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Background

Current literature describes high rates of postoperative subcutaneous emphysema (SE) for video assisted lung and esophageal surgery at 33% and 52%, respectively. However, little is known about the incidence of SE following robotic cardiac surgery. Our study aimed to describe the incidence of postoperative subcutaneous emphysema, identify the risk factors linked to its development, and assess how it affects postoperative outcomes.

Methods

- July 2021- July 2023
- 116 Patients included in analysis
- Robotic Mitral Vale repair n=63 (54.3%)
- Robotic MIDCAB n=23 (19.8%)
- Robotic TECAB n=30 (25.9%)

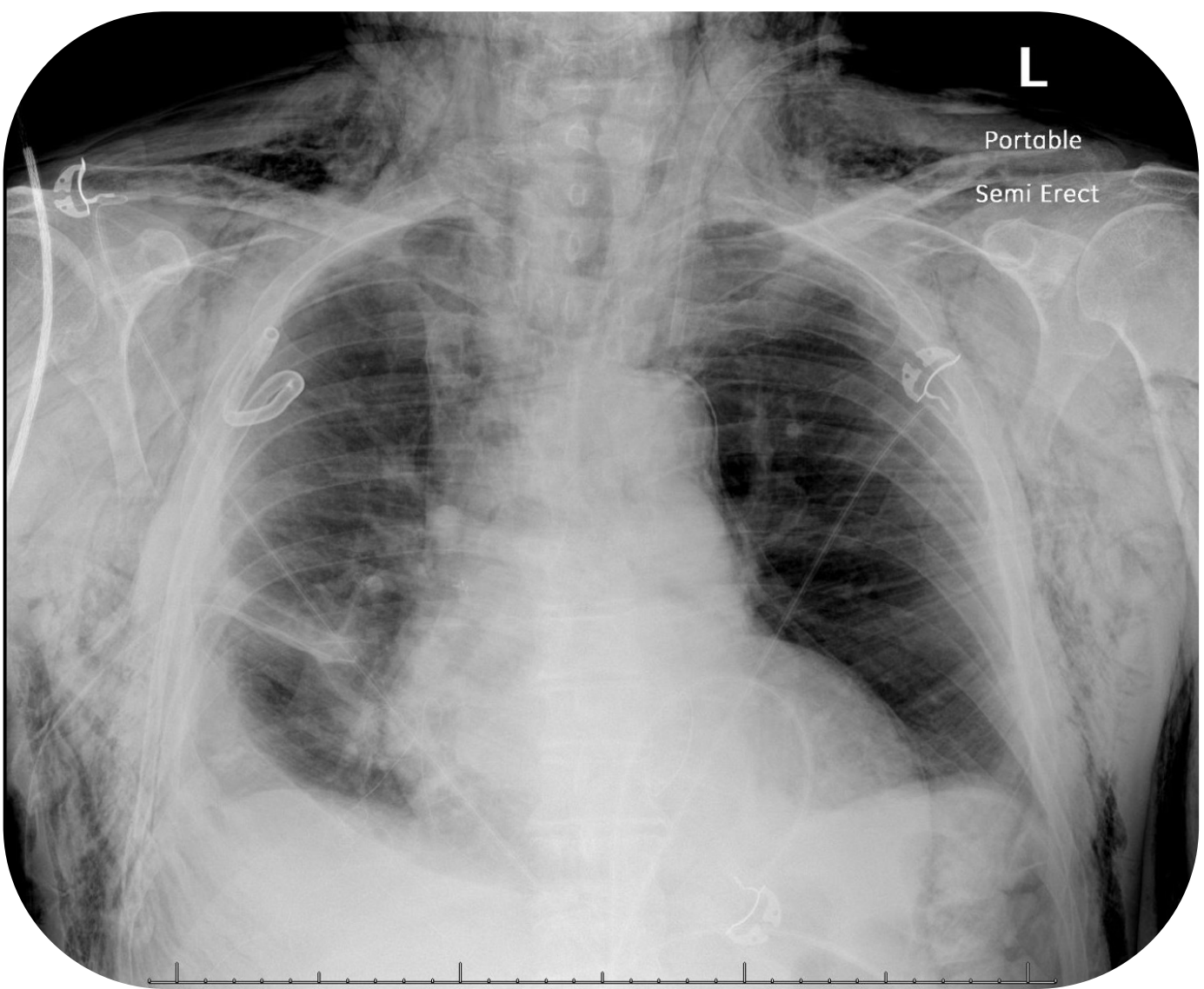
Results

Postoperative Subcutaneous Emphysema occurred with an incidence of 53/116 (45.7%). Emphysema was mild in 30/53 patients (56.6%), moderate in one patient (1.9%) and severe in 22/53 patients (41.5%).

