One Shot Del Nido Cardioplegia In Minimally Invasive Aortic Valve Surgery: Comparison With Multidose Buckberg Cardioplegia

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Link for abstract

AIM

The advantage of a single-dose cardioplegia is appreciated in minimally invasive surgery because it avoids workload interruption for multiple dose administration. We compared the outcome of patients undergoing cardiac surgical procedures with arrested heart using the Del Nido cardioplegia and the Buckberg cardioplegia.

METHODS

From August 2003 to December 2019 a total of 123 isolated minimally-invasive aortic valve replacements were performed in our center. Data were prospectively collected and retrospectively analyzed. Two groups of patients were created based on cardioplegia: Buckberg group (BC) and Del Nido group (DN). Groups including patients matched for gender and diabetes (55 patients per group) were statisically compared (Table 1).

Table 1

Preoperative variables	Buckberg group (n=55) n (%) or mean ± SD	Del Nido group (n=55) n (%) or mean ± SD	p value
Age (y)	67.7 ± 11.7	68.8±9.4	0.6
Women	25 (45.4%)	16 (29.1%)	0.1
Diabetes	4 (7.3%)	7 (12.7%)	0.5
COPD	5 (9.1%)	5 (9.1%)	1
Previous coronary PCI	6 (10.9%)	8 (14.5%)	0.7
Atrial fibrillation	4 (7.3%)	11 (20%)	0.09
Periferal arterial disease	0	3 (5.4%)	0.2
Renal failure	1 (1.8%)	5 (9.1%)	0.2
Euroscore II (%)	1.1 ± 0.5	1.1 ± 0.8	0.9
LV ejection frantion (%)	58.5 ± 7.6	58.2 ± 7.2	0.8
Aortic valve stenosis	48 (87.3%)	48 (87.3%)	1
Aortic valve regurgitation	7 (12.7%)	7 (12.7%)	1
Hemoglobin (g/dL)	13.5 ± 1.4	13.4 ± 1.6	0.5

RESULTS

The two groups were comparable, with no differences in preoperative variables. Mean surgical time and cardiopulmonary bypass (CPB) time were statistically longer in BC group (p<0.001) with higher intraoperative lactate levels (p=0.001). In the DC group there was a statistically significant less need for defibrillation after cross-clamp release (p<0.001). Patients in BC group received more blood transfusions during CPB (p<0.001) and more intraoperative insuline administration for higher glucose levels (p<0.001). Maximum postoperative Creatine Kinase-MB (CK-MB) level, postoperative atrial fibrillation and hospital length of stay were similar. No death occurred (Tables 2-3).

Table 2

Intraoperative variables	Buckberg group (n=55) n (%) or mean ± SD	Del Nido group (n=55) n (%) or mean ± SD	p value
Surgery time (min)	225.1 ± 45.1	195.4 ± 41.6	**<0.001**
CBP (min)	120.8 ± 35.3	90.8 ± 31.8	**<0.001**
Cross-Clamp (min)	73.2 ± 17.1	69.3 ± 22.4	0.3
Internal defibrillation	36 (65.4%)	8 (14.5%)	**<0.001**
PM to Heartbeat	12 (21.8%)	15 (27.3%)	0.6
Transfusions	21 (38.1%)	5 (9.1%)	**0.001**
Peak Potassium (mmol/L)	5.4 ± 0.8	5.2 ± 0.7	0.1
Peak lactate (mmol/L)	2.0 ± 1.1	1.5 ± 0.6	**0.001**
Peak Glucose (mmol/L)	12.0 ± 2.3	8.1 ± 1.7	**<0.001**
Insuline administration	16 (29.1%)	1 (1.8%)	**<0.001**
Inotropic / vasoactive support	33 (60%)	36 (65.4%)	0.6

Table 3

Postoperative variables	Buckberg group (n=55) n (%) or mean ± SD	Del Nido group (n=55) n (%) or mean ± SD	p value
Inotropic / vasoactive support	24 (43.6%)	33 (60%)	0.1
CK-MB (U/l)	66.2 ± 100.5	49.9 ± 99.5	0.4
Acute myocardial infarction	0	0	/
Atrial fibrillation	20 (36.3%)	25 (45.4%)	0.4
Renal failure	3 (5.4%)	0	0.2
Stroke	0	0	/
ICU stay (days)	2.2 ± 2.9	1.7 ± 1.4	0.1
LOS (days)	8.5 ± 3.4	8.6 ± 2.9	0.8
post op Glucose (mmol/L)	8.3 ± 1.3	8.1 ± 1.6	0.6
Insuline somministration	5 (9.1%)	6 (10.9%)	1
Retoracotomy for bleeding	9 (16.4%)	3 (5.4%)	0.1

CONCLUSIONS

One-shot Del Nido cardioplegia allows for a more comfortable minimally invasive surgery and provides a better myocardial protection through significantly more spontaneous return to a regular heartbeat. It allows for less CPB time and consequent less stress conditions attested by lower intraoperative lactate levels, lower peak of glucose, less need of insuline administration and blood transfusions (p<0.005).