

Does Body Mass Index Impact Outcomes in Patients Undergoing Minimally Invasive Mitral Valve Surgery?

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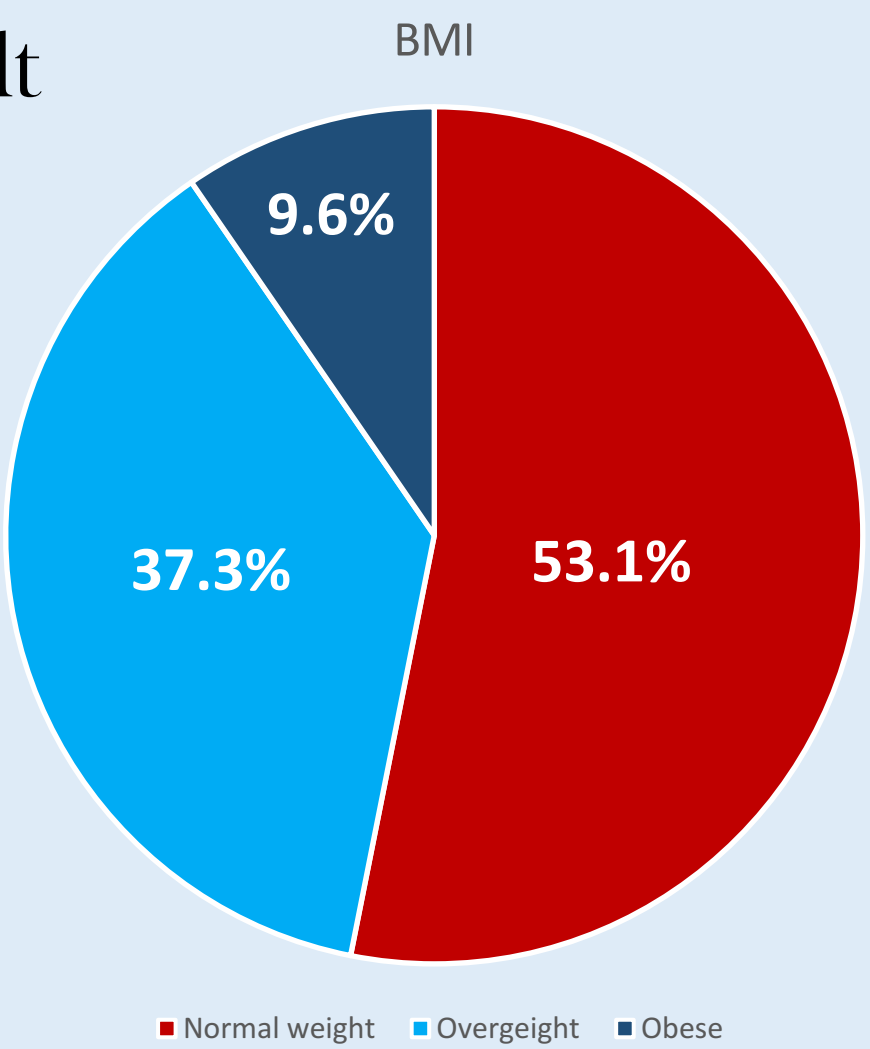
Background

Obesity is a major risk factor for cardiovascular disease and increases complications after cardiac surgery, expecially wound healing. Right minithoracotomy has emerged as a favored approach for mitral valve surgery for its numerous benefits, including the reduced incidence of wound dehiscence. **This study investigates the impact of Body Mass Index (BMI) on patient outcomes following this approach**

Methods

Between January 2010 and December 2024, 1773 adult patients underwent minimally invasive mitral valve surgery

They were categorized into three groups: **normal weight (BMI < 25, n=942)**, **overweight (BMI 25-30, n=661)**, and **obese (BMI > 30, n=170)**



