

Korelasi antara Tekanan Parsial Oksigen dengan Oxygen Reserve Index pada Neonatus yang Mendapatkan Dukungan Respiratori = Correlation between Oxygen Partial Pressure with Oxygen Reserve Index in Neonates Receiving Respiratory Support

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Abstrak

Latar belakang: Dukungan respiratori pada neonatus saat lahir dan stabilisasi bertujuan mencegah terjadinya hipoksia. Hingga saat ini, pemantauan status oksigenasi masih menggunakan saturasi oksigen perifer (SpO₂). Akan tetapi, SpO₂ dan tekanan parsial oksigen (PaO₂) tidak berhubungan secara linier sehingga apabila terjadi peningkatan PaO₂ >80 mmHg, maka SpO₂ akan mengalami plateau >95%. Oxygen reserve index (ORI) merupakan parameter baru yang dapat menilai simpanan oksigen di jaringan. Pengaplikasian ORI diharapkan dapat melengkapi kelemahan SpO₂ untuk mencegah hiperoksia. Namun, penelitian mengenai ORI pada neonatus masih sangat terbatas. Metode: Rancangan penelitian ini menggunakan analitik korelatif dengan desain penelitian potong lintang. Kriteria inklusi adalah neonatus mendapatkan dukungan respiratori dengan pemantuan SpO₂ secara kontinu pada monitor >95% dan direncanakan pemeriksaan gas darah arteri. Nilai ORI diambil selama 30 menit. Setiap perubahan nilai ORI dan SpO₂ dicatat dan dihitung untuk mendapatkan rerata nilai. Data diolah berdasarkan uji korelasi. Hasil: Dari 205 neonatus yang lahir/dirujuk ke Unit Neonatologi RSUPN Cipto Mangukusumo diperoleh 23 subyek yang memenuhi kriteria inklusi. Diperoleh total 70 pengukuran dari 23 subyek. Insidens hiperoksia ditemukan pada 40 pengukuran (57%). Kekuatan korelasi antara ORI dan PaO₂ diperoleh $r = 0,687$ dengan $p < 0,001$. Analisis multivariat memperlihatkan apabila ORI digunakan bersama SpO₂ menunjukkan hasil koefisiens determinasi yang cukup rendah (R^2 adjusted = 28,4%). Nilai cut-off ORI 0,21 dapat memprediksi PaO₂ >80 mmHg dengan dengan sensitivitas 82,5% dan spesifisitas 76,6%. Simpulan: Terdapat korelasi yang bermakna antara ORI dan PaO₂. Pengaplikasian ORI secara klinis dapat memprediksi PaO₂ pada neonatus dalam rentang hiperoksia yang tidak dapat ditunjukkan SpO₂. ORI tidak dapat menggantikan SpO₂.

.....Background: Respiratory support in the delivery room and NICU is an effort to prevent hypoxia at birth and during stabilization. Until recently, peripheral oxygen saturation (SpO₂) is used to monitor oxygenation status non-invasively. However, the relationship between SpO₂ and arterial partial pressure of oxygen (PaO₂) is not linear but sigmoidal. If the level of PaO₂ >80 mmHg, SpO₂ reaches a plateau at the range >98-100%. Oxygen reserve index (ORI) could assess oxygen reserve at the tissue level which is undetected using pulse oximetry. ORI application may complete SpO₂ weakness in detecting hyperoxia. Nevertheless, studies about ORI in neonate is still limited. Method: In this cross-sectional correlational study, we included neonates receiving oxygen therapy whose SpO₂ monitor continuously showed >95%. Arterial blood gas analysis was done according to the attending's order. The ORI value was taken for 30 minutes. Any change in the ORI and SpO₂ value was recorded and calculated to get an average value. Data were analyzed based on a correlation test. Result: From 205 inborn and outborn at Neonatal Unit Cipto Mangunkusumo Hospital, 23 subjects met the inclusion criteria. There were 70 measurements of ORI, SpO₂ and PaO₂ in 23 subjects. Hyperoxia was observed in 40 measurements (57%). The correlation between ORI and PaO₂ was $r = 0,687$ ($p < 0,0001$). Multivariate analysis showed ORI together with SpO₂ has a low coefficient of determination of

R² adjusted = 28,4%. The cut-off ORI value to predict PaO₂ >80 mmHg when SpO₂ >95% was 0,21 with a sensitivity of 82,5% and specificity of 76,6%. Conclusion: ORI and PaO₂ are significantly strongly correlated in neonates. ORI is able to predict hyperoxia that goes undetected by SpO₂. However, ORI cannot replace the role of SpO₂.