Aorta billentyű betegségek

Temesvári András

Kiemelt témák

- Aorta stenosis, jó ejectios fractio, paradox módon kis verővolumen, szignifikáns stenosis
- Stress echocardiográfia
- Percutan aorta billentyű beültetés
- Aorta regurgitatio miatti plasztika

Aorta stenosis, a probléma jelentősége

- A 65 év feletti emberek 25%-nak megvastagodott az aorta billentyűje
- 75 év felett 3%-nak súlyos aorta stenosisa van
- Időskorban a leggyakoribb billentyűhiba, amely műtétet igényel (EHS 2004)
- GOKI évi 238 aorta/308 billentyű műtét (77%)
- Mortalitás 2010-ben: 2,5%

Aorta stenosis

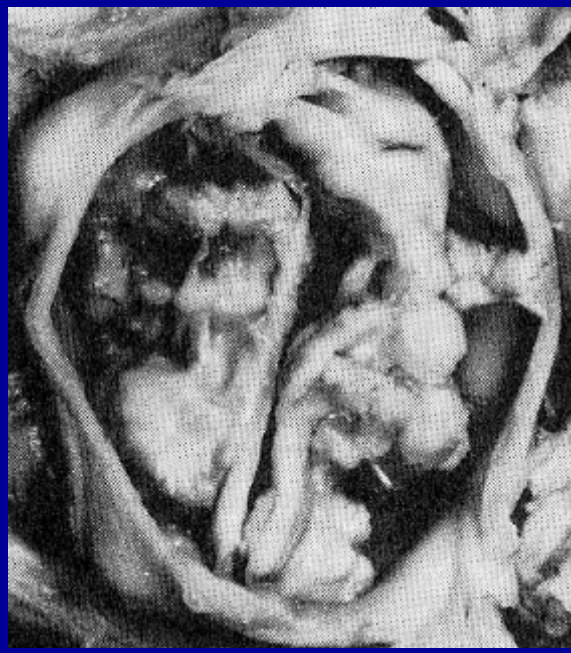
Localisatio szerint:

- Valvularis
- Subvalvularis
- Supravalvularis

Aetiologia szerint:

- Congenitális
- Reumás
- Degenerativ

Az aorta stenosis mechanizmusai



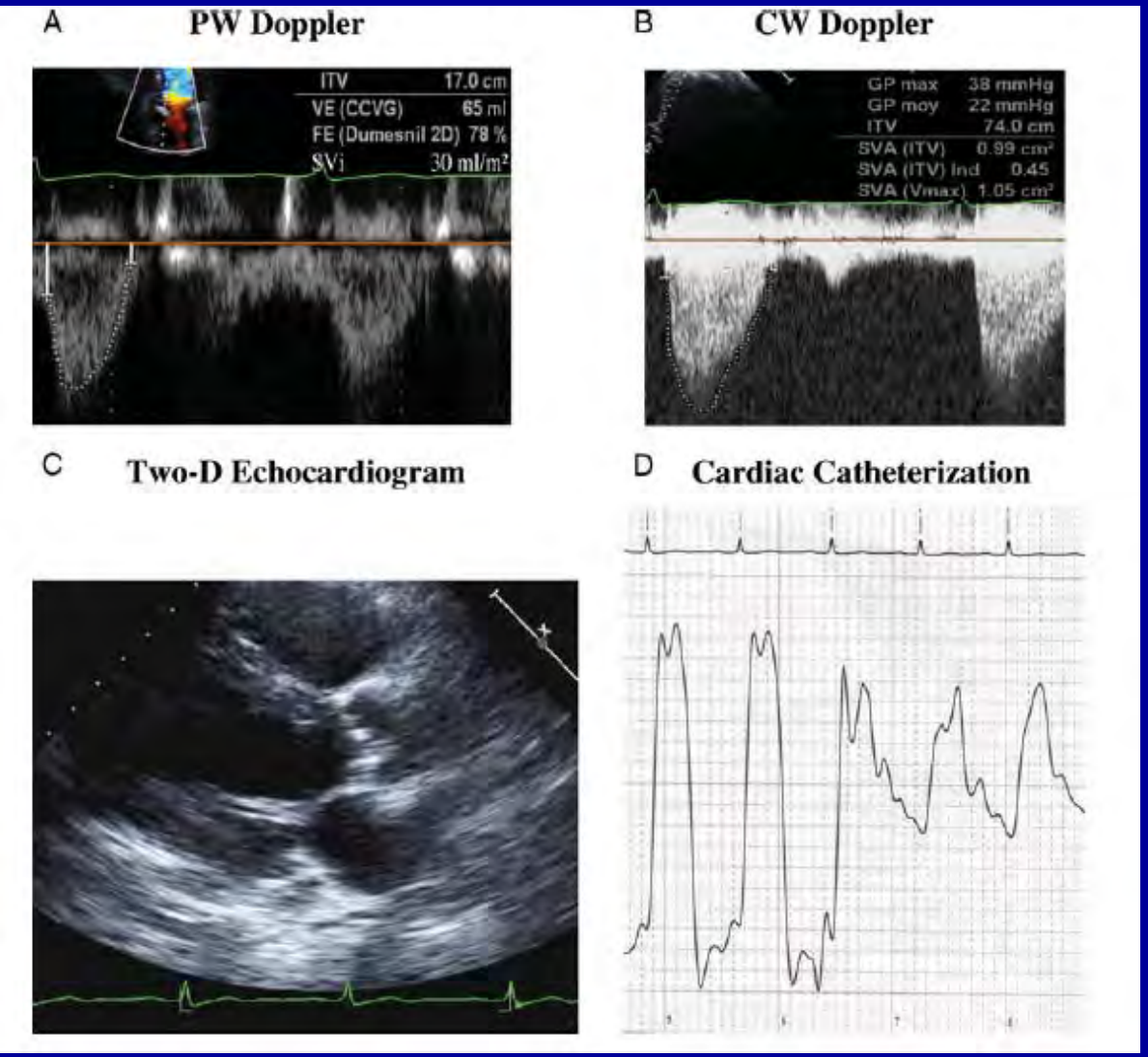
1. Műtéti indikáció: Súlyos aorta stenosis

- Grádiens grádiens legyen nagyobb 40 (50) hgmm-nél
- Area legyen kisebb 1 cm2-nél
- Milyen a bal kamra systolés functio (EF)?
- Milyen a perctérfogat (verővolumen)?

Melyik a fontosabb: grádiens vagy area?

Lehet-e jó systolés functio (EF) mellett csökkent verővolumen (áramlás)?

Index eset



Hypertrofiás bal kamra
Jó EF: 78%
Jelentősen emelkedett
Bal kamrai végdiastolés
Nyomás (35Hgmm)
Hypertonia

European Heart Journal (2010) **31**, 281–289

Mi lehet a mechanizmusa?

- Bal kamra hypertrofia, szűkebb üregek, EF a normális alsó határán (bal kamra concentrikus remodelling)
- Csökkent longitudinális, megtartott radiális functio (csökkent bal kamra strain)
- Rossz compliance miatt csökkent telődés (mitrális beáramlás)
- Vascularis compliance csökkentés

Ind?