Pre-operative characteristics pre IPTW

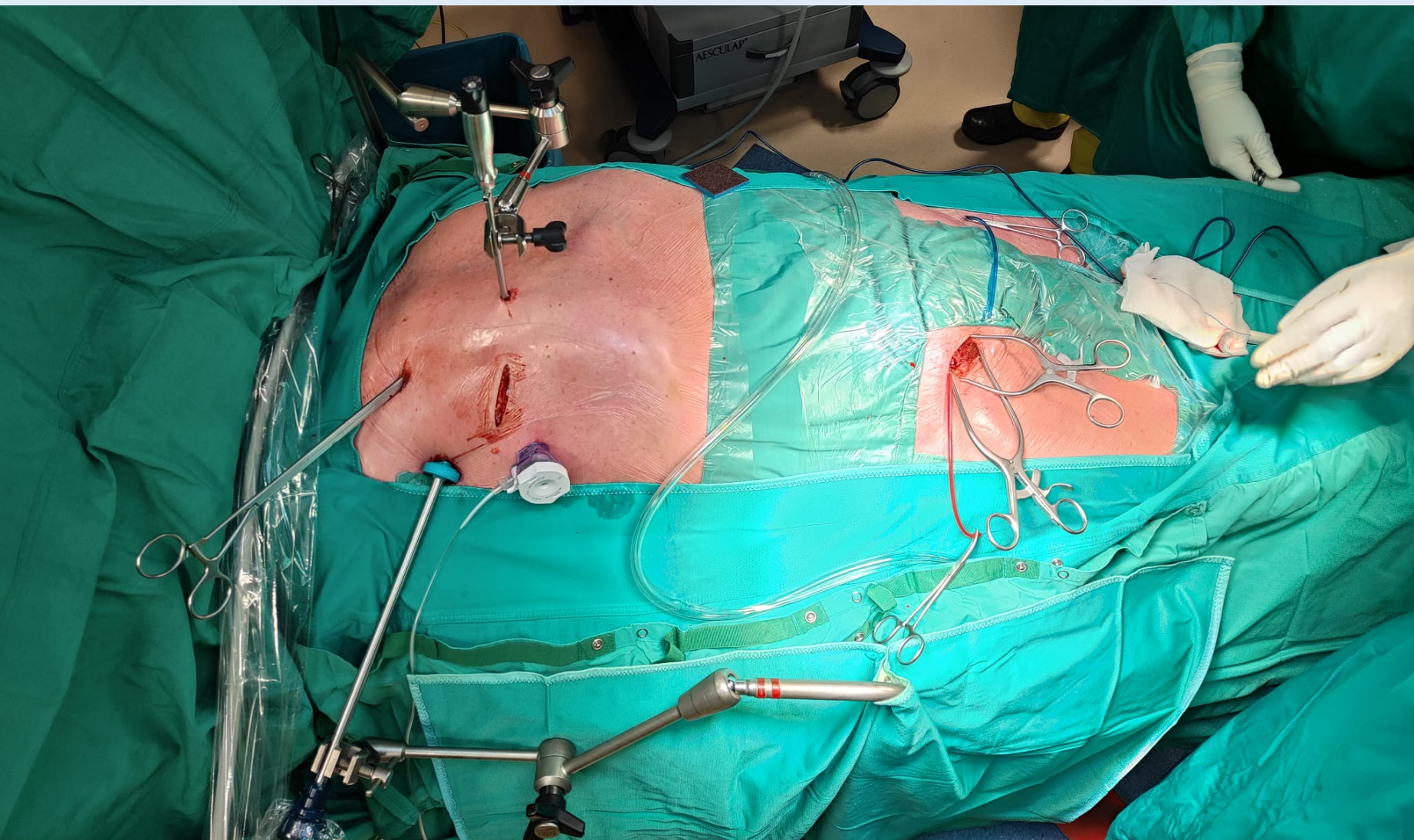
N	BMI <25 (942)	BMI 25-30 (661)	BMI >30 (170)	p	SMD
Age median (Q1-Q3)	64.00 [54.00, 74.00]	66.00 [57.00, 74.00]	67.00 [60.00, 73.00]	0,071	0,113
Male sex	515 (54.7)	466 (70.5)	104 (61.2)	<0.001	0,220
Hypertension	446 (47.3)	405 (61.3)	119 (70.0)	<0.001	0,313
Diabetes	51 (5.4)	57 (8.6)	32 (18.8)	<0.001	0,282
Dyslipidemia	321 (34.1)	271 (41.0)	81 (47.6)	<0.001	0,185
Smoking	260 (27.6)	198 (30.0)	53 (31.2)	0,448	0,052
COPD	33 (3.5)	40 (6.1)	16 (9.6)	0,002	0,167
Preoperative Atrial fibrillation	132 (14)	126 (19.1)	44 (25.9)	0,001	0,220
Preoperative pacemaker	5 (0.5)	8 (1.2)	0 (0.0)	0,224	0,111
Left ventricle EF median (Q1-Q3)	60.00 [55.00, 65.00]	60.00 [55.00, 65.00]	60.00 [55.00, 65.00]	0,059	0,102
Active endocarditis	30 (3.2)	10 (1.5)	5 (2.9)	0,088	0,074
Previous Stroke	8 (0.8)	14 (2.1)	5 (2.9)	0,023	0,104
Previous TIA	3 (0.3)	10 (1.5)	3 (1.8)	0,011	0,096
Plasma creatinine (mg/dl) median (Q1-Q3)	0.90 [0.78, 1.01]	0.97 [0.84, 1.10]	0.99 [0.87, 1.11]	<0.001	0,156
Pulmonary hypertension	411 (43.7)	279 (42.2)	85 (50.0)	NA	0,153
Previous cardiac surgery	43 (4.6)	32 (4.9)	8 (4.8)	0,930	0,010
Euroscore Logistic (%) median (Q1-Q3)	2.88 [1.83, 6.00]	3.08 [1.72, 5.48]	3.73 [2.19, 5.96]	0,072	0,116
Euroscore II (%) median (Q1-Q3)	1.12 [0.75, 2.17]	1.10 [0.69, 1.86]	1.23 [0.79, 2.26]	0,040	0,081

