Comparison of pulse oximetry screening versus routine clinical examination in detecting critical congenital heart disease in newborns.

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Abstract

Introduction: Critical congenital heart disease (CCHD) in newborns has a worldwide prevalence of 1-2 per 1000 live births and often remain asymptomatic pre-discharge, leading to significant morbidity and mortality. Screening depends on physical examination (PE) and pulse oximetry (PO) which is proposed as a novel method.

Objective: Evaluate efficacy and suitability of PO as a screening strategy of CCHD compared to PE in the Sri Lankan setup.

Method: A prospective study was conducted in 5435 asymptomatic newborns, period of amenorrhoea (POA) ≥34weeks, aged ≥24 hours, in Castle Street Hospital for Women, Colombo. Pre-ductal and post-ductal oxygen saturation (SpO_2) measurements in right hand (RH) and right foot (RF) along with PE were performed. Babies without SpO_2 thresholds of ≥95% in RH and RF and ≤3% difference between RH and RF or with abnormal PE, underwent 2D echocardiogram.

Results: Detection rate of CCHD by PO and PE were 91% and 82% respectively. Addition of PO screening to PE detected 02 missed cases. PO and PE sensitivities were 90.9% and 81.8% (p=0.54) and 100% in combination (p=0.8), and specificities were 99.9% and 98.2% respectively (p=0.37) and 98.1% in combination. Positive predictive value and positive likelihood ratio were higher in PO compared to PE (71.4% vs 8.6%, p=0.0001) and 1232.7 vs 46.2), whereas false positive rate was substantially lower in PO compared to PE (0.07% vs 1.76%, p=0.0001).

Conclusions: In our study CCHD prevalence of newborns was 2.02 per 1000 live births. PO improved ruling in and ruling out of CCHD, whereas PE ruled out than ruled in owing to detection of non CCHD. PO is a simple, non-invasive, cost-effective, feasible, and reliable test, which also detects non-cardiac causes of hypoxaemia and our study provides evidence of superiority of PO over PE for CCHD detection.