

Should we start a nationwide screening program for critical congenital heart disease in Turkey? A pilot study on four centres with different altitudes

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Background: To investigate the feasibility of critical congenital heart disease (CCHD) screening test by pulse oximetry in four geographical regions of Turkey with different altitudes, before implementation of a nationwide screening program.

Methods: It was a prospective multi-centre study performed in four centres, between December, 2015 and May, 2017. Pre- and post-ductal oxygen saturations and perfusion indices (PI) were measured using Masimo Radical-7 at early postnatal days. The results were evaluated according to the algorithm recommended by the American Academy of Pediatrics. Additionally, a PI value ≤ 0.7 was accepted to be significant.

Results: In 4888 newborns, the mean screening time was 31.5 ± 12.1 hours. At first attempt, the mean values of pre- and post-ductal measurements were: saturation $97.3 \pm 1.8\%$, PI 2.8 ± 2.0 , versus saturation $97.7 \pm 1.8\%$, PI 2.3 ± 1.3 , respectively. Pre-ductal saturations and PI and post-ductal saturations were the lowest in Centre 4 with the highest altitude. Overall test positivity rate was 0.85% (n = 42). CCHD was detected in six babies (0.12%). Of them, right hand (91 ± 6.3) and foot saturations ($92.1 \pm 4.3\%$) were lower compared to ones with non-CCHD and normal variants (p ≤ 0.05 , for all comparisons). Sensitivity, specificity, positive and negative predictive values, and likelihood ratio of the test were: 83.3%, 99.9%, 11.9%, 99.9%, and 99.2%, respectively.

Conclusion: This study concluded that pulse oximetry screening is an effective screening tool for congenital heart disease in newborns at different altitudes. We support the implementation of a national screening program with consideration of altitude differences for our country.