, Level of Evidence C).

Recommendations for young asymptomatic patients (8–21 years) with WPW ECG pattern

- Young patients deemed to be at low risk might subsequently develop cardiovascular symptoms such as syncope or palpitations.

1) These patients should then be considered symptomatic and may be eligible for **catheter ablation procedures** regardless of the prior assessment

Recommendations for young asymptomatic patients (8–21 years) with WPW ECG pattern

- **Asymptomatic** patients with a WPW ECG pattern and **structural heart disease** are at risk for both atrial tachycardia and AV reciprocating tachycardia, which may result in unfavorable hemodynamics.

1) **Ablation may be considered regardless of the anterograde characteristics of the accessory pathway** (Class IIB, Level of Evidence C).

Recommendations for young asymptomatic patients (8–21 years) with WPW ECG pattern

- Asymptomatic patients with a WPW ECG pattern and **ventricular dysfunction secondary to dyssynchronous contractions**

1) It may **be considered for ablation, regardless of anterograde characteristics of the bypass tract** (Class IIB, Level of Evidence C).

Recommendations for young asymptomatic patients (8–21 years) with WPW ECG pattern

- Asymptomatic patients with a WPW ECG pattern may be prescribed **ADHD medications**. This recommendation follows the American Heart Association Guidelines, which state that ADHD medications may be used in this setting after cardiac evaluation and with intermittent monitoring and supervision of a pediatric cardiologist.

Factors Associated With Sudden Cardiac Death in WPW

■ Accepted

Male

Short anterograde RP of the AP

Shortest RR during AF < 200 ms

High adrenergic state

■ Controversial

Multiple accessory pathways

Septal location of the AP

Age

Presence of CMT

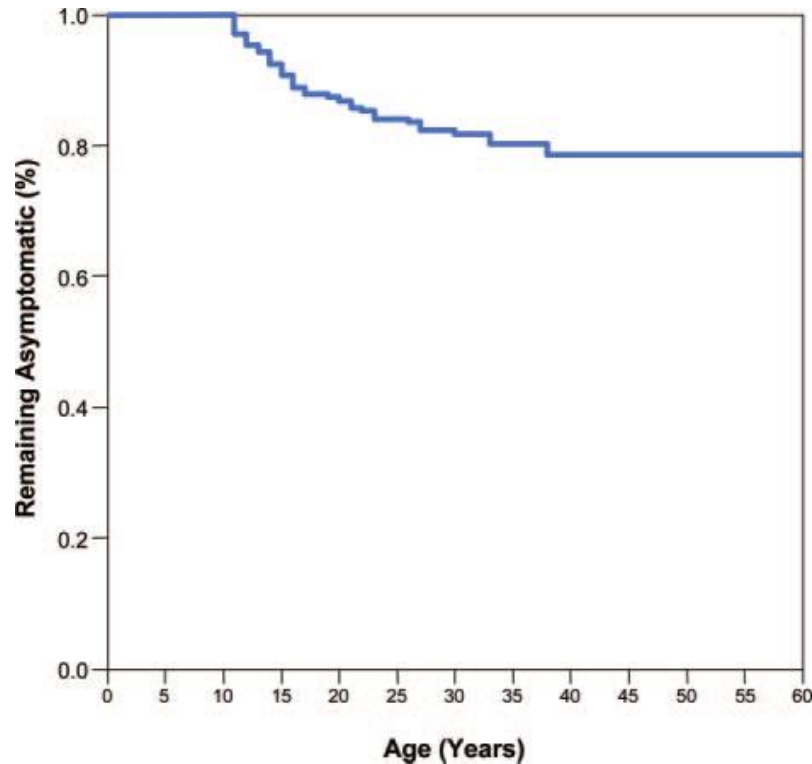
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Let It Be?

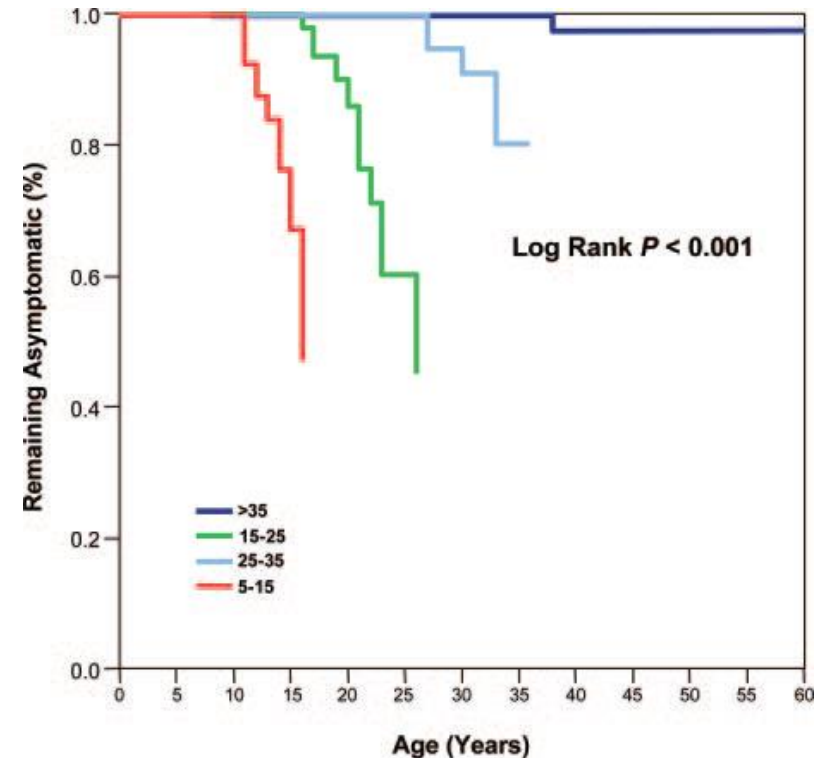
No!

Let us see!

