Abstract: P6486

Flow state, gradients and anatomopathological valvular calcification: influence in aortic stenosis surgical outcomes

Authors:
JT Museli¹, L Zambruno¹, N Coria¹, G Giunta², JF Salmo¹, C Vigliano³, E Guevara¹, ¹Fundación Favaloro University Hospital, Echocardiography - Buenos Aires - Argentina, ²Favaloro Foundation University Hospital, Ambulatory cardiology - Buenos Aires - Argentina, ³Favaloro Foundation University Hospital, Anatomic Pathology - Buenos Aires - Argentina,

Topic(s):
Valvular Heart Disease – Treatment

Citation:
Introduction

Aortic stenosis (AS) patients are heterogeneous. The relationship between stenosis severity, transvalvular flow state and gradients is conflictive and non-linear.

Objective

To evaluate the relationship between transvalvular flow state and gradients with the anatomopathological aortic valve characteristics and perioperative morbimortality among patients (pt) submitted to aortic valve replacement (AVR).

Methods

We analyzed 516 pt with symptomatic severe AS (effective valve area < 1 cm²) with preserved left ventricular ejection fraction (>50%) submitted to AVR. Perioperative mortality and a combined endpoint (death, low cardiac output syndrome and acute renal injury) were analyzed dividing the population by transvalvular flow (35 ml/m²) and mean gradient (40 mmHg), both measured by echocardiography. A morphologic evaluation of 383 operatively excised native cardiac valves was performed. Valvular thickening and calcification were categorized in mild, moderate and severe.

Results

Male subjects represented 52.9% (283 pt). Mean age were 69 ± 11.5 years. Pt showed a mean ejection fraction of 61 ± 4.8%, the peak gradient was 86.2 ± 24 mmHg, and mean gradient was 53± 18 mmHg.

Cardiac low output syndrome (normal flow- NF- 14%, low flow -LF- 23%; p<0,02), IABP (NF 1,8 %, LF 6 %, p<0,02) and perioperative mortality (NF 2,7%, LF 7 %, p<0,02) were more frequent in low flow pt (185 -35%).

Bicuspid valves represented 24.5% of the whole population. Bicuspid patients were younger 64 ± 9 vs 73 ±12 years (p<0.05) and had more moderate- severe calcification (MSC) 93.4% vs 75.6% (p<0.05).

No difference was found in moderate -severe thickening (MSTh) and MSC when analyzing the population by flow (35 ml/m²). On the contrary, low gradient pt (<40mmHg) had lower MSC and MSTh. (Table)

Finally, 4 groups were considered: normal flow- high gradient NFGHG (52.2%), normal flow – low gradient NFLG (12%), low flow – high gradient LFGHG (25.5%) and low flow – low gradient LFLG (10.1%). A trend
Abstract: P6486 Flow state, gradients and anatomopathological valvular calcification: influence in aortic stenosis surgical outcomes

Authors: JT Museli1, L Zambruno1, N Coria1, G Giunta2, JF Salmo1, C Vigliano3, E Guevara1

1 Fundación Favaloro Universitary Hospital, Echocardiography - Buenos Aires - Argentina, 2 Favaloro Foundation University Hospital, Ambulatory cardiology - Buenos Aires - Argentina, 3 Favaloro Foundation University Hospital, Anatomic Pathology - Buenos Aires - Argentina.

Topic(s): Valvular Heart Disease – Treatment

Introduction

Aortic stenosis (AS) patients are heterogeneous. The relationship between stenosis severity, transvalvular flow state and gradients is conflictive and non-linear.

Objective

To evaluate the relationship between transvalvular flow state and gradients with the anatomopathological aortic valve characteristics and perioperative morbimortality among patients (pt) submitted to aortic valve replacement (AVR).

Methods

We analyzed 516 pt with symptomatic severe AS (effective valve area < 1 cm²) with preserved left ventricular ejection fraction (>50%) submitted to AVR. Perioperative mortality and a combined endpoint (death, low cardiac output syndrome and acute renal injury) were analyzed dividing the population by transvalvular flow (35 ml/m²) and mean gradient (40 mmHg), both measured by echocardiography. A morphologic evaluation of 383 operatively excised native cardiac valves was performed. Valvular thickening and calcification were categorized in mild, moderate and severe.

Results

Male subjects represented 52.9% (283 pt). Mean age were 69 ± 11.5 years. Pt showed a mean ejection fraction of 61 ± 4.8%, the peak gradient was 86.2 ± 24 mmHg, and mean gradient was 53 ± 18 mmHg.

Cardiac low output syndrome (normal flow – NF 14%, low flow -LF 23%; p<0,02), IABP (NF 1,8 %, LF 6 %, p<0,02) and perioperative mortality (NF 2,7%, LF 7 %, p<0,02) were more frequent in low flow pt (185 – 35%).

Bicuspid valves represented 24.5% of the whole population. Bicuspid patients were younger 64 + - 9 vs 73 + - 12 years (p<0.05) and had more moderate - severe calcification (MSC) 93.4% vs 75.6% (p<0.05). No difference was found in moderate - severe thickening (MSTh) and MSC when analyzing the population by flow (35 ml/m²). On the contrary, low gradient pt (< 40mmHg) had lower MSC and MSTh. (Table)

Finally, 4 groups were considered: normal flow - high gradient NFHG (52.2%), normal flow - low gradient NFLG (12%), low flow - high gradient LFHG (25.5%) and low flow - low gradient LFLG (10.1%). A trend toward more perioperative events was seen in the LF-LG group despite less calcified and thickened valves. (Figure)

Conclusions

In our population of severe symptomatic AS with preserved ejection fraction submitted to AVR, low gradient pts had less calcified and thickened valves. LFLG pts presented a trend towards more perioperative events despite having less valvular calcification.

<table>
<thead>
<tr>
<th></th>
<th>Normal Flow</th>
<th>Low Flow</th>
<th>P value</th>
<th>Normal gradient</th>
<th>Low gradient</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-S thickening</td>
<td>143 (58.1%)</td>
<td>80 (58.3%)</td>
<td>NS</td>
<td>186 (62.4%)</td>
<td>37 (43.5%)</td>
<td>0.0018</td>
</tr>
<tr>
<td>M-S calcification</td>
<td>195(79.2%)</td>
<td>119(86.8%)</td>
<td>NS</td>
<td>263 (88.2%)</td>
<td>51 (60%)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Bicuspid valve</td>
<td>62 (25%)</td>
<td>32 (23%)</td>
<td>NS</td>
<td>62 (25.2%)</td>
<td>32 (23.3%)</td>
<td>NS</td>
</tr>
</tbody>
</table>

M- S: Moderate- Severe

![Valve Calcification & Perioperative Events According to Flow & Gradient Patterns](image)

**HFHG**: high flow high gradient
**HFLG**: high flow low gradient
**LFHG**: low flow high gradient
**LFLG**: low flow low gradient

Moderate severe calcification (P=0.001)
Moderate severe thickening (P=0.019)
Combined end point (P= NS)
Mortality (P= NS)