

MR

가

color Doppler flow mapping 가

color Doppler flow mapping
MR

Color Doppler Flow Mapping의 제한점

1) MR

, regurgitant volume fraction
action, 가
, regurgitant orifice area
Color Doppler flow imaging _____

regurgitant volume fraction, regurgitant
orifice
MR 가

Fig. 1

가

가

injector

regurgitant volume
regurgitant orifice area가

Fig.
reg -

2

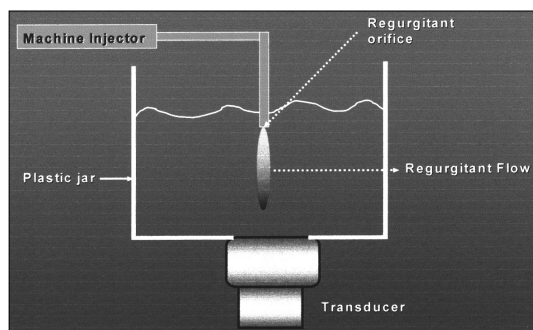


Fig. 1

1152

urgitant orifice

가

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co -

lor jet area가

color jet area 가 MR

가

가

2) Color Doppler flow mapping

jet momentum, chamber constraint

transmit power, receiver gain, transducer
frequency, wall filter pulse repetition frequency
instrumental

2 - 1) Jet momentum - system

(mass),

momentum

PISA (proximal isovelocity surface area)

Bernoulli

equation

가

Jet momentum flow rate
velocity (Q_{0v0}) jet flow

driving pressure

jet longitudinal cross sectional area mome -
ntum

2 - 2) Chamber constraint - jet momentum jet area

가

가

가

jet 가

eccentric jet

가

42%

2)

MR

mitral valve prolapse flail leaflet

regurgitant jet

가

Coanda effect

MR

가

가

Quantitative Doppler Echocardiography

가

Korean Circulation J 1999;29(10):1151-1156

gold
 standard . regurgitant volume, fraction regur -
 MR , gitant orifice area (Fig. 3).
 가 annulus diameter time - ve -
 가 regurgitant volume . locity integral 가

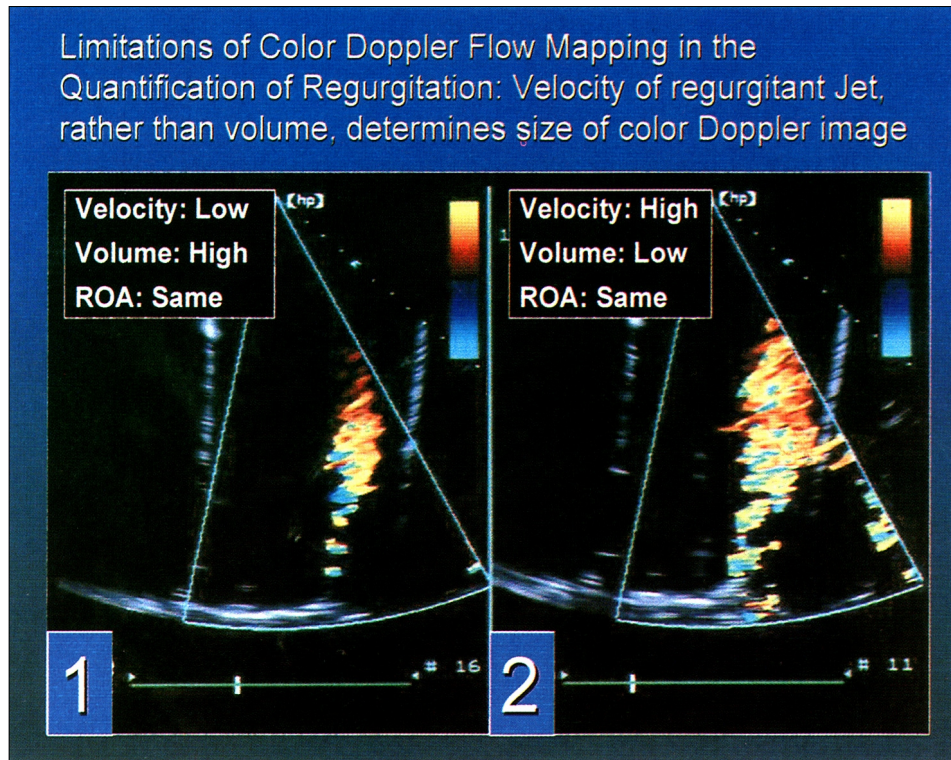


Fig. 2.

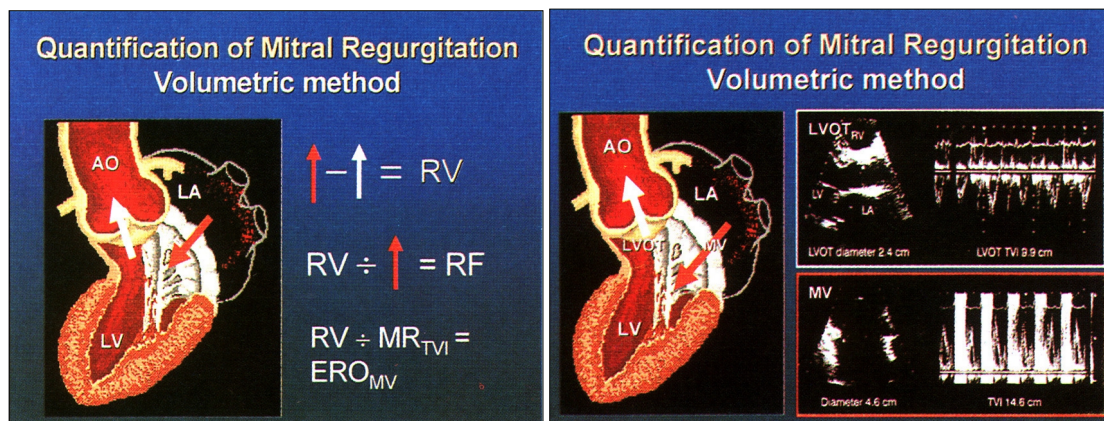


Fig. 3.