Results

Despite baseline disparities, in-hospital mortality and major complications were similar across groups, except for **drainage output in the first 24 hours (p=0.002)** and **ICU stay (p=0.02)**, both resulting higher in the overweight and obese patients.

Operative data and In-hospital outcomes pre IPTW

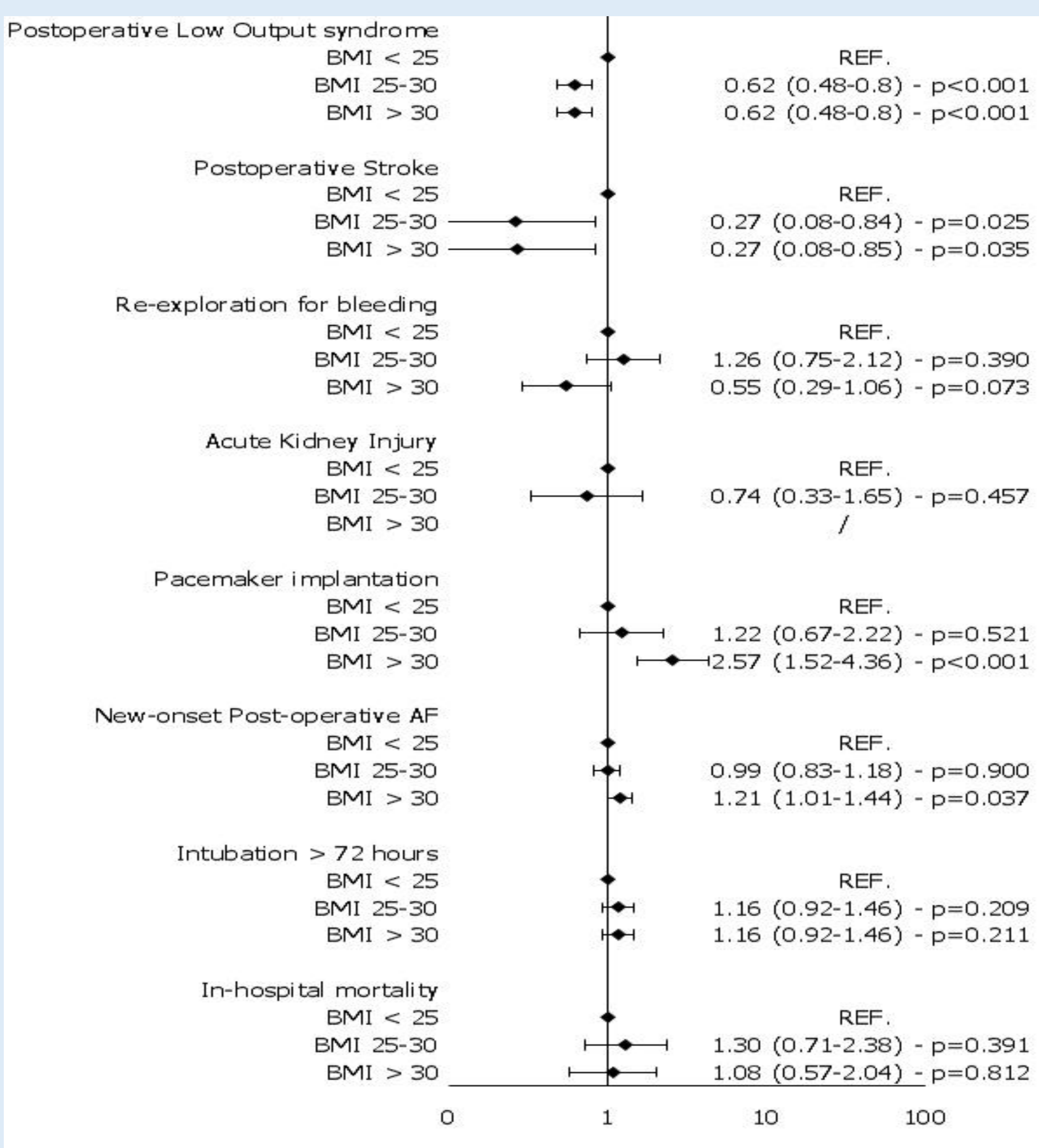
N	BMI <25 (942)	BMI 25-30 (661)	BMI >30 (170)	p	SMD
CPB time, median (IQR)	96.00 [65.50, 125.00]	100.00 [63.25, 130.75]	103.50 [75.75, 136.25]	0,067	0,110
Cross-Clamp time median (IQR)	78.00 [52.00, 102.00]	82.00 [51.00, 107.00]	82.50 [59.50, 107.00]	0,130	0,098
Associate procedures	248 (26.3)	189 (28.6)	46 (27.1)	0,605	0,034
Mitral valve replacement	160 (17.0)	128 (19.4)	47 (27.6)	0,006	0,172
Postoperative Low Output syndrome	75 (8.0)	40 (6.1)	11 (6.5)	0,341	0,050
Postoperative Stroke	7 (0.7)	1 (0.2)	1 (0.6)	0,183	0,060
Re-exploration for bleeding	13 (1.4)	13 (2.0)	2 (1.2)	0,689	0,042
Acute Kidney Injury	11 (1.2)	8 (1.2)	5 (2.9)	0,167	0,084
Postoperative RRT	3 (0.3)	5 (0.8)	2 (1.2)	0,188	0,068
Pacemaker implantation	10 (1.1)	8 (1.2)	5 (2.9)	0,128	0,090
New-onset Post-operative AF	146 (15.5)	102 (15.4)	31 (18.2)	0,634	0,050
Intubation > 72 hours	73 (7.7)	60 (9.1)	21 (12.4)	0,137	0,102
Wound complications	33 (3.5)	18 (2.7)	3 (1.8)	0,625	0,096
Postoperative Sepsis	4 (0.4)	3 (0.5)	3 (1.8)	0,125	0,086
