



Minimally Invasive Mitral Valve Surgery In Elderly

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Background

Right anterior minithoracotomy has gained increasing popularity as a preferred approach for mitral valve surgery due to its numerous advantages. This study aims to evaluate the safety and efficacy of this technique in **elderly patients**.

Methods

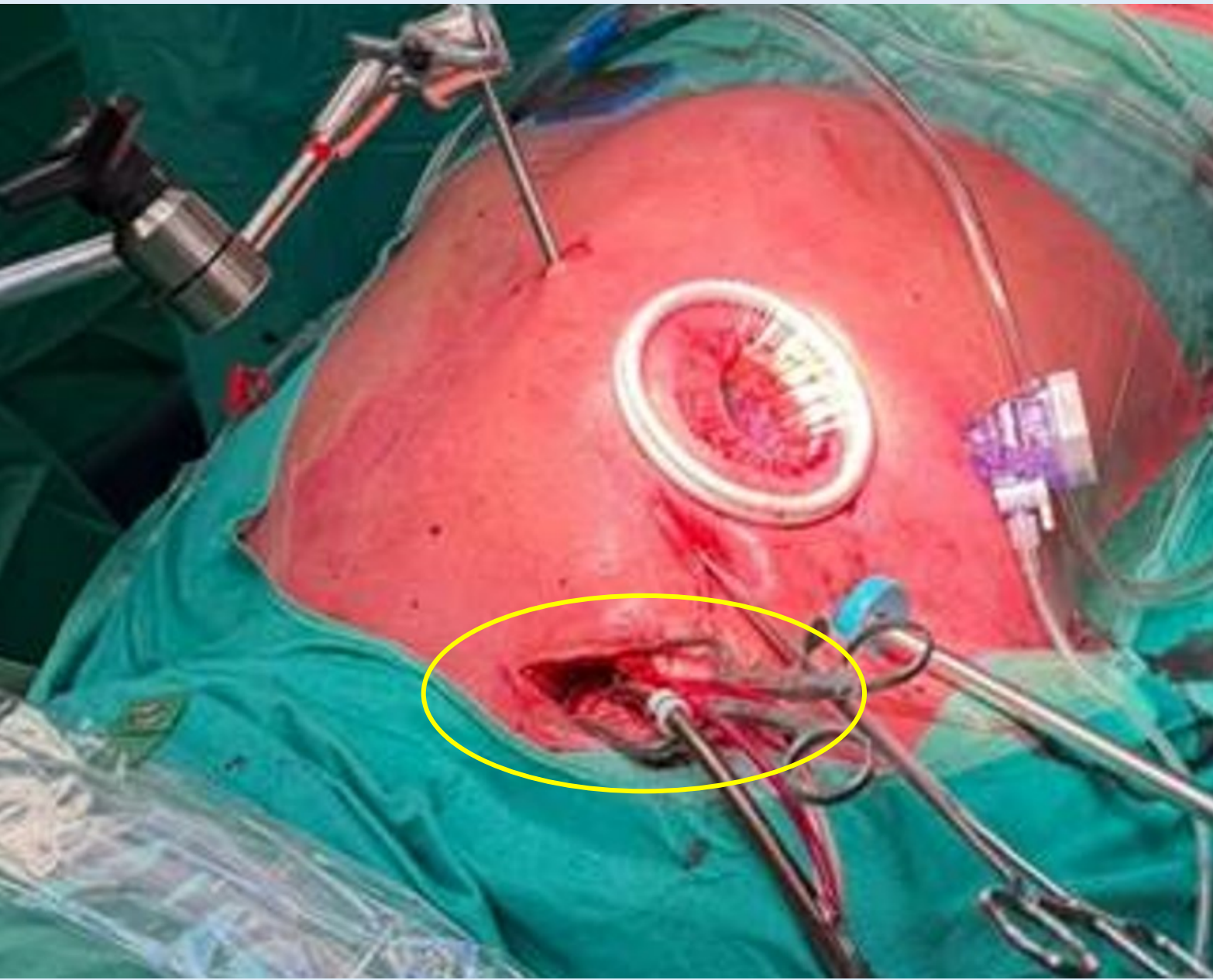
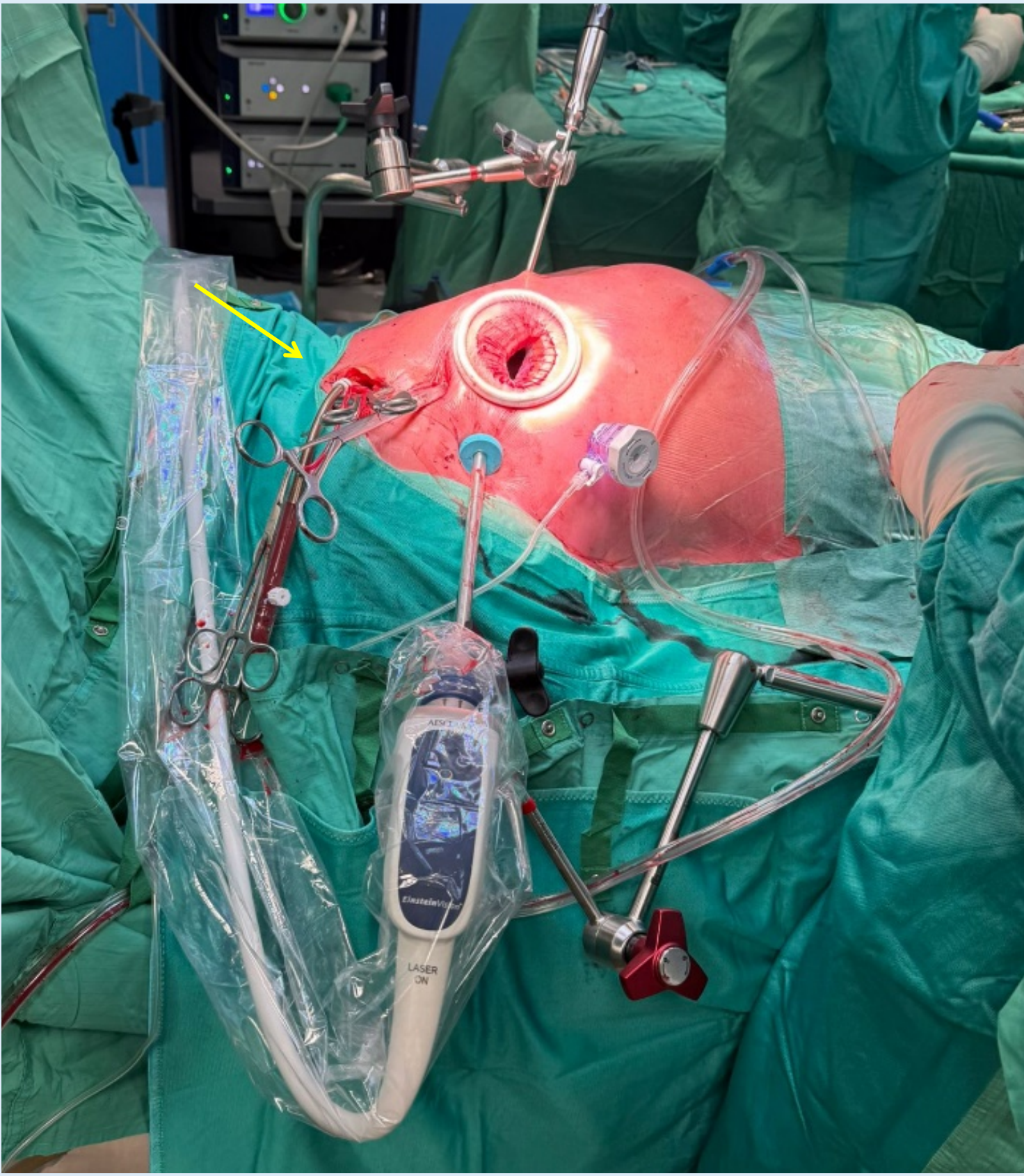
Between January 2010 and November 2024, a total of 4,092 adult patients underwent mitral valve repair or replacement at our institution. Of these, **1,687 patients were treated using a minimally invasive approach**. This analysis focuses on elderly **patients aged 75 years and older (n=402), divided into two groups: 75-79 years (n=253) and 80 years and older (n=149)**. Patients aged 80 years and older exhibited worse preoperative renal function and higher EuroSCOREs compared to the younger group (p<0.001),