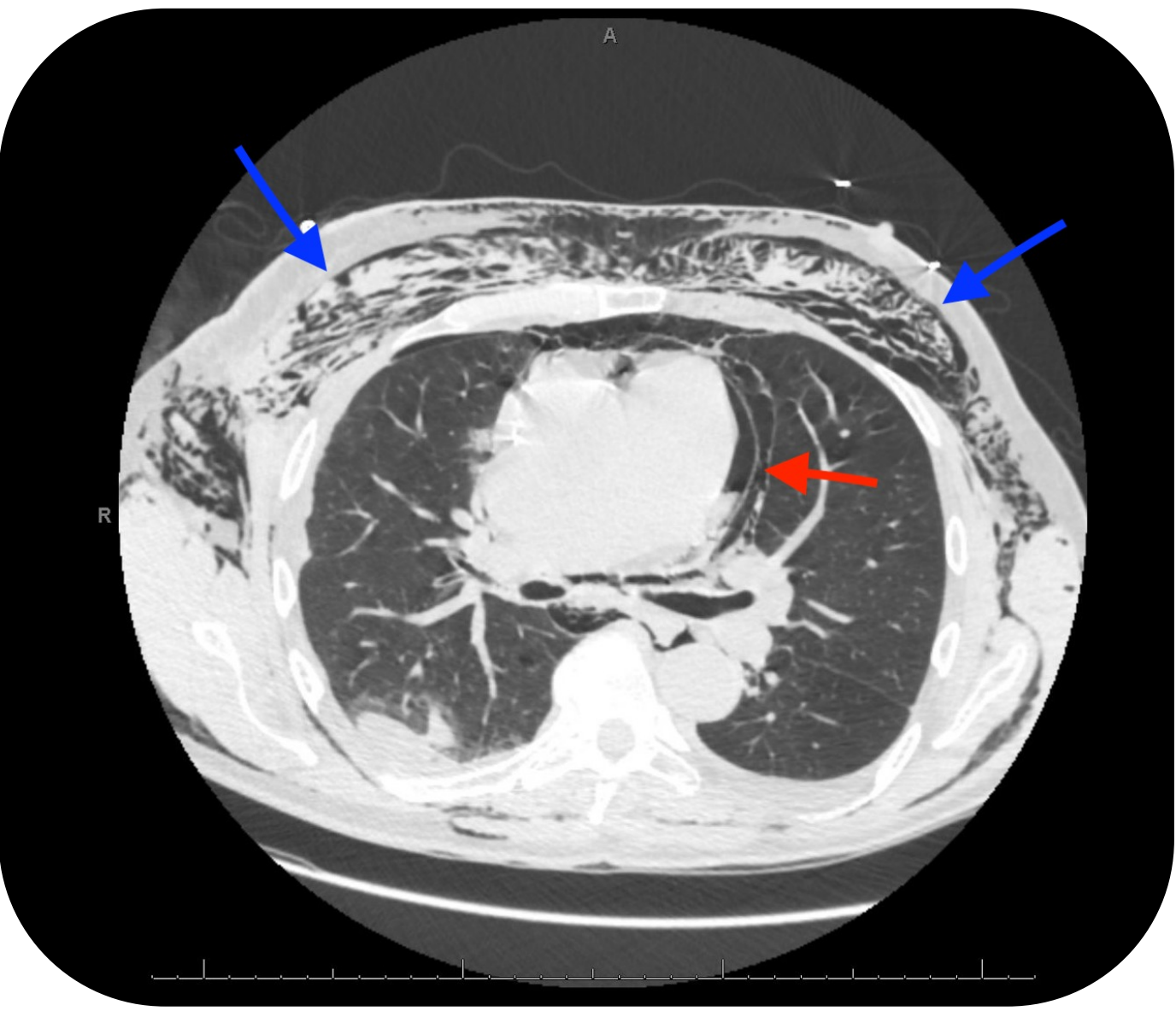
Table. Demographics, risk factors and postoperative outcome across groups with no, mild to moderate and severe subcutaneous emphysema

Variable	no SE n=63	mild to moderate SE n=31	severe SE n=22	p value
Weight (kg)	88.1 (±17.9)	80 (±18.29)	75.6 (±14.8)	0.009
BMI (kg/m ²)	28.6 (±4.8)	26.1 (±4)	25.5 (±4.4)	0.006
Body surface area (m ²)	2.1 (±0.28)	2 (±0.3)	1.9 (±0.24)	0.01
Procedere				0.04
MVR	30 (47.6)	18 (58.1)	15 (68.2)	
MIDCAB	14 (22.2)	9 (29)	0 (0)	
TECAB	19 (30.2)	4 (12.9)	7 (31.8)	
Time to last chest tube removal (days)	3.6 (±2.2)	2.7 (±1.2)	4.6 (±2)	0.006
Pneumothorax	16 (25.4)	24 (77.4)	17 (77.3)	<0.001
Additional chest tube insertion	2 (3.2)	1 (3.2)	4 (18.2)	0.029
No. of postoperative chest x-rays	6.3 (±2.5)	6.2 (±3.1)	8.6 (±6.2)	0.033
Postoperative CT chest	4 (6.3)	3 (9.7)	6 (27.3)	0.026
Revision for bleeding	1 (1.6)	0 (0)	0 (0)	0.654
Stroke	0 (0)	0 (0)	0 (0)	n/a
Renal failure	0 (0)	0 (0)	0 (0)	n/a
ICU stay (h)	57.8 (±35)	63.3 (±62.7)	77.2 (±44.2)	0.056
Length of hospital stay (d)	5.2 (±2.6)	5.1 (±2.5)	6.3 (±4.7)	0.71
Mortality	0 (0)	0 (0)	0 (0)	n/a

Values are presented as mean (± standard deviation) or n (%). SE, subcutaneous emphysema; BMI, body mass index; MVR, mitral valve repair; MIDCAB, minimally invasive direct coronary artery bypass grafting; TECAB, totally endoscopic coronary artery bypass grafting; CT, computed tomography; ICU, intensive care unit



Chest x-ray and CT chest of the same patient demonstrating severe subcutaneous emphysema extending into both sides of the chest as well as into the neck



Conclusion

Subcutaneous emphysema after robotic cardiac surgery is a common finding. SE occurs preferentially in patients with low body weight, low BMI, and a small body surface area and is more common in robotic mitral valve repair than in robotic coronary bypass surgery. SE after robotic heart surgery leads to increased thoracic imaging demand, to a higher need of additional chest tube insertion, and to longer duration of chest drainage. Clinical outcomes are not affected.