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16AP5-10

Pseudocholinesterase deficiency: population screening and literature review

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Background and Goal of Study: Pseudocholinesterase (PChE) is an enzyme that is secreted into the plasma after intrahepatic synthesis. Although its physiological role is not well understood, it is responsible from the hydrolysis of ester bound drugs like mivacurium, procaine, chlorprocaine, tetracaine, cocaine, heroine and succinylcholine.
Duration of succinylcholine action, which is normally 5-10 minutes, is prolonged up to few hours in enzyme deficiency. With the evolution of rapid acting non-depolarizing neuromuscular blockers, the use of succinylcholine is decreased recently.
On the other hand, it is still routinely used for rapid sequence induction for the patients with full stomach, during electroconvulsive therapy. Some developing countries still use succinylcholine routinely for elective intubations.
The aim of this study was to demonstrate the incidence of PChE enzyme deficiency near Adiyaman city, Turkey and investigate the relation of this condition with hepatic and renal function tests.
Materials and Methods: Patients undergoing any elective operation in Adiyaman University Research and Educational Hospital between March and December 2013 were recruited for the study. Local Investigational Review Board approval, and written informed consents were obtained from all the participating patients. The patients' plasma PChE, ALT, AST, urea, creatinine, INR and aPTT values were analyzed. Relationship of PChE deficiency with other values was investigated. The reference values for PChE was taken as 4260-11250 U/L for the women of 16-40 years and 5320-12920 U/L for others. Single and multiple variable logistic regression analyses were performed for statistical analysis of the possible relationship.
Results and Discussion: The study was completed with 964 patients, of which 702 (72.8%) were females. The level of PChE enzyme was below the normal values in 7.2% of the patients. The relationship between AST and urea elevation and PChE deficiency was statistically significant ($P<0.05$). The risk of PChE deficiency was 4.5 times higher in the patients with elevated AST and 9 times higher in those with elevated urea, compared with normal values.
Conclusions: Pathological elevations in AST and urea, that are the part of routine preoperative blood biochemical analysis, should warn us about the possible pseudocholinesterase deficiency.
Acknowledgement: The authors want to thank the personnel of the Laboratory of Adiyaman University for their diligent work.

16AP5-11

Pulse rate (PR) performance in the neonatal intensive care unit (NICU)

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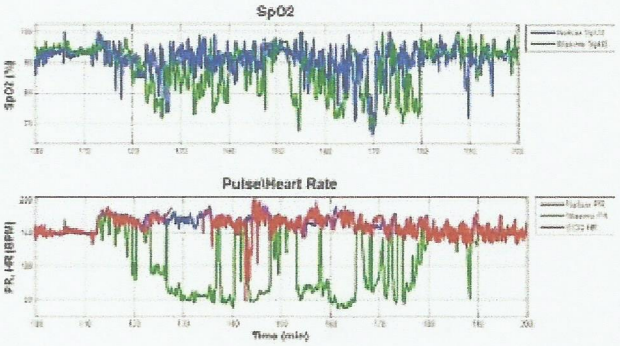
Background: According to the European Resuscitation Council Guidelines; when HR is <60 bpm in a newborn the resuscitation algorithm requires a clinical intervention[1].
This study compares the PR performance of two modern pulse oximeters compared to ECG in a NICU that may be relevant in both the CCHD screening and resuscitation cases.

Methods and Materials: The IRB approved study was conducted at BC Children's Hospital, Canada.
Nellcor and Masimo sensors were applied to either the foot and hand, and connected with their respective pulse oximeter modules.
E40 is the percentage of times that the reported PR from the test instruments differed from the ECG value by at least 40 bpm. Clinically significant errors (CSE) were considered >40 bpm differences that was sustained for more than 30 seconds, long enough to trigger an inappropriate clinical intervention [2].
Results: Twenty-nine subjects of data were included in the analysis. The figure below shows data for the outlier where the PR error for Masimo relative to ECG was >40 bpm continuously for greater than 2 minutes.



[Trend Plots]

Pulse rate performance data is shown in Table 1. When comparing Nellcor vs. Masimo, Nellcor out-performs Masimo.

-	Nellcor N-600x	Masimo SET® module	Significance
Overall Arms (bpm, mean ± SD) E40 (without outlier)	4.14 (0.16 ± 4.14)	10.48 (-1.26 ± 10.41)	p < 0.001
Outlier Arms (bpm, mean ± SD)	8.32 (0.21 ± 8.32)	49.88 (-24.94 ± 43.19)	p < 0.001
Arms without outlier (bpm, mean ± SD)	3.93 (0.15 ± 3.93)	5.07 (-0.44 ± 5.05)	p < 0.001
E40 (overall)	0.08%	0.89%	p < 0.001
E40 (outlier)	0.54%	22.46%	p < 0.001
E40 (without outlier)	0.07%	0.23%	p < 0.001

[Pulse rate performance]

Conclusion: Nellcor shows statistically significant better PR performance between the oximetry technologies that could have impact on clinical care. Masimo had 3 subjects in which CSEs occurred, and in 1 subject (Fig. above) PR crossed below 60 bpm. Nellcor had no CSE.
References:
1. Nolan, J.P et al., European Resuscitation Council Guidelines for Resuscitation 2010; originally published online 2010.
2. Omar, C. et al., Accuracy of clinical assessment of infant heart rate in the delivery room, Journal of Pediatrics, 2008;152:756-60
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