

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 (SpO_2). Akan tetapi, SpO_2 dan tekanan parsial oksigen (PaO_2) tidak berhubungan secara linier sehingga apabila terjadi peningkatan $\text{PaO}_2 > 80 \text{ mmHg}$, maka SpO_2 akan mengalami plateau $> 95\%$. Oxygen reserve index (ORI) merupakan parameter baru yang dapat menilai simpanan oksigen di jaringan. Pengaplikasian ORI diharapkan dapat melengkapi kelemahan SpO_2 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 pemantauan SpO_2 secara kontinu pada monitor $> 95\%$ dan direncanakan pemeriksaan gas darah arteri. Nilai ORI diambil selama 30 menit. Setiap perubahan nilai ORI dan SpO_2 dicatat dan dihitung untuk mendapatkan rerata nilai. Data diolah berdasarkan uji korelasi. Hasil: Dari 205 neonatus yang lahir/dirujuk ke Unit Neonatologi RSUPN Cipto Mangunkusumo 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 PaO_2 diperoleh $r = 0,687$ dengan $p < 0,001$. Analisis multivariat memerlihatkan apabila ORI digunakan bersama SpO_2 menunjukkan hasil koefisiens determinasi yang cukup rendah ($R^2 \text{ adjusted} = 28,4\%$). Nilai cut-off ORI 0,21 dapat memprediksi $\text{PaO}_2 > 80 \text{ mmHg}$ dengan sensitivitas 82,5% dan spesifitas 76,6%. Simpulan: Terdapat korelasi yang bermakna antara ORI dan PaO_2 . Pengaplikasian ORI secara klinis dapat memprediksi PaO_2 pada neonatus dalam rentang hiperoksia yang tidak dapat ditunjukkan SpO_2 . ORI tidak dapat mengantikan SpO_2 .

.....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 (SpO_2) is used to monitor oxygenation status non-invasively. However, the relationship between SpO_2 and arterial partial pressure of oxygen (PaO_2) is not linear but sigmoidal. If the level of $\text{PaO}_2 > 80 \text{ mmHg}$, SpO_2 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 SpO_2 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 SpO_2 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 SpO_2 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, SpO_2 and PaO_2 in 23 subjects. Hyperoxia was observed in 40 measurements (57%). The correlation between ORI and PaO_2 was $r = 0,687$ ($p < 0,0001$). Multivariate analysis showed ORI together with SpO_2 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.