Tailoring Minimally Congenital Heart Surgery: From J-ministernotomy To Axillary Approach. Single Center Experience

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OBJECTIVES

Evaluates our institutional experience with a lesion-specific minimally invasive approach tailored for pediatric patients with different congenital heart defects, ranging from ministernotomies to right vertical axillary thoracotomy.

MATERIAL & METHODS

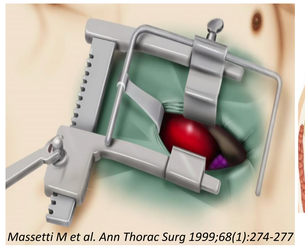
From 2020 to 2026, **82** consecutive patients treated with a minimally invasive surgery:
42 Males (51.2%)/40 Females (48.8%).
Median Age: 5.63 years (range: 25 days –20.24 yrs) - Median weight: 20.0 kg (range: 1.8 – 67.0 kg).

Type of Repair	Num	Type of MIS
ASD Closure	31	Right vertical axillary thoracotomy
ASD Closure	25	J-lower ministernotomy
Perimambranous VSD Closure	2	Right vertical axillary thoracotomy
Pulmonary Artery Banding	2	J-upper ministernotomy
Doubly committed VSD Closure	5	J-upper ministernotomy
Partial AVSD Repair	1	Right vertical axillary thoracotomy
Warden Procedure	5	J-upper ministernotomy
Subaortic membrane resection	9	J-upper ministernotomy
Aortic Valve Replacement	2	J-upper ministernotomy
Pulmonary Valve Replacement	2	J-upper ministernotomy

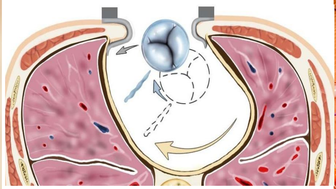
Minimally Invasive Surgical Approach	Patients (n)	CPB Time (min) Median [IQR]	Aortic Cross-Clamp (min) Median [IQR]
Right vertical axillary thoracotomy	47	44.0 [39.5 – 59.5]	22.0 [18.0 – 28.0]
Upper Ministernotomy	22	64.5 [53.0 – 75.8]	39.0 [27.0 – 52.0]
Lower Ministernotomy	11	74.0 [51.5 – 88.0]	40.0 [27.5 – 56.0]

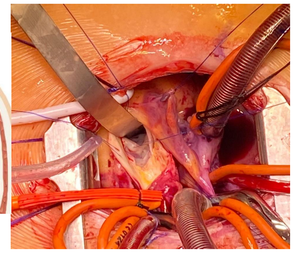
RESULTS

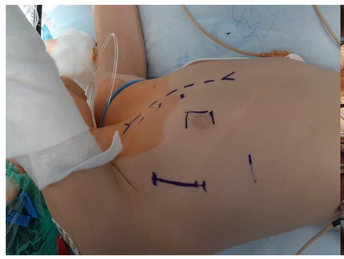
- Median CPB time: 54 minutes (range: 27–190) (except for 2 patients underwent PAB off-pump) - Median Xclamp time: 26 minutes (range: 10–160).
- Median extubation time: 4.5 hours (range: 0–10) with Median ICU stay: 1.1 days (0.1-5)
- Median follow-up time: 11.7 months (IQR: 4.8 – 19.5 months; Range: 7 days – 51.7 months) with no Early or Late Mortality (Survival Rate 100%)
- No conversions to conventional median sternotomy
- Overall Complications: 2.4% (2: 1 transient postoperative inflammatory pericarditis and 1 SVC stenting after Warden procedure)

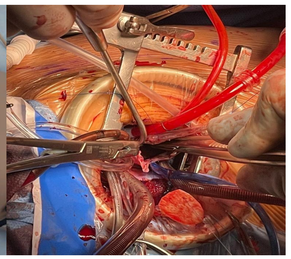


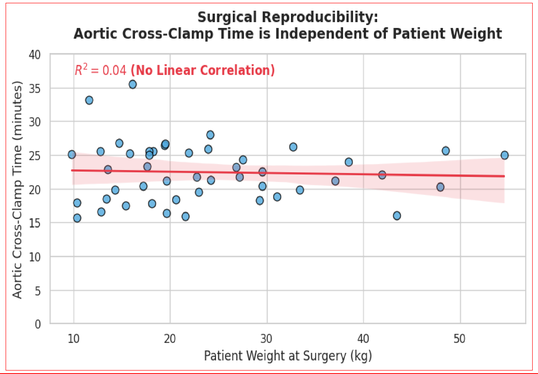
Massetti M et al. Ann Thorac Surg 1999;68(1):274-277

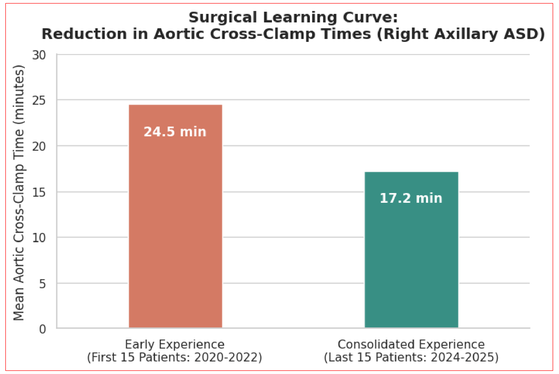


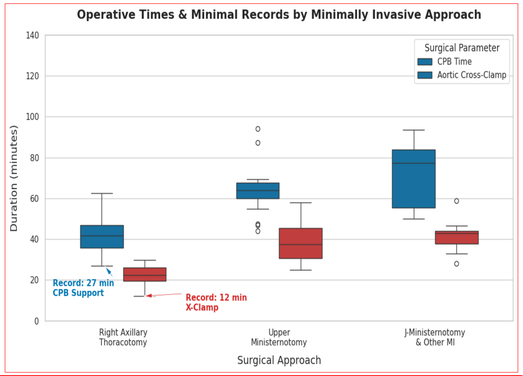












A diversified portfolio of minimally invasive techniques is safe and reproducible for a wide range of congenital heart defects, achieving a 100% survival rate and a 97.6% complication-free course in our experience.

While J-shaped ministernotomies offer versatile access for complex intracardiac repairs and valve surgery, the right axillary thoracotomy (*supported by central cannulation and regional anaesthesia blocks*) represents a superior strategy for ASD repair, providing unparalleled aesthetic outcomes and enhanced recovery without compromising surgical safety