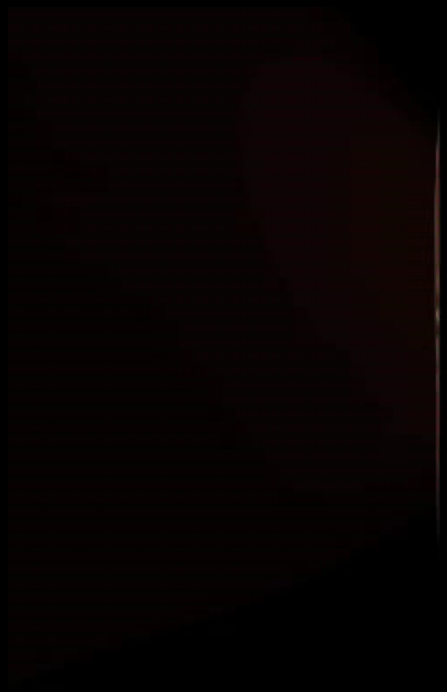
Aortic root reconstructive surgery
- new created technique for aortic stenosis



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Reconstructive surgery for aortic stenosis

Symptoms/Signs

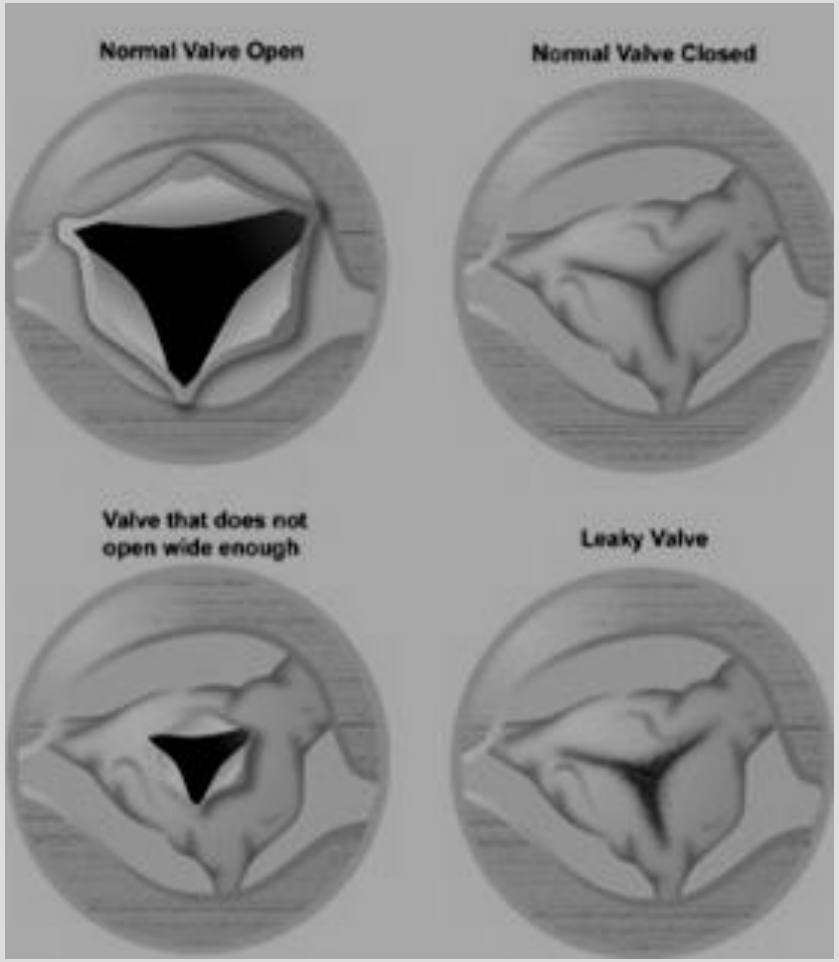
	Live expectancy
Angina	5 years
Syncope	2-3 years
Congestive Heart Failure	1-2 years

Therapy: Valve replacement for severe aortic stenosis

Operative mortality (elderly) 4-24%/

Morbidity 3-11%

Event rate in asymptomatic severe AS ~ 1%/year



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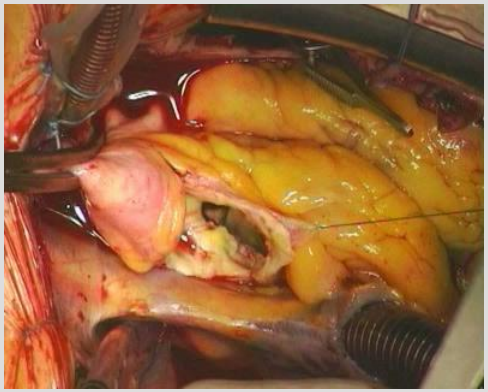
Reconstructive surgery of the aortic root



Type I. Normal cusps with FAA dilatation

Ia: Distal ascending aorta dilation (sino-tubular junction) – aterosclerotic etiology

Ib: Proximal (Valsalva sinuses) and sino-tubular junction dilation- Marfan Sy, sinus Valsalva ectasia…

Ic: Isolated FAA dilation --- aortic ectasia

Id: Cusp perforation and FAA dilation

Type II. Cusp prolapsed: excess of cuspal tissue or commissural disruption / dissection

Type III. Cusp retraction, thickening and calcification.