Catheter ablation should be performed in asymptomatic patients with WPW syndrome

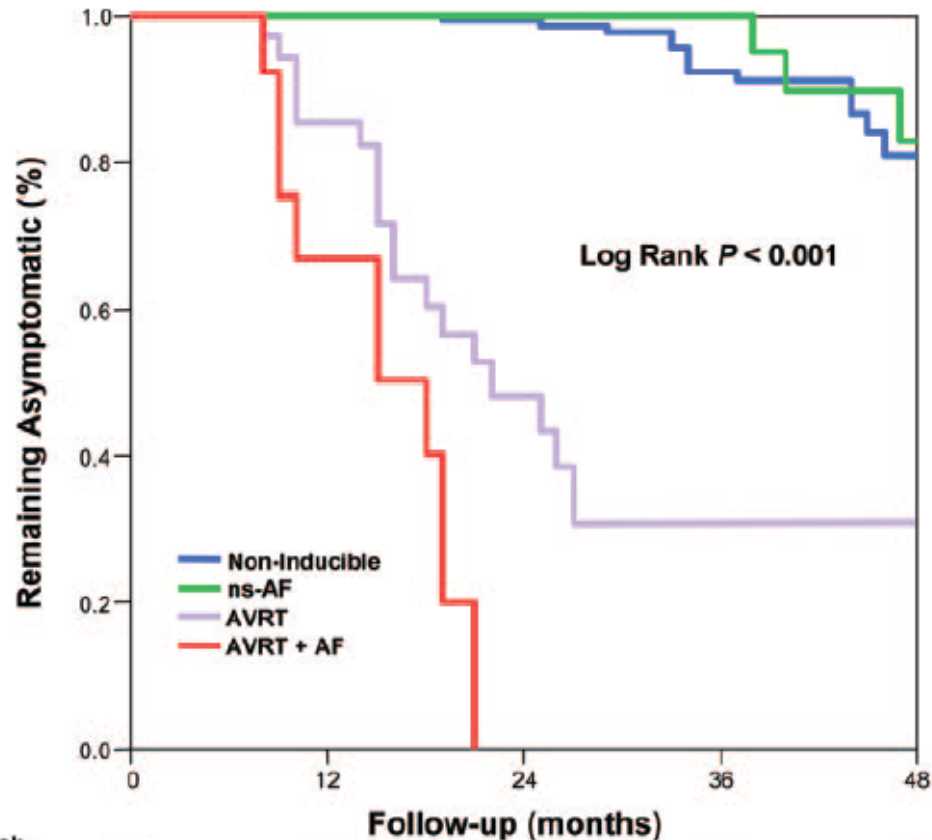


Arrhythmic event-free survival plots for the 315 untreated asymptomatic WPW patients



Arrhythmic event-free survival plots for untreated asymptomatic WPW patients according to age class (5 to 15, 16 to 25, 26 to 35, 35 years) at diagnosis.

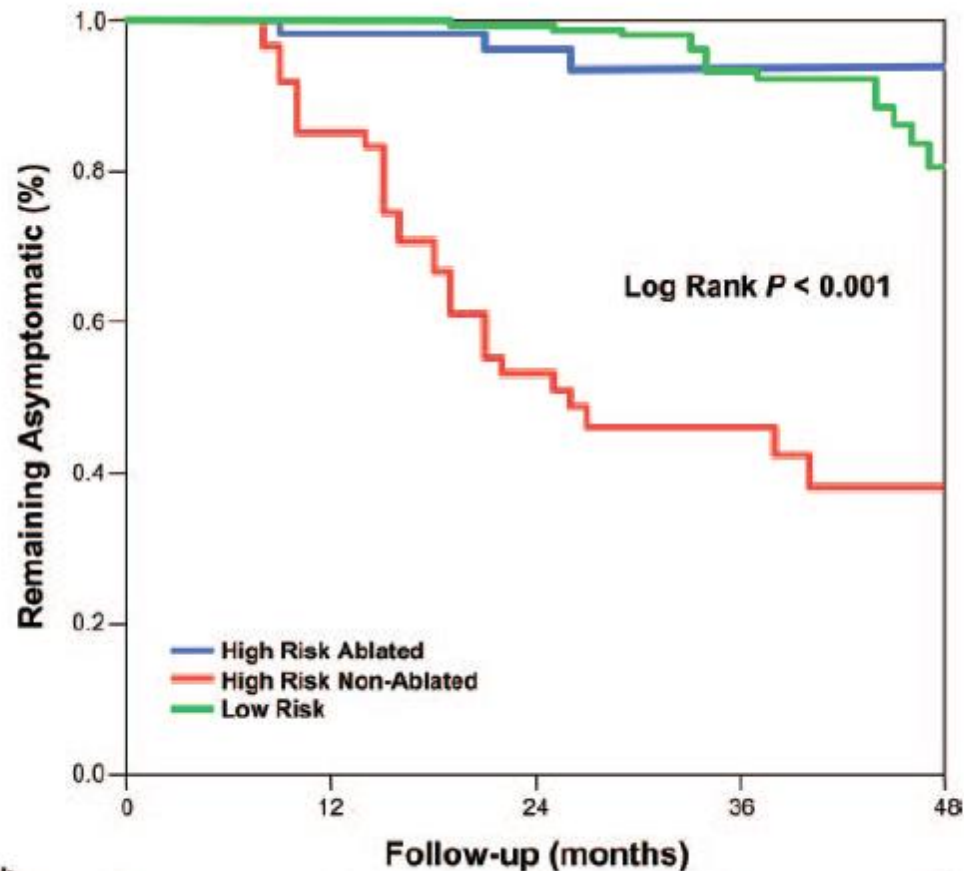
Arrhythmic event free survival plots for untreated asymptomatic WPW patients according to type of induced arrhythmia at EP test



Number at risk	0	12	24	36	48
Non-Inducible	223	200	136	73	16
Ns-AF	42	40	31	20	10
AVRT	34	27	10	2	2
AVRT+AF	12	8	0	0	0

Pappone C, et al. JACC 2003;41:239-244
Pappone C, et al. NEJM 2003; 349:1803-1811
Pappone C, et al. NEJM 2004; 351:1197-1205

Arrhythmic event free survival plots according to whether the high-risks asymptomatic WPW patients received treatment with prophylactic AP ablation



Number at risk	
High Risk ablated	61
High Risk Non-Ablated	56
Low Risk	252


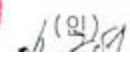
Follow-up (months)	12	24	36	48
High Risk ablated	49	24	12	8
High Risk Non-Ablated	55	39	17	2
Low Risk	225	153	84	20

Pappone C, et al. JACC 2003;41:239-244
Pappone C, et al. NEJM 2003; 349:1803-1811
Pappone C, et al. NEJM 2004; 351:1197-1205

42, M

- 최근 잠을 잘 못자고 스트레스 있었음
외래 내원 대기중 답답함이 계속되어 응급실로 이동
Atrial fibrillation with WPW
심전도에서 심실빈맥과 심실세동