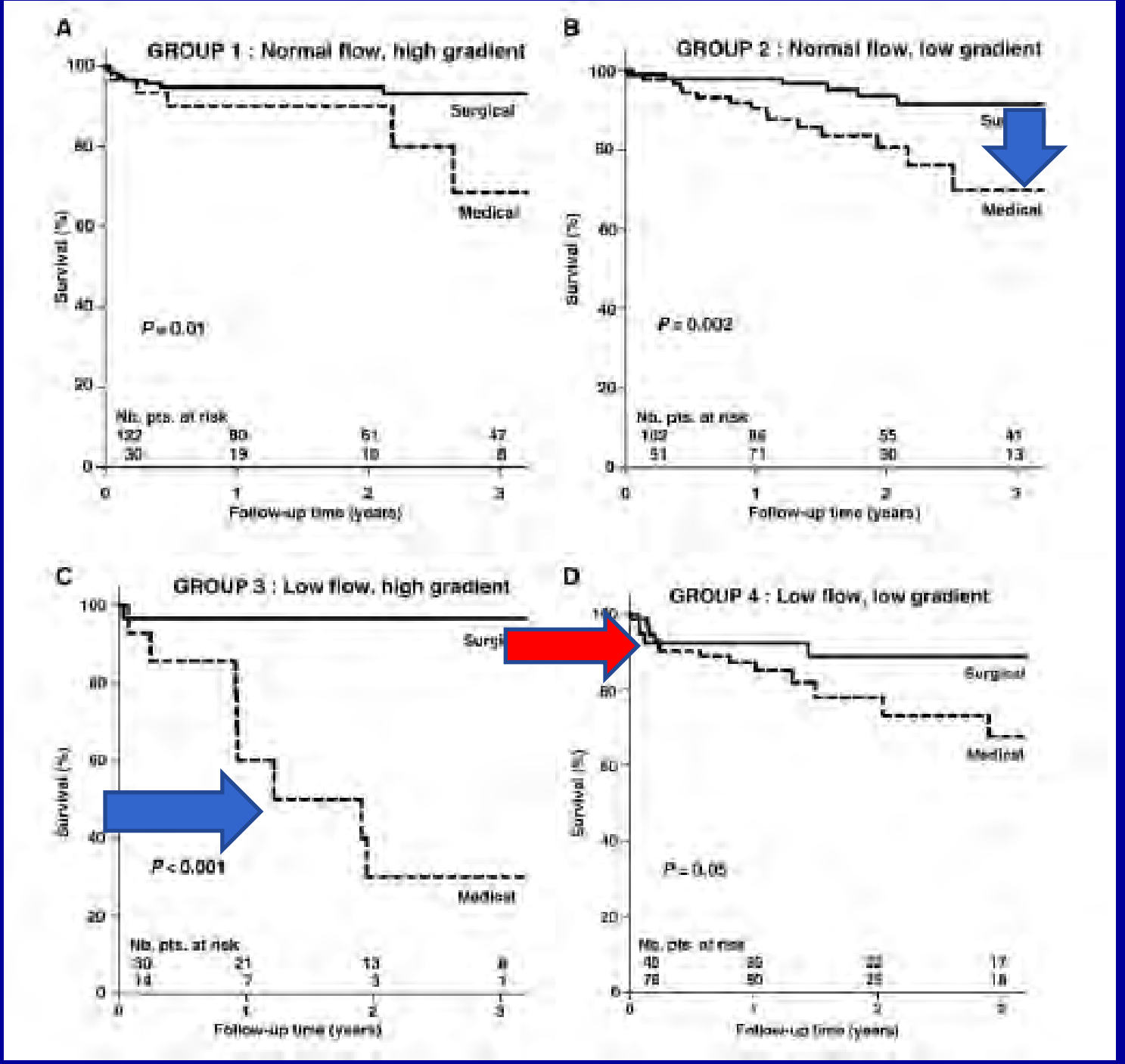
Group 1
'Normal flow, high gradient'
SVi > 35 mL/m²
Gradient > 40 mmHg
n = 152 (30%)
Indexed AVA = 0.4±0.1 cm²/m²
LVEDD = 48±5 mm
LVEDVI = 59±13 mL/m²
Z_{va} = 4.2±0.8 mmHg/mL/m²
AVR = 80%

Group 2
'Normal flow, low gradient'
SVi > 35 mL/m²
Gradient ≤ 40 mmHg
n = 193 (38%)
Indexed AVA = 0.5±0.1 cm²/m²
LVEDD = 48±5 mm
LVEDVI = 58±13 mL/m²
Z_{va} = 4.0±0.6 mmHg/mL/m²
AVR = 53%

Group 3
'Low flow, high gradient'
SVi ≤ 35 mL/m²
Gradient > 40 mmHg
n = 44 (8 %)
Indexed AVA = 0.3±0.1 cm²/m²
LVEDD = 43±5 mm
LVEDVI = 48±12 mL/m²
Z_{va} = 6.0±1.2 mmHg/mL/m²
AVR = 68%

Group 4
'Low flow, low gradient'
SVi ≤ 35 mL/m²
Gradient ≤ 40 mmHg
n = 123 (24%)
Indexed AVA = 0.5±0.1 cm²/m²
LVEDD = 46±5 mm
LVEDVI = 53±11 mL/m²
Z_{va} = 5.2±1.3 mmHg/mL/m²
AVR = 36%

European Heart Journal (2010) **31**, 281–289


A
GROUP 1 : Normal flow, high gradient
Surgical
Medical
P = 0.01
Survival (%)
Nb. pts. at risk
Follow-up time (years)
B
GROUP 2 : Normal flow, low gradient
Medical
P = 0.002
Survival (%)
Follow-up time (years)
C
GROUP 3 : Low flow, high gradient
P < 0.001
Survival (%)
Follow-up time (years)
D
GROUP 4 : Low flow, low gradient
Surgical
Medical
P = 0.05
Survival (%)
Follow-up time (years)

2. Stress echocardiográfia aorta stenosisban (low CO mellett)

1. Súlyos-e az aorta stenosis (átlagos grádiens 40 Hgmm-t eléri-e)
2. Van-e contractilis reserve (VTI növekedés>20%)

Európai multicentrikus vizsgálat

- Bevétel: area<1cm2, EF<35, átlag grádiens<30 Hgmm
- 217 consective beteg
- 1990-2005
- DSE: 83/217, contractilis reserve, ha VTI növekedése<20%

(J Am Coll Cardiol 2008;51: 1466–72)

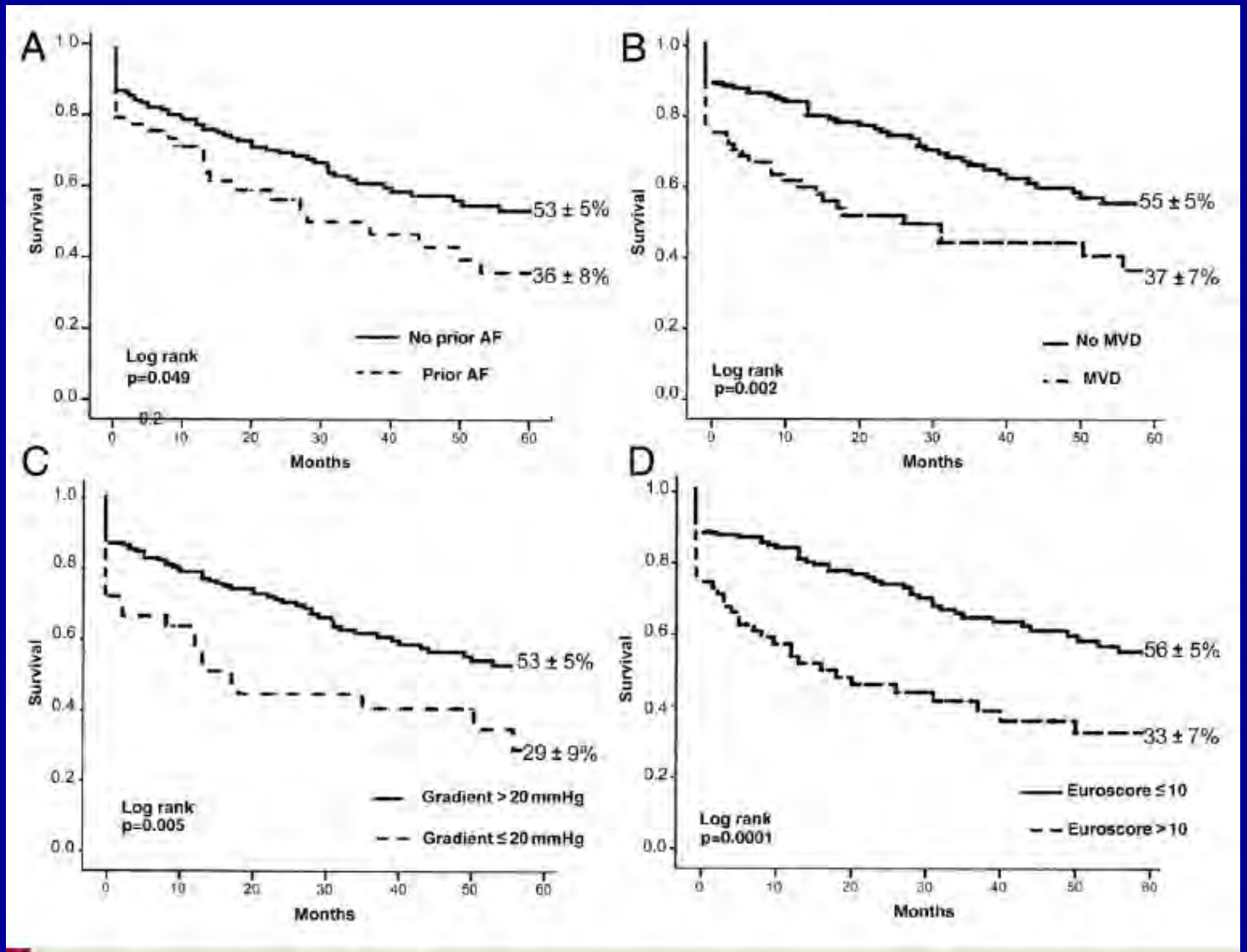
Periop. mortalitás: 16%

- Magasabb Euroscore
- Nagyon alacsony átlaggrádiens
- Nagyon alacsony EF
- Szívelégtelenség
- Több-ér betegség