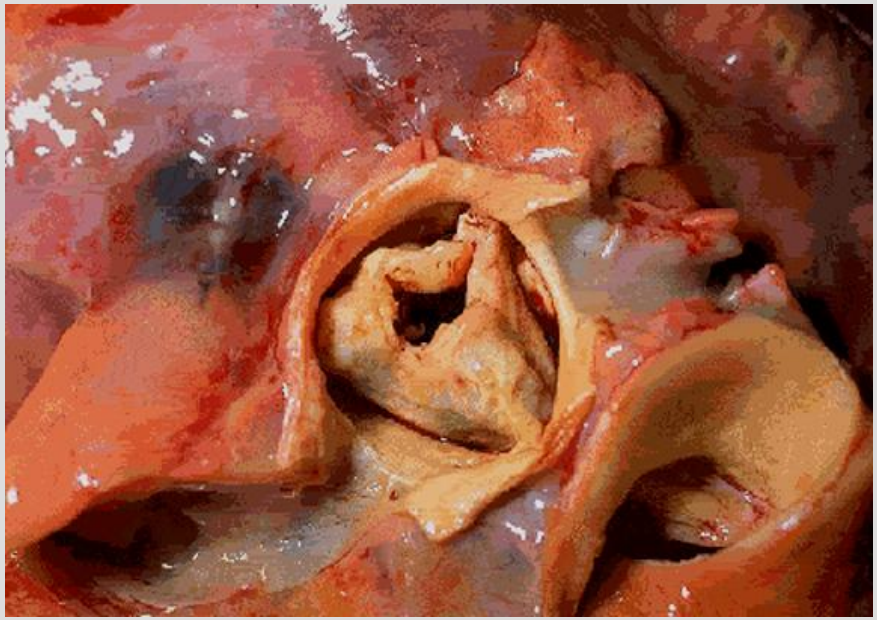
Reconstructive surgery of the aortic root

- in valvular stenosis still is ?????

Main task – restoration of normal aortic valve function

Two main techniques:

- **reconstruction of aortic valve/root structures**
- **replacement of one or more leaflets**

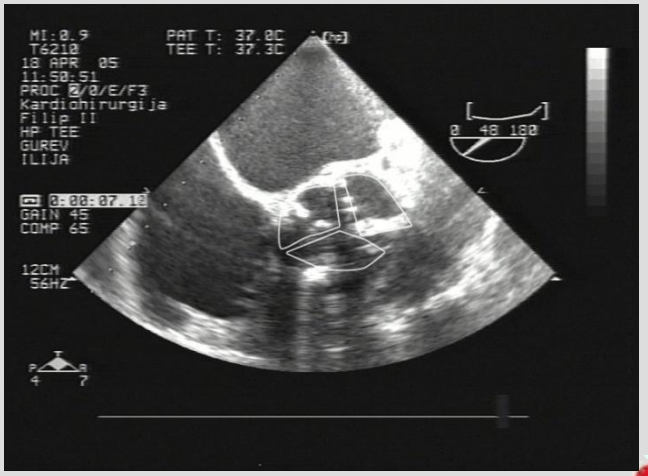


Aortic stenosis- calcification of the leaflets

Reconstructive surgery of the aortic root
Type III. Cusp retraction, thickening and calcification.

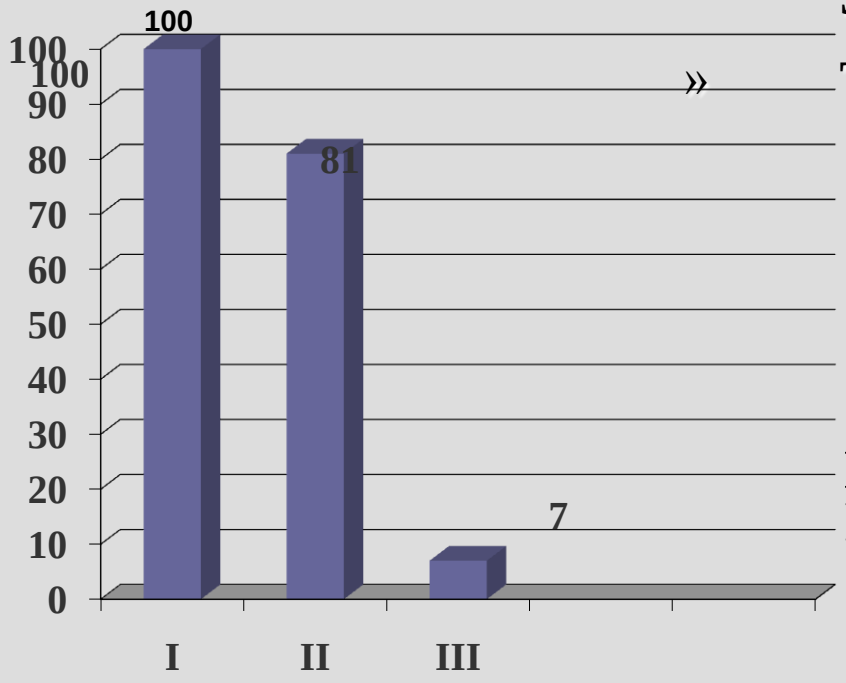
Surgery:

