

단일 도자 VDD형 영구 심조율기 이식 환자에서 자세 변화와 운동시 P파진폭과 방실 조화에 관한 고찰

강경의 · 조정휘 · 강홍선 · 김권삼 · 송정상 · 배종화

Clinical Investigation of P Wave Amplitude and Atrial Synchronous Ventricular Pacing in Different Body Position and Physical Activity with a Single-Pass Lead VDD Pacing

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ABSTRACT

Background : Single pass lead VDD pacing preserves atrioventricular synchrony with a single lead system which incorporates floating atrial electrodes. The objectives of this study were to measure whether different body postures and physical activities cause significant changes of the atrial electrogram amplitudes and to evaluate the effectiveness of its atrial sensing, ventricular sensing and pacing. **Method :** Prospective study was done in 7 patients with high degree AV block and normal sinus node function in whom a single lead VDD pacing system was implanted. The P wave amplitude was been measured in different condition during follow-up period. **Results :** 1) During follow-up period, the P wave amplitude showed variation with changes in posture and respiration, but there was no consistent increase or decrease in amplitude. The lowest P wave amplitude was above the minimal atrial sensing value of 0.2 mV. 2) The percentage of atrial synchronous ventricular pacing recorded in Holter ECG and during Treadmill exercise test was more than 99%. 3) Atrial oversensing or VA cross sensing were not observed in any of the patients. **Conclusions :** Despite floating atrial electrode, the single pass lead VDD pacing maintains reliable atrial sensing and ventricular pacing in different body position and physical activity, so it may offer an excellent alternative in patients with high grade AV block and intact sinus node function. (Korean Circulation J 1999;29(10):1082-1088)

KEY WORDS : Single pass lead · VDD pacing · P wave amplitude · Atrial synchronous ventricular pacing.

서 론

1-4)

Dual chamber

: 1999 5 17

: 1999 9 1

: , 130 - 701

1

: (02) 958 - 8169 ·

: (02) 958 - 8160

가

가

VVI

VDD

가

가

가
가

가

0.5 ms

, R

60

P

, R

4.8 V, 1 ms,

가

가

6

0.1, 0.2 mV

가

1

가

vvi

1

가 가

가

2

4

3

가 0.1, 0.2 mV

46

가

24 Holter ECG

ECG

Treadmill

가

2

Medtronic

Model 8168

가

Biotronik SL - lead Medtronic, Inc., Model 5032

, X

$$/ \quad + \quad \times 100(\%)$$
$$\frac{(\text{As-Vp}) + \{ \text{As-Vs} \} / \{ \text{As-Vs} \} + \{ \text{As-Vp} \} + \text{Ao-Vp} + \{ \text{Ao-Vs} \} \times 100(\%) }{10} \quad (10)$$

6 13 cm, 1 15 cm

통계처리

Microsoft Excel 97

Table 1. Intracardiac electrogram with changes in posture and respiration during the entire course of the study

P amplitude(mV)		Normal breathing				Deep breathing			
Sitting position	0 day	7 day	30 day	60 day	0 day	7 day	30 day	60 day	
Maxium		1.9 ± 1.6	1.9 ± 1.0	1.8 ± 1.0		1.5 ± 0.9	1.6 ± 0.8	1.7 ± 1.0	
Minimum		0.7 ± 0.3	0.7 ± 0.4	0.9 ± 0.5		0.6 ± 0.2	0.6 ± 0.5	0.8 ± 0.5	
Supine position	0 day	7 day	30 day	60 day	0 day	7 day	30 day	60 day	
Maxium	3.1 ± 1.2	2.3 ± 2.0	2.3 ± 1.5	2.5 ± 1.8	2.7 ± 1.1	2.3 ± 1.5	2.3 ± 0.7	2.3 ± 1.0	
Minimum	1.4 ± 0.7	1.2 ± 1.1	1.3 ± 1.0	1.5 ± 1.0	1.2 ± 0.6	0.7 ± 0.3	0.7 ± 0.4	1.0 ± 0.7	

Mean ± S.D, Atrial sensing threshold as estimate of P wave amplitude

±

결과

심조율기 이식

1, 6

P 3.1 ± 1.2 mV,

P 1.4 ± 0.7 mV

P 2.7 ± 1.1 mV,

P 1.2 ± 0.6 mV

P 가 P 0.2 mV

0.5 ms

400 ± 150 mV,

728 ± 105 , R 13 ± 5 mV (Table 1).