Multivariaciós vizsgálat:

- EF<20%, contractilis reserv hiánya DSE-n
- Több-ér betegség

5 éves túlélés meghatározói: AF, 3ér bet., grádiens, euroscore



Intraop. DSE

Table 2. Baseline and Procedural (During DSE) Hemodynamics for the Cases Presented

	Case 1		Case 2	
	Baseline	DSE	Baseline	DSE
Heart rate (beats/min)	85	95	80	88
Blood pressure (mmHg)	90/55	120/65	94/49	115/70
Central venous pressure (mmHg)	13	10	15	15
Pulmonary artery pressure (mmHg)	34/17	35/15	42/20	39/20
Cardiac output (L/min)	2.7	4.0	2.5	3.8
Aortic valve area (cm^2)	0.77-0.79	1.42-1.44	0.77-0.87	0.87-0.94

Journal of Cardiothoracic and Vascular Anesthesia, Vol 20, No 6 (December), 2006: pp 862-866

Contractilis reserve nélküli betegek műtéte

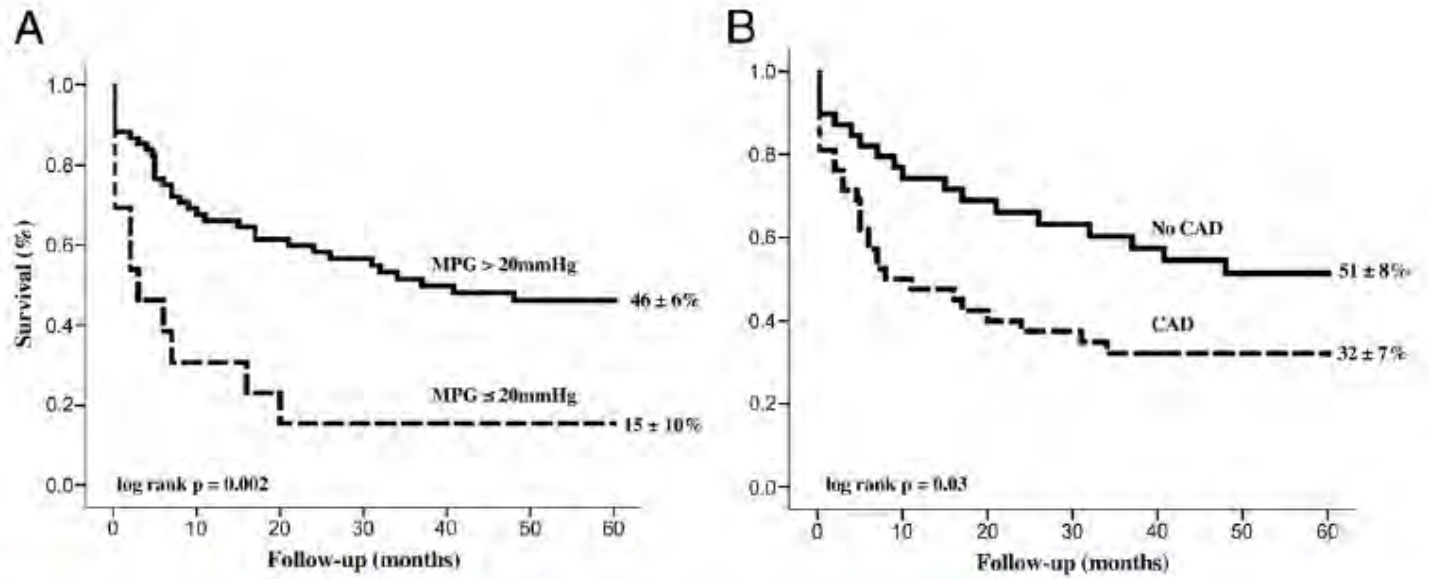


Figure 2 **Influence of MPG and CAD on Survival in LF/LGAS Patients Without CR on DSE**

Kaplan-Meier estimates of the probability of survival of the total population (n = 81) according to: (**A**) mean pre-operative transvalvular gradient (MPG) ≤20 and >20 mm Hg, and (**B**) presence of significant coronary artery disease (CAD). Abbreviations as in Figure 1.

(J Am Coll Cardiol 2009;53:1865–73)

Contractilis reserve nélküli betegek műtéte

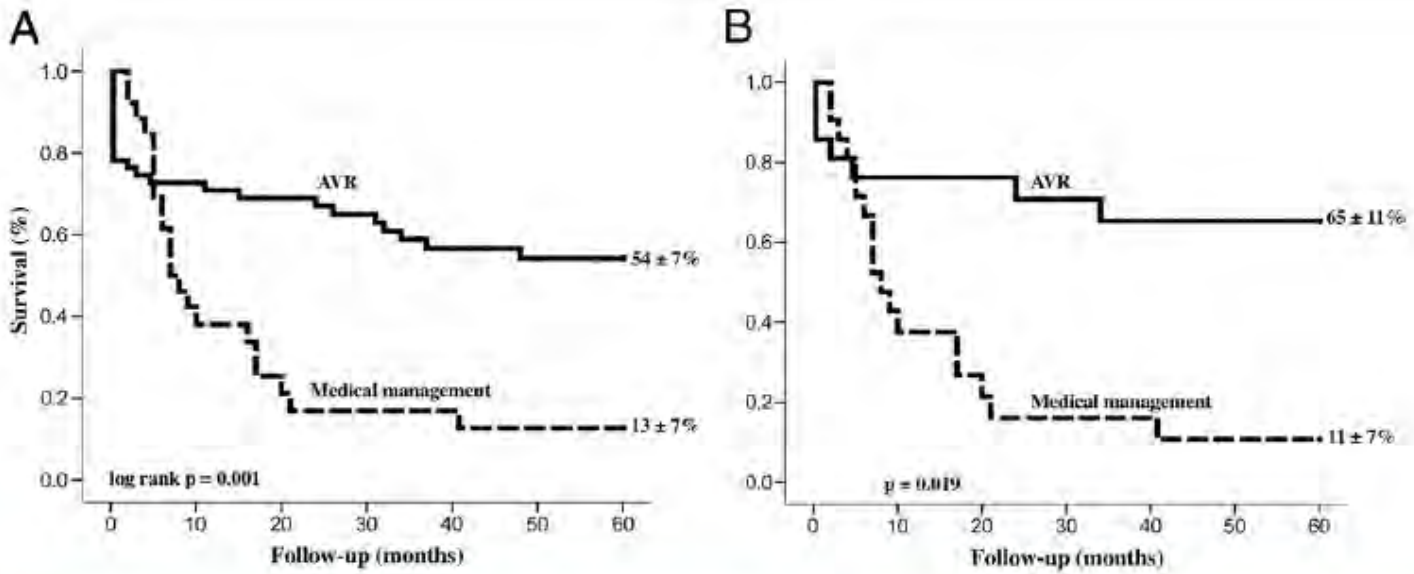
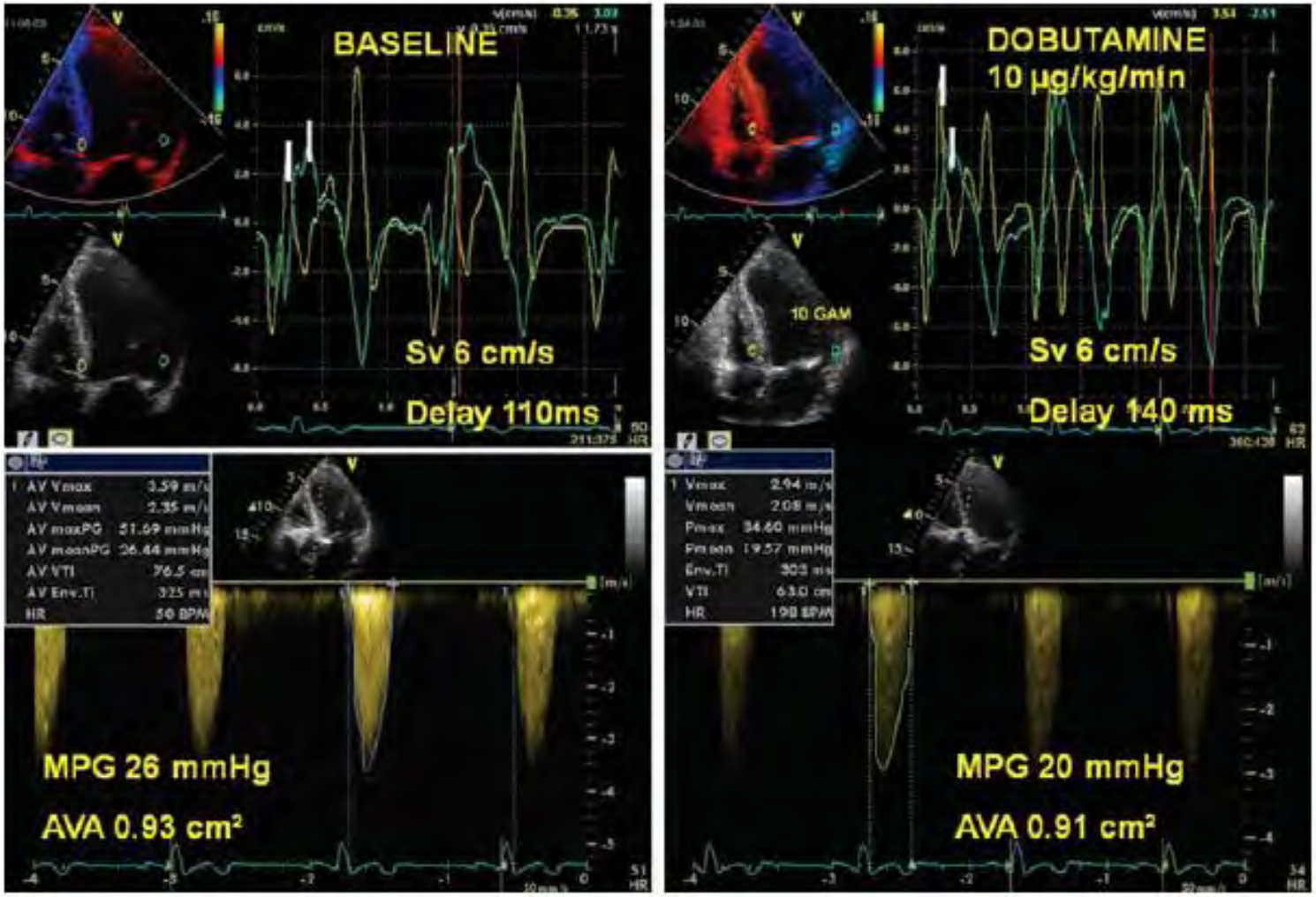


