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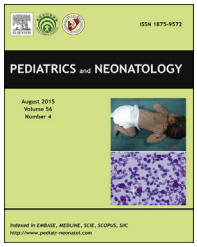

EDITORIAL

Effects of Two Different Exogenous Surfactant Preparations on Serial Peripheral Perfusion Index and Tissue Carbon Monoxide Measurements in Preterm Infants with Severe Respiratory Distress Syndrome

Respiratory distress syndrome (RDS) is a major cause of morbidity and mortality in preterm infants, and exogenous surfactant supplemental therapy is one of the standard treatments. Peripheral perfusion index (PI) and transcutaneous carbon monoxide (TCO) can be measured noninvasively and provide indirect information on the circulatory and pulmonary conditions in critical patients. However, their clinical roles in high-risk premature infants require evidence-based proof. Recently, Terek et al[1] reported their investigations regarding the use of serial PI and TCO measurements in critical preterm infants who were treated with different preparations of surfactants (poractant alfa and beractant). They found some promising results and concluded that noninvasive monitoring of PI and TCO as markers of peripheral perfusion and lung function may be useful for monitoring and follow up of high-risk neonates.

Extremely premature infants suffering from surfactant deficiency and RDS are not rare, and RDS is a major cause of morbidity and mortality in preterm infants. Exogenous surfactant supplemental therapy is known to improve pulmonary outcome and reduce mortality effectively.[2] To further improve the outcome, new exogenous surfactant preparations in treating RDS are continuously being investigated. Furthermore, different strategies of surfactant administration are also being tested to optimize patient outcome.[3] Currently, animal-derived surfactants, such as porcine surfactant (poractant alfa) and bovine surfactants (beractant and calfactant), are available for clinical use.[4] Early selective surfactant administration to infants with RDS requiring assisted ventilation was found to decrease the risk of pulmonary complications, mortality, and chronic lung disease compared to delaying treatment of such infants until they developed a more severe case of RDS.[5] However, changes in circulatory and pulmonary conditions of high-risk preterm infants immediately following surfactant treatment have been rarely investigated.

To continuously monitor patients' conditions, noninvasive monitors are better choices for critical neonates. Peripheral PI is the ratio of the pulsatile to the nonpulsatile blood flow in peripheral tissue. It provides indirect information on the circulatory condition of vital organs, and it is a convenient way to continuously monitor critical patients simply by using a pulse oximeter.[6] TCO correlates with the production of internal carbon monoxide (CO), that usually increases when the body is under oxidative stress and inflammation. RDS is associated with pulmonary inflammation and may induce upregulation of pro- and anti-inflammatory cytokines, leading to increases in CO production. End-tidal CO measurement has been used to predict the development of bronchopulmonary dysplasia in premature infants,[7] but its clinical role and the use of TCO monitoring require further studies. Because both PI and TCO were not commonly used in neonatal intensive care units, investigations are required to elucidate their roles in high-risk preterm infants.

Recently, Terek et al[1] compared the clinical response of beractant and poractant alfa in treating premature infants with RDS by using the noninvasive monitoring of PI and TCO. They demonstrated that preterm infants with severe RDS had significantly lower PI and higher TCO levels than control infants, and that surfactant administration improved patients' peripheral perfusion and decreased the severity of pulmonary disease and oxidative and inflammatory stress. Comparing different surfactants, they found that PI improvement was seen earlier in the beractant rather than the poractant alfa subgroup. TCO declined in both study groups and were normalized earlier with poractant alfa.[1] To

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the best of our knowledge, this is the first study to use serial PI and TCO measurements after surfactant administration and to compare the influence on peripheral perfusion and oxidative stress of different surfactant preparations in high-risk preterm infants. According to the results, noninvasive monitoring of PI and TCO as markers of peripheral perfusion and lung function is useful for continuous monitoring and follow up of high-risk preterm infants.

Conflicts of interest

The author declares no conflicts of interest.

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