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Title: Does SpO₂ correlate with SaO₂ in stable COPD patients?

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Body: Background: Pulse oximetry is commonly used to measure oxygen saturations (SpO₂) in assessment of patients with stable COPD. This is considered to be equivalent to oxygen saturations measured on a blood gas analyser (SaO₂). The ATS, ERS and GOLD guidelines for COPD define suitability for long term oxygen therapy with PaO₂ less than 7.3kPa or SaO₂ of less than 88%. Aim: To confirm if SpO₂ correlates to SaO₂ in stable COPD patients. Methods: Retrospective study of patients with stable COPD attending oxygen clinics in an acute teaching hospital. Results: N=73, Male 29 %, Mean Age70 (range 53 - 93), Mean FEV1 0.89 L, current smokers 29%, 26% on oxygen, mean MRC grade 4, mean BORG score at rest 2 and mean hematocrit (HCT) 0.41. On't' paired testing in all patients, no statistically significant difference was noted between SpO₂ and SaO₂ (p value: 0.972), the mean SpO₂- SaO₂ is -0.012% (95% CI of -0.71 to 0.69). However, in current smokers subgroup (N=21) high variation between these values was noted, with the mean SpO₂- SaO₂ 1.067%. There was a tendency for SpO₂ to be higher than SaO₂ (95% CI of -1.038 to 3.171). There is no statistically significant relationship between SpO₂ and SaO₂ in COPD patients in relation to sex, age, severity of COPD, smoking status, MRC grade, BORG score, and HCT levels. Conclusions: As the difference between SpO₂ and SaO₂ is high in current smokers, SpO₂ reading using pulse oximetry might not be reliable. Further studies with larger sample size are needed to evaluate this further.