[GA2-47] In infants and babies, the potassium level of capillary blood is higher than venous blood

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Introduction: Determining potassium level in infants and newborns may be indicated in the preoperative preparation for anesthesia. Whether there is a difference or correlation between venous potassium level and potassium level of heel stick blood is not well established in anesthesia literature.
A previous study of premature infants in NICU demonstrated that the correlation between the results of blood examination from arterial blood sampling and capillary blood sampling via heel-stick for potassium was 0.67.[1] Establishing the difference and possible correlation in potassium level of capillary versus venous blood may lead to fewer surgical delays and a decrease in medical cost
Methods: The study was prospective and observational. IRB and written consent from parents of babies, ASA physical status 1-3, <6 months and scheduled for elective surgery under general anesthesia were obtained. Blood, 0.5 ml, was drawn from a vein, when an IV was placed and 0.5 ml of blood was drawn into a capillary pipette from a heel stick for capillary blood gas analysis.
Babies with anemia, coagulopathy or HIV were excluded.
The primary outcome variable was potassium level in a blood sample drawn from a vein or a heel stick. Other outcome variables: PH, PO2, PCO2, HCO3, O2 saturation, hematocrit, sodium, chloride, calcium, glucose, lactate and base excess.
The sample size calculation described by Diggle, Liang and Zeger, Analysis of Longitudinal Data, Oxford, 1994, was used for comparing repeat measurements within a subject. From the Yang et al study,[1] mean potassium (± SD) was 4.6 (± 0.6) mEq/liter for arterial blood samples and 4.9 (± 0.7) mEq/liter for capillary blood samples, with the correlation 0.67. In order to detect 0.2 unit difference in potassium between venous and capillary blood, a sample size of 55 was needed to achieve 80% power at 5% significance using paired t test.
Data Analysis: Descriptive statistics, mean (± SD) for continuous variables and frequency for discrete variables, were summarized. Differences in potassium level and all other outcome variables were compared using paired t-test. Analyses were performed using SAS 9.1 for window, Cary, NC and a p-value less than 0.05 was significant.
Results: See Tables 1 and 2.
Conclusions: In infants and babies, potassium levels from venous blood samples differed from those of capillary blood samples; potassium level of capillary blood was significantly higher than that of venous blood.
Reference:
1. Yang KC, et al: The comparison between capillary blood sampling and arterial blood sampling in a NICU. Act Paediatr TW 2002; 43:124-6.

Table 1. Demographic Data

Variable	N	Mean (± SD)	Minimum	Maximum
Age (mos)	17	3.05 ± 2.0	0.10	6.00
Weight (kg)	17	4.88 ± 2.1	2.30	10.00
GA (wks)	16	34.00 ± 6.9	22.00	40.00
Birth Weight (kg)	13	2.63 ± 1.3	0.03	3.71

Data presented as mean ± SD

Table 2. Difference Between Venous and Capillary Blood Gases

Variable	N	Mean (± SD)	Minimum	Maximum	Pr> [t]
diff pH	17	0.04 ± 0.05	-0.06	0.11	0.0141*
diff pCO_2	17	-6.82 ± 7.6	-22.00	5.00	0.0020*
diff pO_2	17	54.82 ± 66.0	-25.00	168.00	0.0034*
diff sodium	17	2.41 ± 2.4	-3.00	6.00	0.0008*
diff potassium	17	0.64 ± 0.08	-1.30	2.00	0.0063*
diff calcium	17	-0.02 ± 0.07	-0.20	0.09	0.3191
diff lactate	17	0.17 ± 0.45	-0.40	1.40	0.1362
diff Hct	17	1.76 ± 3.1	-6.00	7.00	0.0318
diff bicarb	17	-1.42 ± 1.3	-3.50	1.10	0.0003*
diff base excess	17	-0.63 ± 1.4	-4.00	2.10	0.0809
diff O_2 sat	17	13.12 ± 15.0	-2.00	-2.00	53.00

Data presented as mean ± SD
*p <0.05