Pre-operative characteristics

N	> 75-79 (402)	75-79 (253)	>=80 (149)	p
Age median (Q1-Q3)	78 (76-81)	77 (76-78)	82 (81-83)	<0.001
Male sex	200 (49.8)	127 (50.2)	73 (49)	0.837
Weight median (Q1-Q3)	68.00 [60.00, 77.00]	70.00 [60.00, 78.00]	65.00 [58.00, 75.00]	0,057
Hypertension	303 (75.4)	187 (73.9)	116 (77.9)	0,403
Diabetes	47 (11.7)	31 (12.3)	16 (10.7)	0,749
Dyslipidemia	204 (50.7)	129 (51.0)	75 (50.3)	0,918
Smoking	108 (26.9)	73 (28.9)	35 (23.5)	0,294
COPD	29 (7.2)	16 (6.3)	13 (8.7)	0,426
Preoperative pacemaker	6 (1.5)	3 (1.2)	3 (2.0)	0,674
Left ventricle Ejection Fraction median (Q1-Q3)	60.00 [55.00, 65.00]	60.00 [55.00, 65.00]	60.00 [55.00, 65.00]	0,797
Active endocarditis	7 (1.7)	4 (1.6)	3 (2.0)	0,713
Previous Stroke	8 (2.0)	6 (2.4)	2 (1.3)	0,716
Previous TIA	4 (1.0)	2 (0.8)	2 (1.3)	0,629
Plasma creatinine (mg/dl) median (Q1-Q3)	1.00 [0.87, 1.24]	0.99 [0.84, 1.18]	1.08 [0.92, 1.27]	0,001
Previous cardiac surgery	26 (6.5)	13 (5.1)	13 (8.7)	0,207
Euroscore Logistic (%) median (Q1-Q3)	7.68 [5.83, 11.00]	6.59 [5.14, 9.90]	8.97 [7.84, 13.09]	<0.001
Euroscore II (%) median (Q1-Q3)	2.75 [1.71, 4.40]	2.19 [1.50, 3.65]	3.57 [2.39, 5.38]	<0.001

