

Influence of Fraction of Inspired Oxygen on Noninvasive Hemoglobin Measurement: Parallel Assessment of 2 Monitors.

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BACKGROUND: Previous reports have brought specific attention to the relationship between oxygenation of the patient and the accuracy of noninvasive measurement of hemoglobin (Hb) using an optical sensor. This study aimed to assess prospectively the relationship between fraction of inspired oxygen (FIO₂) and the bias of the measurement of Hb by the use of 2 different noninvasive monitors compared with the classic invasive technique.

METHODS: Forty-four patients were included prospectively. In each individual, Hb level was determined noninvasively by monitor Pronto-7™ (Masimo Corporation, Irvine, CA) and by monitor NBM-200MP™ (OrSense Ltd, Petah-Tikva, Israel), with the probe placed on 2 fingers on the same hand of the patient. Three measures were performed, first under breathing air and 2 others when fraction of expired oxygen rose to 50% ± 5% and to 90 ± 5%. Simultaneously, a nurse collected a venous blood sample, which was sent immediately to the hematology laboratory for Hb measurement. The main outcome measurement was the mean bias between noninvasive and invasive measurements.

RESULTS: Results show no change in median bias [interquartile range] with FIO₂ for Pronto-7 (from 1.1 g/dL [0.0-2.0] in FIO₂ 21% to 1.0 g/dL [0.2-1.5] in FIO₂ 100%), but increasingly negative median bias with increasing FIO₂ for NBM-200MP (from -0.3 g/dL [-1.3 to 0.3] in FIO₂ 21% to -0.8 g/dL [-1.5 to -0.1] in FIO₂ 100%, P = .04).

DISCUSSION: This study showed that noninvasive measurement of Hb could be influenced by inspired fraction of oxygen when the monitor NBM-200MP is used.