Figure 4 **Prognostic Impact of AVR in LF/LGAS Patients Without CR on DSE**

Kaplan-Meier estimates of the probability of survival according to whether aortic valve replacement (AVR) was performed: (**A**) total population (n = 81), and (**B**) matched patients (n = 42). Abbreviations as in Figure 3.

(J Am Coll Cardiol 2009;53:1865–73)

Dynamic left ventricular dyssynchrony: a potential cause of no contractile reserve in patients with low-gradient aortic stenosis



European Journal of Echocardiography
doi:10.1093/ejechocard/jep079

3. Percutan billentyűk

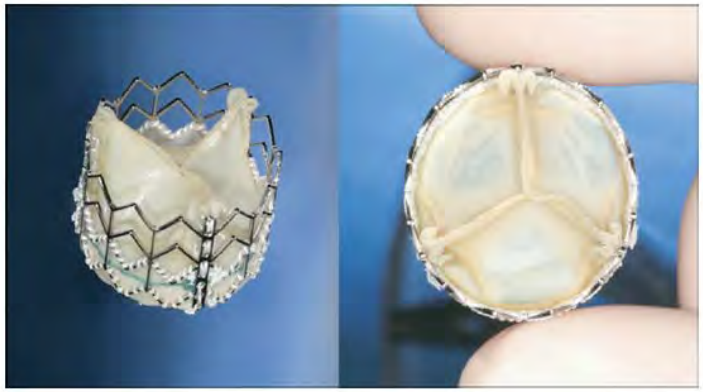


Figure 1 Profile of the Edwards SAPIEN Transcatheter Heart Valve

The Edwards SAPIEN transcatheter aortic prosthesis is mounted on a balloon-expandable stainless steel stent that is placed in the subcorona bovine pericardial prosthesis is attached to the stent and treated with an anticalcification treatment. The stent has a polyethylene terephthalat decreases perivalvular leaks.

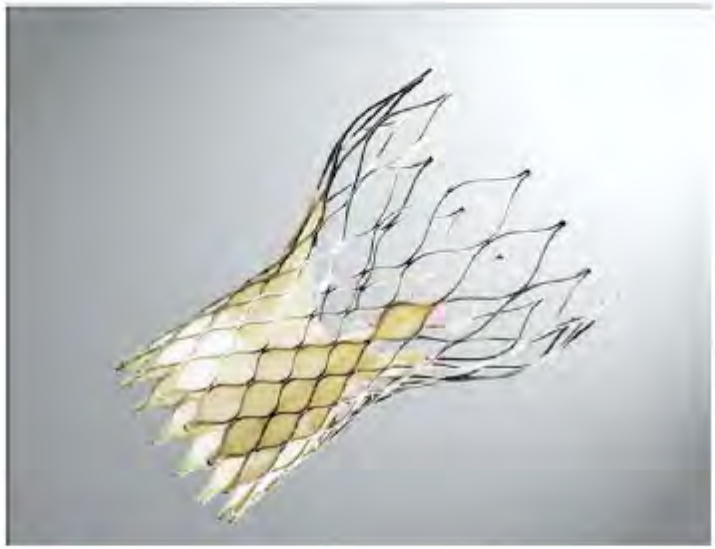
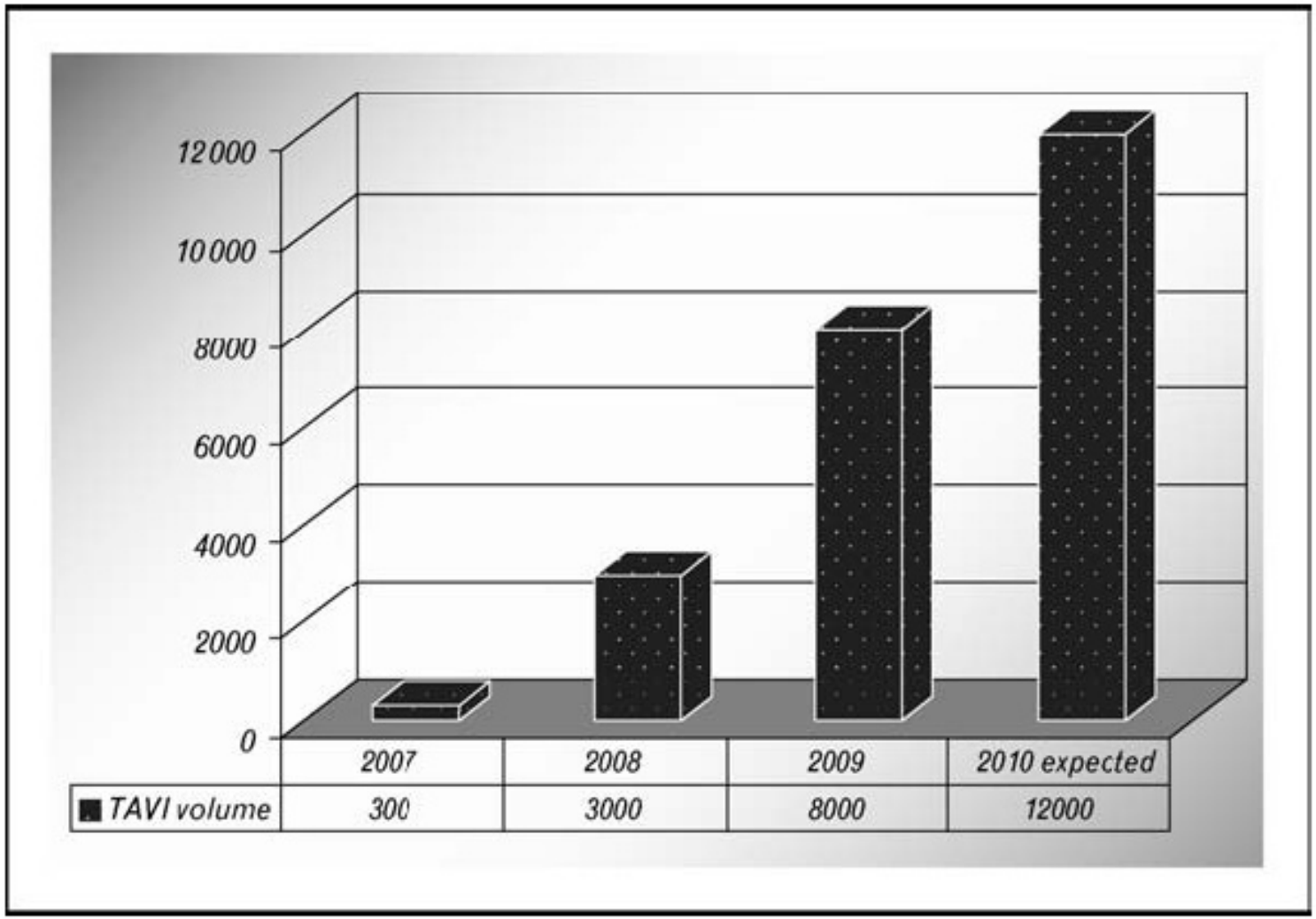


