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Early Outcomes of Del Nido Microplegia in Minimally Invasive Mitral Valve Repair: A Single Institution's Initial Experience

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INTRODUCTION

- Del Nido Microplegia (DNM) is a whole blood cardioplegia with relatively small quantities of concentrated Del Nido additives that minimizes the volume of crystalloid administered.
- Few studies have reported outcomes of using DNM in minimally invasive cardiac surgery (MICS).

AIM

- We sought to compare early clinical outcomes of minimally invasive mitral valve repair (MIMVR) with DNM to traditional open mitral valve repair with crystalloid (Del Nido or HTK/Custodiol) cardioplegia solution.

METHODS

- All adult patients between October 2018 and September 2021 who underwent either minimally invasive mitral valve repair or open mitral valve repair were identified and included in this retrospective review.
- Clinical information and perioperative outcomes for the patients were collected and analyzed.

CONCLUSIONS

- Operative time for MIMVR with DNM is longer and requires more bypass time, cross clamp time and extended myocardial protection.
- Despite these differences, early outcomes using whole blood DNM during MIMVR are comparable to traditional, open techniques with similar early outcomes and 30-day mortality.
- These short-term results are encouraging, suggesting DNM provides adequate myocardial protection despite longer cardiac arrest times often required for MICS. A larger sample size, with long term follow up, is necessary to document further efficacity.

RESULTS

	Del Nido Microplegia
Cardioplegia type	Blood
Total volume	15mL/kg (Min 1000mL, Max 1500mL)
Additives	
Mannitol 20%	32 mL (6.4 grams)
Potassium	20 mL (40 mEq)
Magnesium 50%	8mL (4 grams)
Lidocaine 2%	13 mL (260 mg)

Table 1: Components of whole blood Del Nido Microplegia.

	Open MVR (n=20)	Minimally Invasive MVR (n=20)	*P value*
Cardioplegia	Del Nido (n=16) HTK/Custodiol (n=4)	Del Nido Microplegia (n=20)	
Age, years	62 (range 30-78)	63 (range 36-76)	0.6
Men, n (%)	16 (80)	18 (90)	0.6
Body mass index, kg/m^2	29 ± 5	25 ± 4	**<0.01**
Risk factors, n (%)			
Diabetes	4 (20)	1 (5)	0.3
CVA	3 (15)	1 (5)	0.1
Dyslipidemia	10 (50)	9 (45)	1.0
Hypertension	14 (70)	9 (45)	0.2
STS 30-day perioperative risk score, %	0.7	0.4	0.05
Left Ventricular Ejection Fraction, %	58 ± 8	57 ± 6	0.6
Preoperative biology			
Creatinine (mg/dL)	1.3 ± 0.4	1.0 ± 0.2	**<0.01**
Hemoglobin (g/dL)	13.4 ± 2	14.3 ± 1	0.2
Albumin (g/dL)	3.7 ± 0.6	4 ± 0.5	**0.03**
Operative status			
Elective, n (%)	14 (70)	20 (100)	**0.02**

Table 2: Preoperative characteristics of patients who underwent open or minimally invasive mitral valve repair. CVA: Cerebral vascular accident; HTK: Histidine-tryptophan-ketoglutarate; MVR: Mitral valve repair; STS: Society of Thoracic Surgeons.

	Open MVR (n=20)	Minimally Invasive MVR (n=20)	*P value*
Operative characteristics			
CPB, min	157 ± 38	247 ± 35	**<0.01**
Aortic cross clamp time, min	107 ± 28	145 ± 31	**<0.01**
Total cardioplegia volume, mL	1581 ± 532	2095 ± 775	**0.03**
Cardioplegia delivery			**<0.01**
Antegrade	14 (70)	20 (100)	
Antegrade and retrograde	6 (30)	0	
Intraoperative packed red blood cells, units	7	7	0.3
Inotropes used to wean from CPB, n (%)	11 (55)	13 (65)	0.8
Complications, n (%)			
30-Day mortality	1 (5)	0	0.5
Atrial fibrillation	9 (45)	6 (30)	0.2
Renal failure requiring dialysis	0	0	-
Stroke	0	0	-
MI	0	0	-
Time to extubation, hrs	4 (range 1-43)	4 (range 1-44)	0.8
Change in LVEF, %	8 ± 9	9 ± 10	0.8
Hospital stay, days	6 (range 3-20)	5.5 (range 3-13)	0.12

Table 3: Perioperative outcomes following open or minimally invasive mitral valve repair. CPB: Cardiopulmonary bypass; LVEF: Left ventricular ejection fraction; MI: Myocardial Infarction.

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DISCLOSURES

The authors have no relevant disclosures or conflicts of interest.

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