42, M

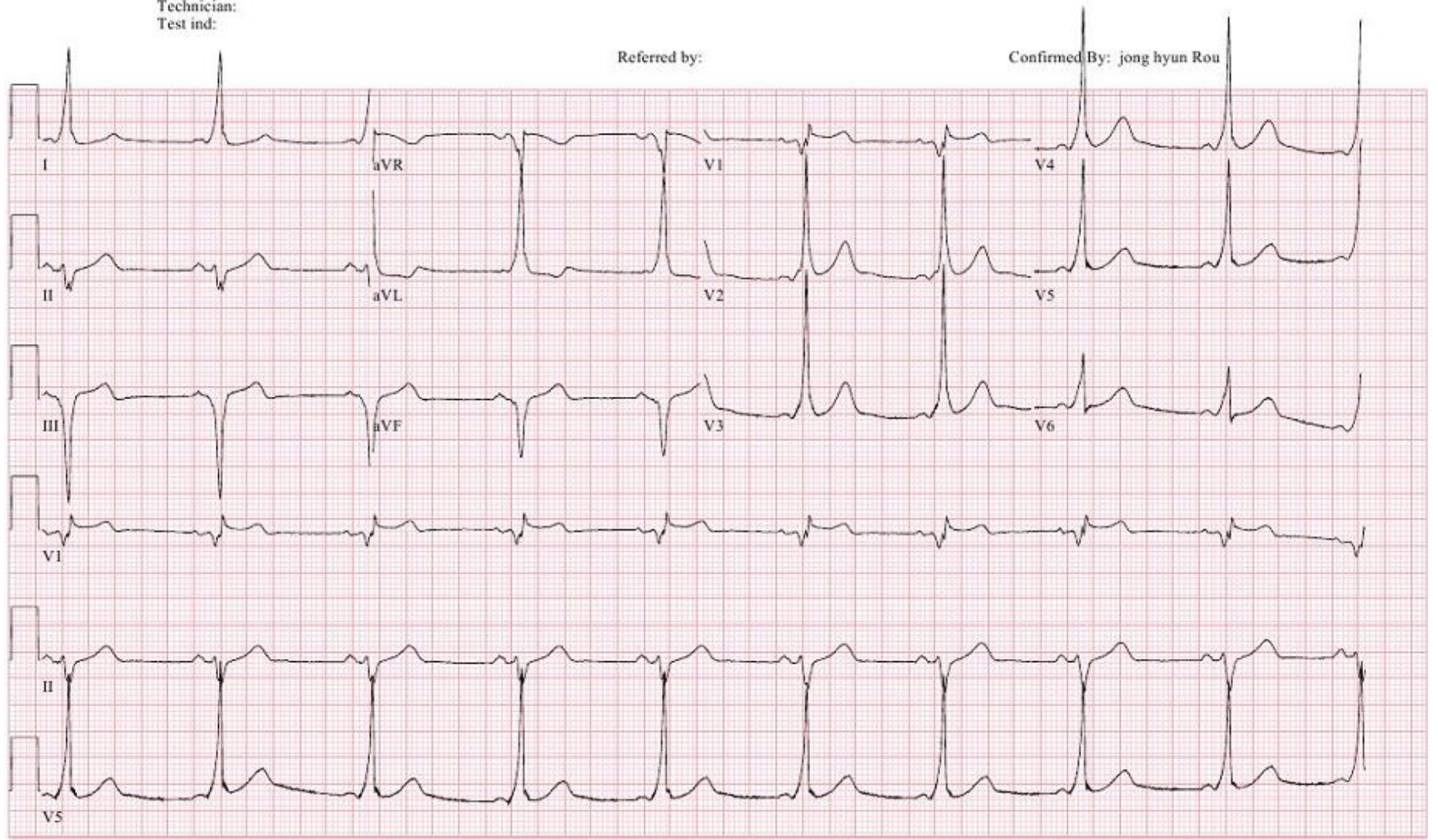
상 병 명	1472 심실성 빈맥 14900 심실세동		
진 료 기 간	2013.01.25 -	진료 구분	<input type="checkbox"/> 1.입원 <input checked="" type="checkbox"/> 2.외래
환자상태 및 진 료 의 건	<p>흉부압박감 주소로 금일 외래 내원하였고 ER 이동하여 처치 및 검사중 Arrest 발생하였으며 Monitoring상 V. tac -> V. fibrillation 보여 D.C Cardioversion 및 CPR시행하였습니다.</p> <p>이후 NSR Conversion 되었고 환자 irritable하여 sedation시킨 상황입니다. 현재 Codarone 300mg IV over 2hrs 및 IHD 영두해두고 heparin loading 및 20000 IU 유지중으로 F/Ex 및 proper management위해 전원드립니다.</p> <p>감사합니다.</p>		
환자동의	* 병원은 환자의 의료정보와 인권을 보호하기 위해 환자 및 보호자의 동의가 있을 경우에만 진료결과를 제공해 드립니다.		
	주민등록번호	721024-1550715	수진자 김종철 (서명) 관계
주 소	광주 북구 용두동 276-4번지	전 화 번 호	062) 608-6000
요양기관번호	36100650	기 관 명 칭	광주희망병원
면 허 번 호	제 64569 호	담 당 의 사	양금별 (인)  

42, M

Technician:
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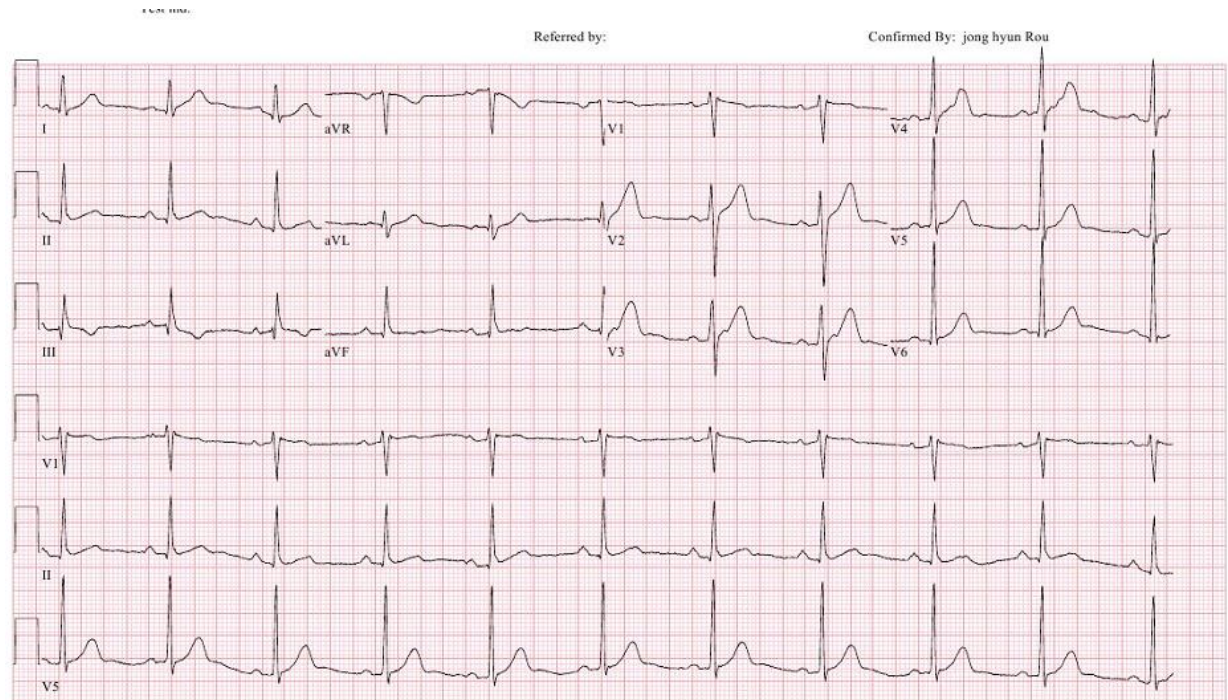
Referred by:

Confirmed By: jong hyun Rou



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- CAG: Mild stenosis in p-RCA (30%)
- EPS: Ventricular extrastimuli induced regular narrow QRS tachycardia, and atrial extrastimuli induced AF (AP anterograde ERP > 250 ms).
- RFCA: Ablation of AP at left posterior septum.