- shaving of the nodes and free margin,
- cusp extension with pericardium
- calcium enucleation,
- **cusps replacement**



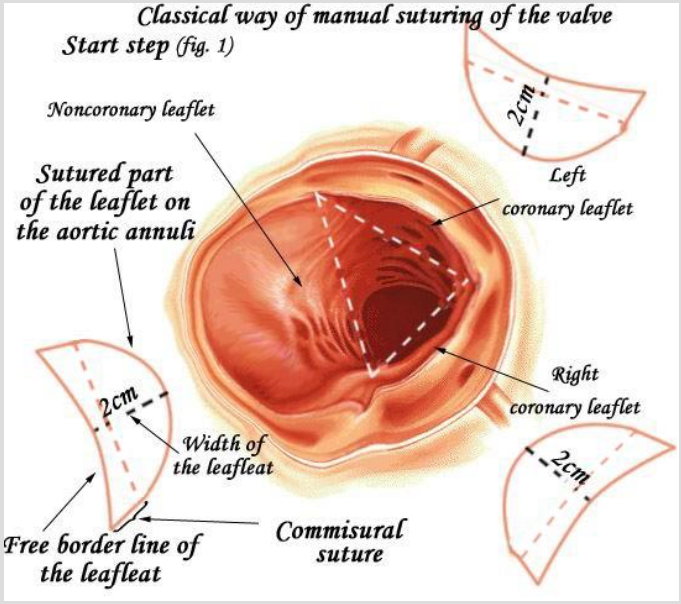
Aortic root reconstructive surgery for aortic stenosis - clinical approaches

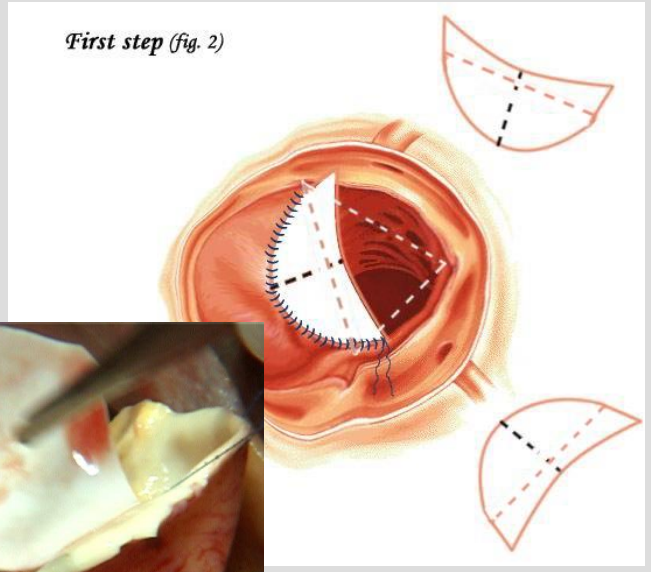
- **Prospective study N = 188 pts Age (years) 56 ± 7.6y**
- **Sex (f/m) 54 / 74**
- **The oldest patient – 72y**

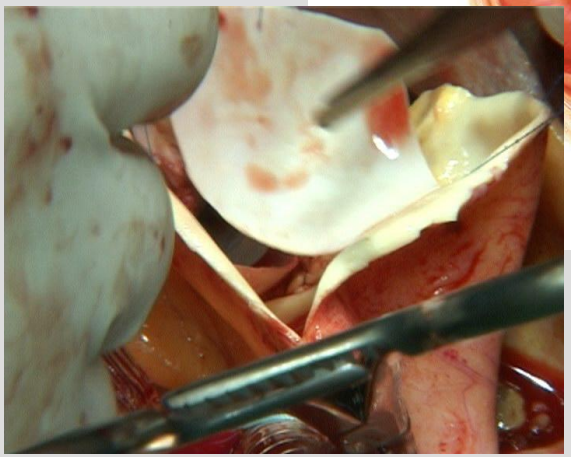


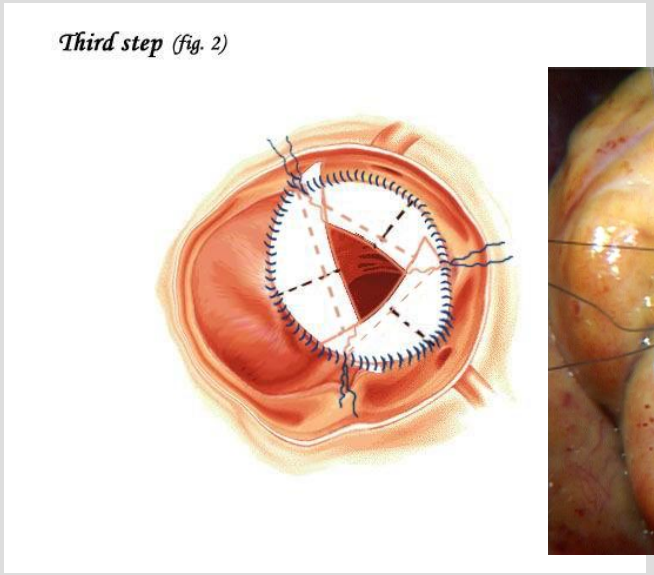
I=atherosclerotic etiology
II=rheumatic etiology
III=subacute endocarditis in patients on chronic haemodyalysis