- Regurgitant volume (RV) = mitral flow - left ventricular outflow tract flow = $\{ (\text{mitral annulus diameter}/2)^2 \times TVI_{MV} - (\text{LVOT diameter}/2)^2 \times TVI_{LVOT} \}$
- Regurgitant fraction (RF) = RV/mitral flow
- Regurgitant orifice area (ROA) = RV/MRTVI

vena contracta width high quality image

가 가

Vena Contracta Imaging

Regurgitant orifice
 tracta(Fig. 4) regurgitant orifice
 jet regurgitant orifice
 vana contracta width
 MR 가
 . Vena contracta 가
 orifice 20%
 . vena contracta width가 0.5 cm
 severe MR
 Vena contracta width regurgitant orifice
 jet area, pulmonary venous systolic
 flow reversal
 In vitro vena contracta width가 regurgi -
 tant fraction peak regurgitant flow rate
 vena contracta width

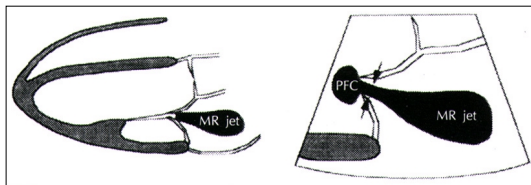


Fig. 4.

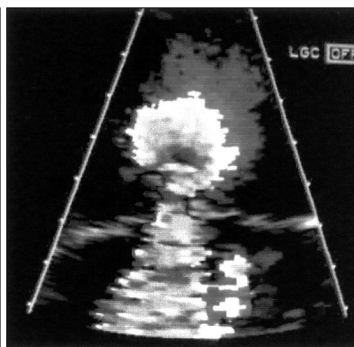
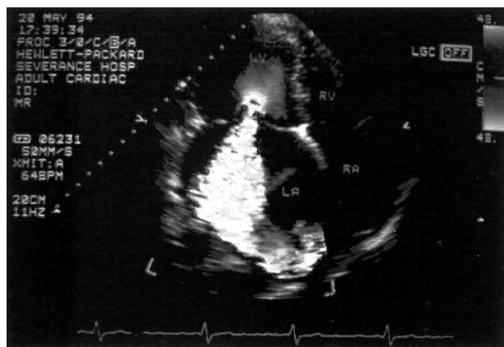


Fig. 5

Proximal Isovelocity Surface Area

regurgitant orifice
 가 regurgitant orifice
 hole
 MR
 가
 regurgitant orifice
 regurgitant volume effe -
 ctive regurgitant orifice area
 Flow rate at PISA = Flow rate across regurgi -
 tant orifice
 $2\pi r^2 \times \text{Alias velocity} = \text{ERO}(\text{effective regurgitant orifice}) \times \text{MR velocity}$

$$\text{ERO} = 6.28r^2 \times \frac{\text{Alias velocity}}{\text{MR velocity}}$$

$$\text{MR RegV}(\text{regurgitant volume}) = \text{ERO} \times \text{MR TVI}$$

 PISA
 coloe bar aliasing velocity
 proximal convergence zone
 (Fig. 5).
 PISA , (visco -
 sity), orifice geometry,

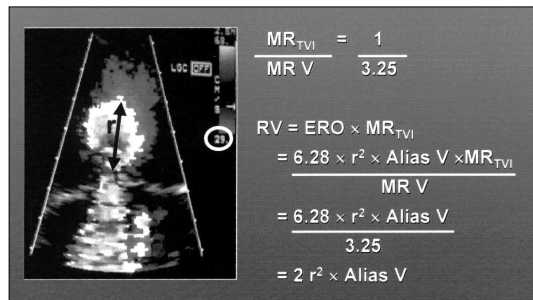


Fig. 6

PISA
MR maximal to integral of velocity ratio가
3.25 ± 0.47
regurgitant volume
(Fig. 6).

1. $MR_{TVI}/MR_{velocity} = 1/3.25$

Regurgitant volume = $ERO \times MR_{TVI}$

= $(6.28 \times r^2 \times Aliasing \text{ velocity} \times MR_{TVI})/MR_{velocity}$

= $(6.28 \times r^2 \times aliasing \text{ velocity})/3.25$

= $2 \times r^2 \times aliasing \text{ velocity}$

PISA radius	aliasing velocity
regurgitant volume	
eccentric	MR
가	

—

2. $ERO = \frac{6.28 \times r^2 \times 30 \text{ cm/sec}}{500 \text{ cm/sec}}$

Peak mitral velocity 500 cm/sec 가 r
1 ERO가 0.38 cm 2가 alias -
ing velocity가 30 cm/sec PISA 1
cm MR .

3. $ERO = \frac{6.28 \times r^2 \times 40 \text{ cm/sec}}{500 \text{ cm/sec}} = \frac{251 \times r^2}{500} = \frac{r^2}{2}$

Aliasing velocity가 40 cm/sec MR velo -

city가 500 cm/sec ERO r^2
MR jet peak velocity

가

결 론

가
가
가

가

가

가

가

가

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중심 단어 :

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