Reference value of brain tissue oxygen saturation in newborns immediately after birth

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**Abstract**

【Objective】The Consensus on Resuscitation Science and Treatment Recommendations indicate the target SpO2 values during the first 10 min of life. However, there are many cases in which SpO2 cannot be measured immediately after birth. Although there are a few studies of the brain rSO2 values in newborns, the changes in brain rSO2 levels immediately after birth are still unknown, and no reference value has been determined. The purpose of this study was to develop reference values for brain rSO2 up to 10 minutes after birth.【Method】 We evaluated both brain rSO2 and SpO2 at 1, 3, 5 and 10 minutes after birth in 100 neonates. rSO2, was measured at the forehead using a finger-adhering oximeter (Toccare KN-15, Astem Co.). To measure SpO2, a Radical-7 (manufactured by Masimo Co.) was used. This study was approved by the institutional review board at our hospital.【Result】 The gestational age and birth weight were 37.9±1.2 weeks and 2,825±429 g, respectively. Eighty-seven infants and 13 infants were term and late preterm infants, respectively, and there were 21 vaginal deliveries and 79 cesarean sections. In all cases, rSO2 levels were measured at 1, 3, 5, and 10 minutes after birth. For the SpO2 measurements, nine cases at 1 min, 40 cases at 3 minutes, 81 cases at 5 minutes and 93 cases at 10 minutes were available. The median rSO2 level was 43% at 1 minute after birth, 48% at 3 minutes, 52% at 5 minutes and 57% at 10 minutes.【Conclusion】 We used a finger-adhering oximeter to observe changes in the brain rSO2 values of 100 normal transition infants. rSO2 was easier and more detectable than the pulse oximeter. Brain rSO2 values might be useful to evaluate oxygenation immediately after birth.

Reference

1. Dawson JA, Kamlin CO, Vento M, et al. Defining the reference for oxygen saturation for infants after birth. Pediatrics2010;125:e1340-e1347
2. Watanabe T, Ito M, Miyake F, et al. Measurement of brain tissue oxygen saturation in term infants using a new portable near-infrared spectroscopy device. Pediatric international 2017;59: 167-170
3. Mari M, Toshiyuki U, Hiroaki I et al. Tissue oxygen saturation levels from fetus to neonate. J obstet gynaecol Res 2017 ;43: 855-859
4. Kanayama N, Niwayama M. Examiner`s finger-mounted fetal tissue oximetry. J Biomed.Opt 2014;19:067008

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