심조율기 이식후 7일 30일 60일째 각각의 자세와 호흡 변화에 따른 P파진폭의 변화

P 가

0.2 mV 가

P (Figs. 1 and 2).

가 0.2 mV 가

P (Figs. 3 and 4).

, P 가

가 0.2 mV

100% (Table 1).

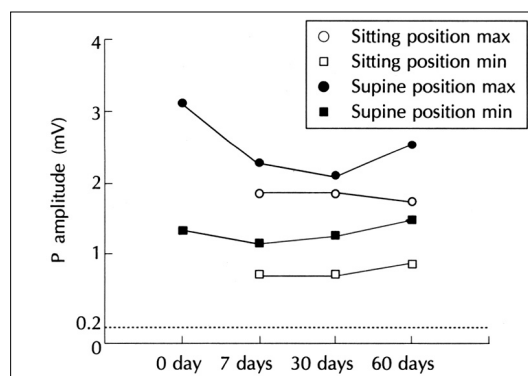


Fig. 1. P wave amplitude showed variation with changes in posture during normal breathing, but there was no significant difference between serial measurements of atrial electrogram amplitudes in 7 patients during follow-up period (implantation, 7 days, 30 days and 60 days). The lowest P wave amplitude was above the minimal atrial sense of 0.2 mV.

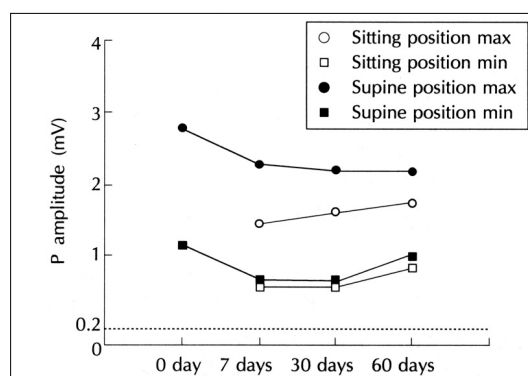


Fig. 2. P wave amplitude showed variation with changes in posture during deep breathing, but there was no significant difference between serial measurements of atrial electrogram amplitudes in 7 patients during follow-up period (implantation, 7 days, 30 days and 60 days). The lowest P wave amplitude was above the minimal atrial sense of 0.2 mV.

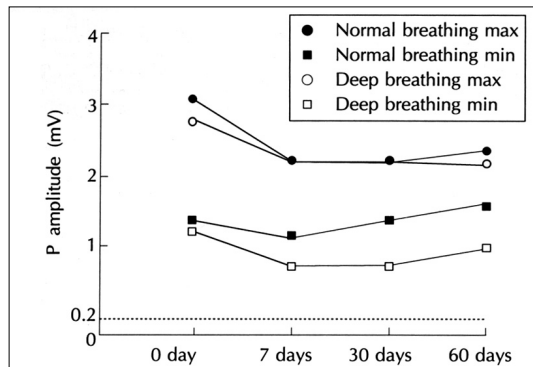


Fig. 3. P wave amplitude showed variation with changes in breathing pattern in supine position, but there was no significant difference between serial measurements of atrial electrogram amplitudes in 7 patients during follow-up period (implantation, 7 days, 30 days and 60 days). The lowest P wave amplitude was above the minimal atrial sense of 0.2 mV.

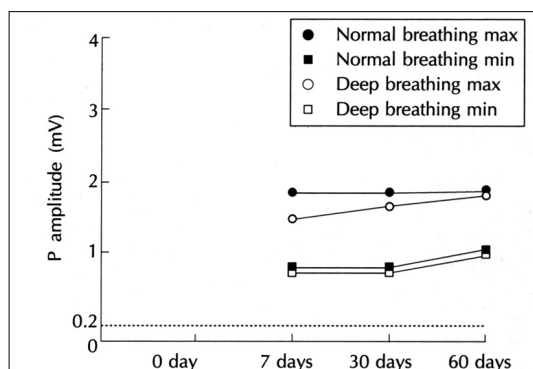


Fig. 4. P wave amplitude showed variation with changes in breathing pattern in the sitting position during deep breathing, but there was no significant difference between serial measurements of atrial electrogram amplitudes in 7 patients during follow-up period (implantation, 7 days, 30 days and 60 days). The lowest P wave amplitude was above the minimal atrial sense of 0.2 mV.

