PLENARY SESSION III: MITRAL VALVE REPAIR TIPS AND TECHNIQUES
POSTERIOR LEAFLET PROLAPSE REPAIR

RENATO A. K. KALIL
CONFLICT OF INTEREST DISCLOSURE

THERE IS NO CONFLICT OF INTEREST TO DISCLOSE, RELATED TO THIS PRESENTATION
Atrial view of mitral valve showing anterior or septal leaflet and posterior or mural leaflet with its 3 portions.
Antero-lateral comissure

Anterior leaflet

Postero-medial comissure

SCALLOP 1 - P1

SCALLOP 2 - P2

SCALLOP 3 - P3

Posterior leaflet

Anderson RH & Becker A. Atlas de Anatomia Cardíaca. Livr Edit Santos, SP. 1983
Coaptation line

Free margin
Mitral valve morphology with its large rough zone of leaflet coaptation.

Rough zone

Clear zone
Mitral valve physiologic mechanism includes participation from several related structures.

- Leaflets
- Chordae
- Papillary muscles
- Left ventricular wall
- Valve annulus
- Left atrial wall
• When the jet of blood flowing into the ventricle as a result of atrial contraction suddenly ceases, a negative pressure occurs on the inner aspect (atrial side) of the valve leaflets, causing these leaflets to be drawn toward each other.
• The valve leaflets come together first in the area near the valve ring and last at the valve margins.
• During the last stage of ventricular contraction, the annular area is constricted by approximately 30% in comparison to the maximum open orifice. However, two-thirds of this is due to atrial contraction.
Degenerative mitral valve regurgitation

FED

FED+

Forme fruste

Barlow’s

Leaflet tissue

**General Requisites for a Valvuloplasty Technique**

- Maintain an adequate minimal useful orifice
- Maintain a large coaptation zone, > 5mm
- Maintain leaflet support by chordae
- Preserve flexibility
- Preview fibrosis and calcification
- Use compatible chordae or membranes
- Maximum of autologous material “Respect rather than resect”
Valvuloplasty Requisites
Related to Posterior Repair

1. RESTORE CHORDAL SUPPORT

QUADRANGULAR RESECTION

TRIANGULAR RESECTION

SLIDE PLASTY

CHORDAL FOLDOPLASTY

NEOCHORDAE
Valvuloplasty Requisites
Related to Posterior Repair

2. REDUCE ANNULAR DIMENSION

- POSTERIOR ANNULOPLASTY
- WOOLER TYPE ANNULOPLASTY
- POSTERIOR RING
- POSTERIOR BAND
- FLEXIBLE OR RIGID COMPLETE RING
Quadrangular resection

Wooler Annuloplasty
Annuloplasty (Wooler, Thorax 1962)

Triangular resection (Mcgoon DC, JTCS 1960)

Chordal shortening

Double Teflon Pledget Technique

Sobreviva (%)

94,7+/- 3,6%

Sobreviva Livre de Reoperação (%)

99,2 +/- 0,8%
**Mitral Annulus Circumference (cm)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Pre</th>
<th>IPO</th>
<th>6-month</th>
<th>1-year</th>
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**ML Diameter (cm)**

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* *p* < 0.05
Rings

ADVANTAGES

Technical standardization
Reproducibility
Redilation prevention
Support to the surgeon
Possible "valve in ring" later

DISADVANTAGES

Compromises dynamic nature
Reduces basal LV contraction
Changes the saddle shape of mitral annulus
Difficults growing, in children
Useless in anterior portion and may cause SAM
Deiscence
Unsupported Valvuloplasty for Degenerative Mitral Regurgitation: Long-Term Results

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Arq Bras Cardiol 2009; 90(6): 363-369
Late Outcome of Unsupported Annuloplasty for Rheumatic Mitral Regurgitation

Kalil R *et al* (J Am Coll Cardiol 1993;22:1915..20)
Unsupported Valvuloplasty in Children with Congenital Mitral Valve Anomalies. Late Clinical Results

Patients distribution by groups with congenital mitral valve malformations. Patients with complete defects of the atrioventricular septum were excluded from the sample.

Actuarial survival probability curve in the group of with congenital mitral insufficiency

Actuarial survival probability free of reoperation in the group of congenital mitral insufficiency

Lorier G, Kalil R et al Arq Bras Cardiol 2001; 76: 215-20
Fig 1. Three-dimensional posterior view of the heart after the procedure showing the suture line around the four pulmonary veins, exclusion of left atrial appendage, and perpendicular incision directed into the mitral annulus. (Reprinted from Kalil RAK, et al, Ann Thorac Surg; 2002;73:1022, with permission.)
Randomized study of surgical isolation of the pulmonary veins for correction of permanent atrial fibrillation associated with mitral valve disease

A) Kaplan–Meier curve showing the number of patients at sinus rhythm as a function of time, according to surgical technique

Conclusions

Posterior mitral leaflet prolapse repair can be achieved with quadrangular resection and corresponding unsupported annuloplasty. This preserves annular flexibility and motion.

Triangular resection + posterior ring annuloplasty and/or complete ring annuloplasty are preferred by some authors.

Proper chordal support & large area of leaflet coaptation is essential for repair durability.
Renato A. K. Kalil
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CLASS MEDICAL AND MEDICAL ILLUSTRATIONS

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Mitral annulus morphologic and functional analysis using real-time tridimensional echocardiography in patients submitted to unsupported mitral valve repair

- Anterior mitral annulus (cm)
  - Pre IPO
  - 6-month
  - 1-year
  - *p<0.05

- AP Diameter (cm)
  - Pre
  - IPO
  - 6-month
  - 1-year
  - *p<0.05
Smooth zone

Annulus

Rough zone

Free margin

Coaptation line (atrial)

Anderson RH & Becker A. Atlas de Anatomia Cardíaca. Livr Edit Santos, SP. 1983
Is physiologic annular dynamics preserved after mitral valve repair with rigid or semirigid ring?