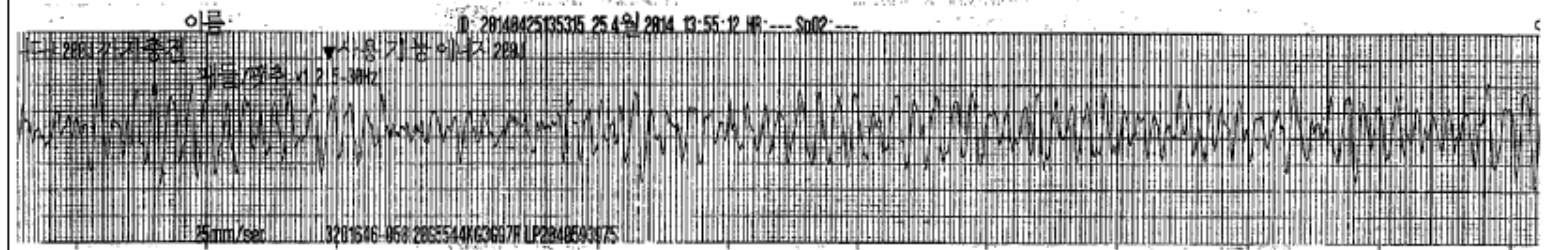
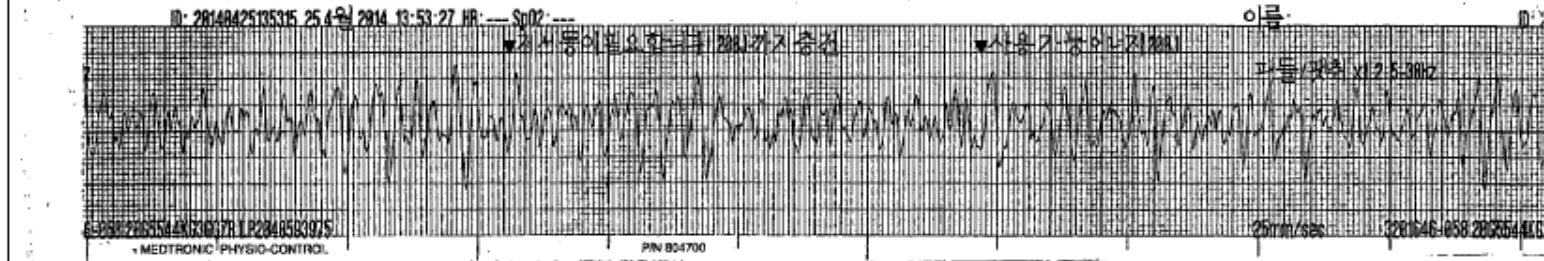


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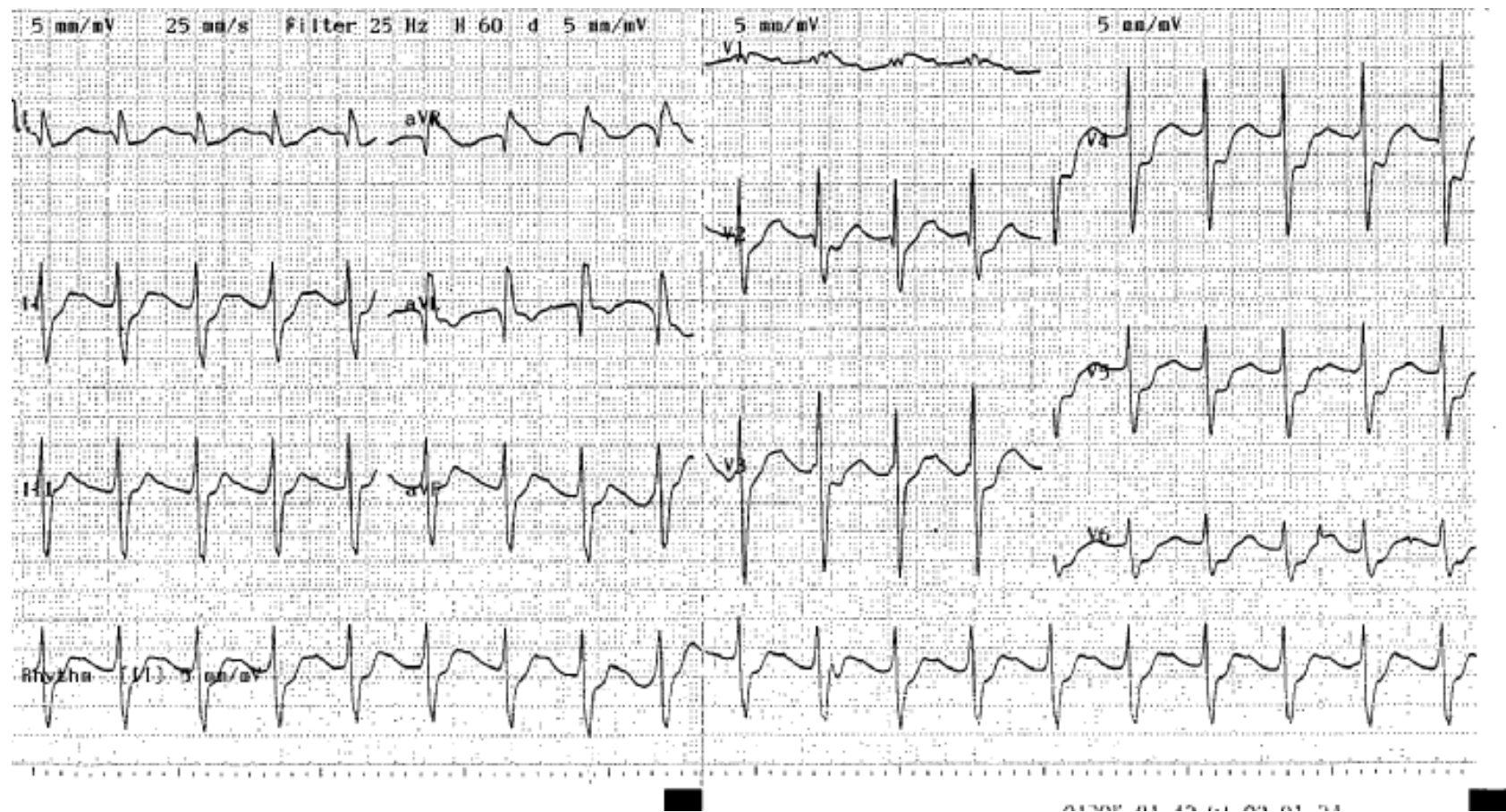
상 병 명	R/O Sudden cardiac death R/O VT		
진 료 기 간	부 터	까 지	진료구분 <input type="radio"/> 외래 <input type="radio"/> 입원
환 자 상 태 및 진 료 의 견	<p>버스타고 가던 중 경련, 의식소실, 청색증 발생하여 119 통해 내원 119 접수 13시 45분 119에서 VF 발생하여 DC 후 내원 13시 59분 본원 내원후 CPR 중 VT 발생, DC 150J, 아미오다론 300mg 부하 후 호전됨</p> <p>상기 문제에 대한 진료위하여 의뢰드립니다. 감사합니다.</p>		
<p>발 행 일: 2014년04월25일</p> <p>병 원 주 소: 광주광역시 남구 서문대로 654번길 5</p> <p>전 화 및 F A X: ☎ 062)460-7000 FAX 062)460-7777</p>			



