

급성 심근경색증에서 QT 간격 및 기타 재분극 지표들의 분산

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= Abstract =

Dispersion of QT Interval and Other Repolarization Indexes in Acute Myocardial Infarction

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Background : It is known that QT dispersion represents asynchronous repolarization of ventricle which is related to ventricular fibrillation. The incidence of ventricular arrhythmia is increased after acute myocardial infarction. So this study compared QT dispersion and other repolarization indexes for detection of asynchronous repolarization in acute myocardial infarction. We also investigated which portion of repolarization is the key portion of the asynchrony.

Method : In 37 acute myocardial infarction patients and 38 angina patients dispersion of QT, JT, JTpeak and QTpeak were measured. We also measured maximum adjacent dispersion of same parameters in precordial leads. In 20 survived patients and 17 dead patients after acute myocardial infarction were also compared. We also investigated correlation of PVC's on Holter monitoring with these repolarization parameters.

Results :

1) All ventricular repolarization indexes (QT, QTc, JT, JTpeak, QT peak and TpeakTend dispersion) were significantly increased in acute myocardial infarction group than compared with those of angina group ($p < 0.05$).

2) Maximal precordial dispersion (QT, QTc, JT, JTpeak and QTpeak) were also significantly increased in acute myocardial infarction group than angina group ($p < 0.05$).

3) Dead patient group after myocardial infarction showed significantly increased QTc and Tpeak-Tend dispersion compared with those of survived patient group ($p < 0.05$).

4) Multivariate linear correlation showed that TpeakTend dispersion and JT dispersion was correlated with QT dispersion.

25mm/sec
computer
digitization computer 10
24 Holter
1
QT JT(J T
) , JTpeak(J T) ,
QT - peak(Q T) ,
Tpeak to Tend(T T ,
TpeakTend) , QRS
(Fig. 1). QTc Bazett (QTc
= QT/RR^{1/2})
(dispersion)

가
가
T
T
TP
U 가 T U

12 10
T TpeakTend
T 가 T 가
1/2 T T 가
T

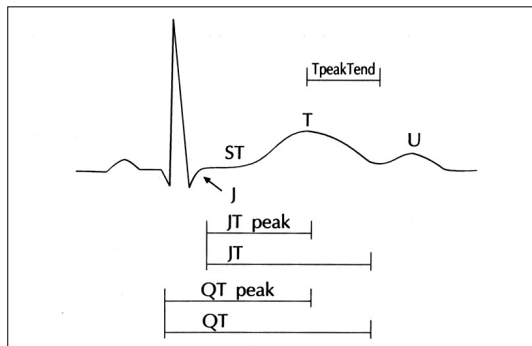


Fig. 1. Measurement of various repolarization parameters.

3. 통계처리

SPSS

±
Student t - test
Mann - Whitney U - Wilcoxon
Rank Sum W test , QT
(multiple
linear regression analysis)
bivariate cor -
relation p<0.05

결 과

1. 대상 환자의 임상 소견

가
가
(p<0.05) (Table 1).

2. 급성 심근경색증환자와 협심증환자간의 비교

QT	56 ± 23, 92 ± 39msec,
QTc	61 ± 27, 106 ± 46msec
	가 (p<0.05).
TpeakTend	62 ± 25, 93 ± 42
msec	가
JT JTpeak , QTpeak	가
, QRS	

가 (Table 2, Fig. 2).

QT, QTc, QTpeak, JT, JT - peak
가 ($p < 0.05$) (Table 3, Fig. 3).

3. 급성 심근경색증군 생존자와 사망자간의 비교

QT
 $72 \pm 22, 111 \pm 42 \text{ msec} (p = 0.001)$,

Table 2. Comparison of dispersions between patients with angina and acute myocardial infarction

Dispersion(msec)	Angina	AMI	p value
QT	56 ± 23	92 ± 39	0.001
QTc	61 ± 27	106 ± 46	0.001
QTpeak	53 ± 22	88 ± 43	0.001
JT	92 ± 37	124 ± 42	0.001
Jtpeak	59 ± 28	88 ± 45	0.001
QRS	18 ± 12	26 ± 17	0.029
TpeakTend	62 ± 25	93 ± 42	0.001

