

Focus on patient-prosthesis mismatch: can we perform aortic annulus enlargement with a minimally invasive approach?

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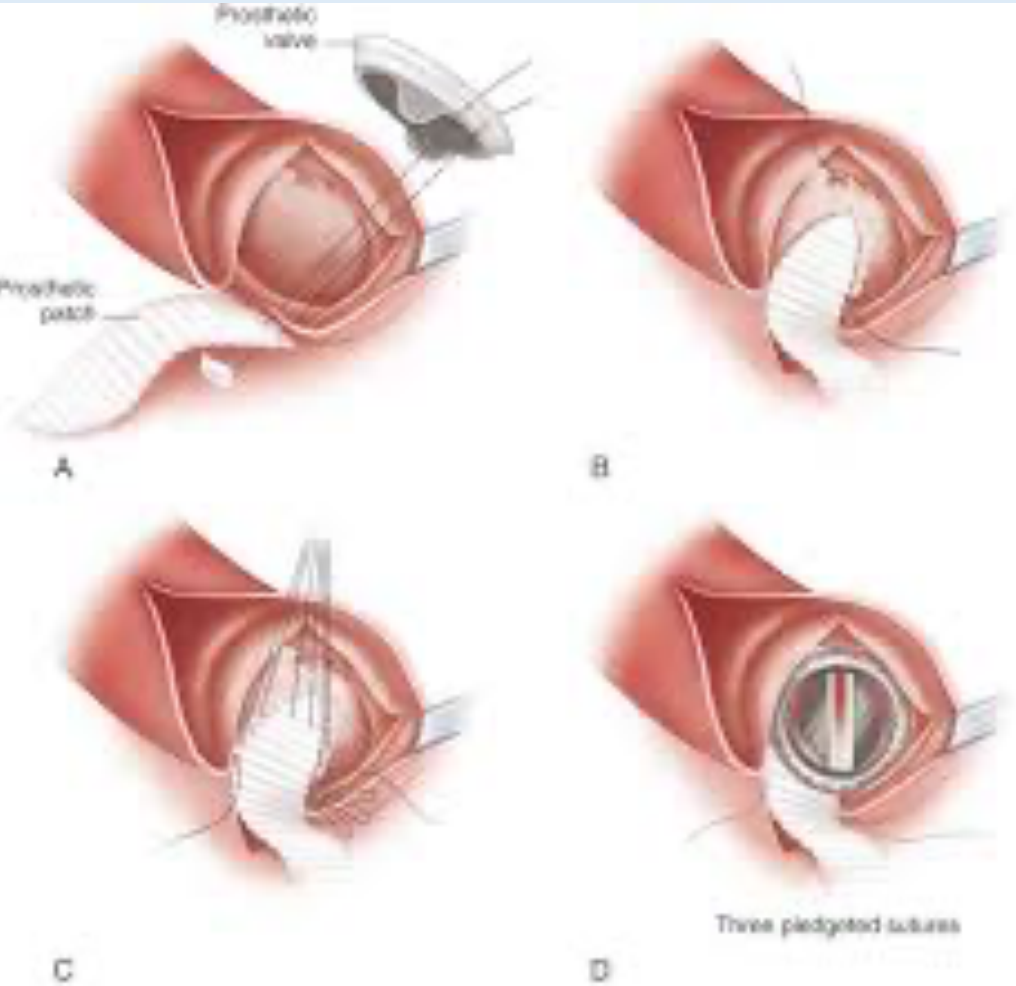


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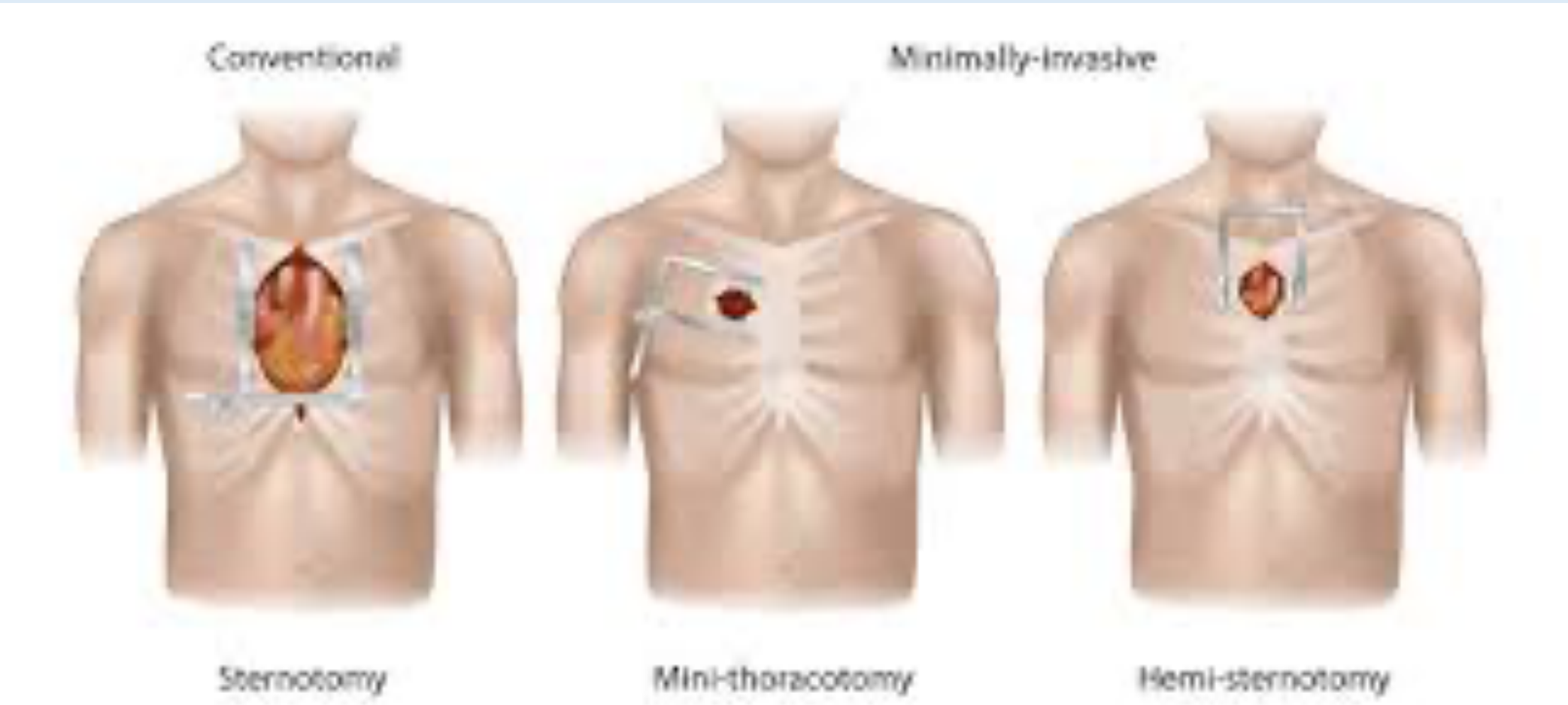
Background