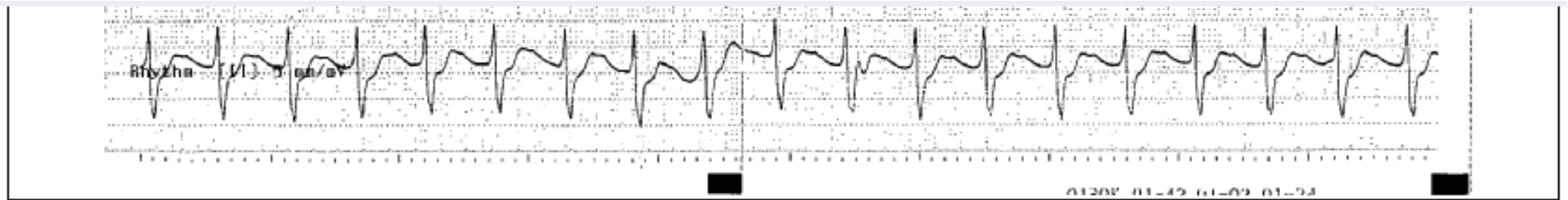
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14-4104

76세인 (F/3)

2014. 4. 25

2014/04/25 14:34:05 ID:04821 Event Mon
HR * 142



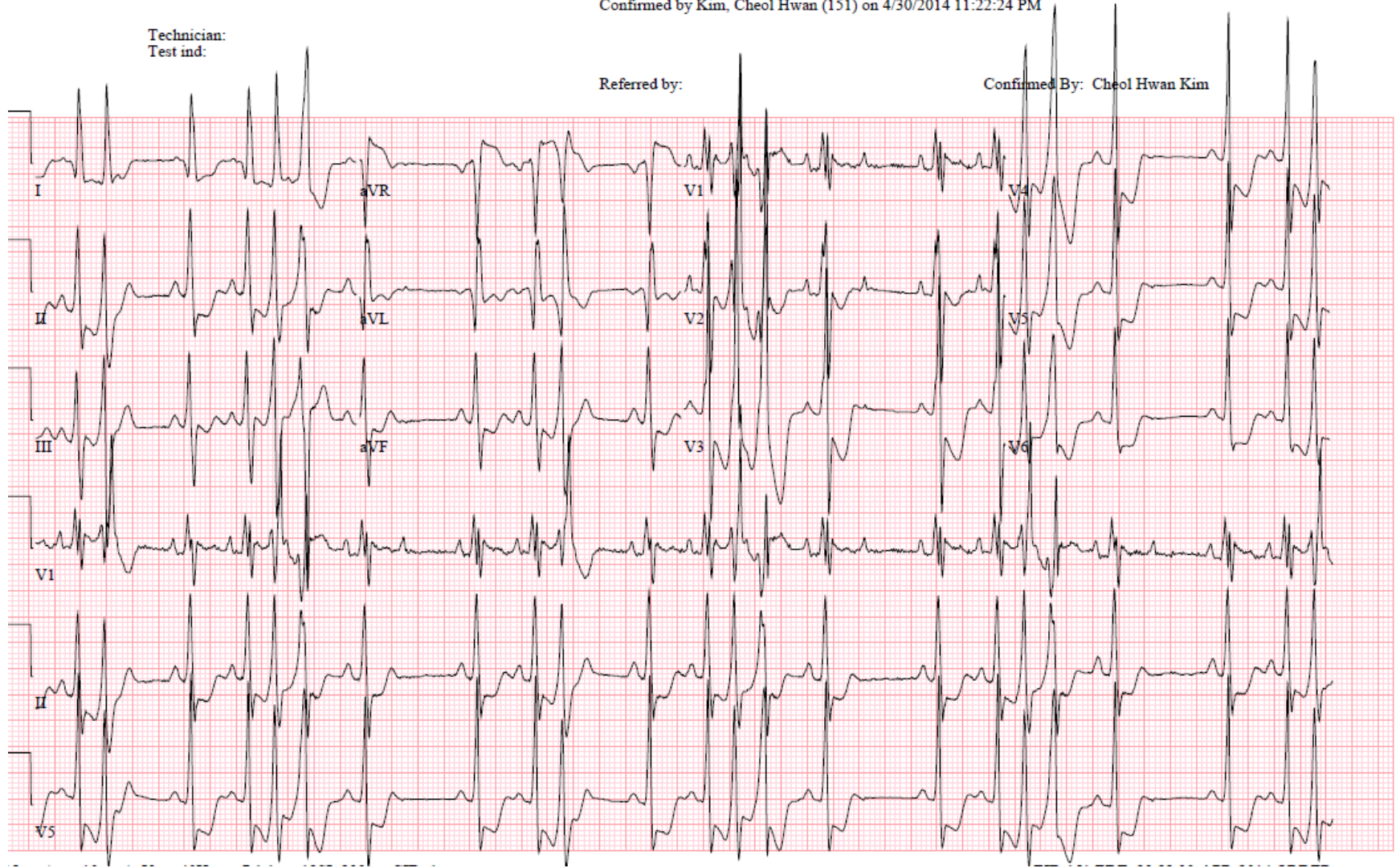
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Confirmed by Kim, Cheol Hwan (151) on 4/30/2014 11:22:24 PM

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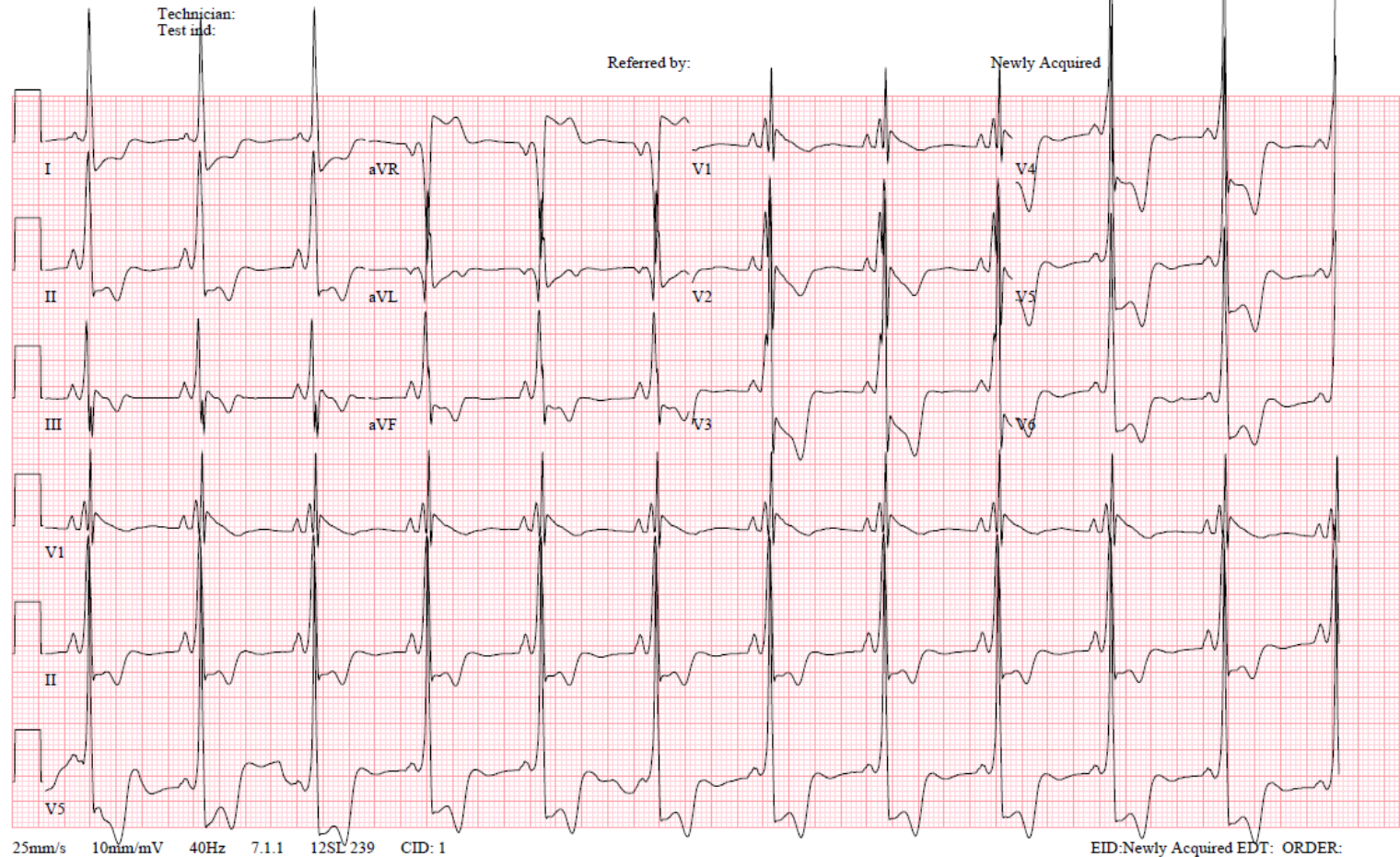
Confirmed By: Cheol Hwan Kim