Figure 2 Profile of the CoreValve ReValving System

The CoreValve transcatheter aortic heart valve is a self-expanding nitinol frame porcine pericardium prosthesis developed for the treatment of aortic stenosis, regurgitation, and failing surgical bioprosthesis. The frame has 3 distinct functional levels with different radial and hoop strengths. The valve is placed across the left ventricular outflow tract and extends into the aortic root.

Percutan beültetett aorta billentyűk száma

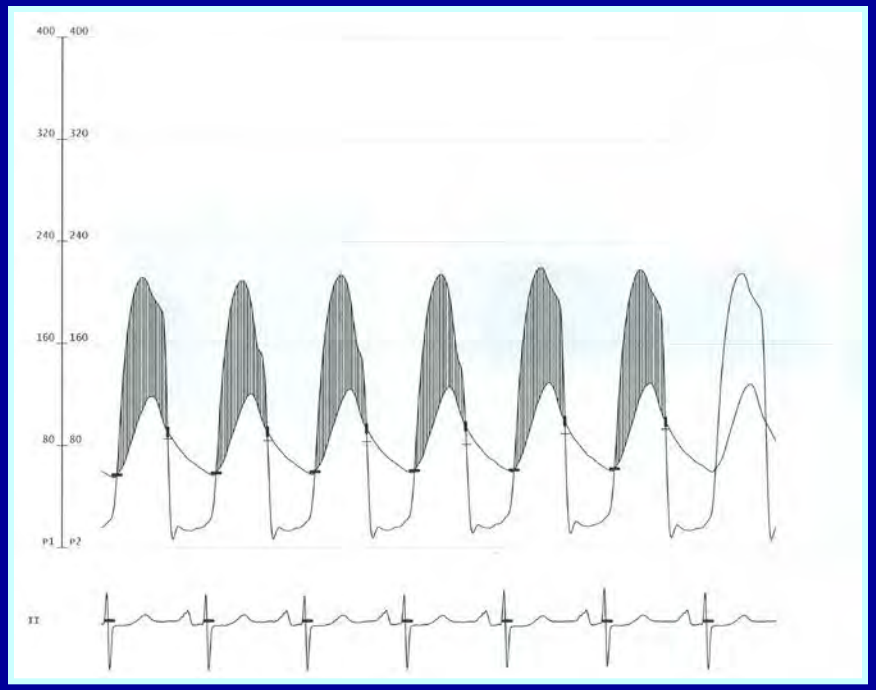


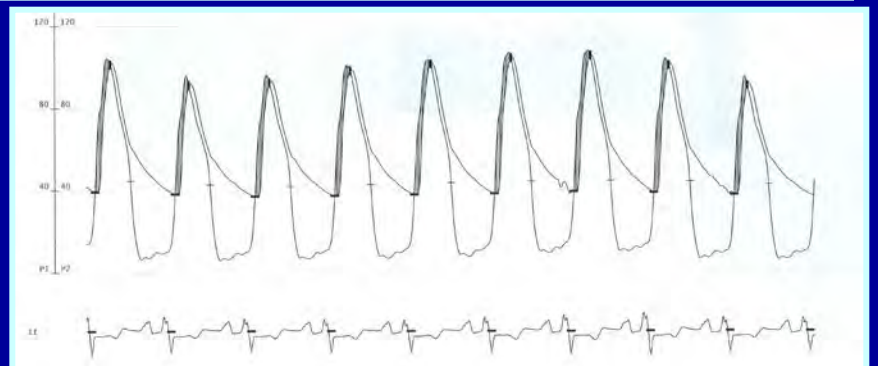
Jelenlegi fő megállapítások

Key points

- The PARTNER (Placement of AoRTic traNscath-etER valve) randomized trial, cohort B confirms the superiority of the transfemoral transcatheter aortic valve implantation (TAVI) compared with standard medical therapy with regard to overall survival and cardiac functional status.
- Major stroke and vascular complications, however, remain higher in the transfemoral TAVI group.
- Large European registries of both the transapical and transfemoral TAVI are reporting improved procedural success and early survival.
- The CoreValve and SAPIEN valves remain the forerunners, with accumulating evidence for use, and published 3-year prosthesis durability data for the latter.

