A Near 100% Repair Rate is Achievable with Minimally Invasive and Robotic Mitral Valve Surgery Over a 15-Year Period in the UK.

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INTRODUCTION

Repair of degenerative mitral disease is the only intervention that restores life expectancy to that of an age and sex-matched population.

In the UK, the adoption of minimally invasive techniques (endoscopic or robotic) in mitral valve surgery is lower than in Europe and the US.

A near 100% repair rate has been reported for sternotomy mitral valve procedures by some reference centres but there is concern that minimally invasive and robotic mitral valve surgery may be associated with a lower repair rate due to its greater procedural complexity and therefore potential loss of patient survival.

METHODS

- From January 2011 to December 2025, 597 consecutive patients underwent minimally invasive (n=541) or robotic mitral valve surgery (n=56) by a single surgeon (PM).
- Prospective data collection,
- Endoscopic techniques used a 4cm right minithoracotomy whereas robotic techniques were through a 2cm access port with the Da Vinci X robot.
- Peripheral vacuum-assisted cardiopulmonary bypass (28-30°C)
- Cold blood cardioplegia or Custodiol®
- Predominant repair technique: Gore-Tex loops

ENDOSCOPIC (L), ROBOTIC (R)

DEMOGRAPHICS

	Mini / Robot mitral valves (n = 597)
Elective	557 (93.3)
Age at operation (years)	62 (54, 70)
Female	187 (31.3)
NYHA class ≥ III	137 (22.9)
Previous cardiac surgery	44 (7.4)
Peripheral vascular disease	5 (0.8)
LVEF 30-50%	70 (11.7)
LVEF <30%	1 (0.2)
EuroSCORE II	0.86 (0.67, 1.27)

PATHOLOGY

	Mini / Robot mitral valves (n = 597)	Degenerative pathology only (n = 478)
Pathology		
FED	276 (46.2)	276 (46.2)
Barlow's	202 (33.8)	202 (33.8)
Rheumatic	30 (5.0)	-
Atrial SMR	29 (4.9)	PLP 363 (75%)
Failed prior repair	15 (2.5)	BLP 81 (18%)
Previous infection	15 (2.5)	ALP 34 (7%)
Active infection	8 (1.3)	-
Ischaemic	6 (1.0)	-
Other	16 (2.7)	-
MV repair	516 (86.4)	462 (96.7)
Convn to sternotomy	12 (2.0)	11 (2.3)
CPB time (mins)	193 (167, 222)	195 (168, 226)
AXC time (mins)	128 (109, 151)	132 (111, 156)

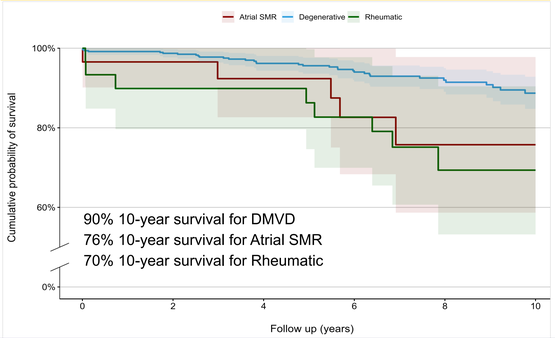
POST-OP OUTCOMES

	Mini / Robot mitral valves (n = 597)	Degenerative pathology only (n = 478)
In-hospital mortality	6 (1.0)	3 (0.6)
Stroke	7 (1.2)	5 (1.0)
New AF	59 (9.9)	52 (10.9)
ICU stay (hrs)	44 (23, 71)	43 (22, 68)
ICU readmission	24 (4.0)	18 (3.8)
Post-op stay (d)	6 (5, 8)	6 (5, 8)

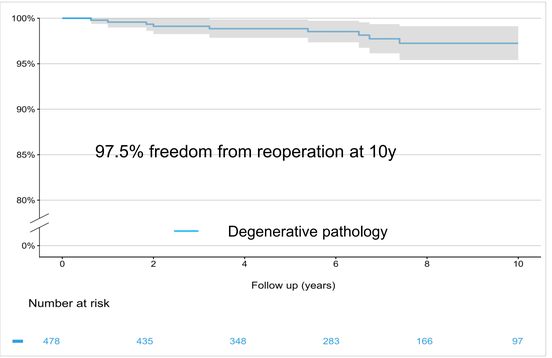
ENDOSCOPIC VS ROBOTIC

	Mini MV (n = 422)	Robot MV (n = 56)	*P* value
MV repair	406 (96.7)	56 (100.0)	0.23
Convn to sternotomy	6 (1.4)	0	-
EuroSCORE II	0.8 (0.6-1.2)	0.8 (0.6-0.9)	
In-hospital mortality	3 (0.7)	0 (0.0)	>0.99
Stroke	5 (1.2)	0 (0.0)	>0.99
ICU stay (hrs)	45 (23, 70)	24 (20, 42)	<0.001
Post-op stay (d)	6 (5, 8)	4 (4, 5)	<0.001

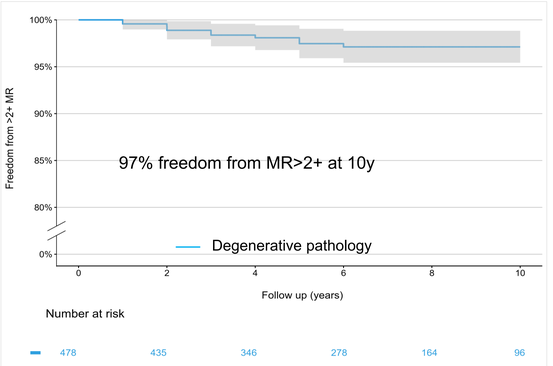
SURVIVAL BY PATHOLOGY



FREEDOM FROM REOPERATION



FREEDOM FROM >2+MR



CONCLUSIONS

- Near 100% repair rates & low failure rates are achievable for degenerative disease with endoscopic & robotic mitral valve surgery.
- Robotic shortens CCU & hospital stays.
- Minimally invasive and robotic techniques should be the standard of care.