14, F

Room: 01b
Loc:12

Vent. rate	69	BPM	Normal sinus rhythm
PR interval	106	ms	Wolff-Parkinson-White
QRS duration	120	ms	Abnormal ECG
QT/QTc	416/445	ms	
P-R-T axes	75 41 223		



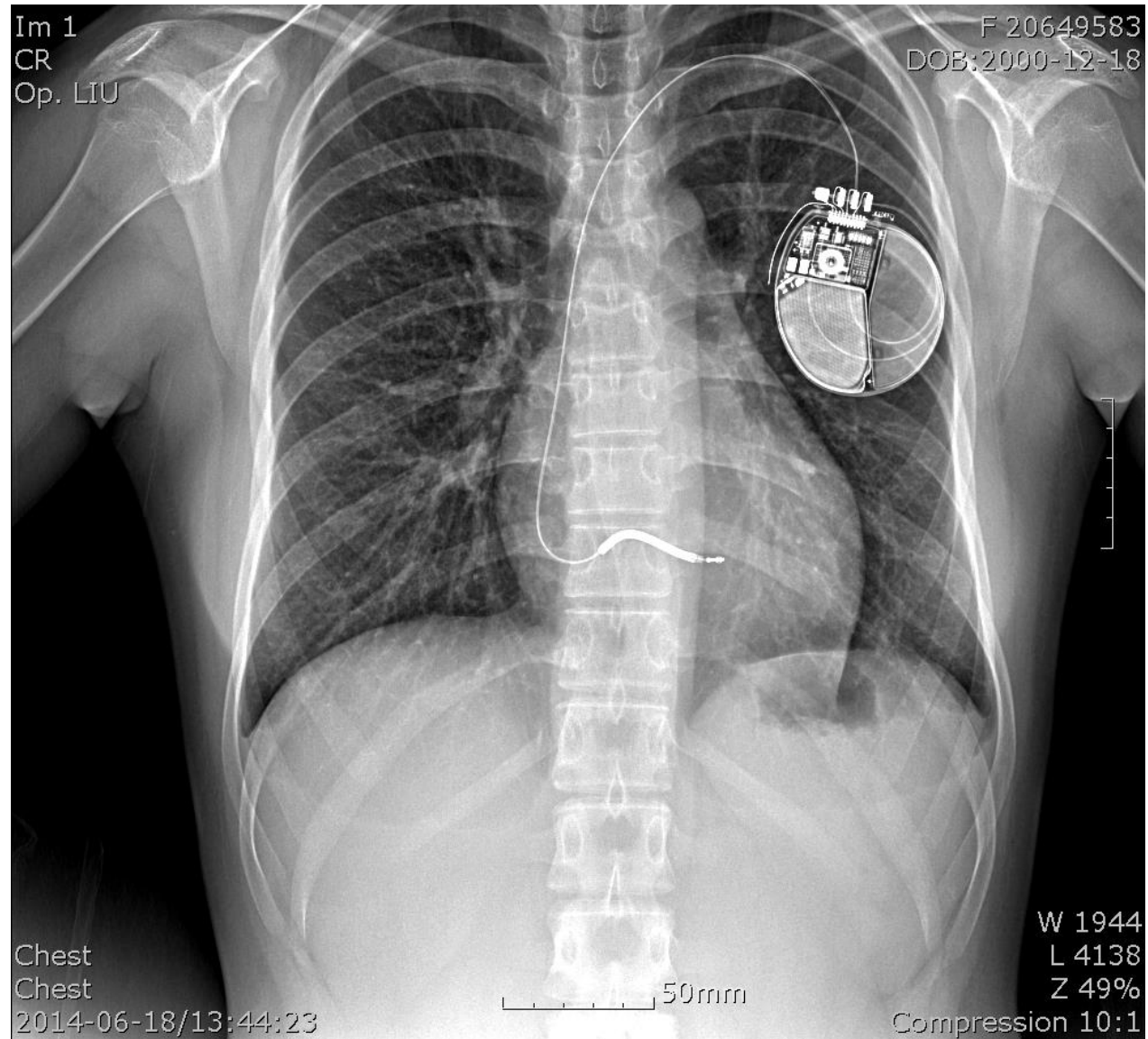
25mm/s 10mm/mV 40Hz 7.1.1 12SL 239 CID: 1

EID: Newly Acquired EDT: ORDER:

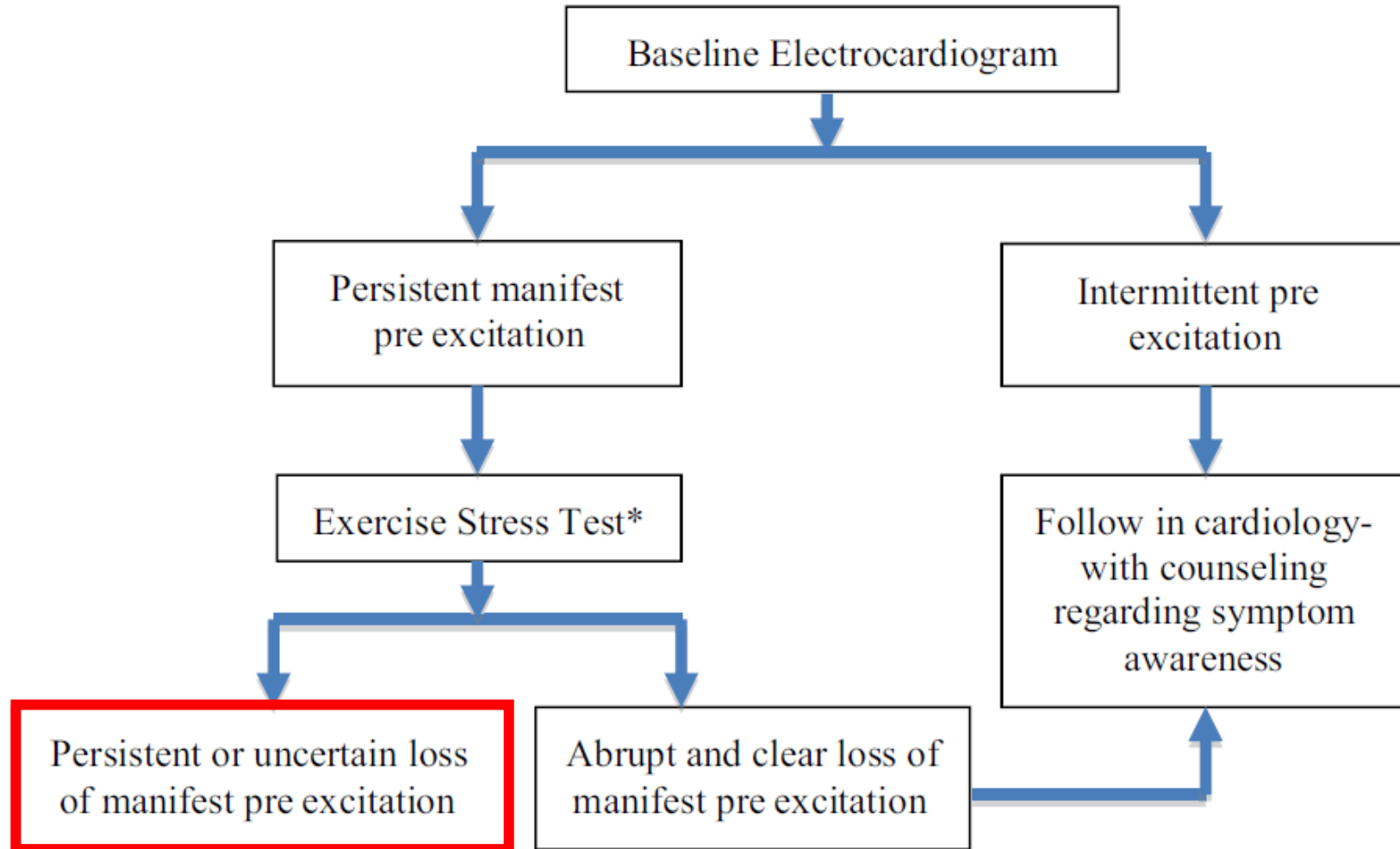
14, F

- EPS: Baseline rhythm was ventricular preexcitation.
Concentric retrograde conduction with decremental property.
Ventricular extrastimuli did not induce any tachyarrhythmia.
Anterograde conduction over accessory pathway was not shorter than 250 ms
(450 ms at baseline, 390 ms during isoproterenol infusion).

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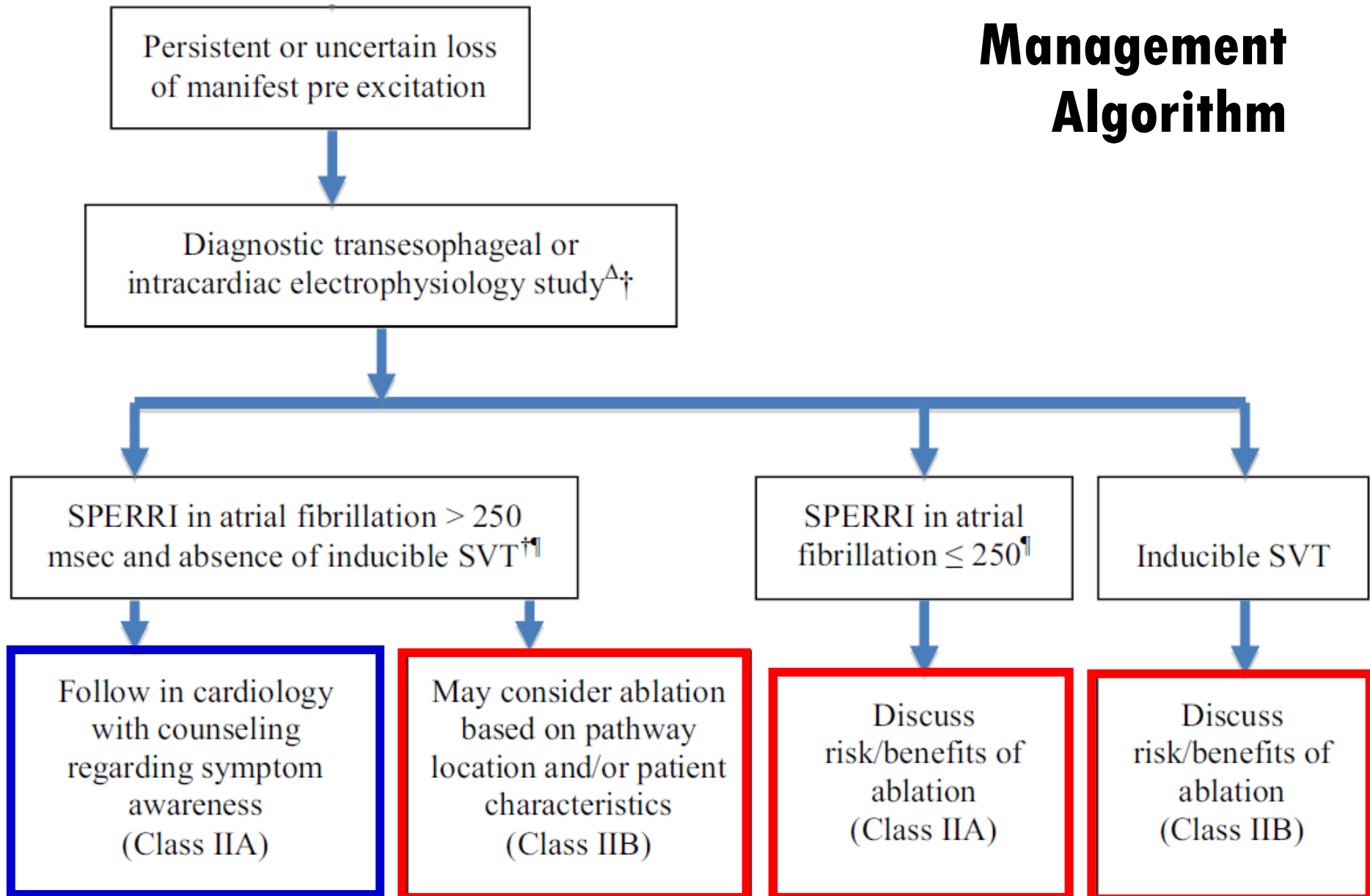


Management Algorithm



KEYWORDS Ablation; HRS/PACES Consensus Statement; Preexcitation; Wolff-Parkinson-White syndrome (Heart Rhythm 2012;9:1006–1024)