In the TAVI era, patient-prosthesis mismatch (PPM) remains a significant concern in surgical aortic valve replacement (SAVR), particularly in patients with small aortic annuli. Minimizing the risk of PPM is crucial to optimize long-term outcomes. **The Yan technique**, a surgical approach to enlarge the aortic annulus, is a promising strategy to address this issue.



Methods

Between June 2023 and November 2024, 25 patients underwent **aortic valve replacement with concomitant aortic annulus enlargement**. Among these, **12 were completed using a minimally invasive approach**, either through partial sternotomy or mini-thoracotomy. Patients were predominantly women (58.3%) with a median age of 66 years and overweight (median BMI 28.2).



Pre-operative characteristics

N	12
Age median (Q1-Q3)	66 [63.75-68.50]
Female sex	7 (58.3)
BMI median (Q1-Q3)	28.20 [26.94, 30.50]
Hypertension	8 (66.7)
Diabetes	3 (25)
Dyslipidemia	9 (75)
Smoking	4 (33.4)
COPD	1 (8.3)
Preoperative Atrial Fibrillation	0 (0)
Preoperative pacemaker	0 (0)
Left ventricle Ejection Fraction median (Q1-Q3)	61.00 [55.00, 65.00]
Previous stroke	1 (8.3)
Plasma creatinine (mg/dl) median (Q1-Q3)	0.89 [0.78, 1.03]
Previous cardiac surgery	0 (0)
Euroscore Logistic (%) median (Q1-Q3)	3.40 [2.68, 4.66]
Euroscore II (%) median (Q1-Q3)	1.07 [1.00, 1.32]
LVOT diameter median (Q1-Q3)	20.75 [20.02, 21.72]
LVOT area median (Q1-Q3)	3.38 [3.21, 3.71]

Results

Median CPB time and aortic cross-clamp time were 104 and 94 minutes. One patient (8.3%) developed pneumonia and sepsis requiring prolonged ventilation. Atrial fibrillation was observed in 4 patients (33.3%) and 1 patient (8.3%) required Pace-maker implantation. One (8.3%) re-explorations for bleeding were necessary with 50% of patients requiring blood transfusions. ICU and in-hospital stay were 2 and 7 days respectively.

No stroke, renal failure requiring dialysis or 30-day mortality

Operative data and In-hospital outcomes

N	12
CPB time median (Q1-Q3)	94.00 [72.75, 120.00]
Aortic cross-clamp time median (Q1-Q3)	104.00 [83.00, 136.50]
In-hospital mortality	0 (0)
Conversion to full sternotomy	0 (0)
Postoperative stroke	0 (0)
Dialysis	0 (0)
New onset atrial fibrillation	4 (33.3)
Permanent pacemaker implantation	1 (8.3)
RBC transfusions	6 (50.0)
Re-thoracotomy for bleeding	1 (8.3)
Ventilation time median (Q1-Q3)	4.50 [4.00, 7.50]
Prolonged mechanical ventilation	1 (8.3)
Sepsis	1 (8.3)
ICU length of stay median (Q1-Q3)	2.00 [2.00, 3.00]
In-hospital length of stay median (Q1-Q3)	7.00 [7.00, 7.25]

Median pre preoperative LVOT diameter was 20.75 mm



After aortic annulus enlargement

Postoperative median effective orifice area was 1.97 cm² and NO cases of even mild PPM reported.
Postoperative median gradient was 14 mmHg
Postoperative maximum gradient was 26 mmHg.

Conclusions

According to our findings, the Yan technique offers a promising approach to reduce PPM and can be performed safely through a minimally invasive approach. Ensuring accurate valve sizing, it improves immediate outcomes and facilitates long-term management, including potential valve-in-valve intervention