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THE EFFECT OF CARDIOPULMONARY BYPASS ON RENAL FUNCTION IN CYANOTIC AND ACYANOTIC CHILDREN

Donmez A, Aldemir D, Ozgur S, Mutlu H, Mercan S, Turkoglu S
Baskent University School of Medicine, Ankara, Turkey

Introduction: Glomerulopathy has been recognized as a prominent complication of cyanotic heart disease, and renal dysfunction remains as a serious complication during perioperative period in children undergoing cardiac surgery. However, the comparison of renal functions between cyanotic and acyanotic children has been rarely evaluated. The present study was undertaken to investigate some aspects of glomerular and proximal tubule function by detecting for the presence of microalbuminuria and measuring urinary N-acetyl-b-D-glucosaminidase (NAG) activity respectively in cyanotic children undergoing cardiopulmonary bypass (CPB) and compare these results with acyanotic children.

Patients and Methods: After Ethics Committee approval, 17 cyanotic and 16 acyanotic children between 2 - 36 months old without known renal disease were studied. Standard anaesthesia, CPB, and hypothermia protocols were used in both groups. Microalbuminuria detection (urinary albumin) and NAG activities were studied at four (after anesthesia induction, at the end of CPB, 4 and 24 hours postoperatively), blood urea nitrogen and creatinine values were studied at three (after anesthesia induction, at the end of CPB, 4 hours postoperatively) stages respectively. Statistical analyses were performed with repeated measurement design variance analysis with three factors, and $p < 0.05$ was considered significant.

Results are shown in Table I ($p < 0.05$).

Conclusion: Although renal dysfunction remains an important complication following CPB, there are few data on renal function in children with cyanotic heart disease. Our results demonstrate that alterations in urinary NAG activity and microalbuminuria level were similar in cyanotic and acyanotic children undergoing CPB.

References:

1. Bulet A, et al. Renal function in cyanotic congenital heart disease. *Nephron* 1999;81:296-300.
2. Dittrich S, et al. Renal impairment in patients with long-standing cyanotic congenital heart disease. *Acta Paediatr* 1998;87:949-54.
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Table I: (* $p < 0.05$)

	Cyanotic (n=17)	Acyanotic (n=16)
Age (age)	2.42±1.38	2.02±1.27
Weight (kg)	10.5±3.1	11.8±4.9
CPB / XC time (min)	65.7±24.6 / 39.1±22.3	63.3±28.3 / 39.7±23.0
Urinary NAG (U/L)		
- after anesthesia induction	9.34±8.28	13.35±15.36
- at the end of CPB	9.66±31.01	9.05±16.84
- 4 hours postoperatively	14.85±16.25	21.66±49.52
- 24 hours postoperatively	30.35±63.87	14.13±10.86
Microalbuminuria(mg/dL)		
- after anesthesia induction	1.53±2.24	1.42±2.26
- at the end of CPB	0.94±0.99	2.21±3.61
- 4 hours postoperatively	4.48±4.36	4.43±7.23
- 24 hours postoperatively	3.06±2.97	2.33±3.36
Serum BUN (mg/dL)		
- after anesthesia induction	14.1±4.1	14.4±3.5
- at the end of CPB	12.5±3.2	12.7±2.6
- 4 hours postoperatively	13.1±3.0	15.2±5.9
Serum creatinine (mg/dL)		
- after anesthesia induction	0.42±0.41	0.33±0.30
- at the end of CPB	0.36±0.10	0.35±0.28
- 4 hours postoperatively	0.37±0.35	0.34±0.33