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Analysis of Clinical Outcomes of Fast-track Early Extubation in Neonates After Arterial Switch Operation for Transposition of the Great Arteries

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Fast-track in neonates

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Definition： neonates were extubated within 24h after surgery [1](4–8 h after simple procedures)

Advantages

- ✓ lower rate of pulmonary complications
- ✓ shorter stay in ICU
- ✓ more favorable psychological effects

References： [1]Yamasaki Y, Shime N, Miyazaki T, Yamagishi M, Hashimoto S, Tanaka Y. Fast-track postoperative care for neonatal cardiac surgery: a single-institute experience. J Anesth. 2011;25(3):321-329.

Should early extubation be the goal for children after congenital cardiac surgery?

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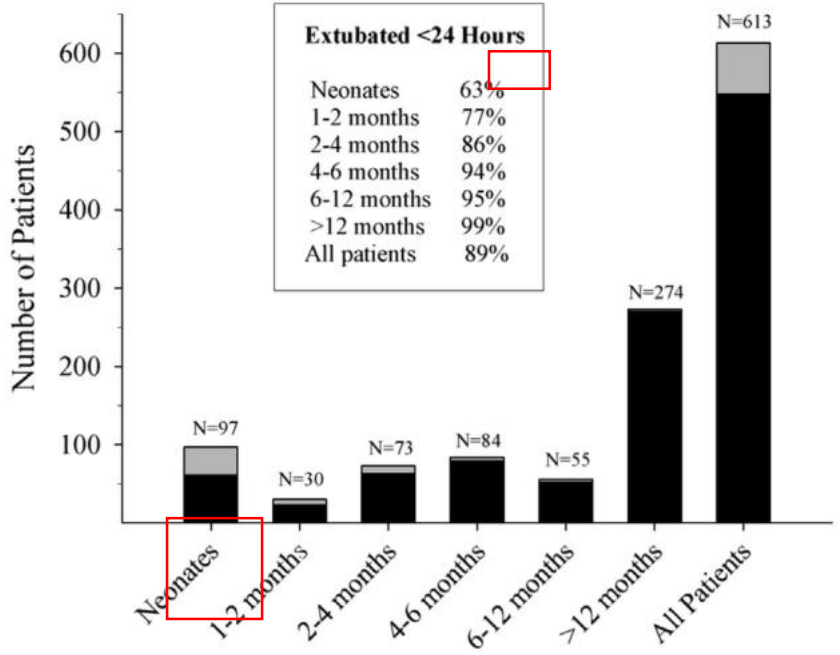
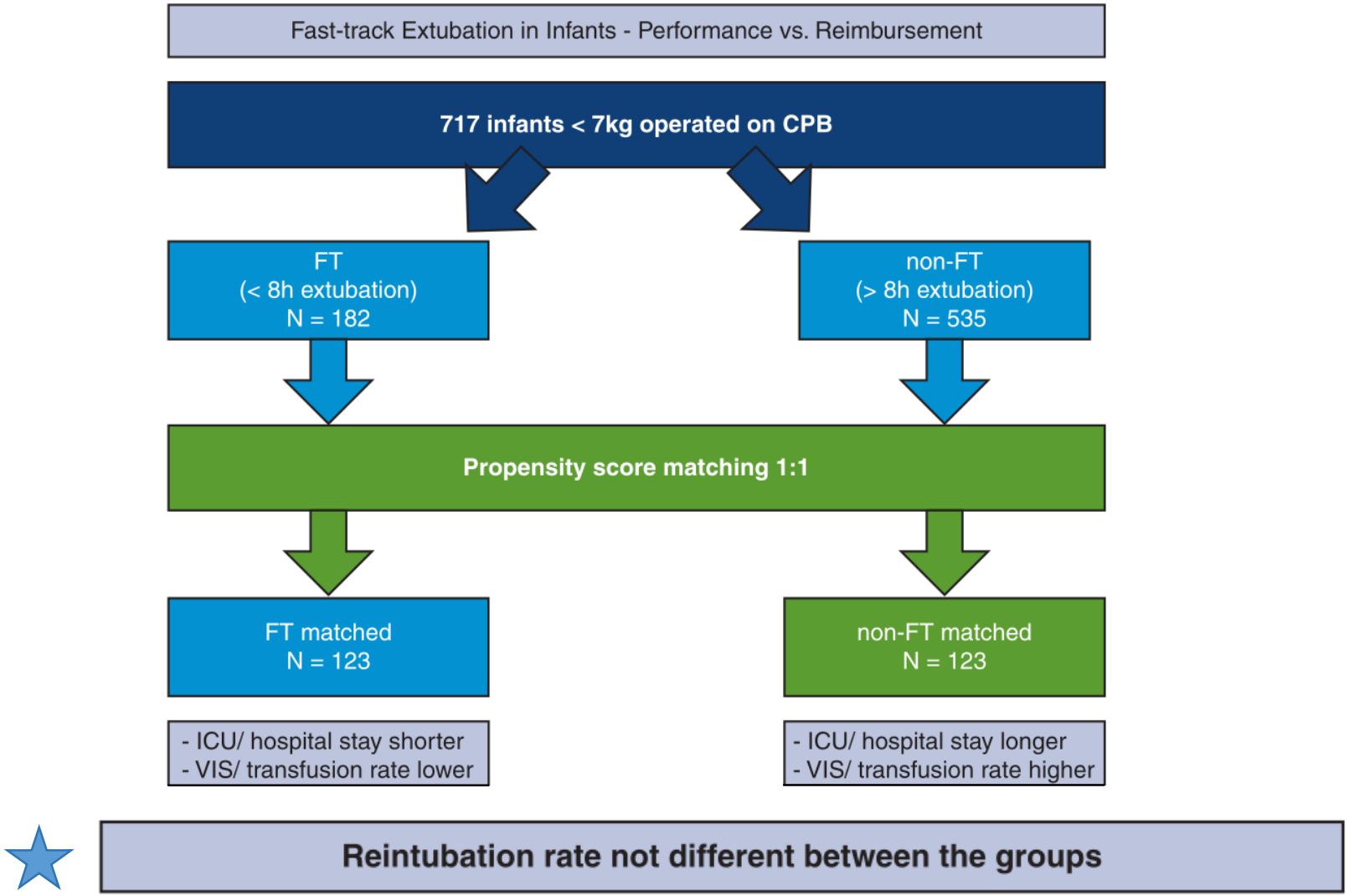