Egy példa





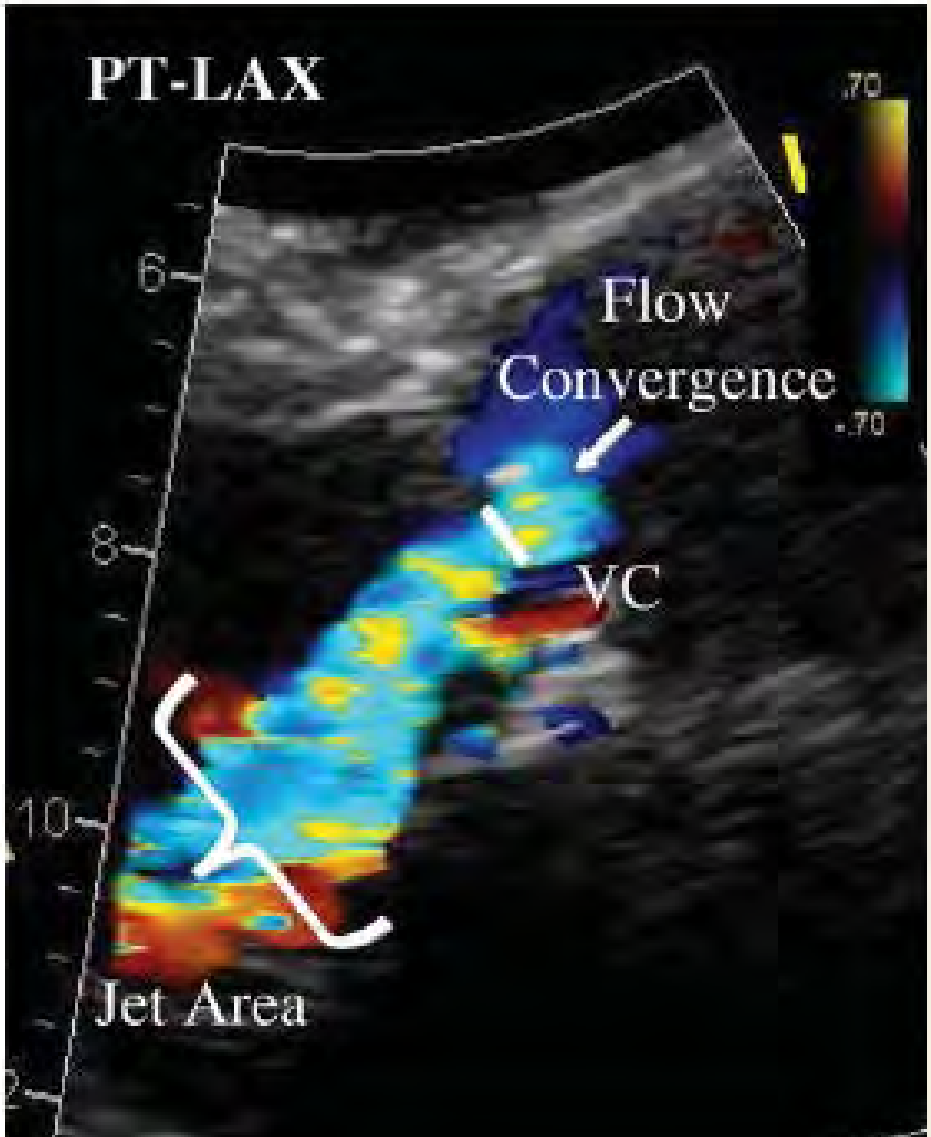
4. Aorta regurgitatio

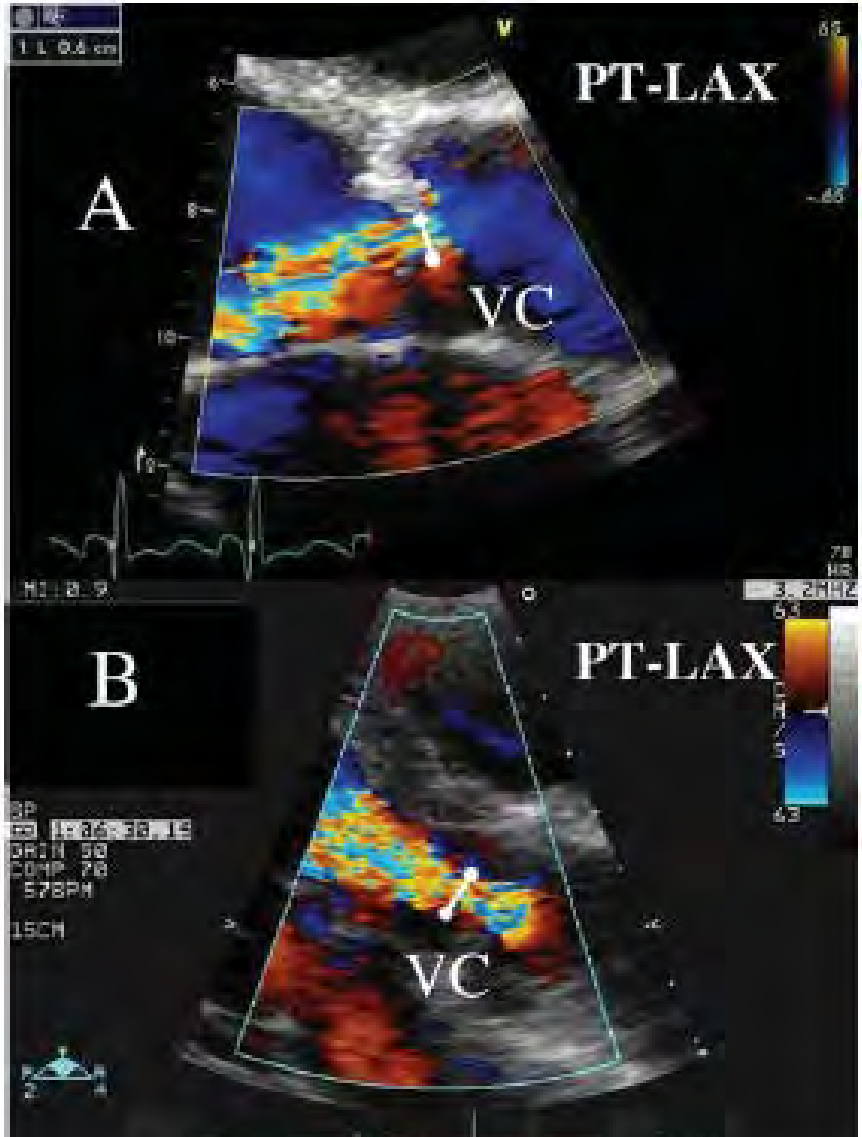
Súlyosságának meghatározása

Table 2 Grading the severity of AR

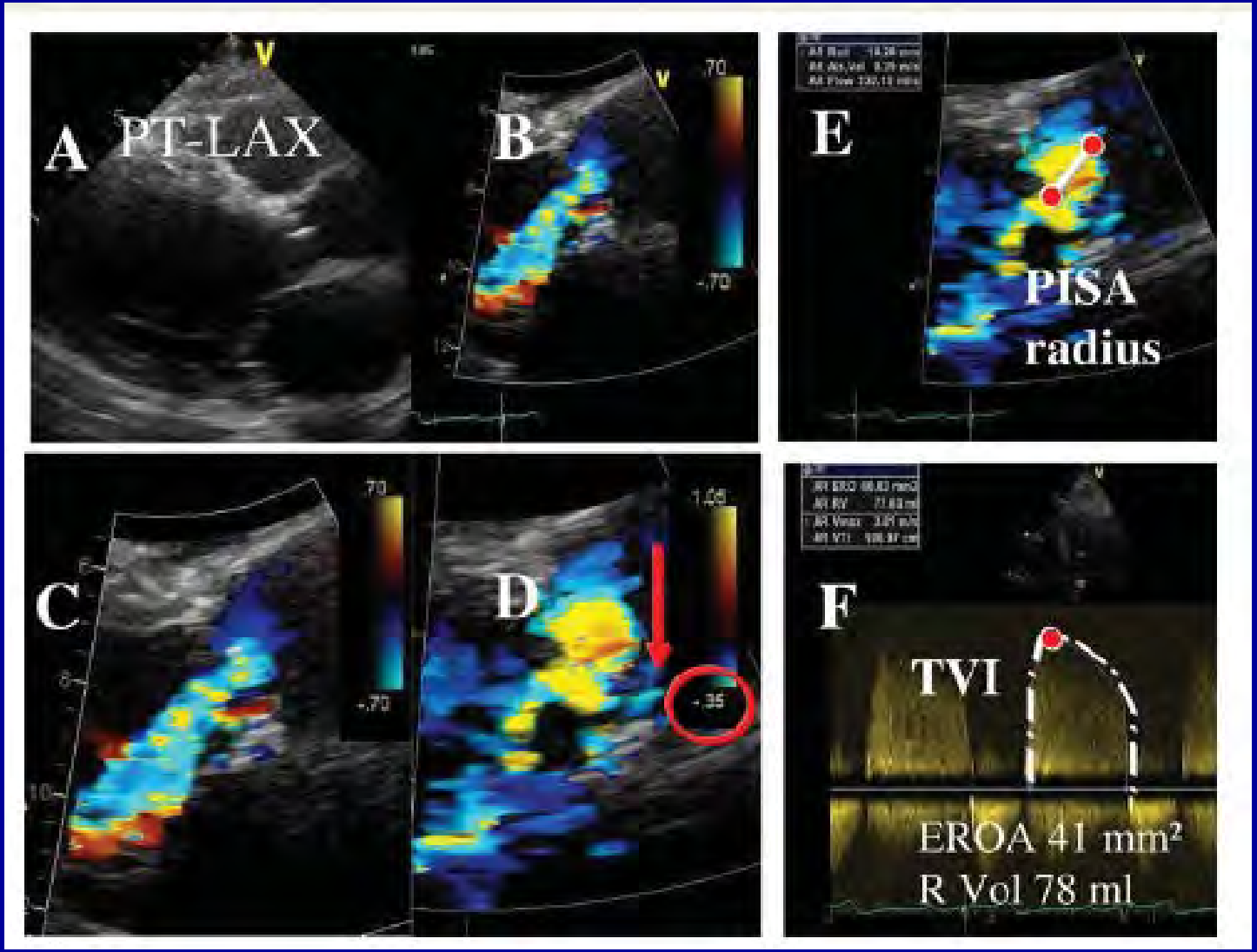
Parameters	Mild	Moderate	Severe
Qualitative			
Aortic valve morphology	Normal/Abnormal	Normal/Abnormal	Abnormal/flail/large coaptation defect
Colour flow AR jet width[a]	Small in central jets	Intermediate	Large in central jet, variable in eccentric jets
CW signal of AR jet	Incomplete/faint	Dense	Dense
Diastolic flow reversal in descending aorta	Brief, protodiastolic flow reversal	Intermediate	Holodiastolic flow reversal (end-diastolic velocity >20 cm/s)
Semi-quantitative			
VC width (mm)	<3	Intermediate	≥6
Pressure half-time (ms)[b]	>500	Intermediate	<200
Quantitative			
EROA (mm^2)	<10	10–19; 20–29[c]	≥30
R Vol (mL)	<30	30–44; 45–59[c]	≥60
+LV size[d]			