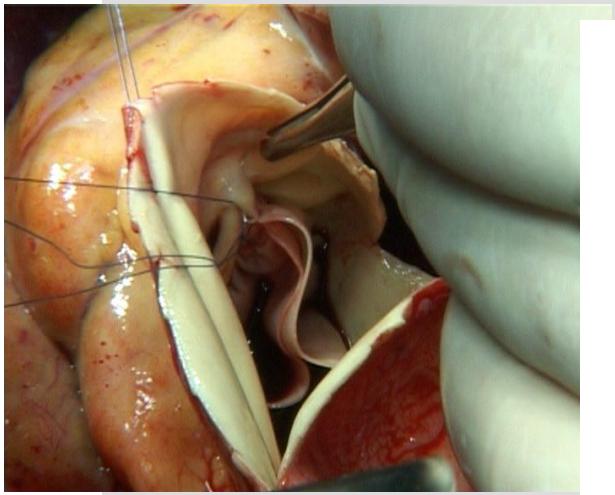
How to do it

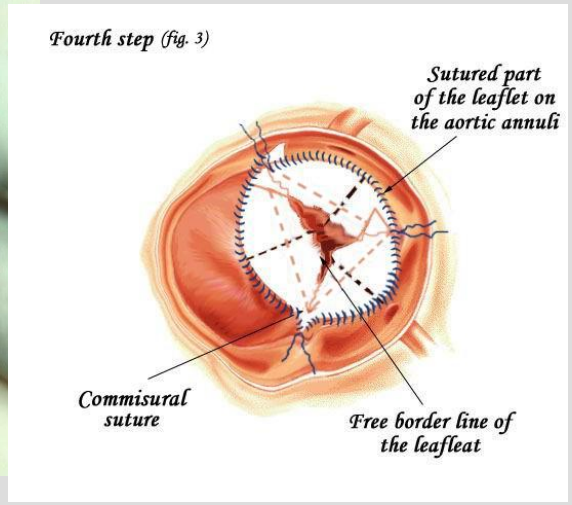

Classical way of manual suturing of the valve
Start step (fig. 1)
Noncoronary leaflet
Sutured part of the leaflet on the aortic annuli
2cm
Left coronary leaflet
Right coronary leaflet
2cm
Width of the leafleat
2cm
Free border line of the leafleat
Commisural suture


First step (fig. 2)




Third step (fig. 2)




Fourth step (fig. 3)
Sutured part of the leaflet on the aortic annuli
Commisural suture
Free border line of the leafleat

Aortic root reconstructive surgery for aortic stenosis Reconstruction of aortic leaflets N= 188 pts.

surgery

Preop.echo 2D TEE

Postop.echo 2D TEE

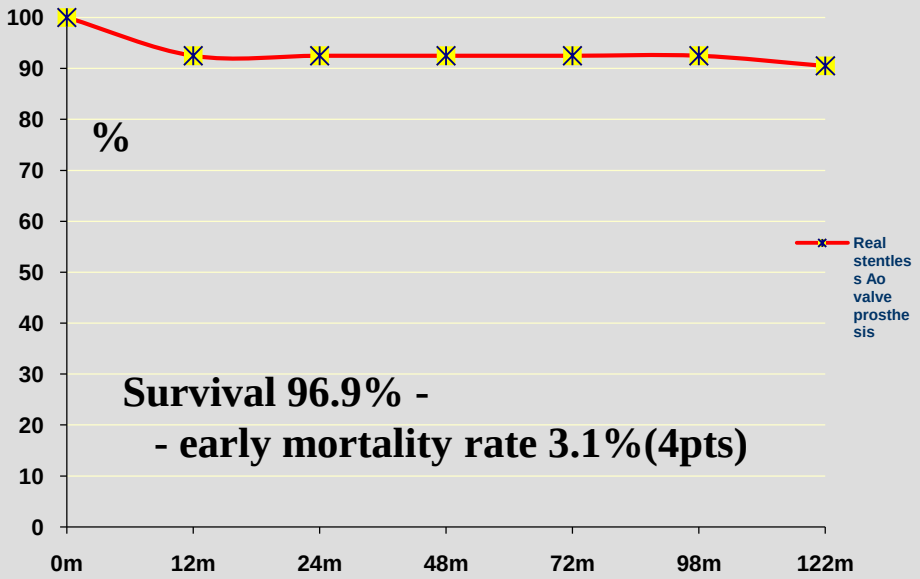
Results N= 188 pat

- **Early survival (30 days) 96.9 %(6pts)**
- **Other main complication:**
- **Bleeding 21 pat (5 surg. etiology)**
- **Ventilation time 6.2h 2.13**
- **Stroke 5 (1 with left side hemiparesis)**
- **4pts (with preoperative terminal renal failure) with CAVH 5 days in combination with bicarbonate haemodyalisis**
- **Length of ICU stay 4.2d 2.13**
- **Hospital stay 13.2d 3.1**
- **Follow up period 1-144 months**

