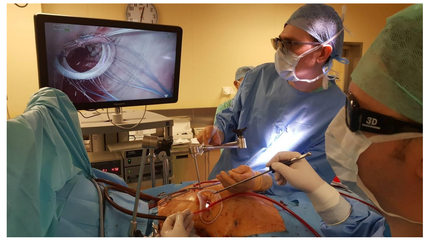
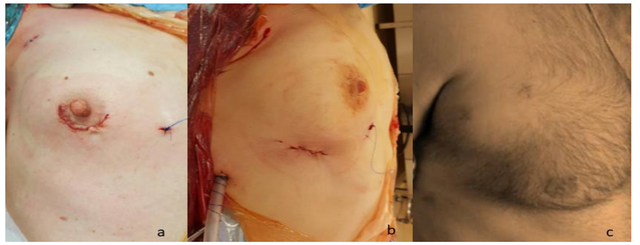
Propensity Score Adjusted Comparison Of Totally Thoracoscopic Vs Video Assisted Minimally Invasive Mitral Valve Surgery

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Objective

We sought to compare the totally thoracoscopic periareolar (TTP)- and video-assisted (VA)- approaches for minimally invasive mitral valve surgery (MIM

Parameter	V-A minithoracotomy group (n=215)	Totally thoracoscopic group (n=185)	p value
Age (in years)	64.3(+/- 12)	65.4(+/- 10)	0.6
Males	49%	83%	0.001
COPD	8%	4%	0,5
Diabetes	17%	19%	0,9
LVEF	54(+/-12)%	52(+/- 14)%	0.4
Euroscore II	7.1(+/- 7)	5.1(+/- 4)	0.1
NYHA II class	73,8%	78,2%	0,7
Isolated MV regurgitation	61%	69%	0.6
Isolated MV stenosis	13%	8%	0.2
Secondary TV regurgitation	26%	23%	0.7

Table 1. The comparison of the preoperative risk factors and the indication for surgery in study groups (data is expressed as the number of patients and the % of the population or as a mean +/- value standard deviation; where the GFR is glomerular filtration rate, the COPD is chronic obstructive pulmonary disease, the LVEF is the left ventricle ejection fraction, the MV is mitral valve and the TV is the tricuspid valve).

Methods

Between 2011 and 2018, 400 consecutive patients underwent minimally invasive heart surgery due to mitral and mitral-tricuspid valve disease. The first 215 patients were operated via right-sided VA minithoracotomy, while the following 185 patients were operated via the TTP approach. Clinical characteristics and outcomes between the groups were analyzed and adjusted by means of propensity score matching.

Results

Of 400 patients, 62.3% underwent isolated MV repair, 11.8% isolated MV replacement and 25.3% mitral+tricuspid valve repair. There was no difference in in-hospital mortality between the TTP group (2.1%) and the VA group (3.1%): Hazard Ratio (HR): 0.68 (95% Confidence Intervals [CIs]):0.08-5.91; P=0.724). Stroke occurred in 2.3% patients in VA- and none in the TTP subgroups (P=0.31). The average aortic cross-clamp time was not significantly different between the groups, with 103±39 min and 97±46 min in the TTP and VA groups (P=0.719) respectively. Cardiopulmonary bypass time was no different as well 166±53 vs. 166±70 min (P=0.422). No conversion to either full sternotomy or TTP to VA was required. Within investigated follow-up, there was no difference in terms of reoperation estimated rates (98.5% in VA and 97.8% in TTP; P=0.439) and no difference in overall estimated 5-years survival between the TTP- (94.3%) and the VA- (96.2%) MIMVS- undergoing patients: HR: 0.71 (95%CIs): 0.08-6.39); P=0.763. After propensity matching adjusted HR was 0.74 (95%CIs: 0.06-6.56); P=0.740.