Vena contracta

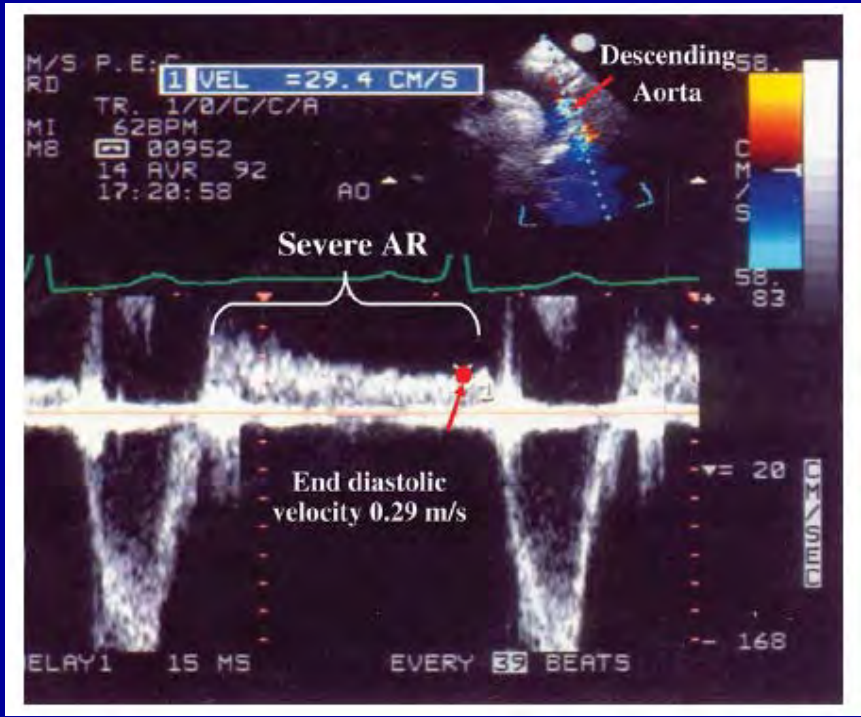




PISA


A PT-LAX
B
70
-70
E
PISA
radius
C
70
-70
D
1.44
-35
F
TVI
EROA 41 mm²
R Vol 78 ml

Aorta descendens reverse áramlás



Key point

The measurement of the diastolic flow reversal in the descending aorta is recommended, when assessable. It should be considered as the strongest additional parameter for evaluating the severity of AR.

aorta

prolapsus

Billentyű destructio

Table I Functional classification of AR lesions

Dysfunction	Echo findings
I: enlargement of the aortic root with normal cusps	Dilatation of any components of the aortic root (aortic annulus, sinuses of Valsalva, sinotubular junction)
IIa: cusp prolapse with eccentric AR jet	
Cusp flail	Complete eversion of a cusp into the LVOT in long-axis views
Partial cusp prolapse	Distal part of a cusp prolapsing into the LVOT (clear bending of the cusp body on long-axis views and presence of a small circular structure near the cusp free edge on short-axis views)
Whole cusp prolapse	Free edge of a cusp overriding the plane of aortic annulus with billowing of the entire cusp body into the LVOT (presence of a large circular or oval structure immediately beneath the valve on short-axis views)
IIb: free edge fenestration with eccentric AR jet	Presence of an eccentric AR jet without definite evidence of cusp prolapse
III: poor cusp quality or quantity	Thickened and rigid valves with reduced motion
	Tissue destruction (endocarditis)
	Large calcification spots/extensive calcifications of all cusps interfering with cusp motion

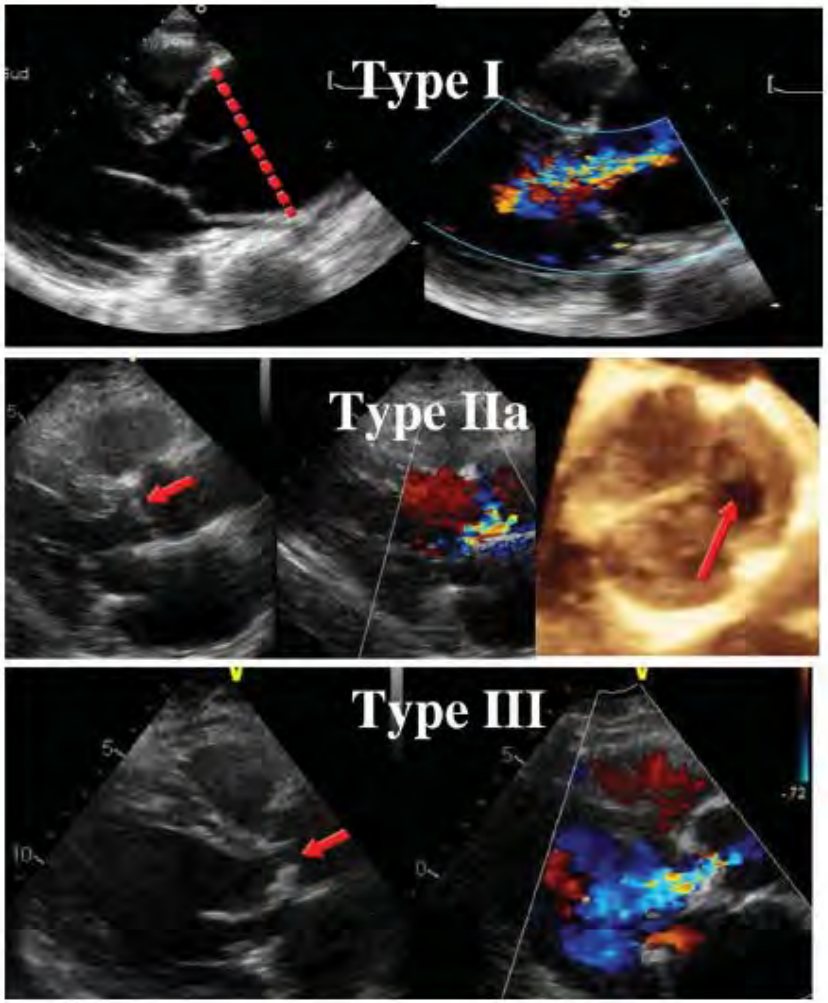


Figure 4 Mechanisms of aortic regurgitation according to the Capentier functional classification. Type I, aortic annulus dilatation; Type IIa, prolapse of the left coronary cusp (arrow); Type III, rheumatic aortic valve disease with restricted cusp motion.

Aorta regurgitatio, klasszifikáció

Repair-oriented classification of aortic insufficiency: Impact on surgical techniques and clinical outcomes

Munir Boodhwani, MD, MMSc, Laurent de Kerchove, MD, David Glineur, MD, Alain Poncelet, MD, Jean Rubay, MD, Parla Astarci, MD, Robert Verhelst, MD, Philippe Noirhomme, MD, and Gébrine El Khoury, MD

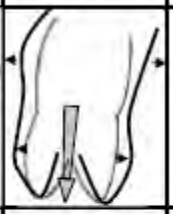
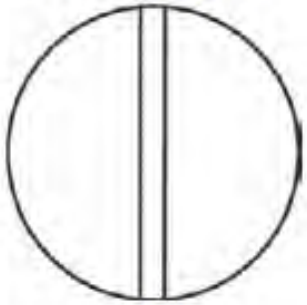
AI Class	Type I Normal cusp motion with FAA dilatation or cusp perforation				Type II Cusp Prolapse	Type III Cusp Restriction
	Ia	Ib	Ic	Id		
Mechanism						
Repair Techniques (Primary)	STJ remodeling *Ascending aortic graft*	Aortic Valve sparing: *Reimplantation or Remodeling with SCA*	SCA	Patch Repair *Autologous or bovine pericardium*	Prolapse Repair *Plication* *Triangular resection* *Free margin Resuspension* *Patch*	Leaflet Repair *Shaving* *Decalcificatio* *Patch*
(Secondary)	SCA		STJ Annuloplasty	SCA	SCA	SCA

FIGURE 1. Repair-oriented functional classification of aortic insufficiency *(AI)* with description of disease mechanisms and repair techniques used. *FAA*, Functional aortic annulus; *STJ*, sinotubular junction; *SCA*, subcommissural annuloplasty.