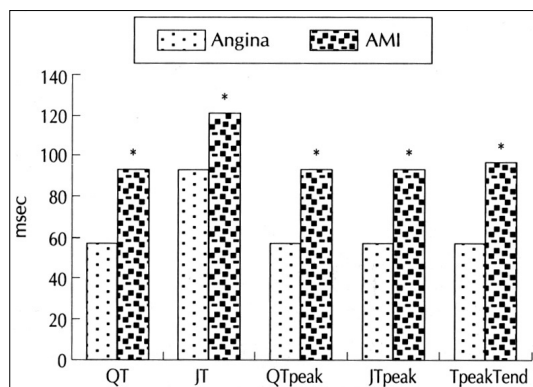


Fig. 2. Comparison of dispersion between patients with angina and acute myocardial infarction. * $p < 0.05$.

Table 3. Comparison of maximal adjacent dispersion in precordial leads between patients with angina and acute myocardial infarction

Dispersion(msec)	Angina	AMI	p value
QT	23 ± 16	39 ± 29	0.003
QTc	25 ± 17	45 ± 34	0.002
QTpeak	28 ± 20	39 ± 27	0.041
JT	22 ± 15	40 ± 29	0.001
JTpeak	26 ± 18	40 ± 28	0.009
QRS	7 ± 7	8 ± 7	0.642
TpeakTend	29 ± 17	37 ± 27	0.103

QTc $81 \pm 25, 130 \pm 48 \text{ msec} (p = 0.001)$
가

QTpeak, TpeakTend $76 \pm 23, 114 \pm 50 \text{ msec} (p = 0.004)$
가 (Table 4, Fig. 4).

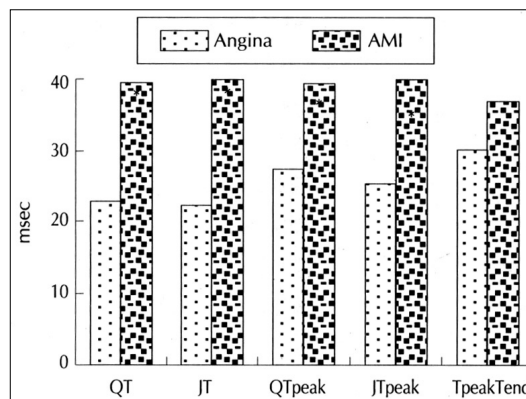


Fig. 3. Comparison of maximal adjacent dispersion in precordial leads between patients with angina and acute myocardial infarction.

Table 4. Comparison of dispersions between survived and dead patients in acute myocardial infarction

Dispersion(msec)	Survived	Dead	p value
QT	72 ± 22	111 ± 42	0.001
QTc	81 ± 25	130 ± 48	0.001
QTpeak	74 ± 24	102 ± 57	0.005
JT	116 ± 36	128 ± 48	0.388
JTpeak	74 ± 25	101 ± 59	0.067
QRS	30 ± 16	20 ± 15	0.068
TpeakTend	76 ± 23	114 ± 50	0.004

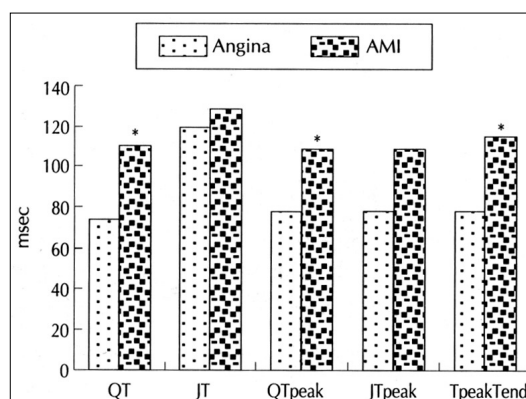


Fig. 4. Comparison of dispersion between survived and dead patients in acute myocardial infarction.

4. 전벽 심근경색증 환자에서 생존자와 사망자 사이의 비교

QTc
83 ± 26msec, 135 ± 50msec
가 (p = 0.038), TpeakTend
68 ± 17msec, 127 ± 54msec
가 (p = 0.005)(Table 5).