Intra-operative TEE data

- *Dp/dt = 0.07 0,015; SS= 22±3.2*
- *EAO cm2=3.6±0,8; CO = 6,5±2.9l*
- *Average systolic valve gradient 14±6.8mmHg*
- *Average mean valve gradient 7±5.6mmHg*

Actuarial survival



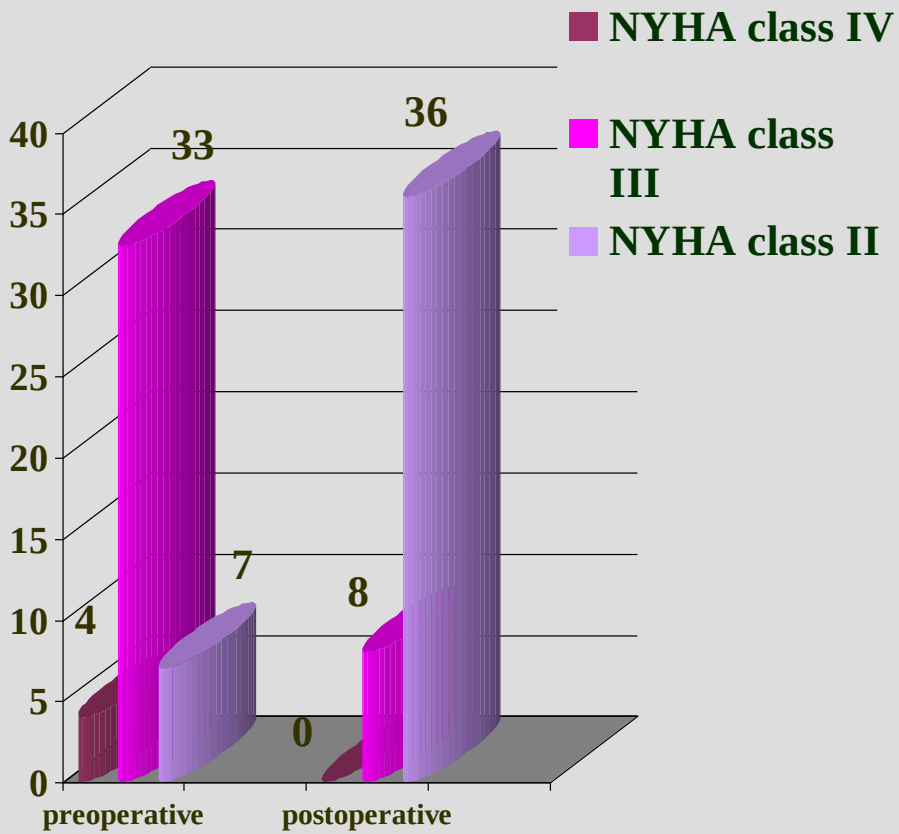
Late complications and NYHA class N=182pts

5 patients re-operated (2,5%)

1-due to aortic regurgitation bigger than +2 as a result of dilatation of the aortic annulus

2-due to calcium degeneration of the leaflets

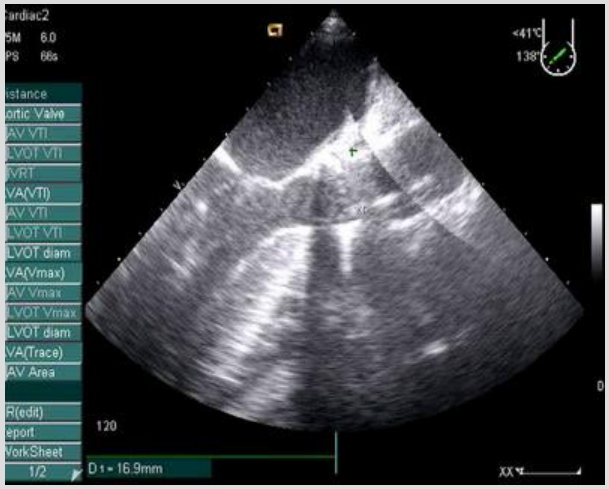
1-due to infective endocarditis



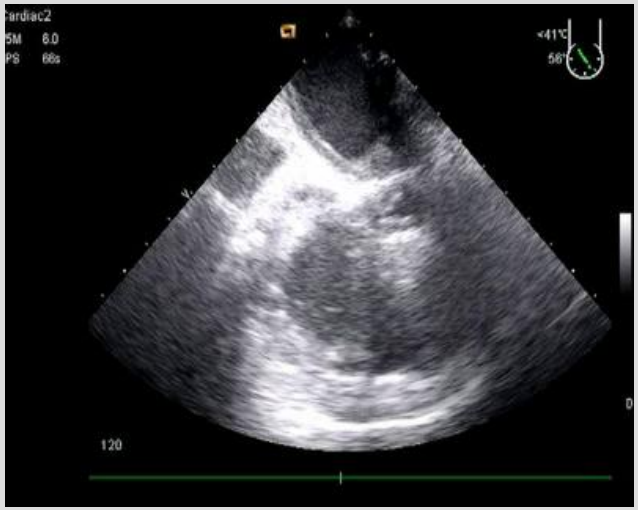
Late mortality 1% (2pts).

