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Title: The influence of carboxyhemoglobin (COHb) generation on measured total lung diffusion capacity

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Body: Background. We found earlier that as a result of single breath diffusion capacity test for CO and NO mean relative current COHb concentration in lung capillary volume (Vc) reaches to 10% [Babarskov E. et al. ERJ 2009. v.34. suppl.53:391s]. Aim. To determine the influence of COHb generation on measured value of total lung diffusion capacity (DLco) and calculated Vc. Methods. Dynamic balance equations of CO and COHb in alveolar and capillary volumes were solved by numerical method. Results. The dependence of average relative COHb concentration on breathholding time and initial CO alveolar concentration was determined, as well as relationship between measured DLco and COHb concentration. It was demonstrated, that using of gas mixtures with usually recommended CO content (0.28%) results in COHb concentration increase to about 10%, that in turn leads to reducing of DLco about by 5% and Vc by 10%. If initial CO content in gas mixture is increased three fold (0.84%), then COHb concentration reaches to about 30%, that in turn leads to reducing of DLco about by 15% and Vc by 30%. Conclusion. Our findings confirm possibility of experimental measurement of the difference between DLco values, which may be used for noninvasive investigating of lung hemodynamics. Particularly this allows to determine important diagnostic parameter - capillar blood flow rate across ventilated alveoli and correctly to calculate Vc.