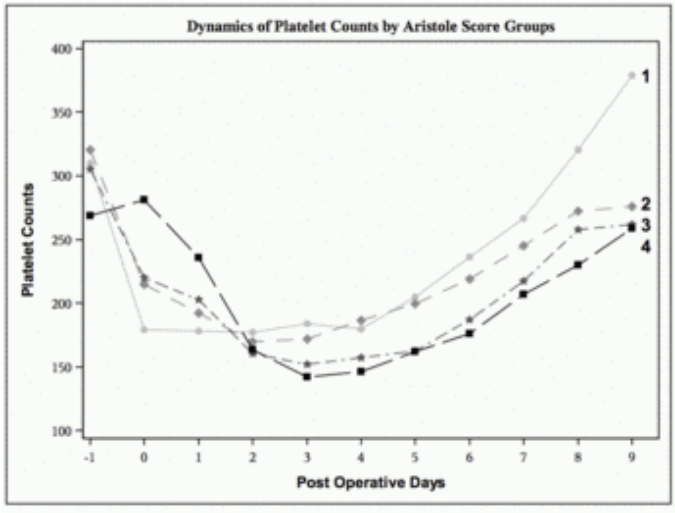
[CCAS-4] Natural History of Non-Immune Mediated Thrombocytopenia in Pediatric Open Heart Surgery

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Background: Quantitative and qualitative platelet defects during cardiopulmonary bypass (CPB) in the pediatric population are well described.[1] However, the magnitude of nadir platelet and recovery in the immediate post-operative period has not been well characterized. Initial decrease in the early post-operative period is informative of the extent of the surgery, blood loss and any ongoing consumptive processes, whereas the rate of recovery reflects compensatory mechanisms of the bone marrow or an ongoing consumptive process.[2],[3]
Methods: After IRB approval, we performed a retrospective review from a single institution's electronic medical record and anesthesia department's cardiac database over a 5 year period. Patient's demographic, laboratory, and surgical characteristics were captured, and clinical event rates were recorded. Descriptive statistics were used to evaluate platelet distributions and ANOVA was used for any comparisons of unbalanced data among Aristotle groups. We describe the natural platelet count trajectory of pediatric patients under 21 years of age having open heart surgery with CPB and stratify them using the Aristotle Complexity levels.
Results: 977 patients were included in the analysis with demographics represented in Table 1. Results of platelet trajectories of the 4 Aristotle Complexity level groups are in Figure 1. The platelet count in group 4 initially increases from preoperative values, due to the intraoperative platelet transfusions but ultimately reaches the lowest nadir (142,000/µL) despite receiving the greatest volume/kg of platelets. Table 2 shows the number of patients that received platelet transfusion with the representative volume transfused between groups. Platelet nadir for the whole group (mean 158,000 ±3,000/µL) was reached on post-operative day 3 with 48% decrease from baseline counts.
Conclusions: Complexity level of the surgery has a significant effect on post-operative platelet count with patients with higher Aristotle levels having the lowest nadir platelet count. We are investigating the relation between thrombocytopenia and non-fatal and fatal ischemic complications following pediatric heart surgery.
References
1. Minerva Anestesiol. 2012;78(5):556-563.
2. Hematology Am Soc Hematol Educ Program. 2010:135-143.
3. Curr Opin Anaesthesiol. 2009;22(1):78-83.
4. Paediatr Anaesth. 2009;19(9):854-861.



Thrombocytopenia Compared in Aristotle Groups (p values)

	Aristotle Groups:					
	1 with 2	1 with 3	1 with 4	2 with 3	2 with 4	3 with 4
Pre-operative	0.4041	0.6659	**0.0006***	0.1097	**<.0001***	**0.0006***
POD 0	**0.0003***	**<.0001***	**<.0001***	0.4973	**<.0001***	**<.0001***
POD 1	0.0957	**0.0041***	**<.0001***	0.131	**<.0001***	**0.0006***
POD 2	0.3306	**0.0338***	0.1257	0.1114	0.3483	0.6561
POD 3	0.3111	**0.0054***	**0.0008***	**0.0019***	**<.0001***	0.1483
POD 4	0.7516	0.2667	0.105	**0.0005***	**<.0001***	0.199
POD 5	0.8373	0.0927	0.1194	**0.0003***	**0.0004***	0.9528
POD 6	0.5843	0.0788	**0.0421***	**0.0105***	**0.0004***	0.3444
POD 7	0.5425	0.1534	0.0707	0.0885	**0.0085***	0.4818
POD 8	0.1219	0.0866	**0.0020***	0.481	**0.0137***	0.1534
POD 9	**0.0083***	**0.0099***	**0.0009***	0.569	0.3989	0.909

Figure 1: Graph depicting the platelet count (x10^9/L) from pre-operative value (-1) to post-operative day (POD) 9 separated by Aristotle Complexity Scores 1-4. Points represent means with standard errors. The table compares (p values) the platelet count between Aristotle Groups 1-4 at perioperative days. *Represents statistically significant difference between values, p ≤ 0.05.

		ARISTOTLE GROUP			
	TOTAL GROUP (n=977)	1 (n=122)	2 (n=388)	3 (n=267)	4 (n=200)
Gender (M:F)	**540:435** (55%:45%)	**54:68** (44%:56%)	**216:172** (56%:44%)	**162:105** (61%:39%)	**109:91**(55%:45%)
Age (years)*	**3.3** ± 5.3	**5.1** ± 5.8	**3.7** ± 5.6	**2.9** ± 4.9	**2.0** ± 4.3
Weight (kg)*	**16.6** ± 21.2	**23.2** ± 22.0	**18.4** ± 22.8	**14.9** ± 19.0	**11.6** ± 18.8
Neonates (n)	**200** (21%)	**4** (3%)	**41** (11%)	**40** (15%)	**115** (58%)
Infants (n)	**391** (40%)	**7** (6%)	**138** (34%)	**111** (42%)	**135** (68%)

Table 1: Demographics . *Data is presented as mean values with standard deviation.

		ARISTOTLE GROUP			
	TOTAL GROUP (n=977)	1 (n=122)	2 (n=388)	3 (n=267)	4 (n=200)
Patients with Platelet Transfusion (n)	625 (64%)	22 (18%)	224 (58%)	218 (82%)	161 (81%)
Platelet dose (mL/kg)*	14.3 ± 12.8	7.6 ± 4.5	12.0 ± 9.4	12.2 ± 10.3	21.4 ± 17.3
Platelet Nadir (platelet count x10^9/L)**	158 ± 3	177 ± 6	169 ± 4	152 ± 5	142 ± 5
Platelet Nadir Drop (%)	48%	43%	47%	50%	47%
Day of Nadir (POD)	3	2	2	3	3
Platelet Recovery to 50% (POD)	7	6	7	7	7
Platelet Recovery to 75% (POD)	9	7	Not Reached	Not Reached	8

Table 2: Results of the total group and separated by Aristotle group. Data is represented with * standard deviation and **standard error. Platelet recovery to 75% was not achieved in Aristotle groups 2 and 3.