Follow up 1-144 months

Replacement of Aortic Valve Leaflets in a patient with a small root aorta – case report



Pre-operative echocardiography



Post-operative echocardiography

68y.old women
Severe symptomatic aortic stenosis
Small aortic root– 16,9mm
Severe calcification of the ascending aorta up to the aortic arch
Once delayed operation- because of her condition

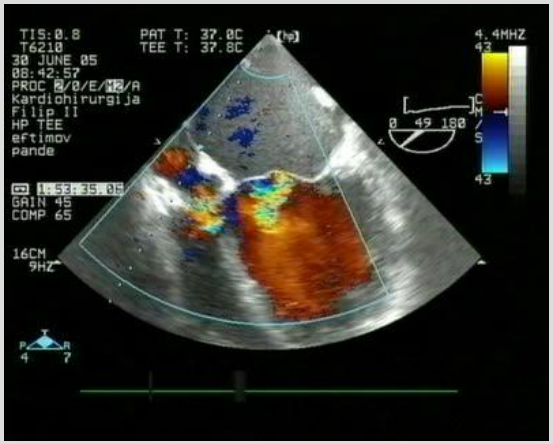
Filip Vtori

Replacement of Aortic Valve Leaflets in a patient with a bicuspid valve – case report

Pre-op.evaluation

Post-op.evaluation

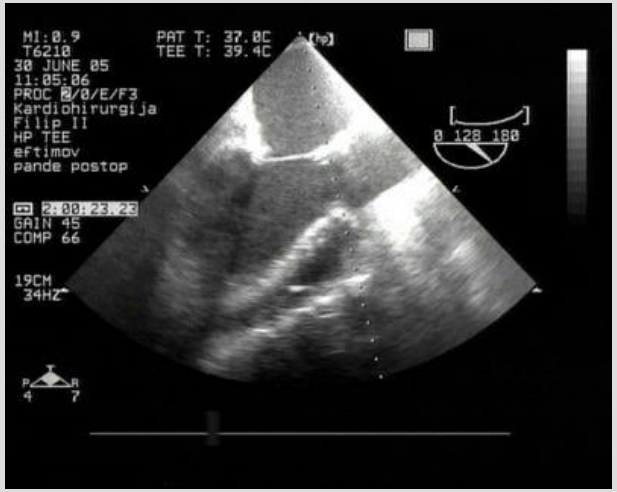
Reconstruction of the unileaflet aortic disease in a patient – case report



E.P.- 65y
Aortic insuff. p. p. rupture and prolaps of the non-coronarial leaflet
Mitral insuff. –annulus dilatation

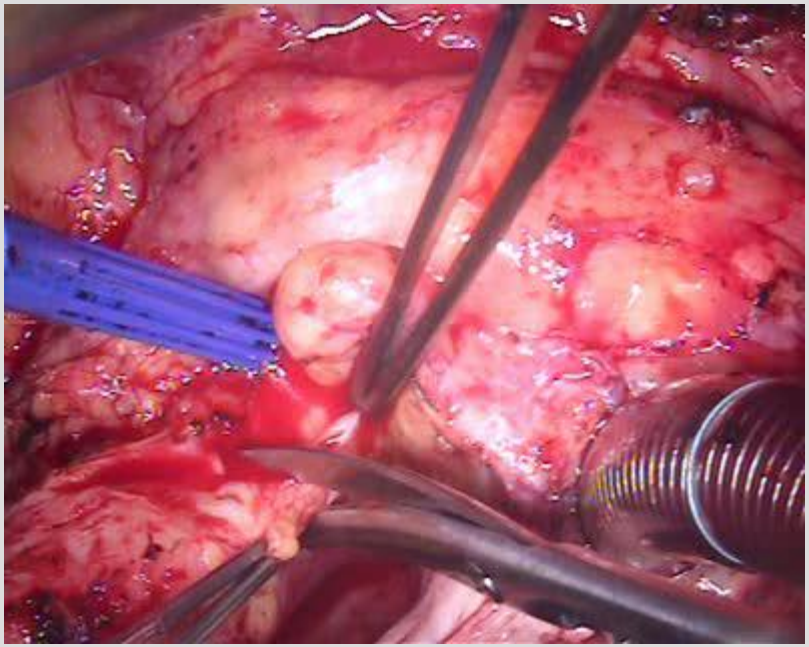
Pre-op.evaluation

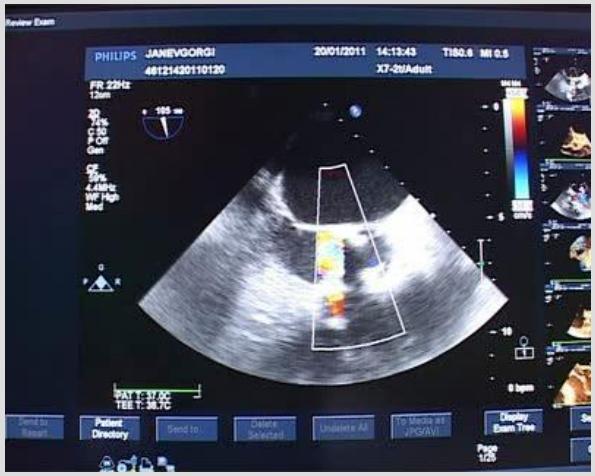
Operation technique



Post-op. evaluation

Re-operation-replacement of Aortic Valve Leaflets in a patient with prosthetic endocarditis – case report





