Noninvasive Peripheral Perfusion Index as a Possible Tool for Screening for Critical Left Heart Obstruction.

de-Wahl Granelli A., Östman-Smith I. *Acta Paediatrica.* 2007; 96: 1455-1459.

Introduction

Congenital heart disease affects seven to eight of every 1000 newborns, resulting in 3% of all infant mortalities most of which occur in the first year of life[1] so early detection and treatment is critical. In addition, up to 30% of all deaths from congenital heart disease in the first year of life are due to failure to detect the condition. Oxygen saturation readings from pulse oximetry have been used for the early detection of duct dependent congenital heart disease in infants with high sensitivity and specificity[2] but this method is less accurate for detecting cases with duct-dependent systemic circulation. Researchers from the Department of Clinical Sciences at the Sahlgrenska Academy in Sweden report on a new method, using Masimo SET Perfusion Index (PI), to detect Left Heart Obstructive Disease, (LHOD) a type of congenital cardiac defect that could not be accurately detected previously by physical examination or with pulse oximetry.

Methods

Ten thousand healthy newborns and nine infants with LHOD, all between 1-120 hours of age and recruited from all newborn nurseries in the fifth cities of Vastra Gotaland Sweden, participated in the study. To establish the range of PI values in healthy newborns compared to the range of PI values from newborns with LHOD, PI readings from the right hand (preductal) and foot (postductal) of both healthy subjects and LHOD patients were taken with a Masimo SET Radical. Preductal and postductal PI measurements were made in addition to saturation screening and neonatal physical exams. None of the infants assigned to the healthy control group were readmitted with duct dependent heart disease within three months of the initial screening. Since the PI distribution curve is different from a normal distribution, results from the statistical analysis of the data were expressed in medians with an interquartile range for non-normal distributions.

Results

All nine LHOD infants had either pre or postductal PI below the interquartile range of the healthy infants and 56% of them had either pre or postductal PI values below the fifth percentile cut off of 0.70. A pre or postductal PI value of below 0.70 increased the likelihood of having LHOD by 23.75%. Among the nine infants diagnosed with LHOD, three cases were missed by neonatal exam and two of these three were missed by screening with pulse oximetry saturation values.

Discussion

Perfusion index from Masimo SET pulse oximetry reflects real time changes in peripheral blood flow at the sensor site and therefore is a direct indicator of arterial circulation. This is the first study to establish a range of PI values for normal infants. Previous studies have shown low PI to be associated with illness in newborns[3], but this is the first study to show that subnormal PI values may be an indicator of duct dependent systemic circulation as occurs with LHOD.

Authors' Conclusions

"Lower PI values than 0.70 may indicate illness. Including the cut off values for PI in pulse oximetry screening for duct-dependent congenital heart disease is a promising tool for improving the detection of critical congenital heart disease with duct-dependent systemic circulation."

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