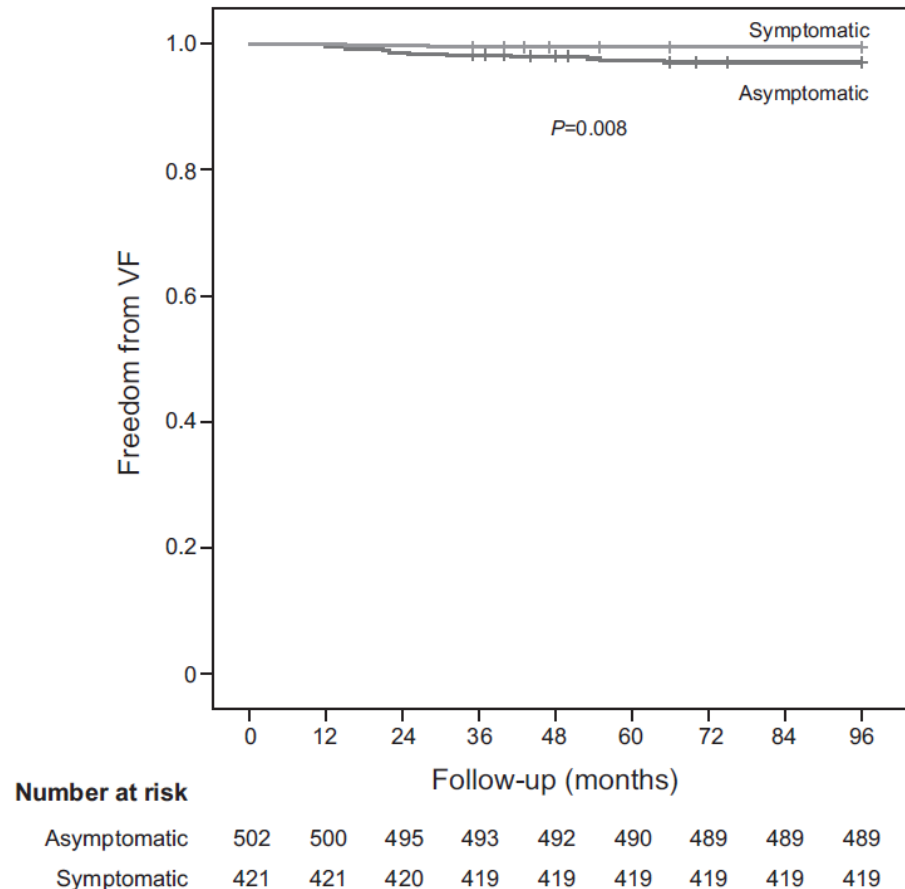
Management Algorithm



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Revisit !!!

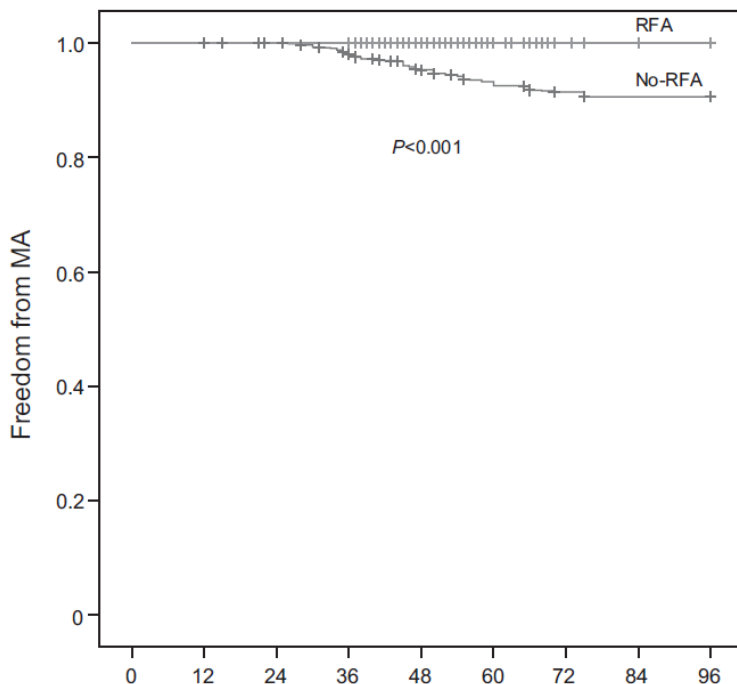
Wolff-Parkinson-White Syndrome in the Era of Catheter Ablation: Insights From a Registry Study of 2169 Patients



Survival analysis stratified by symptoms after the exclusion of malignant arrhythmias shows that more ventricular fibrillation (VF) episodes were observed in asymptomatic patients

Revisit !!!

Wolff-Parkinson-White Syndrome in the Era of Catheter Ablation: Insights From a Registry Study of 2169 Patients

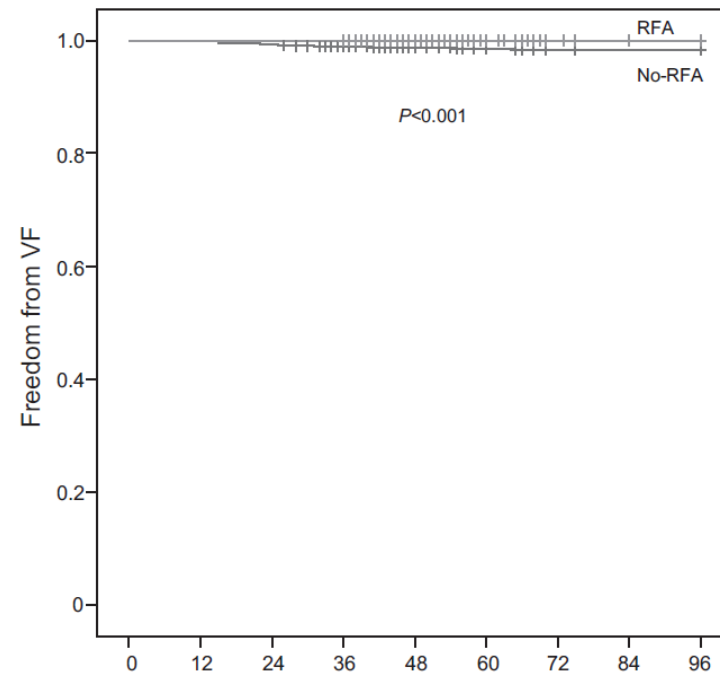


Number at risk

Follow-up (months)

	0	12	24	36	48	60	72	84	96
RFA	1168	1168	1168	1168	1168	1168	1168	1168	1168
No-RFA	1001	1001	1001	981	958	937	929	923	923

Kaplan–Meier survival plot for malignant arrhythmias (MAs) in untreated patients (no radiofrequency catheter ablation [RFA]) and patients treated with RFA. Patients treated with RFA were less likely to experience MAs than those who did not undergo RFA.



Number at risk

Follow-up (months)

	0	12	24	36	48	60	72	84	96
RFA	1168	1168	1168	1168	1168	1168	1168	1168	1168
No-RFA	1001	999	993	990	989	987	986	986	986

Survival analysis up to 96 months of follow-up shows that untreated patients (no radiofrequency catheter ablation [RFA]) were more likely to experience ventricular fibrillation (VF) than those who underwent RFA.

Concerns

- Careful history taking and regular follow up
- Subtle or inconclusive history; non-invasive study? (not definitive)
- Invasive (transesophageal or intracardiac); helpful but “invasive”
- Ablation of all high risk AP?