

Utility of Pulse Oximetry Screening of Newborns for Non-critical Cyanotic Congenital Heart Diseases

Saxena A., Ramakrishnan S.

Department of Cardiology, All India Institute of Medical Sciences, New Delhi, India

Background: Several large randomized trials have shown that pre-discharge screening of newborns by pulse oximetry helps in early diagnosis of cyanotic congenital heart diseases (CCHD). Most studies have used a cut off value of oxygen saturation (SaO₂) of 95% or more to exclude CCHD. However newborns with non patent ductus arteriosus (PDA) dependent CCHD (non-critical CCHD) may have a SaO₂ of >95%, thereby passing the oximetry test. This may falsely reassure the parents.

Objective: We aimed to study the SaO₂ difference between the critical (PDA dependent) and non-critical CCHD in newborns.

Methods: It was a cross sectional observational study conducted over a period of three years in a community hospital. All babies born during a specific 8 hour period of the day were recruited over a period of 3 years. The investigations included routine clinical examination, post ductal pulse oximetry (within 48 hours of life) and echocardiography (to screen for congenital heart disease) for all babies.

Results: Among the 20307 newborns screened, 1298 were excluded due to non availability of total data. Echocardiography detected CCHD in 33 newborns, giving a prevalence of 1.7/1000 (95% CI: 1.2-2.4/1000). Of these, 23 had critical CCHD and 10 had non critical CCHD (tetralogy of Fallot or its variant: 5; non-obstructive total anomalous pulmonary venous drainage: 2; common arterial trunk: 2; double inlet left ventricle with pulmonary hypertension: 1). Overall, SaO₂ was higher in non-critical CCHD as compared to critical CCHD (94%±2.05% vs. 82.9%±14.3%, p=0.001). A SaO₂ of <95% was present in 21/23 (91%) newborns with critical CCHD and in 6/10 (60%) newborns with non-critical CCHD. If a cut off value of < 92% was considered, 9/10 (90%) of non-critical CCHD were missed by pulse oximetry as against 9/23 (39%) critical CCHD.

Conclusion: Pulse oximetry is a sensitive tool for detecting CCHD, however 40% of non-critical CCHD may be missed if SaO₂ cut off of <95% is used. The non-critical CCHD could be complex with a suboptimal long term outcome, requiring parental counselling.