

좌심실 확장기말압과 심초음파 지표들의 상관관계

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Echocardiographic Indices Associated with Left Ventricular End-Diastolic Pressure

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ABSTRACT

Background and Objectives : It has been suggested that the indices based on tissue doppler and color M-mode echocardiography reflect the left ventricular end-diastolic pressure. These include the early diastolic transmitral velocity (E) to early myocardial velocity ratio measured by tissue doppler (E') and the E to the wave propagation velocity (Vp) ratio measured from color M-mode images. However, these indices have not been well validated in congestive heart failure patients. **Subjects and Methods :** Thirty one congestive heart failure patients who underwent simultaneous cardiac catheterization and echocardiography, and had normal sinus rhythm were enrolled in this study. The left ventricular end-diastolic pressure obtained from the left heart catheterization was compared with the diastolic indices using pulsed doppler, tissue doppler and color M-mode echocardiography. **Results :** The left ventricular end-diastolic pressure (LVEDP) ranged from 3.3 to 23 mmHg. Some parameters showed a significant correlation with the LVEDP. The propagation velocity showed a significant correlation with the LVEDP ($r = -0.382, p = 0.034$), and the E to propagation velocity ratio (E/Vp) showed a good correlation with the LVEDP ($r = 0.408, p = 0.023$). In addition, the E to early diastolic velocity of the mitral annulus (E') ratio had an insignificant correlation with the LVEDP ($r = 0.322, p = 0.078$). Among the patients with ischemic congestive heart failure, the E to the propagation velocity ratio (E/Vp) showed a marginal correlation with the LVEDP ($r = 0.461, p = 0.047$). **Conclusion :** In patients with congestive heart failure, the Vp and E/Vp showed a good correlation with the LVEDP. In the subgroup of patients with ischemic congestive heart failure, only the E/Vp showed a significant correlation with the LVEDP. (**Korean Circulation J 2002;32 (10):872-877**)

KEY WORDS : Ventricular pressure ; Echocardiographic, doppler, color ; Mitral valve ; Blood flow velocity.

서 론

가

가

: 2002 5 27

: 2002 8 13

: 2002 8 31

: , 140 - 743

657

(E')

가

가

(E)

1-3)

M - mode

(Vp)

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가 3)4)

가

(Vp) M - mode
(Fig. 3).

mode (E)

50%
3)

대상 및 방법

31 62
±11 가 15 , 가 16

3.3 23 mmHg, 13.2 mmHg(Mean
±SD : 13.2 ± 5.9 mmHg)

(E),
(A), (E'),
(A'), (DT),
(Vp)
31 19 ,
6 , 3 (
2 , 1), 3 (
1 , 2)
5

14
3
10 , 2 2 , 1 2 ,

2 , 1
6F
(Poly-
graph, Siemens, 1993).

(E), (A)
(Fig. 1),
(E'), (A')
(TDE) (Fig. 2).

통 계
SPSS (Systat 10.0 ;
SPSS Inc ; Chicago, Illinois)
p 0.05

Table 1. Correlation between echocardiographic parameters and LVEDP

Index	Mean	Regression coefficient	p
E (cm/s)	71.7 ± 21.1	0.111	NS
A (cm/s)	81.5 ± 26.0	-0.276	NS
E/A	0.9 ± 0.3	-0.203	NS
DT (ms)	238.9 ± 52.0	-0.180	NS
Vp (cm/s)	42.0 ± 18.8	-0.382	0.034
E' (cm/s)	5.4 ± 1.9	-0.051	NS
E/E'	14.3 ± 5.5	0.322	0.078
E/Vp	2.1 ± 0.9	0.408	0.023

A : late transmitral filling velocity, DT : deceleration time of early transmitral velocity wave, E : early transmitral filling velocity, E' : early diastolic tissue velocity at septal mitral annulus, LVEDP : left ventricular end-diastolic pressure, Vp : color M-mode early diastolic propagation velocity

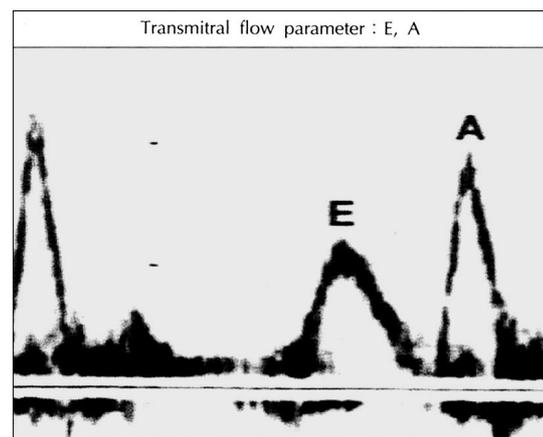


Fig. 1. Transmitral flow parameter, E : early transmitral filling velocity, A : late transmitral filling velocity

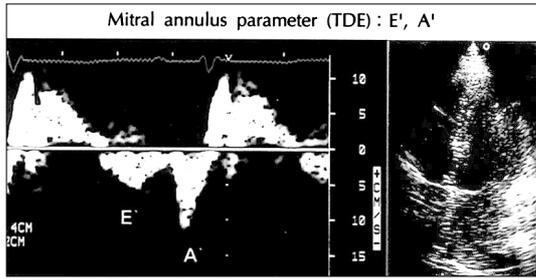


Fig. 2. Pulsed wave tissue doppler at septal mitral annulus. E' & A' : early and late diastolic tissue velocity at septal mitral annulus