Bicuspidalis aorta billentyű típusai, megoszlása

main category: number of raphes	0 raphe - Type 0		1 raphe - Type 1			2 raphes - Type 2
	 21 (7)		 269 (88)			 14 (5)
1. subcategory: spatial position of cusps in Type 0 and raphes in Types 1 and 2	lat 13 (4) 	ap 7 (2) 	L – R 216 (71) 	R – N 45 (15) 	N – L 8 (3) 	L – R / R – N 14 (5) 
2. subcategory:						
VALVULAR FUNCTION I	6 (2)	1 (0.3)	79 (26)	22 (7)	3 (1)	6 (2)
VALVULAR FUNCTION S	7 (2)	5 (2)	119 (39)	15 (5)	3 (1)	6 (2)
VALVULAR FUNCTION B (I + S)		1 (0.3)	15 (5)	7 (2)	2 (1)	2 (1)
VALVULAR FUNCTION No			3 (1)	1 (0.3)		

Műtéti technikák és eredmény

Cusp repair in aortic valve reconstruction: Does the technique affect stability?

Diana Aicher, MD, Frank Langer, MD, Oliver Adam, MD, Dietmar Tscholl, MD, Henning Lausberg, MD, and Hans-Joachim Schäfers, MD

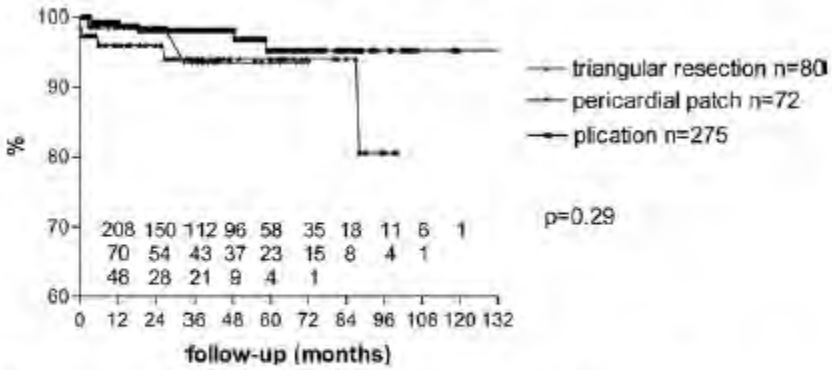


Figure 1. Freedom from reoperation after the three different cusp repair techniques.

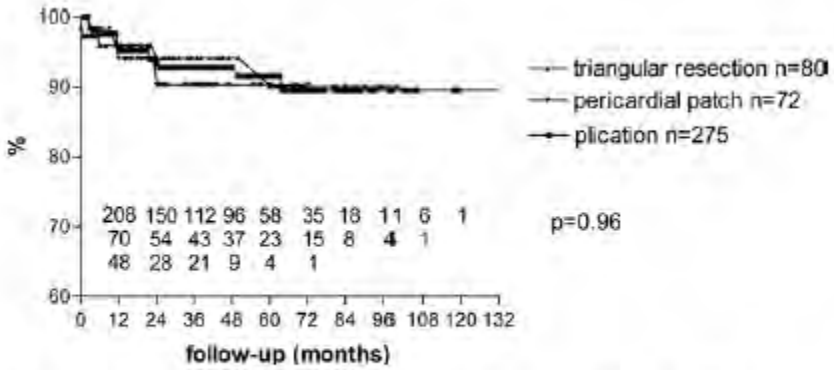


Figure 2. Freedom from aortic regurgitation of grade II or more after the three different cusp repair techniques.

Kivizsgálási terv

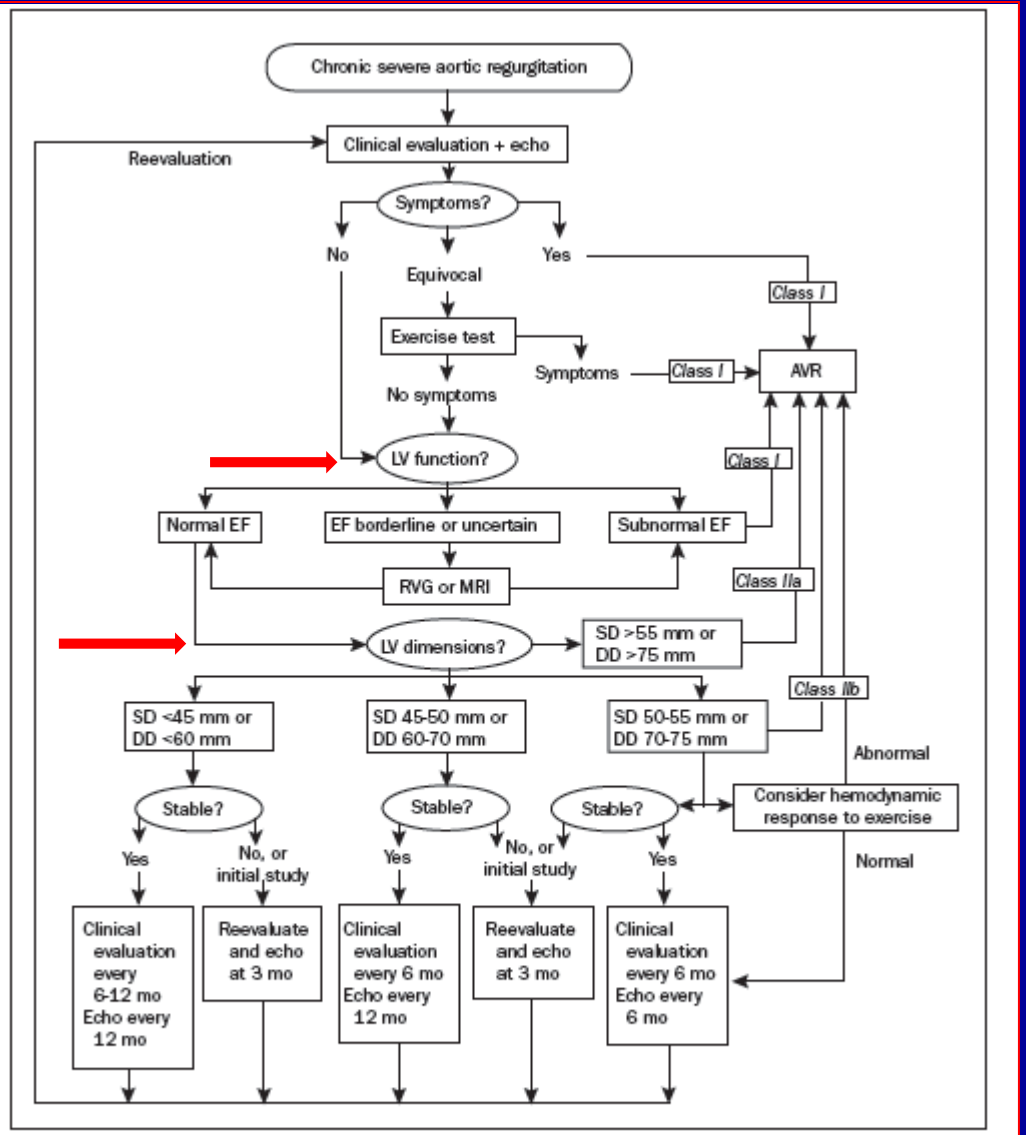


FIGURE 8. Management strategy for patients with chronic severe aortic regurgitation. AVR = aortic valve replacement; DD = diastolic diameter; echo = echocardiography; EF = ejection fraction; LV = left ventricular; MRI = magnetic resonance imaging; RVG = radionuclide ventriculography; SD = systolic diameter.
Adapted from *Circulation*.[2]

Összefoglalás

- Aorta stenosis műtéti indikációja alapuljon a stenotikus areara
- Alacsony verővolumen esetén a dobutamin terhelés segít mechanizmus és a progonsis megismerésében
- Percutan billentyű beültetés meghódította Európát
- Nem jet nagyság alapján határozzuk meg a jelentős aorta regurgitatiot
- Aorta plasztika még nem rutin eljárás