Basic principles of Rheumatic mitral valve Repair

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Rheumatic MV disease

- MV repair confers significant benefits compared to MV replacement

- Also in Rheumatic disease

- However rheumatic MV repair is technically challenging and there is a higher risk of recurrence/reoperation over time (especially if repair was not “complete”)
Patho-surgical correlation

Rheumatic Mitral Disease

Regurgitant  Mixed/Stenotic

Early
Early Rheumatic disease process:

- Mitral regurgitation (15%)

- Due to
  - Acute rheumatic carditis
  - Elongation of the chordae tendinae
  - Dilatation and deformation of the posterior mitral annulus
  - (Restriction in motion of the posterior leaflet than the anterior mitral leaflet)
Patho-surgical correlation

*Mitral stenosis & mixed disease*

- Fibrosis + thickening in response to inflammation → increased tissue inertia
- Multilevel involvement: annulus, leaflets, subvalvular apparatus
- Affects anatomy and function
- Geometric orifice on inspection ≠ Hemodynamic consequences
General Principles

Three key factors for successful rheumatic mitral valve repair:

1. No acute activity, no total calcified tissue and still some pliable leaflet tissue
2. Although pre-op TEE provide useful information on valve reparability, direct inspection of the valve will give the final answer
3. Restore mitral valve function and stabilize the annulus
Stepwise Approach

1. Systematic valve analysis (intraop TEE + valve inspection)
2. Commissurotomy, often also improves visualization of the subvalvular apparatus
3. Extensive removal of fibrous tissue to improve valve mobility
4. Assessment of quality and quantity of residual tissue
   
   **THE REAL PATIENT SELECTION STEP**

5. Restore leaflets matching and coaptation:
   - augment the leaflet (patch extension)
   - reduce the annulus (annuloplasty)
How we do it

**Principles of repair – Restore**

- Assessment of reparability
- Multilevel assessment of involvement
- Aggressive resection of all affected tissue with preservation of normal tissue
- Mobility of restricted tissue
- Length of coaptation
- Point of coaptation
- Pliability of valve leaflets

**Techniques available:**

- Classic commissurotomy
- Papillary muscle splitting
- Chordae replacement
- Calcium resection
- Valve thinning
- ± Annuloplasty

→ But…

If you leave affected tissue
Risk factor for recurrence

Replacement of excised tissue with a supple substitute to restore normal valve function
Surgical Options:

- Regurgitant
  - Standard Repair techniques
- Mixed/Stenotic
  - Sub-valvular fenestration
  - Leaflet thinning
  - Patch extension
  - Decalcification
  - Complex repair techniques
  - Commisurotomy
Surgical Options...

- Regurgitant
  - Standard Repair techniques

- Mixed/Stenotic
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  - Complex repair techniques
  - Commisurotomy
Mixed/ Stenotic

Localised

- Single element of valvular apparatus
  - Simple commissurotomy
  - splitting papillary muscle
  - chordae replacement

- Multiple elements of valvular apparatus
  - Tricuspid Autograft

Diffuse

- Body of leaflets supple
  - «Fish mouth» technique
  - Advanced repair

- Extensive fibrosis or retraction
  - Replacement
Mixed/Stenotic

Localised
- Single element of valvular apparatus
  - Simple commissurotomy
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  - Chordae replacement
- Multiple elements of valvular apparatus
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Diffuse
- Body of leaflets supple
  - «Fish mouth» technique
- Extensive fibrosis or retraction
  - Advanced repair
  - Replacement
Numerous and specific techniques of repair

The choice is a function of...

Lesion type, size localization, tissue quality & quantity
Patient characteristics
Fish Mouth Technique
Case 1.

53 years old male
NYHA-3

Hypertension
Sinus Rhythm

Severe MS
Mean G: 7 mmHg
MV area: 0.8 cm²

Also Moderate Aortic stenosis

A rheumatic MV stenosis with severe disease of the AL (particularly the free margin) but still mobile, and retracted PL. Is this valve suitable for repair in a young patient?
Case 1

Commissurotomy

“Debulking” of anterior leaflet (with resection of fibrous tissue and chordae)

Patch extension of P3

Splitting of commissural chordae

Patch extension of P1

Patch extension of P2

Peeling of the anterior leaflet

Artificial chordae on anterior leaflet

Annuloplasty

(repair of the Aortic valve as well)
Case 1
Post-Op

Mean G: 4 mmHg
MV Area >2 cm²

No perioperative complications
Patient doing well 1 month after surgery
Case 2.

27 years old female
NYHA-3

Hypertension
Sinus Rhythm

Severe MR
RV: 51mL
PAP: 76mmHg
MS

Thicken free edge of both anterior and posterior leaflets, restricted motion (particularly of the PL)
Case 2.

Commissurotomy

Splitting of papillary muscles and chordae

Removal of fibrous restricted chordae

Patch repair of AL

Thinning of the free edge of PL

Patch extension of the body of PL

Partial Annuloplasty
Case 2. Post-Op

No significant MR
No significant gradient
SPAP: 37mmHg

Patient doing well 3 years after surgery, no valve-related complications, no anticoagulation
Case 3.

59 years old female
NYHA-3

Hypertension
Sinus Rhythm

Severe MS
Mean G: 15 mmHg
MV area: 1.0 cm²

A classic rheumatic MV stenosis with thickened leaflets (“fish mouth”), severely reduced mobility of the PL and of the free margin of the AL. A more complex case for repair, but the patient is still young.
Case 3.

Extensive “debridement” of anterior and posterior leaflet...

Not enough residual tissue

Valve replacement
Conclusion

- MV repair can be successfully performed also in (selected) rheumatic patients
- An assessment of both the valvular and subvalvular apparatus is necessary to determine degree of anatomic involvement
- Repair proceeds through aggressive resection of all affected tissue and restore of valve mobility and function
- Non-classical techniques are available and offer durable results and extend the proportion of patients eligible for repair
- Intra-Op TEE should show a satisfactory repair, otherwise higher risk of reoperation
Thank you