Mitral Balloon Valvuloplasty in the era of TAVI/Mitra Clip

The Addis Ababa Mitral stenosis project, a technology transfer experience

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Conflict of Interest

• NONE
# Global Burden of Cardiovascular Diseases

Part I: General Considerations, the Epidemiologic Transition, Risk Factors, and Impact of Urbanization

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## TABLE 1. Modified Model of the Stages of Epidemiologic Transition as it Pertains to Cardiovascular Diseases

<table>
<thead>
<tr>
<th>Stages of Development</th>
<th>Deaths From CVD, % of Total Deaths</th>
<th>Predominant CVDs and Risk Factors</th>
<th>Regional Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age of pestilence and famine</td>
<td>5–10</td>
<td>Rheumatic heart disease, infections, and nutritional cardiomyopathies</td>
<td>Sub-Saharan Africa, rural India, South America</td>
</tr>
<tr>
<td>2. Age of receding pandemics</td>
<td>10–35</td>
<td>As above + hypertensive heart disease and hemorrhagic strokes</td>
<td>China</td>
</tr>
<tr>
<td>3. Age of degenerative and man-made diseases</td>
<td>35–65</td>
<td>All forms of strokes, ischemic heart disease at young ages, increasing obesity, and diabetes</td>
<td>Urban India, former socialist economies, aboriginal communities</td>
</tr>
<tr>
<td>4. Age of delayed degenerative diseases</td>
<td>&lt;50</td>
<td>Stroke and ischemic heart disease at old age</td>
<td>Western Europe, North America, Australia, New Zealand</td>
</tr>
<tr>
<td>5. Age of health regression and social upheaval</td>
<td>35–55</td>
<td>Re-emergence of deaths from rheumatic heart disease, infections, increased alcoholism, and violence; increase in ischemic and hypertensive diseases in the young</td>
<td>Russia</td>
</tr>
</tbody>
</table>
project mitral stenosis - background

• rheumatic fever, incidence 2-50/100 000, insufficient data from African countries
• rheumatic heart disease
  – global prevalens: 20 million
  – mitral valve always affected (MS/MR)
  – aortic valve affected in 20-30%
  – tricuspid valve disease usually subclinical

• rheumatic mitral stenosis
  – latency 2-40 years
  – congestive heart failure
  – stroke
  – AF
  – pulmonary hypertension
1987

FAMINE

Why are Ethiopians starving again?
What should the world do—and not do?
• Ethiopian/Swedish/Egyptian collaboration, operation Mitral Stenosis, part of larger operation involving surgery.
• Started by training in Cairo December 2010 where a Swedish/Ethiopian team trained at NHI for one week performing cases of MBV using the Inoue technique for the first time.
• Continued in Addis Ababa, as of today 18 cases performed all using the same balloons used in Cairo after resterilization.
Learning @Imbaba the septostomy
Learning @Imbaba, the MBV
Why, Imbaba Egypt? Many daily patients, Very few limits in MBV
Case Examples, MBV post AVR, giant LA, previous failure
all techniques used, Inoue, double balloon, Multitrack, abandoned the Metal Valvutome
MBV for all : MBV in Situs Inversus
Situs Inversus
Few limits: Echo guided MBV in early pregnancy without Xray

Solely Echo guided septostomy
The valvuloplasty balloon as it is inflated across the MV (contd.)
MVA = 1.6 cm² & mean pressure gradient = 5 mmHg
Associated conditions, MBV in Cor Tri triatum

TEE apical 4-chamber view shows a clear membrane dividing left atrium into two chambers
MVA = 1.9 cm² & diastolic pressure gradient = 14/7 mmHg
balloon mitral valvuloplasty, ACH, 2011

- training in Cairo dec 2010
- first case ever in Ethiopia april 11, 2011
- until today 18 cases
- Last 5 cases performed mainly by Ethiopian team, transfer of knowledge.

- 11 female, 7 male
- age: mean 31.8 (range 14 – 51)

- NYHA-class: mean 2.3 (range 2 – 4)
- AFib: 33% 4 patients with previous stroke history
- medications:
  - diuretics: 72%
  - digitalis: 22%
  - warfarin: 44%
  - betablocker: 78%
  - antibiotics: 72%
balloon mitral valvuloplasty, ACH, 2011

• mitral valve:
  – area: mean 0,8 cm² (range 0,4 – 1,3)
  – mean gradient: mean 19 mmHg (range 10 – 36)
  – valve score: mean 7,8 (range 5 – 9)

• pulmonary hypertension: 78%

• preop TEE performed 100%
  – organized thrombus: 2 pts (11%)
  – smoke: 3 pts (17%)
BMV, ACH, 2011; procedure

- Inoue balloon
- Size: 4 x 24 mm, 10 x 26 mm, 4 x 28 mm

- All cases evaluated with V-scan echocardiography after each inflation
- Stepwise inflations stopped due to new/increased MR: (5 cases)
- Stepwise inflation stopped if splitting of commisures adequate in PSSAX

- No of inflations: mean 2.1 (range 1 – 4)
- Procedural complications (MACE, Stroke, Bleeding, severe MR): 0

- 1 simultaneous MS and TS dilatation in presence of large LA thrombus
- 1 PBV thrown in for good measure!
- Both last 2 cases NYHA class 3-4 very sick patients
BMV, ACH, 2011; evaluation day 1

- echocardiography:
  - valve area: mean 1.84 cm² (range 1.2 – 2.4)
  - mean gradient 5.3 mmHg (range 3 – 13)
  - MR: 4 pts increase 1 (4 step scale), 1 pt increase 2
  - MR > 2/4: 0

- success: 83% (15 of 18)
  definition: MVA increase > 50% and > 1.5 cm², and mean gradient < 10 mmHg

- all pts had area increase > 50%
- all 3 pts not meeting above criteria had > doubling of valve area
BMV, ACH, 2011; evaluation 1-3 months

- 11 pts
- all NYHA 1
- mean NYHA improvement: 1,5 (range 1 – 3)

- echo findings unchanged
Teaching septostomy using atrial flush/stain technique
Lateral image showing septostomy using septal stain technique
Stepwise increase in size guided by echo till full size +1 mm
Breaking limits in Addis’s early experience. Associated TV stenosis!
Using Hand Held echo (Vscan) to make up for absence of pressure recording & injector
V Scan showing adequate MV opening post MBV, and some MR
MS, TS pre and post showing spontaneous echo contrast & thrombus pre MBV, and echo post procedure
case: congenital pulmonary valve stenosis on Day 2 in Addis

• male 27 yrs
• severely symptomatic, NYHA 4, cyanotic, CHF
• echo:
  – valvular PS, gradient > 150 mmHg,
  – severe RVH
  – ASD with R-L shunt-scheduled for open heart surgery

• pulmonary balloon valvotomy, 25 mm balloon
  – SAO2 immediately from 63 – 99%
  – cyanotic fingernails turned red
  – 3 month follow: up NYHA I (Truck driver!), acyanotic, gradient 20 mHg
No ASD, just a PFO
Crossing the PV, MP catheter and Terumo Glidewire
Conclusion

• There is a wide rift in the quality of medical care between the developed and the developing worlds.
• While we aspire to improve the quality of life for elderly patients, with palliative expensive procedures (like TAVI); let us not forget that there are thousands of young, otherwise healthy patients, in poor nations specially sub saharan africa who are both miserable and/Or dying of valve disease which WE can easily palliate with minimal effort and cost ($3000 per patient?!) we need someone to organize this-no industry interest.