

Pulse oximetry as a screening test for congenital heart disease in newborn babies (PulseOx)

Background

Congenital Heart Disease (CHD) is the commonest group of congenital malformations and affects 7-8 per 1000 live born newborns. It contributes to 3% of all infant mortality and 46% of deaths from congenital malformations with most deaths occurring in the first year of life.

Currently in the UK, all newborn babies undergo a routine screening examination, usually in the first 24 hours after birth, during which, among other things, a careful assessment of the cardiovascular system is undertaken. However, it is estimated that over 50% of babies with undiagnosed CHD failed to be picked up by routine neonatal examination. An accurate, simple, non-invasive test for CHD in newborn babies is needed.

What was the PulseOx study?

This large multi-centre study determined the accuracy of Pulse Oximetry (PO) screening for CHD in newborns. Over 20,000 babies were recruited and tested. It also evaluated the acceptability of PO to both parents and health professionals. The study will also assess the costs and cost effectiveness of utilising such screening in combination with clinical examination in the early detection of potentially life-threatening CHD.

What did the PulseOx study find?

The study showed that pulse oximetry is a simple, safe, feasible test which is acceptable to parents and staff and adds value to existing screening. It is likely to identify cases of critical CHD which would otherwise go undetected. It is also likely to be cost-effective given current acceptable thresholds. The detection of other pathologies such as significant CHD and respiratory and infective illnesses is an additional advantage.

What impact will this study have?

The NHS Screening Committee, which reviews the evidence for each type of screening test, will consider this study. We believe that pulse oximetry should be included as part of the routine newborn tests. The equivalent committee in the USA is also recommending pulse oximetry on the strength of our results.

Publications

- Pulse oximetry screening for congenital heart defects in newborn infants: An evaluation of acceptability to mothers Powell R, Pattison HM, Bhoyar A, Furnston AT, Middleton LJ, Daniels JP, Ewer AK, on behalf of the PulseOx Study Group. Arch Dis Child 2012 in press
- **Pulse oximetry as a screening test for congenital heart defects in newborn infants: a test accuracy study with evaluation of acceptability and cost-effectiveness** (<http://www.ncbi.nlm.nih.gov/pubmed/22284744>) Ewer AK, Furnston AT, Middleton LJ, Deeks JJ, Daniels JP, Pattison HM, Powell R, Roberts TE, Barton P, Auguste P, Bhoyar A, Thangaratnam S, Tonks AM, Satodia P, Deshpande S, Kumararatne B, Sivakumar S, Mupanemunda R, Khan KS. Health Technol Assess. 2012 Jan;16(2):v-xiii, 1-184.
- **Pulse oximetry as a screening test for congenital heart defects in newborn infants: a cost-effectiveness analysis** (<http://www.ncbi.nlm.nih.gov/pubmed/22247242>) Roberts TE, Barton PM, Auguste PE, Middleton LJ, Furnston AT, Ewer AK. Arch Dis Child. 2012 Mar;97(3):221-6. Epub 2012 Jan 13.
- **Pulse oximetry screening for congenital heart defects in newborn infants (PulseOx): a test accuracy study.** (<http://www.ncbi.nlm.nih.gov/pubmed/21820732>) Ewer AK, Middleton LJ, Furnston AT, Bhoyar A, Daniels JP, Thangaratnam S, Deeks JJ, Khan KS; PulseOx Study Group. Lancet. 2011 Aug 27;378(9793):785-94. Epub 2011 Aug 4.
- **Accuracy of pulse oximetry in screening for congenital heart disease in asymptomatic newborns: a systematic review.** (<http://www.ncbi.nlm.nih.gov/pubmed/17344253>) Thangaratnam S, Daniels J, Ewer AK, Zamora J, Khan KS. Arch Dis Child Fetal Neonatal Ed. 2007 May;92(3):F176-80. Epub 2007 Mar 7. Review.

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More information

NHS Choices (<http://www.nhs.uk/conditions/congenital-heart-disease/pages/introduction.aspx>)