A204
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Room Hall D, Area H,

New Generation and Old Generation Pulse Oxymeters in Children with Cyanotic Congenital Heart Disease

Maxime Cannesson, M.D., Jean Neidecker, M.D., Dominique Bompard, M.D., Catherine Védrinne, M.D., Ph.D., Jean-Jacques Lehot, M.D., Ph.D.
Anesthesiology, Hospices Civils de Lyon, Hopital Louis Pradel, Lyon, France

Background: Pulse oximetry is a standard monitoring for patients in the operating room and in the intensive care unit (ICU) for children and adults. However, most of the pusle oxymeters fails to provide accurate measurements in patients with low saturation (Sa02 < 90 %) and/or low peripheral perfusion. In the palliative pediatric cardiac surgery setting, several pathologies induce low peripheral perfusion and cyanosis in the postoperative period. In this setting, arterial oxygen saturation (Sa02) monitoring using pulse oxymeter (Sp02) is of major importance. New generation pulse oxymeters are supposed to be more accurate in case of low saturation and less sensitive to motion artifact and low peripheral perfusion. The aim of our study was to compare the accuracy of an old generation pulse oxymeter (Nellcor N-395, Tyco Healthcare) and of a new generation pulse oxymeter (Masimo Blue Sensor, Masimo Corp.) in the postoperative period following palliative pediatric cardiac surgery in children with cyanotic disease.

Methods: We studied 10 children (age 7 days to 53 months, weight 2.9 to 9.8 kgs, height 48 to 86 cm) in the postoperative period following palliative cardiac surgery (3 Norwood procedures for hypoplasic left heart syndrome, 7 cavopulmonary connections). SpO2 were obtained from Masimo Blue Sensor (SpO2ng) and from Nellcor N-395 sensor (SpO2og). Both sensors were located at the same site (finger). At the same time, SaO2 of arterial blood sample was obtained from an intra arterial catheter located in the radial artery, at the same side than the oxymeters. Measurements were performed every 4 hours until discharge from the intensive care unit. Bias and precision between SpO2 and SaO2 were determined using Bland and Altmann analysis. A Student t test was used to compare bias.

Results: We obtained 136 SaO2 determinations. Mean Sa02 was 76 ± 15 % (range from 31% to 100%). Mean SpO2ag (80 ± 9 %)was significantly different from mean SaO2 and from Mean SpO2ng (75 ± 16) whereas no difference was observed between SaO2 and SpO2ng (see Table). In 20 (15 %) cases, SpO2og was not available whereas SpO2ng was available in 136 (100%) cases. In the remaining 116 cases, mean bias for SpO2ng was significantly lower than mean bias for SpO2ag (-0.2 ± 3.6 vs -1.8 ± 6.7; $p<0.05$) (see Table).

Conclusion: New generation pulse oxymeters provide more accurate informations and are more reliable than old generation pulse oxymeters in the postoperative period following palliative pediatric cardiac surgery for cyanotic congenital heart disease.[table1]

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Mean value and Bias of SpO2 old and new generation compared to SaO2

	SpO2og	SpO2ng	SaO2
Mean ± SD	80 ± 9∗†	75 ± 16	76 ± 15
Bias ± SD	-1.8 ± 6.7∗	-0.2 ± 3.6	-

SpO2og: SpO2 old generation, SpO2ng: SpO2 new generation, ∗$p<0.05$ compared to SpO2ng, †$p<0.05$ compared to SaO2