New Approach in The Treatment of Sinus of Valsalva Aneurysm

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Faculty disclosure

I have no financial relationships to disclose.
**Sinus of Valsalva aneurysm**

Involves the areas out of the fibrous skeleton of the heart*

- non-coronary sinus (up to 25 %)**
- the medial halves of the right and left sinuses
  - up to 77% right coronary sinus**
  - up to 2% left coronary sinus **

- Not always associated with aortic annulus dilatation
- Usually associated with
  - ascending aorta dilatation
  - bicuspid aortic valve

* David TE, J Thorac Cardiovasc Surg. 1995
** Meier JH, J Am Soc Echocardiogr 1998
Surgical treatment of sinus of Valsalva aneurysm

In general

- Tirone David procedure
- Yacoub procedure
- Bentall procedure

In all types of surgical treatments the coronary arteries re-implantation is one of the important steps which

- increases the extra-corporal circulation time
- cross-clamp time
- the risks associated with re-implantation
  - bleeding
  - coronary twist
  - kinking
  - stenosis of orifices
  - false aneurysm
To reduce the operative time and above mentioned complications in high risk population, was proposed a new approach and a new technique of treatment of some type of sinus of Valsalva aneurysm
Main condition of choice

- Dilatation of
  - non-coronary sinus
  - right-coronary sinus

- Intact left-coronary sinus

- Without aortic annulus dilatation

- With or without ascending aorta dilatation
- With or without aortic valve abnormalities
The idea

- Keep **untouched** the left coronary sinus (which will serve as reference for diameter)
- Make **plicature** of dilated right coronary sinus to bring in same diameter with non-dilated left coronary sinus
- **No** resection of right coronary sinus
- **Resect** the non-coronary sinus
- Resect the dilated ascending aorta (above of sinotubular junction)
- Complete the aorta with tailored Dacron graft *

* David TE. J THORAC CARDIOVASC SURG. 1995
Non dilated left coronary sinus considered as reference

$\text{LC} = \text{RC} = \text{NC}$
Technique of plicature

Stop at the sino-tubular junction

Tissue of the “excess” tissue

Starting from annulus between right coronary orifice and right-left commissure
Resection of non coronary sinus
Replacement of non coronary sinus and aorta by tailored Dacron graft
Study

- 15 patients
- Prospective
- Non randomized
- From 2010 till 2011
- Mean age 81 ± 8 years old
- ASA ≥ 3
## Preoperative characteristic of 15 patients

<table>
<thead>
<tr>
<th>Condition</th>
<th>N (%)</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>11 (73.3)</td>
<td>1 (6.6) History of previous coma</td>
</tr>
<tr>
<td>Female</td>
<td>4 (26.6)</td>
<td>2 (13.3) Syncope</td>
</tr>
<tr>
<td>Diabetic</td>
<td>2 (13.3)</td>
<td>1 (6.6) Pulmonary embolism</td>
</tr>
<tr>
<td>CKD*</td>
<td>4 (26.6)</td>
<td>2 (13.3) Epilepsy</td>
</tr>
<tr>
<td>HTN*</td>
<td>8 (53.3)</td>
<td>5 (33.3) Thrombo-phlebitis</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>5 (33.3)</td>
<td>1 (6.6) History of rheumatism</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>2 (13.3)</td>
<td>1 (6.6) Pericarditis</td>
</tr>
<tr>
<td>Smoker</td>
<td>5 (33.3)</td>
<td>1 (6.6) *Previous AVR</td>
</tr>
<tr>
<td>COPD*</td>
<td>3 (20)</td>
<td>1 (6.6) *Previous PCI</td>
</tr>
<tr>
<td>Carotid severe stenosis</td>
<td>2 (13.3)</td>
<td>1 (6.6) Intramural hematoma</td>
</tr>
<tr>
<td>TIA*</td>
<td>2 (13.3)</td>
<td>1 (6.6) Stroke</td>
</tr>
</tbody>
</table>

*CKD - chronic kidney disease, HTN - hypertensive disease, TIA - transient ischemic attack, COPD - chronic obstructive pulmonary disease, AVR - aortic valve replacement, PCI - percutaneous coronary intervention
## Preoperative data

