

Accuracy of the Masimo Pronto-7 System in Patients with Left Ventricular Assist Device-
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Background

The Masimo Pronto-7(R) calculates hemoglobin (Hb) values using the pulse oximetry technique and a variety of mathematical algorithms analyzing the pulse waveform. Although this system has demonstrated a high level of accuracy in average patients, the performance might be altered in special patient populations. Regarding patients with left ventricular cardiac failure, a rotary blood pump generates a constant, continuous, non-pulsatile flow to improve effective cardiac output. Due to this alteration in both, blood flow and arterial blood pressure we hypothesized a reduced accuracy of the Masimo Pronto-7 to detect Hb in patients with left ventricular cardiac failure. To test our hypothesis, we evaluated the Pronto-7 SpHb system in outpatients after continuous-flow-left ventricular assist device (cf-LVAD) implantation (HEARMATE II, Thoratec).

Methods

21 cf-LVAD outpatients from the Clinic for Cardiac, Thoracic and Vascular Surgery were investigated during routine follow up examinations. After venous blood samples were drawn, the Pronto-7 sensor was attached to one randomly selected finger of one hand. The collected SpHb data were compared with Hb values measured by our central laboratory. The difference between the methods was determined using Bland -- Altman analysis. The study was registered in the DRKS (DRKS00004415).

Results

In all cf-LVAD-patients evaluated, the Pronto-7 successfully detected SpHb values. Using Bland -- Altman analysis, a bias of 0.14 g/dl (95% upper and lower limits of agreement +/- 2.76 g/dl) was calculated.

Conclusion

The Pronto-7(R) overestimated the actual Hb value in cf-LVAD outpatients with the HEART Mate II. Due to this, we conclude that, the system is suitable for screening in routine examinations and further analysis can be performed if needed. However, its use as an emergency tool is questionable because of the increased inaccuracy when Hb values are critically low.