Most neonates,including many undergoing complex procedures, can be extubated within the first 24 hours after surgery.

Fast-track extubation after cardiac surgery in infants: Tug-of-war between performance and reimbursement[1]?



References： [1]Murin P, Weixler VHM, Romanchenko O, et al. Fast-track extubation after cardiac surgery in infants: Tug-of-war between performance and reimbursement?. J Thorac Cardiovasc Surg. 2021;162(2):435-443.

Simple D-TGA with/without VSD

Switch operation Beyond 3 days after birth[1]

Morbidity ↑ 47%

Healthcare costs ↑ 8%

Excluded

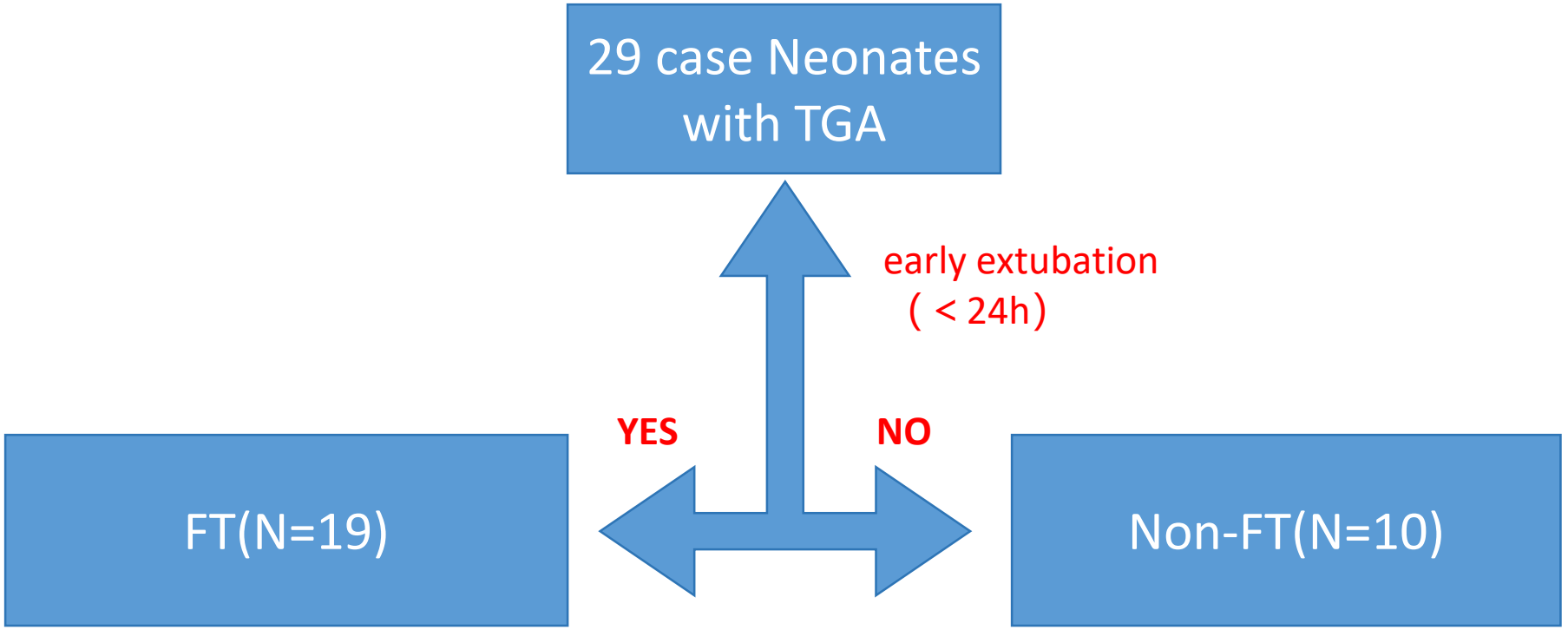
- Cardiac anomalies other than VSDs， ASDs， PDAs
- LVOTO、 DORV
- COA

