

Heart rate assessment during neonatal resuscitation: can a smartphone-based application help us reach guidelines?

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Background:

In current guidelines for neonatal resuscitation rapid assessment of heart rate is crucial to evaluate the efficacy of ventilation. Pulse oximetry provides heart rate after 90 seconds (s) and is rarely accessible in low-income settings, where the burden of asphyxia is the highest. NeoTap is a newly developed free smart-phone-application that could improve compliance to guidelines. The aim of this study was to assess NeoTap's usefulness in real-life situations.

Method:

An observational study on 51 newborns was conducted at the Labor Ward Theatre, Mulago Hospital, Uganda in April 2014. 41 of 51 cases were video recorded (figure 1). One neonatologist and one pediatrician attended to the patients and monitored heart rate by smartphone-assisted auscultation and by pulse oximetry. Acquisition time was obtained in all cases.

Results:

A total of 99 paired heart rate assessments were done. The acquisition time was significantly lower with NeoTap, mean 6 s (min 3, max 20) compared to pulse oximetry, mean 62 s (min 15, max 140), $p < 0.001$, (figure 2). With NeoTap heart rate was overestimated with an average 3.6 beats per minute compared to pulse oximetry, a difference small enough not to have any clinical relevance.

Conclusion:

Accurate heart rate in newborns can be obtained using NeoTap, also in a low-resource setting. Acquisition time is dramatically shorter for NeoTap compared to pulse oximetry. Further studies are needed to determine if NeoTap is reliable in the hands of first-time smartphone users.



Figure 1.

Scenario from research study at Mulago Hospital, Kampala, Uganda 2014. Registration of heart rate using NeoTap.

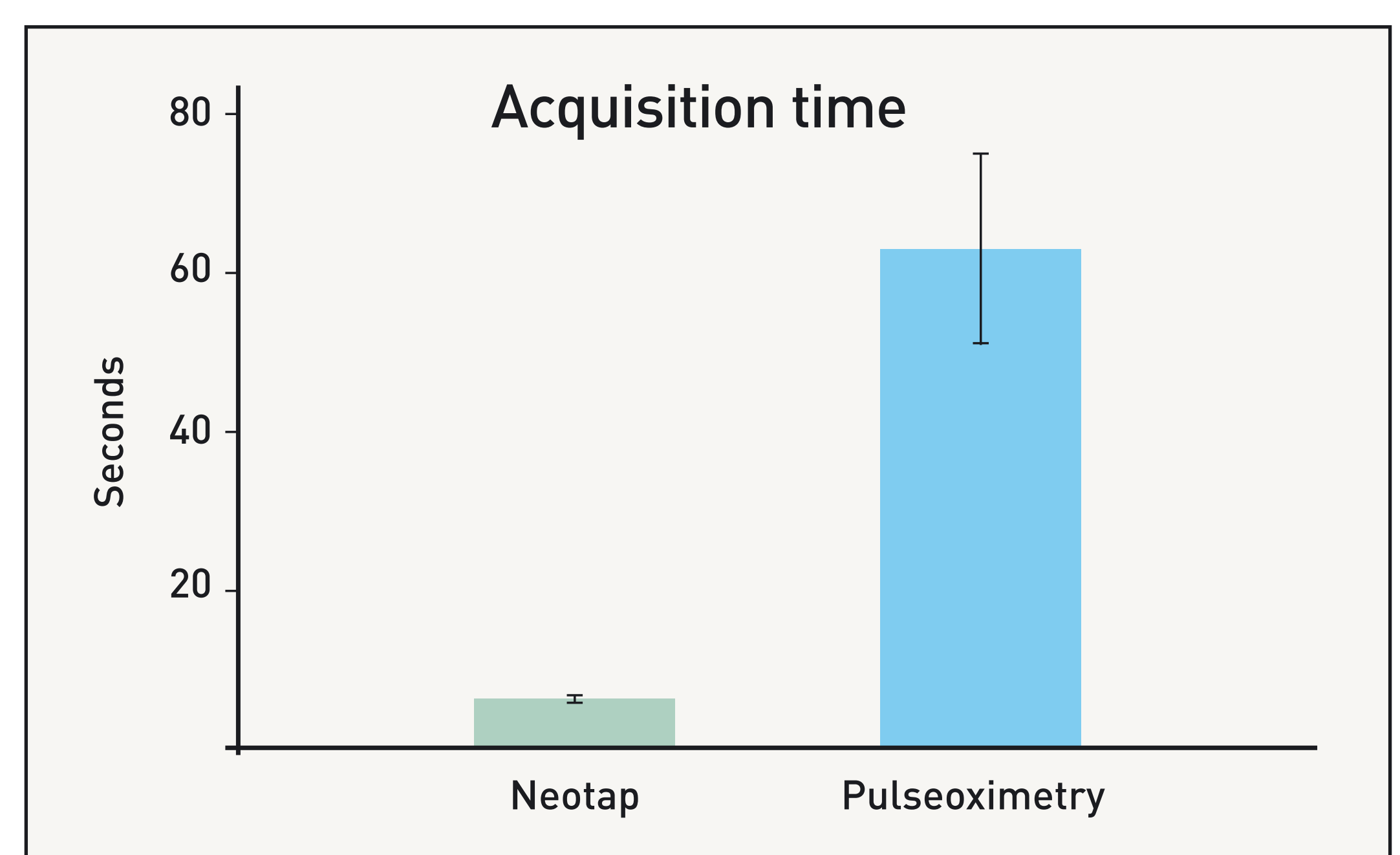


Figure 2.

Time in seconds to first estimated heart rate (Mean and 95% CI).

