

Predictors of Neurological Outcome Following Infant Cardiac Surgery Without Deep Hypothermic Circulatory Arrest

Kosiorek A., Donofrio M. T., Zurakowski D., Reitz J. G., Tague L., Murnick J., Axt-Flidner R., Limperopoulos C., Yerebakan C., Carpenter J. L.



INTRODUCTION

Numerous studies identified potential risk factors for adverse neurodevelopmental outcome in infants with congenital heart disease (CHD). Nevertheless, little is known about neurologic sequelae within CHD subpopulations.

- The aim of the study was to illustrate perioperative variables and abnormal brain MRI findings in a specific CHD subpopulation of infants who were not exposed to deep hypothermic circulatory arrest (DHCA) during their first heart surgery.
- A secondary aim was to determine the impact of clinical characteristics, perioperative course and neuroimaging abnormalities on neurological outcome in this subpopulation of CHD patients.

METHODS

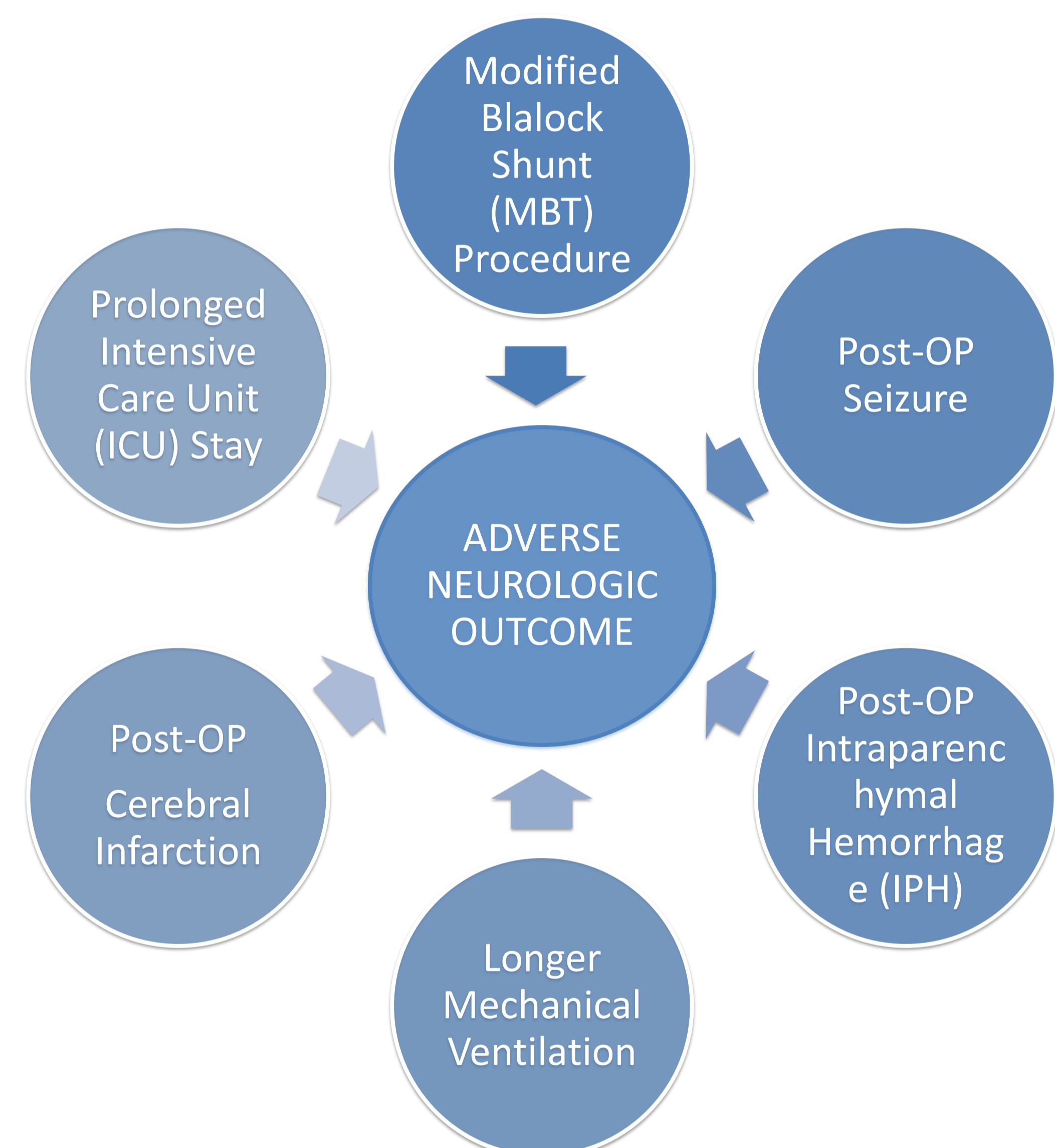
- Infants with CHD who underwent open heart surgery without DHCA between 2009 and 2017 were identified from a cardiac surgery database.
- Full term infants < 10 weeks of age at the time of surgery who received both a pre- and post-operative brain MRI were included. Patients with a syndrome associated with cerebral or neurodevelopmental disorders were excluded. Clinical characteristics and perioperative variables were collected from the electronic medical record.
- Brain Injury Scores (BIS) were assigned to pre- and postoperative brain MRIs. Variables were examined for association with neurological outcome of the patients at ≥ 12 months of age using the Pediatric Stroke Outcome Measure and Glasgow Outcome Scale-Extended.

RESULTS

In the study, **42 infants** were enrolled and evaluated, of which 69 % (n = 29) participated in a neurological **follow-up at ≥ 12 months of age**.

Variable	Good Outcome (n = 23)	Poor Outcome (n = 6)	P value
Age at the time of assessment in months, median (range)	27 (14-77)	24 (12-80)	0.477
MBT shunt, n (%)	4 (18%)	5 (83%)	0.005*
Surgery with CPB more than 1 time, n (%)	6 (26%)	4 (67%)	0.143
Days in ICU, median (IQR)	13 (10-22)	40 (34-200)	0.003*
Total mechanical ventilation days, median (IQR)	4 (3-8)	13 (6-35)	0.031*
Preoperative Injury, n (%)			
WMI	6 (26%)	0 (0%)	0.295
Infarct and/or IPH	5 (22%)	1 (17%)	0.999
Postoperative Injury, n (%)			
WMI	9 (39%)	2 (33%)	0.999
Infarct and/or IPH	3 (13%)	4 (67%)	0.018*
Seizure postoperatively, n (%)	0 (0%)	3 (50%)	0.005*

*Statistically significant univariate risk factor (P value < 0.05)



X BIS scores did not predict the outcome.

CONCLUSION

Adverse neurologic outcome in infants with CHD after infant cardiac surgery without DHCA was associated with prolonged **ICU stay**, extended **mechanical ventilation**, **MBT shunt**, presence of **postoperative seizures** as well as **postoperative stroke** and/or **IPH**.

LITERATURE

[1] Kosiorek A., Donofrio M. T., Zurakowski D., Reitz J. G., Tague L., Murnick J., Axt-Flidner R., Limperopoulos C., Yerebakan C., Carpenter J. L. *Predictors of Neurological Outcome Following Infant Cardiac Surgery Without Deep Hypothermic Circulatory Arrest*. *Pediatr Cardiol*. 2022 Jan;43(1):62-73. doi: 10.1007/s00246-021-02693-z