Note： VSD,Ventricular Septal Defect;ASD,Atrial septal defect;PDA,Patent ductus arteriosus;LVOTO,Left ventricular outflow tract obstruction;DORV,double outlet right ventricle;COA,Coarctation of the aorta;

For simple D-TGA with/without VSD Early ASO operation is recommended

[1]Anderson BR, Ciarleglio AJ, Hayes DA, Quaegebeur JM, Vincent JA, Bacha EA. Earlier arterial switch operation improves outcomes and reduces costs for neonates with transposition of the great arteries. J Am Coll Cardiol. 2014;63(5):481-487.

Method


29 case Neonates with TGA
early extubation
(< 24h)
YES
NO
FT(N=19)
Non-FT(N=10)

Results

Characteristics	FT（N=19）	Non-FT（N=10）	*p* Value
Age at operation(days)	2.95±2.76	3.63±3.89	0.587
Weight at operation(kg)	3.36±0.61	2.72±0.5	0.01
Sex(male)	11（57.89%）	6（60.00%）	0.913
Coronary anomalies	4（21.05%）	4（40.00%）	0.278
Restrictive ventricular septal defect	2(10.53%)	5(50.00%)	0.187
Cross-clamp time(min)	79±11.45	86.50±11.20	0.105
CPB time(min)	120.00(113.00,141.00)	132.00(120.75,147.75)	0.104
Postoperative ICU stay time(hours)	155.47±67.70	257.60±89.58	0.002
Hospital costs（10000RMB）	10.21(9.4,12.11)	14.42(12.52,17.74)	0.002
Postoperative Hospital stay（days）	13.26±4.27	18.10±3.99	0.006
operation time(min)	216.21±52.93	236.50±43.40	0.280

Note:CPB,cardiopulmonary bypass;ICU,Intensive Care Unit,FT ,fast-track

There is a Statistics significant difference on Weight at operation、Postoperative ICU stay time，Hospital costs, Postoperative Hospital stay

