Reconstructive surgery of the aortic root

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Reconstructive surgery of the aortic root

“Aortic valve repair: still a dream?” - 1997 M. Antunes

Ascending Aorta

Aortic Root

Cardiosurgery-Skopje
Reconstructive surgery of the aortic root

In insufficiency-established last few years

In stenosis still is ?????

Acute aortic insuff due to dissection of the ascending aorta

Aortic stenosis- calcification of the leaflets
Reconstructive surgery of the aortic root – mortality

Aortic regurgitation -

Asymptomatic
Normal LV function (good prognosis)
- 75% 5 years survival
- Sudden death 0.2%

Abnormal LV function
- 50% 5 year survival
- Sudden death 2%

Symptomatic (bad prognosis)
- 15% 5 year survival
- Sudden death > 10%

Therapy: Conservative treatment
Surgical treatment before LV dysfunction occurs.

Aortic stenosis

Symptom/Sign
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

www.escardio.org
Reconstructive surgery of the aortic root

Aortic insufficiency

Different techniques depending on the assessment mode of the functional aortic annulus.

Functional aortic annulus (aortic root) FAA = internal part (aortic ventricular junction) + external part (sinotubular junction)

Aortic stenosis

Still there is no approach !!!
Reconstructive surgery of the aortic root
Types of aortic regurgitation according to the pathoanatomical changes of the functional aortic annulus FAA

Type I. Normal cusps with FAA dilatation
   Ia: Distal ascending aorta dilation (sino-tubular junction) –
       atherosclerotic ethiology
   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 - 11 years experience

Number of operations per year
N=9156pts.

N=7708 open heart surgeries
N= 1248 vascular surgeries

Type of surgery (08.12.2010)
N = 9156pts

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Reconstructive surgery of the aortic root
Type I. Normal cusps with FAA dilatation

Surgical treatment:
- sino-tubular junction remodelling;
- replacement of the ascending aorta with a tube graft
- sub-commissural annuloplasty
- Yacoub, David operation
- FAA annuloplasty

64 MSCT scan
transoesophageal echo 2D/3D
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Reconstructive surgery of the aortic root

Type II. Cusp prolapse: excess of cuspal tissue or commissural disruption

Surgery - reinforcement of the free leaflet margin

Pre-operative

Post-operative

Surgical treatment:
- Free margin plication
- Triangular resection
- Implantation of stentless valve
- Tugging (sparing) surgery
- Reinforcement of the free leaflet margin

64 MSCT scan

transoesophageal echo 2D/3D

Cardiosurgery-Skopje
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 and calcium enucleation,
- cusps replacement
- Reconstruction of aortic leaflets
# Aortic reconstructive surgery

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<th>Type of surgery</th>
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<tr>
<td><strong>RECONSTRUCTIVE SURGERY IN AORTIC STENOSIS</strong></td>
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**Aortic insufficiency**
Aortic root reconstructive surgery for aortic stenosis - clinical approaches

- Prospective study
  - N = 118 pts
  - Age (years) 56 ± 7.6y
  - Sex (f/m) 24 / 64

The oldest patient – 72y

I = atherosclerotic ethyology
II = rheumatic ethyology
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

Left coronary leaflet

Width of the leaflet

Right coronary leaflet

Free border line of the leaflet

Commissural suture

First step (fig. 2)

Third step (fig. 2)

Fourth step (fig. 3)

Sutured part of the leaflet on the aortic annuli

Commissural suture

Free border line of the leaflet

Cardiosurgery-Skopje
Aortic root reconstructive surgery for aortic stenosis
Reconstruction of aortic leaflets N= 118 pts.
Results

N= 118 pat

- Early survival (30 days) 97.5% (3pts)
- Other main complication:
  - Bleeding 5 pat (3 surg.ethyology)
  - Ventilation time 6.8h 2.2
  - Stroke 2 (1 with left side hemiparesis)
  - 3 pts (with preoperative terminal renal failure) with CAVH 5 days in combination with bicarbonate haemodyalisis
- Length of ICU stay 4.1d 2.1
- Hospital stay 12.4 3.2
- Follow up period 1-108 months

Intra-operative TEE data
- $Dp/dt = 0.07 \pm 0.015; SS = 22 \pm 3.2$
- $EAO \ cm^2 = 3.6 \pm 0.8; CO = 6.5 \pm 2.9 l$
- Average systolic valve gradient $14 \pm 6.8 \ mmHg$
- Average mean valve gradient $7 \pm 5.6 \ mmHg$

Actuarial survival
- Survival 97.5% -
  - early mortality rate 2.5% (3pts)

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Graph showing survival rates and stentless Ao valve prosthesis data.
Replacement Aortic Valve Leaflets in a patient with a small roth aorta – case report

68y. old women
Severe symptomatic aortic stenosis
Small aortic roth – 16.9mm
Severe calcificated ascending aorta up to aortic arch
Once delated operation - because of her condition

Pre-operative echocardiography

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

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
3mouths after ICV re-operation

Pre-operative echocardiography

Post-operative echocardiography
Aortic root reconstructive surgery for aortic stenosis
Reconstruction of aortic leaflets

Accepted as a patent in USA 09.12.2008

Post-operative echo
Conclusion:

Reconstructive surgery of the aortic root covers many complex surgical techniques, whose application depends on the preoperative functional state of the aortic annulus.

The patients do not need anticoagulation therapy.

Aortic leaflet reconstructive surgery is possible even in aortic stenosis.

The past results have shown good clinical outcome, better quality of life and good rate of mid term survival.
I PORED OPERACIJE

PACIJENTU JE IPAK DOBRO

Prof dr.sc. Ino Husedžinović, dr.med.