Pre-operative echocardiography

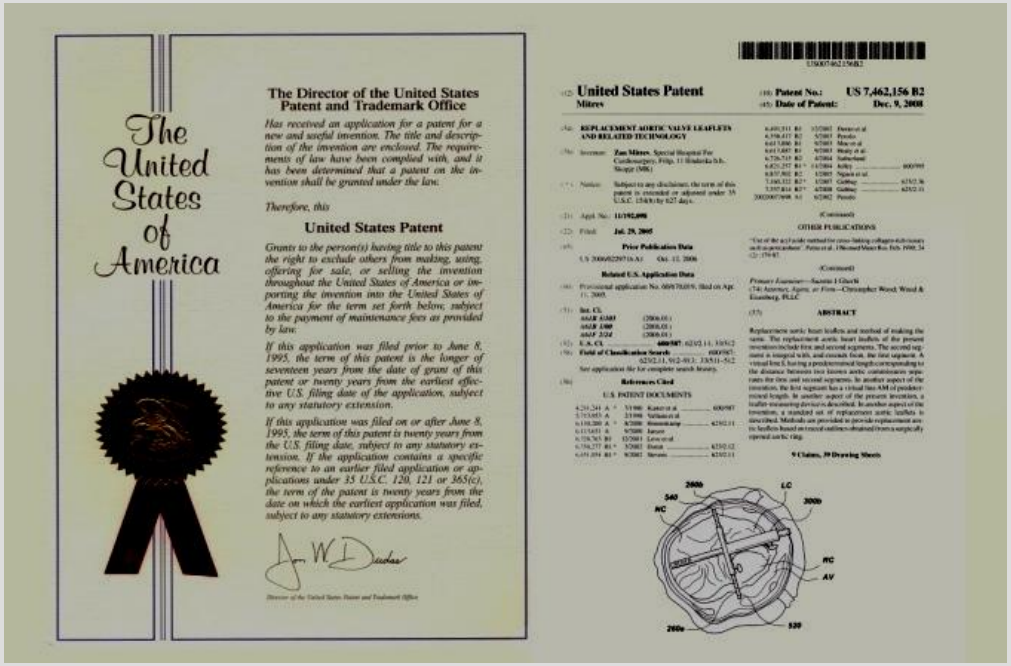
64y.old men; 04/2007 biologic aortic valve prosthesis
09/2010 Pseudomonas pneumonia with severe symptomatic prosthetic endocarditis
Peri-annular abscess
Positive haemoculture- Pseudomonas aurogenosa
ICV- aphasio
3mounths after ICV re-operation