Parameter	V-A minithoracotomy group	Totally endoscopic group	p value
Primary endpoints			
Mortality	3.1%	2.1%	p=0.25
Stroke/ TIA	2.3%	0	p=0.31
Chest revision for bleeding	3.1%	4%	p=0.34
ECMO/IABP/LVAD	0	0	1
Mechanical ventilation time (hours)	7.6(+/- 8)	8(+/- 42)	p=ns
Extended mechanical ventilation (over 24 hours)	3.1%	2.1%	p=0.26
Secondary outcomes			
Conversion to full sternotomy	0	0	1
Total Drainage (ml)	433(+/- 315)	445(+/-308)	p=0.87
Number of RBC units transfused	1.8(+/-2)	1.8(+/-2)	p=0.97
Aortic cross-clamp time (minutes)	97(+/-46)	103(+/- 39)	0.5
ECC time (minutes)	166(+/- 70)	162(+/- 53)	0.2
ICU stay	3.2(+/-3)	3.6(+/-3)	0.3
Wound infection	2%	0	p=ns

Table 2. The comparison of primary and secondary outcomes in two study groups (data is expressed as the number of patients and the % of the population or as a mean +/- value standard deviation; where the TIA is the transient ischaemic attack, the ECMO is the extracorporeal membrane oxygenation, the IABP is the intraaortic baloon pump, the LVAD is the left ventricle assist device, the POD is the postoperative day, the RBC are the red blood cells, the ECC is the extracorporeal circulation and the ICU is the intensive care unit).

Variable	death		reoperation	
	OR(CI)	p-value	OR(CI)	p-value
Surgical access	1.26(0.31-5.13)	0.75	1.45(0.12-0.16.71)	0.76
Operation type	0.97(0.36-2.59)	0.94	0.54(0.08-3.43)	0.51
Gender	1.05(0.28-3.89)	0.93	1.06(0.14-1.42)	0.98
Age	0.98(0.93-1.03)	0.58	1.05(0.93-1.19)	0.36
LVEF	0.96(0.94-0.99)	0.2	0.97(0.92-1.01)	0.14
Diabetes	3.56(0.93-13.7)	0.06	2.44(0.21-28.4)	0.47
COPD	1.73(0.2-15.2)	0.62	0.04(0.00-0.3)	0.77
Euroscore II	1.09(1.01-1.18)	0.03	1.05(0.91-1.22)	0.45
ECC time	1.01(0.99-1.02)	0.5	1.00(0.99-1.01)	0.21
Aortic cross-clamp time	1.00(0.99-1.02)	0.94	1.0(0.98-1.02)	0.67
Total Drainage	1.00(0.99-1.01)	0.23	0.98(0.98-1.01)	0.56
Transfusions	1.25(0.99-1.58)	0.06	0.84(0.39-1.8)	0.65
Mechanical ventilation time	1.00(0.99-1.02)	0.11	0.99(0.92-1.05)	0.81
ICU stay	1.18(1.05-1.32)	0.003	0.98(0.71-1.36)	0.93

Table 3. Mortality and Reoperation Risk Factors – logistic regression for entire group; where the ECC is the extracorporeal circulation, the ICU is the intensive care unit, the COPD is chronic obstructive pulmonary disease, the LVEF is the left ventricle ejection fraction.

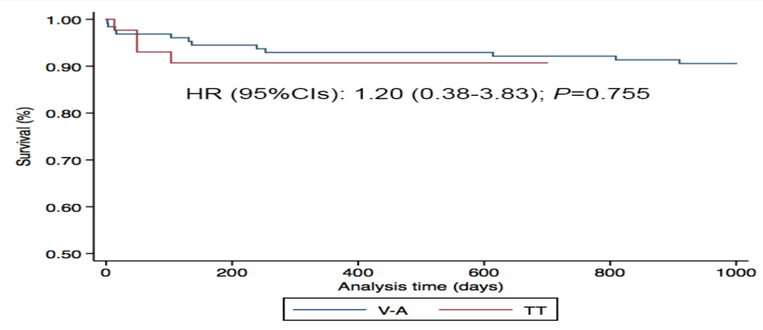


Table 4. The comparison of the overall Kaplan-Meier survival rate between the video-assisted group (V-A) and the totally thoracoscopic group (TT) over a 5-year follow-up period.

Conclusions

The study proved an equal safety and feasibility of the totally thoracoscopic periareolar and video-assisted minithoracotomy access in minimally invasive mitral valve surgery.