실방 교차 감지와 심방 과감지 여부

가 0.1, 0.2 mV

0.1, 0.2 mV

활동성 Holter ECG와 Treadmill 운동 부하 검사

24 Holter ECG

68 /

- (As - Vp) 67.005 / ,

- (As - Vs) 0.0005 / ,

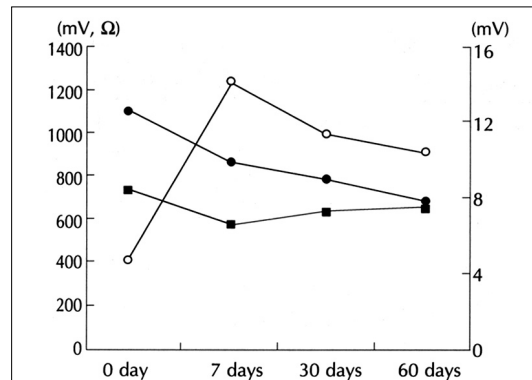


Fig. 5. The measured atrial and ventricular pacing parameters during follow-up period. Ventricular threshold at pulse width 0.5 ms showed increasing pattern to 7 days, then decreasing pattern in normal range. Impedance and R wave amplitude were stable in normal range during follow-up period.

		(Ao - Vp) 0.0001 / ,	
		(Ao - Vs) 0.0044 /	
		0.0045 /	
		가 99%	
Bruce protocol	Treadmill		
1	7	100%	
2	4	3	
100% 1	95%	. 3	
2	1	100% 1	90%
6	1	100%	

심실 조율 역치, 저항, R파 진폭의 변화

0.5 ms

, 7 , 30 , 60 400 ± 150

mV, 1300 ± 900 mV, 1000 ± 400 mV, 900 ± 600 mV

가

, 7 , 30 , 60 728 ± 105 , 557 ±

55 , 625 ± 67 , 641 ± 130 R

13 ± 5 mV, 9.7 ± 5 mV, 8.8 ± 2.9 mV, 7.9 ± 2 mV

가

합병증

1

가

가

가 VVI
고 찰
DDD
Treadmill
P
0.2 mV
Varriale ²²⁾
가 19.5%
가 Tr -
Be - eadmill 99%
rnstein ¹⁾
2 Brownlee ²⁾ 6 24 Holter ECG Naegeli ²³⁾
11% VDD 20
P 100%
³⁻⁴⁾ 24 Holter ECG
가 75% VVI 68 / -
(As - Vp) 67.005 / , -
(As - Vs) 0.0005 / , -
VDD 1980 (Ao - Vp) 0.0001 / , -
(Ao - Vs) 0.0044 /
가 0.0045 /
11 - 14) 가 99%
가
VDD 8 - 9) 가
^{11)12)15 - 21)} , VDD
90%
13) Antonioli P
²⁰⁾ 99.8% Senden ⁵⁾ 99.1%
가 . P Faere - Antonioli ²⁰⁾ 6.4%,
strand ⁶⁾ Parravicini ²⁴⁾ 7%
12 P
99% 가 ⁷⁾²⁵⁾²⁶⁾
0.25 mV 가 Ovs - VDD
가 가
yshcher ⁷⁾ 가
가 165 VDD 가 ¹⁴⁾²³⁾
24 P
P 가
1
가 2 가

가 7 30 60

가 VVI 가 P , R 가

Biotronic 0.1, 0.2 mV 가 24 Holter ECG

Iridium fractal Medtronic ECG Treadmill

가 가

결 과 :

1) P 가 P 가

2) Holter ECG Treadmill

3)

결 론 :

VDD

요 약

가 가

연구배경 :

VDD

결 론 :

VDD

가 가

가 가

VDD P 가 0.2 mV

24 Holter ECG Treadmill

99%

VDD

가

가 9 VDD

2 가

가 P

0.5 ms

중심 단어 : VDD P

, R

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