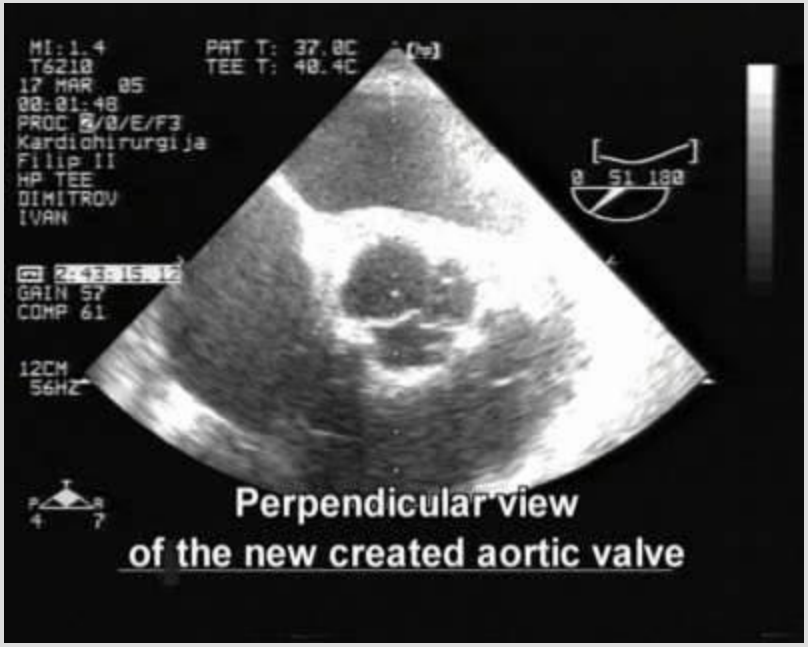
Post-operative echocardiography

Filip Vtori

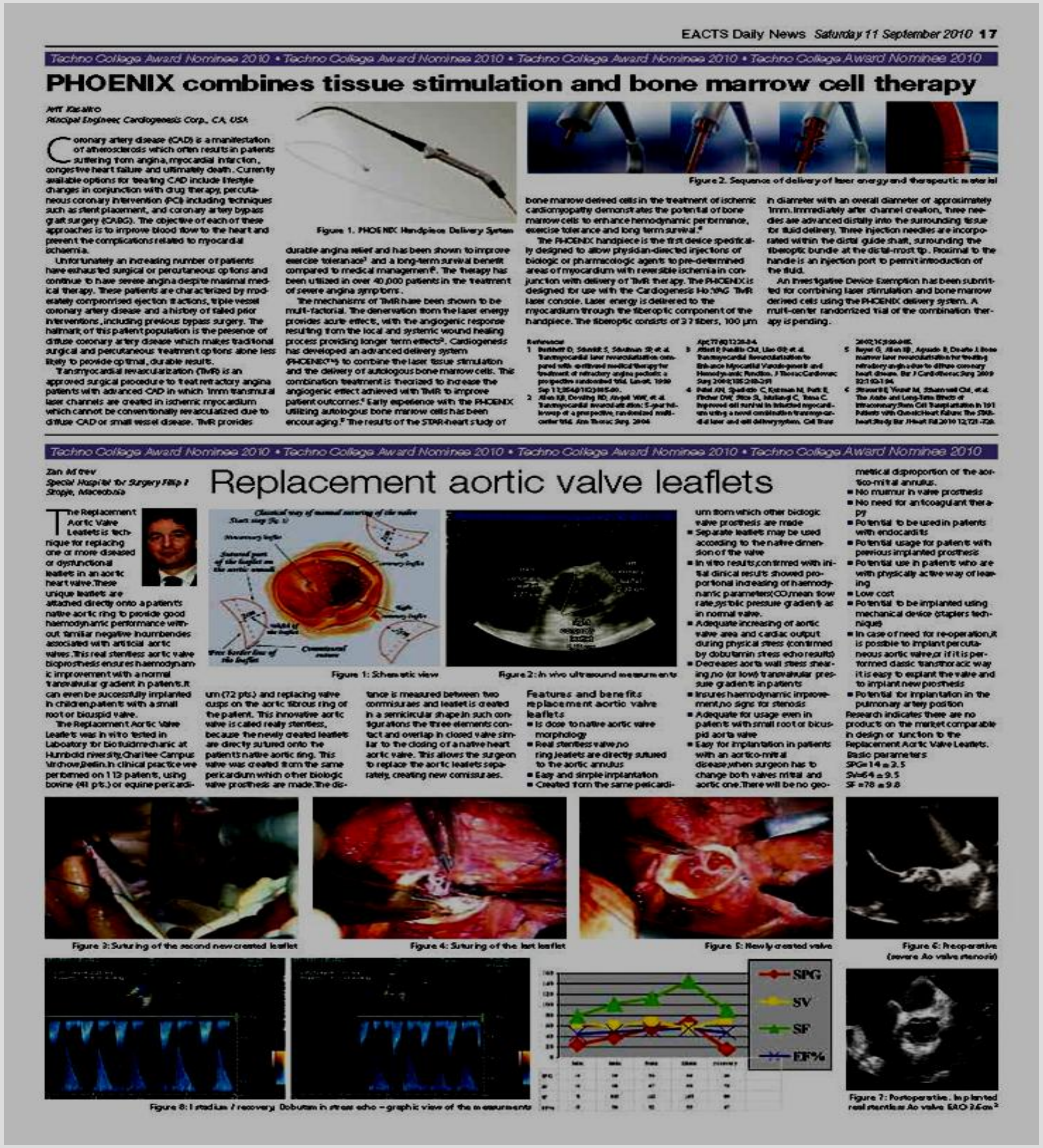
Reconstructive surgery for aortic stenosis aortic leaflets reconstruction

Accepted as a patent in USA 09.12.2008





Post-operative echo



EACTS Daily News Saturday 11 September 2010 17

Techno College Award Nominee 2010 • Techno College Award Nominee 2010 • Techno College Award Nominee 2010 • Techno College Award Nominee 2010

PHOENIX combines tissue stimulation and bone marrow cell therapy

Figure 1. PHOENIX Handpiece Delivery System

Figure 2. Sequence of delivery of laser energy and therapeutic material

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Replacement aortic valve leaflets

Figure 1: Schematic view

Figure 2: In vivo ultrasound measurements

Features and benefits replacement aortic valve leaflets

Figure 3: Suturing of the second new created leaflet

Figure 4: Suturing of the last leaflet

Figure 5: Newly created valve

Figure 6: Preoperative (severe Ao valve stenosis)

Figure 7: Postoperative. Implanted real stentless Ao valve

Figure 8: I stadium / recovery; Dobutamin in stress echo – graphic view of the measurements

EACTS 2010

Techno-colegue Award nominee (printed Daily News)

Conclusion:

This technique is:

- **method of choice for small root aortic stenosis**
- **patients do not need anticoagulation therapy**
- **restores the aortic root geometry , because every leaflet is sized according to patient's natural dimensions of sinus Valsalva**
- **ensures bigger orifitium area with a smaller transvalvular gradient compare with standard procedure**

Reconstructive surgery of the aortic stenosis is not that complex surgical technique and could be routine and applicable for every cardio surgeon