<table>
<thead>
<tr>
<th>Condition</th>
<th>n</th>
<th>%</th>
<th>Mm (mean) ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinus of Valsalva dilatation</td>
<td>15</td>
<td>100</td>
<td>50.5 ±7.38</td>
</tr>
<tr>
<td>Ascending aorta dilatation</td>
<td>11</td>
<td>74.8</td>
<td>53.5 ±16.7</td>
</tr>
<tr>
<td>Atypical placement of right coronary artery orifice</td>
<td>4</td>
<td>26.6</td>
<td></td>
</tr>
<tr>
<td>Bicuspid aortic valve</td>
<td>4</td>
<td>26.6</td>
<td></td>
</tr>
<tr>
<td>Aortic insufficiency (sever and moderate)</td>
<td>8</td>
<td>53.3</td>
<td></td>
</tr>
</tbody>
</table>

SD - standard deviation
## Perioperative data

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
<th>Time minutes (mean) ± SD</th>
<th>Mm (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVR</td>
<td>10</td>
<td>66.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correction of moderate AI</td>
<td>5</td>
<td>33.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECC</td>
<td>15</td>
<td>100</td>
<td>96 ± 19.4</td>
<td></td>
</tr>
<tr>
<td>Cross clamp</td>
<td>15</td>
<td>100</td>
<td>73 ± 11.1</td>
<td></td>
</tr>
<tr>
<td>Dacron tube</td>
<td>15</td>
<td>100</td>
<td>30 ± 2.5</td>
<td></td>
</tr>
</tbody>
</table>

**ECC** - Extracorporeal circulation, **AVR** - aortic valve replacement, **SD** - standard deviation, **AI** – aortic insufficiency
## Immediate postoperative period

<table>
<thead>
<tr>
<th></th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N1</td>
</tr>
<tr>
<td>No death</td>
<td>yes</td>
</tr>
<tr>
<td>No stroke</td>
<td>yes</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>yes</td>
</tr>
<tr>
<td>Complete heart bloc</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>2.1 days - mean intensive care unit stay</td>
</tr>
<tr>
<td></td>
<td>5 days - mean hospital stay</td>
</tr>
<tr>
<td>Low cardiac output</td>
<td>yes</td>
</tr>
<tr>
<td>Renal dysfunction</td>
<td>yes</td>
</tr>
<tr>
<td>Transient ischemic attack</td>
<td>yes</td>
</tr>
</tbody>
</table>

- Required long cardiopulmonary assistance: 140 minutes
- No death
- No stroke

- 2.1 days - mean intensive care unit stay
- 5 days - mean hospital stay

- Patients stay:
  - 2.1 days - mean intensive care unit stay
  - 5 days - mean hospital stay

- Patients recovery:
  - 2.1 days - mean intensive care unit stay
  - 5 days - mean hospital stay
Postoperative follow-up

- All patients were followed by surgeons and cardiologists
  - work-up in every 6 months

- Include
  - Trans - thoracic echocardiography
  - Trans - esophageal echocardiography
  - CT scanner
  - IRM

- The mean follow-up - 12 months.
- The maximum - 30 months
Postoperative complications

- One sternal infection
- One arch dilatation
- One death (Non cardiac cause)
- One left coronary sinus dilatation
- One infective endocarditis
Reoperation for infective endocarditis

- Infection on the native aortic valve
- Replacement by bio-prosthesis
- Full visual revision of added suture
  - suture presence
  - no involvement in infection
  - no dilatation
  - no thrombus on the suture
  - no distortion of the aorta
  - no occlusion
  - no kinking in right coronary artery and orifice
- The results of biopsy from the suture and adjacent tissues
  - scar tissue
  - fibrous tissue
  - no calcification
Conclusion

The

- easiness of the technique
- relatively short cross clump and extracorporeal time
- low morbidity and no mortality
- the absence of any complications in the added suture side
- the presence of scar/ fibrous tissue in the biopsy
- the stability of reduced right coronary sinus during all follow-up period

encourage us to continue and to recommend our technique in highly selected patients with dilatation of sinus of Valsalva
Thank you