Results

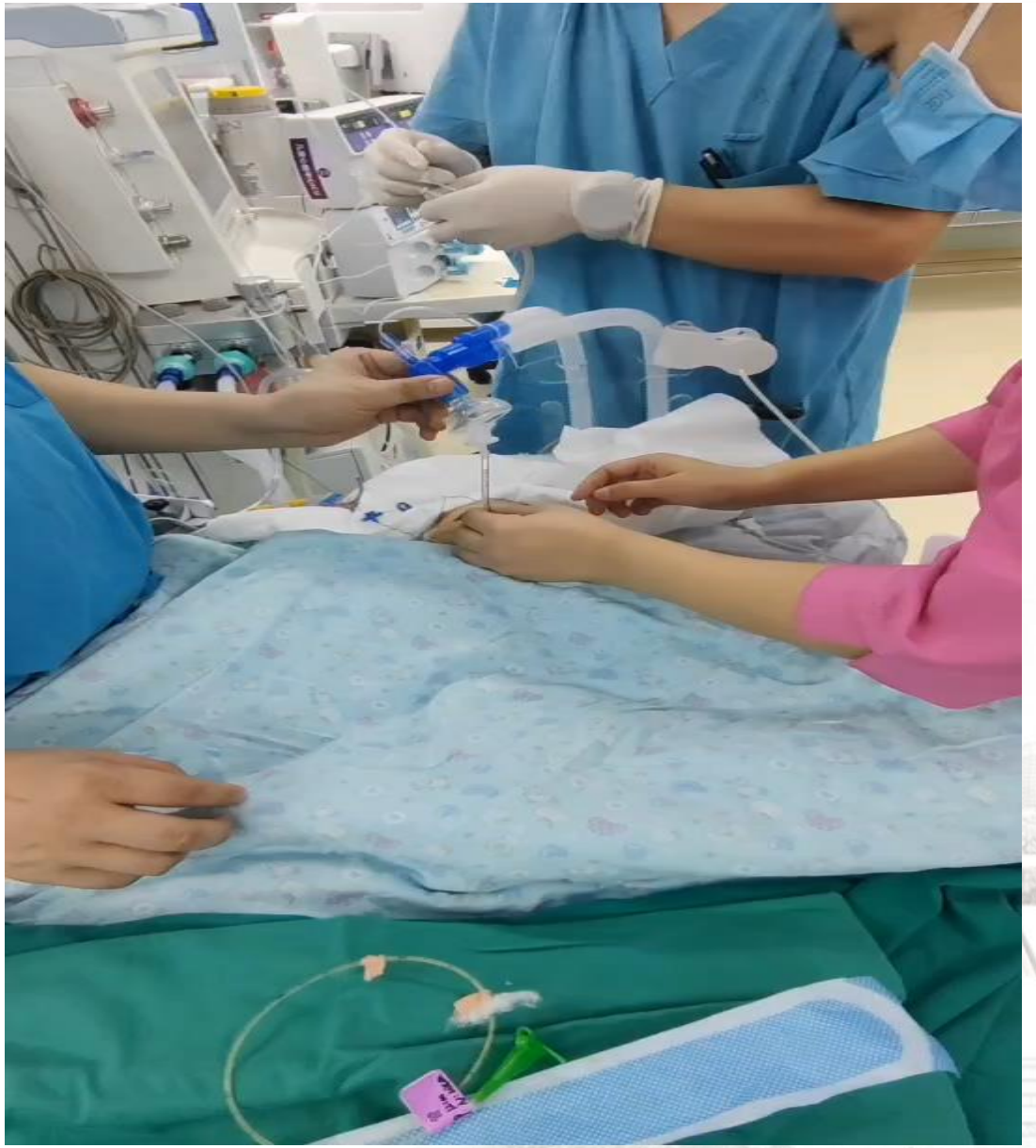
Binary Logistic Regression Analysis

Outcome	FT(N=19)	Non-FT(N=10)	EXP(B) (95% CI)	*p*-value
Aortopulmonary Collateral Arteries	0	2 (20.00%)	0.000	0.999
Nonrestrictive ventricular septal defect	2(10.53%)	5 (50.00%)	0.029(0.001,0.773)	0.035
Coronary anomalies	4(21.05%)	4(40.00%)	0.290(0.018,4.692)	0.383
Prenatal and postnatal Integrated care	15(78.95%)	8(80.00%)	0.000	0.999
Premature birth	1(5.26%)	2(20.00%)	1.927(0.008,474.434)	0.815
Preoperative resuscitation	2(10.53%)	3(30.00%)	0.027(0.001,0.721)	0.031
Weight ≤ 3kg	8(42.11%)	7(70.00%)	0.249(0.019,3.342)	0.294
Reoperation	0	0	-	-
Readmission 30-days from discharge	0	0	-	-
postoperative complications	0	0		
Mortality	0	0	-	-

Nonrestrictive ventricular septal defect, preoperative resuscitation is a major factor that cannot early extubation.

In Opration room Extubation

D-TGA-IVS,
newborn baby
Age: 2 days
Wt : 2.5Kg



Conclusion

- ✓ The FT early extubation after complete transposition of the great arteries operation in neonates, effectively reducing the postoperative Hospital stay time, ICU stay time, and hospital costs.
- ✓ The major factors that may affect FT early extubation after complete transposition of the great arteries are nonrestrictive ventricular septal defect and pre-operative resuscitation.
- ✓ And FT early extubation will not increase the incidence of postoperative complications, readmission, or mortality.

Limitations

The findings of this study were done at just one center and the sample size is small, so we need to confirm them in a trial with multiple centers and more patients.


Thanks