

Beyond Pannus and Thrombosis: Progressive Rheumatic Subvalvular Fibro-Calcific Remodeling as an Underrecognized Mechanism of Prosthetic Mitral Dysfunction

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BACKGROUND & OBJECTIVE

Late dysfunction of mechanical mitral prostheses is usually attributed to thrombosis or pannus. In rheumatic disease, retained subvalvular tissue may remain exposed to decades of fibro-calcific remodeling.

Objective: describe a recurrent subprosthetic imaging phenotype and its hemodynamic consequences.

PATIENTS & METHODS

- Retrospective imaging case series: 6 patients with previous rheumatic mitral valve replacement.
- TTE and TEE, including 3D TEE; fluoroscopy and cardiac CT when available.
- Assessment: lesion location, prosthetic leaflet motion and inflow obstruction.

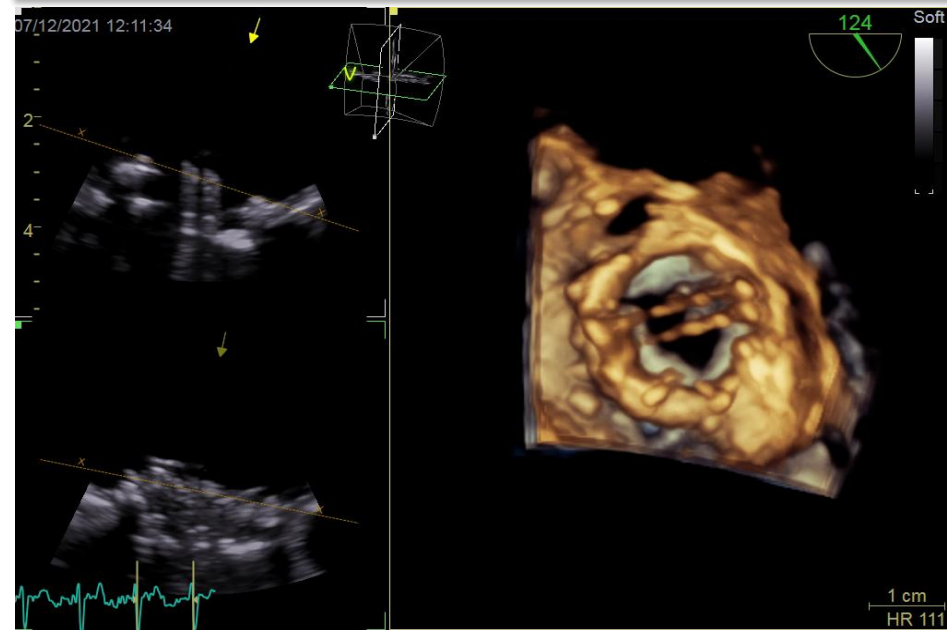
RESULTS

- Recurrent fibro-calcific tissue predominantly below the sewing ring and related to the retained subvalvular apparatus.
- Clinical spectrum ranged from limited hemodynamic impact to severe subprosthetic inflow obstruction.
- Preserved or near-preserved mechanical leaflet motion could coexist with marked obstruction.
- Therapeutic anticoagulation and dense calcific morphology made thrombosis unlikely, although mixed lesions cannot be excluded without pathology.

DIAGNOSTIC CLUE

High gradient + preserved

KEY RESULT — SEVERE SUBPROSTHETIC OBSTRUCTION DESPITE PRESERVED DISC OPENING



CASE 1

Both mechanical discs open well despite massive fibro-calcific remodeling below the prosthesis.

Severe left ventricular inflow obstruction is therefore predominantly subprosthetic.



Scan to watch the real 4D TEE video

IMAGING INTERPRETATION

The dominant abnormal tissue is located ventricular to the prosthesis and follows the retained rheumatic subvalvular apparatus.

This distribution differs conceptually from classic pannus arising at the sewing ring. 3D TEE is particularly useful for demonstrating the spatial relationship between the prosthesis and the subprosthetic calcific ridge.

THE TA PROHM PARADIGM



“The valve is replaced; the residual rheumatic substrate may continue to remodel.”

The image is a visual metaphor for progressive remodeling around an intact prosthetic structure.

OPEN QUESTIONS — HYPOTHESIS-GENERATING

- 1 Is chordal/subvalvular preservation always the right strategy in rheumatic mitral disease?
- 2 Could adjunctive medical therapy (anti-inflammatory, anti-fibrotic or anti-calcific therapy) modify long-term remodeling after valve surgery?
- 3 Does chronic kidney disease or other metabolic disease accelerate ectopic calcification in rheumatic valvular and subvalvular tissue?

With progressive population aging, the severity and clinical impact of this phenotype may increase.

CONCLUSIONS & PERSPECTIVES

Progressive fibro-calcific remodeling of retained rheumatic subvalvular tissue may represent an underrecognized mechanism of late prosthetic mitral dysfunction, expanding the differential diagnosis beyond pannus and thrombosis.

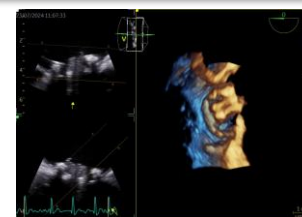
REPRESENTATIVE IMAGING FROM THE SERIES



Case2
St.Jude 27



Case 3
Ultracor 25



Case 4
Bileaflet mechanical valve



Case 5
Bileaflet mechanical valve



Case 6
Bileaflet mechanical valve