Table 5. Comparison of dispersion between survived and dead patients in anterior acute myocardial infarction

Dispersion(msec)	Angina	AMI	p value
Number	9	9	
QT	75 ± 22	109 ± 37	0.058
QTc	83 ± 26	135 ± 50	0.038
QTpeak	80 ± 11	87 ± 34	0.895
JT	107 ± 32	116 ± 44	0.566
Jtpeak	77 ± 18	91 ± 42	0.596
QRS	34 ± 19	23 ± 20	0.216
TpeakTend	68 ± 17	127 ± 54	0.005

Table 6. Multiple linear regression analysis of QTc dispersion with various factors

Variables	Beta coefficient	p value
QTpeak	0.611	0.777
JT	0.272	0.037
JTpeak	0.194	0.326
TpeakTend	0.460	0.001
QRS	-0.033	0.797
Coronary artery disease score	-0.227	0.839
Potassium	0.030	0.802
Ejection fraction	-0.012	0.925

Table 7. Correlation between PVC's on Holter monitoring and various factors

	R value	p value
QT dispersion	0.067	0.607
QTc dispersion	0.057	0.668
QTpeak dispersion	-0.104	0.427
JT dispersion	0.104	0.428
JTpeak dispersion	-0.894	0.497
TpeakTend dispersion	-0.069	0.602
Precordial QT dispersion	0.275	0.033
Precordial QTc dispersion	0.266	0.040
Ejection fraction	-0.326	0.014
Potassium	-0.539	0.001

5. QTc 분산의 다변수선형회귀분석

QTc TpeakTend , JT
(Table 6).

6. PVC와 여러 지표들과의 상관관계

Holter
QT , QTc
(p < 0.05)(Table 7).

고 찰

QT long QT
2-4).
QT 가
5,6).
(reentry)가
7).
가 ,
가
QT .
Long QT , , ,
torsade de pointes
early
afterdepolarization triggered activity
가 8).
가
9).
24
QT
Cowan 10)
QT
70 ± 30ms,
73 ± 32ms 가
48 ± 18ms

가 , QRS 가 JT 가 . JT
가 . QT
가 QT 가 QRS
가 11,12), QT JT 가 QRS
JT 13). QT 가 QRS
QT 가 QRS 가 QT
가 ,
가 14). Bogun 15) QT
가 , QT 가 20). QRS
가 120ms 가 가
(sustained monomorphic ventricular tachycardia) 가 ,
가 가 , 90ms 120ms 가
가 가 90ms
가
QT QRS 가
18). QRS 가
15).
2 3 ,
QT 5
16). QRS
QRS
QRS
가 가 Markus 19) mono-
morphonic action potential(MAP) 90%
QT, QT , JT
QTc, JT, JTpeak, QTpeak, TpeakTend T , T
가 QRS MAP 90% T
QT QRS JT ,
QT 가 TpeakTend 가
QT 가 T 1/2
17) QT 가 가
가 가 T
QT 가 T
JT 가

vector T QT ,
 가 . T 3 QTc , QTpeak , JT peak
 가
 T , , Holter

QTc
 20), T
 21),
 22,23).
 T
 가
 3 가
 , Holter 가
 5 7

TpeakTend
 가 가

요 약

QTc TpeakTend 가
 QTc
 연구배경 :
 QT
 QTc TpeakTend
 , JT
 Tpeak - kTend QTc 가
 QT
 가
 가
 Restivo 7)
 가

방 법 :

37 38
 ECG QT , QTc , JT(J
 T) , JTpeak(J T
) , QTpeak(Q T
) T peak to T end(T T
 , TpeakTend)

24 Holter

결 과 :

1) QT , QTc , JT
JTpeak , QTpeak , TpeakTend
가
($p < 0.05$).

2) QT , QTc , JT , JTpeak ,
QTpeak 가
($p < 0.05$).

3) QTc TpeakTend
가 ($p < 0.05$).

4) QT JT , TpeakTend
($p < 0.05$).

5) Holter QT
QTc , QT
가 ($p < 0.05$).

결 론 :

가 가
, 가
T 가 가
T 가가

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