Ventilation time, median [IQR]	6.00 [4.00, 10.00]	6.00 [4.00, 10.00]	6.00 [5.00, 11.25]	0,112	0,027
Bleeding in 24 h, median [IQR]	350.00 [250.00, 500.00]	400.00 [300.00, 550.00]	400.00 [250.00, 500.00]	0,002	0,131
In-hospital mortality	10 (2.3)	10 (3.2)	1 (1.4)	0,703	0,082
ICU days, median [IQR]	2.00 [1.88, 2.00]	2.00 [1.92, 2.00]	2.00 [2.00, 3.00]	0,022	0,111
LOS days, median [IQR]	7.00 [7.00, 9.00]	7.00 [7.00, 8.00]	7.00 [7.00, 9.00]	0,058	0,050



We employed inverse probability of treatment weighting (IPTW) to create three well-matched groups.

Following IPTW, intraoperative variables such as CPB time, cross clamp time, and the percentage of mitral valve replacement remained comparable.

Weighted univariate logistic regression demonstrated comparable outcomes across the groups, except for obese patients who exhibited a **higher incidence of new onset atrial fibrillation (p = 0.037)** and **pacemaker implantation (p < 0.001)**. Both overweight and obese patients suffered less frequently from low output syndrome (p < 0.001) and postoperative stroke (p = 0.025)



Conclusions

Our findings suggest that **obesity does not significantly increase the risk of mortality or major adverse cardiovascular events after minimally invasive mitral valve surgery**. This approach may offer a less invasive alternative for obese patients, potentially reducing the risk of wound complications associated with conventional surgery.