Results

Alternative cannulation strategies, guided by **AngioCT scans**, can expand the applicability of this technique to patients unsuitable for femoral cannulation. Male patients were 49.8%, 1.7% had a history of endocarditis, and 6.5% had undergone prior cardiac surgery. Median logistic EuroSCORE was 7.68 (IQR 5.83-11.00), and median EuroSCORE II was 2.75 (1.71, 4.40).



Median CPB and aortic cross-clamp time were 99.5 and 80.0 minutes. Median ventilation time was 7 hours, and the median ICU stay was 2 days. Atrial fibrillation was the most common postoperative complication (20.9%). A significant proportion of patients (47.8%) required blood transfusions, and 3.0% needed re-exploration for bleeding. The **in-hospital mortality rate was 3.7%**, with 7 (1.7%) patients requiring postoperative dialysis and 5 (1.2%) experiencing sepsis and multiple organ failure.

Patients aged 80 years and older had shorter CPB (p=0.004) and cross-clamp times (p=0.001) and underwent a higher proportion of valve replacements (p=0.003 compared to the younger group. Rates of **major complications and in-hospital mortality** were comparable between the two age groups.

Operative data and In-hospital outcomes

N	> 75-79 (402)	75-79 (253)	>=80 (149)	p
Mitral valve replacement	112 (27.9)	57 (22.5)	55 (36.9)	0,003
CPB time median (Q1-Q3)	99.50 [77.00, 129.00]	104.00 [79.25, 135.00]	93.00 [71.75, 118.75]	0,004
Aortic cross-clamp time median (Q1-Q3)	80.00 [62.00, 105.00]	85.00 [66.00, 109.00]	74.00 [59.00, 88.25]	0,001
In-hospital mortality	15 (3.7)	7 (2.8)	8 (5.4)	0,275
Postoperative stroke	6 (1.5)	3 (1.2)	3 (2.0)	0,674
Peri operative myocardial infarction	1 (0.2)	1 (0.4)	0 (0.0)	1,000
Postoperative inotropic support	43 (10.7)	24 (9.5)	19 (12.8)	0,320
New onset atrial fibrillation	84 (20.9)	52 (20.6)	32 (21.5)	0,899
Permanent pacemaker implantation	9 (2.2)	4 (1.6)	5 (3.4)	0,301
RBC transfusions	192 (47.8)	119 (47.0)	73 (49.0)	0,757
Re-thoracotomy for bleeding	12 (3.0)	6 (2.4)	6 (4.0)	0,373
Chest drain output in 24/hours median (Q1-Q3)	400.00 [262.50, 600.00]	425.00 [300.00, 600.00]	400.00 [250.00, 550.00]	0,739
Dialysis	7 (1.7)	3 (1.2)	4 (2.7)	0,431
Ventilation time median (Q1-Q3)	7.00 [5.00, 12.00]	8.00 [5.00, 11.25]	7.00 [5.00, 13.00]	0,515
Prolonged mechanical ventilation	53 (13.2)	31 (12.3)	22 (14.8)	0,542
Sepsis	5 (1.2)	3 (1.2)	2 (1.3)	1,000
ICU length of stay median (Q1-Q3)	2.00 [2.00, 3.00]	2.00 [2.00, 3.00]	2.00 [2.00, 4.00]	0,045
In-hospital length of stay median (Q1-Q3)	8.00 [7.00, 10.00]	8.00 [7.00, 10.00]	8.00 [7.00, 11.00]	0,935

Logistic regression analysis identified the **logistic EuroSCORE** as the only significant preoperative risk factor (p=0.001).

Conclusions

Right anterior minithoracotomy is a safe and reproducible surgical approach, even in elderly patients, promoting faster recovery with a lower risks of complications . Among patients aged >80 years, despite higher comorbidities and elevated Euroscore II, in-hospital outcomes are comparable to those aged 75-79 years.