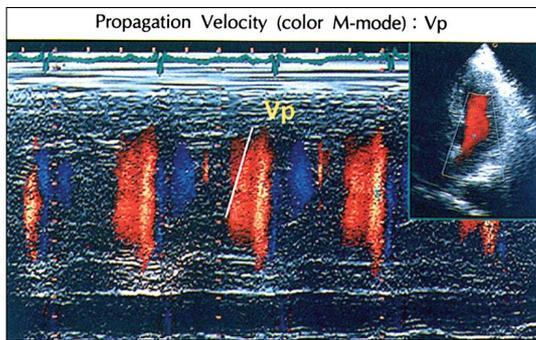


Fig. 3. Representative color M-mode image demonstrating Vp determination. Flow propagation velocity was derived in a fashion in which the values of each pixel were decoded and the slope of the isovelocity contour at 50% of the maximum E-wave velocity was determined.

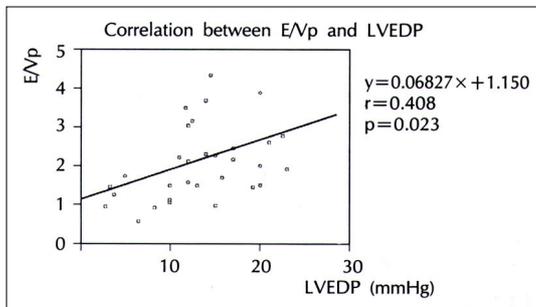


Fig. 4. Relationship between LVEDP and E/Vp. Linear regression analysis demonstrating the relationship between LVEDP and E/Vp. LVEDP : left ventricular and diastolic pressure

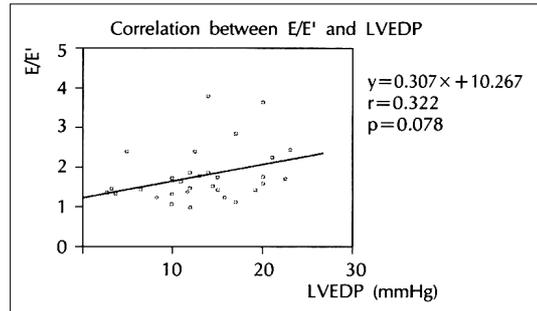


Fig. 5. Relationship between LVEDP and E/E'. Linear regression analysis demonstrating the relationship between LVEDP and E/E'.

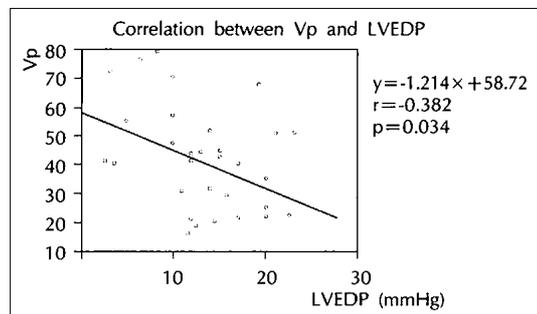


Fig. 6. Relationship between LVEDP and Vp. Linear regression analysis demonstrating the relationship between LVEDP and Vp. LVEDP : left ventricular and diastolic pressure

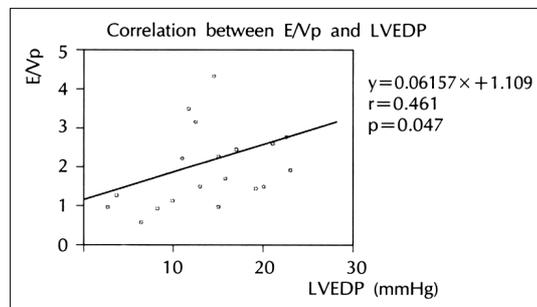


Fig. 7. Relationship between LVEDP and E/Vp in ischemic dilated cardiomyopathy. Linear regression analysis demonstrating the relationship between LVEDP and E/Vp. LVEDP : left ventricular and diastolic pressure

결 과

가 Table 1 .
(Vp)가
(r = -

0.382, p=0.034), (E)
(Vp)
(r=0.408, p=
(E)
(r=0.322, p=0.078).

(A)

Fig. 4 - 6 .

19

가 가

5

, 14

3 10 , 2 2 , 1 Nagueh ¹⁾ 가

2

(Vp) (E/E)

가 (r = - 0.07, (E) 2)

p=0.775), (Vp) (E/E)

0.047, Fig. 7), (E) (r=0.461, p=

(E) (E/E)

(r=0.425, (E/E)

p=0.07).

고 찰

가

가 Nagueh ¹⁾ E/E ' 11, Sudereswaran ⁸⁾

E/E ' 10.5 18 mmHg ⁸⁾

E/E ' 15.8

18 mmHg

가 (A)가 가

⁹⁾

(Vp) Brun

(Vp), (Vp) (tau)

(E/Vp) ¹⁰⁾ Firstenberg ³⁾

(E/E) (E), (E),

¹⁵⁾ (E/Vp)

(E) (E)

Garcia ⁴⁾

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