



## Single Breath Detection During Spontaneous Ventilation Using Alar Photoplethysmography

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### Introduction

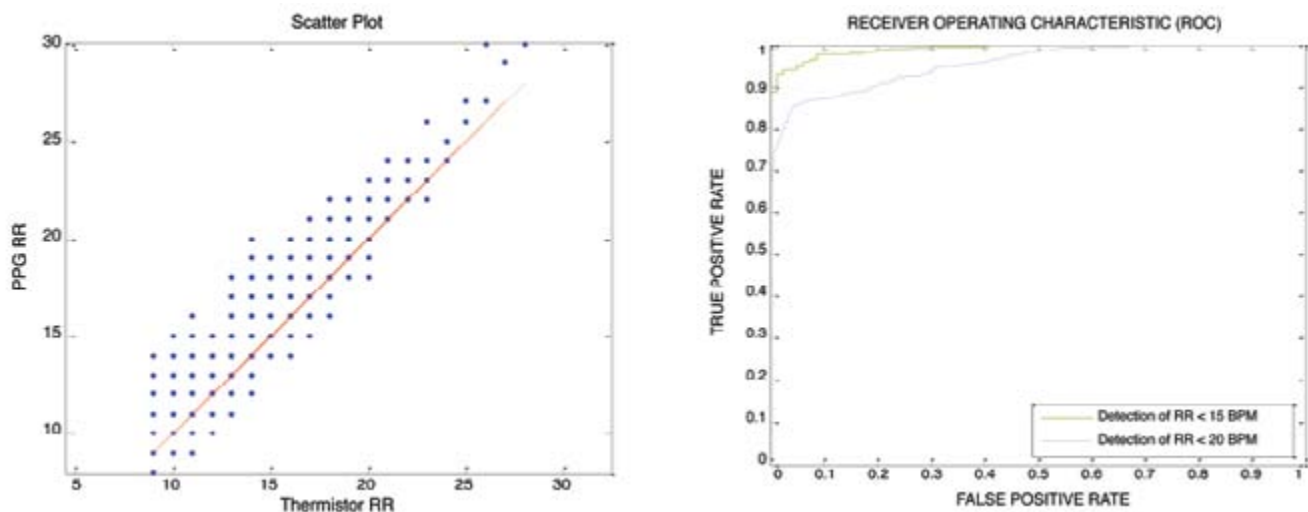
Accurate detection of opioid-induced respiratory depression (ORD) is critical and challenging, as ORD is life-threatening and multifactorial. The Anesthesia Patient Safety Foundation seeks novel solutions for monitoring post-operative patients receiving patient-controlled analgesia. The authors hypothesized that photoplethysmography (PPG) sensors placed on the nasal ala – a site with a rich vascular supply with minimal-to-no sympathetic innervation – can accurately detect individual breaths in spontaneously breathing patients during minor surgery. This can be useful for early detection of ORD.

### Methods

The study included 39 outpatients who received standard monitoring. Assurance® Alar Sensors (Xhale Assurance, Inc., Glastonbury, CT) were placed on either ala and connected to an OxyPleth oximeter (Dixtal Medical, Wallingford, CT). The accuracy of breath detection from the alar sensor was determined using one minute epochs of thermistor flow [TF] as the “gold standard” (respiratory rate [RR] in breaths per minute from the alar sensor was compared to RR from the TF).

### Results and Conclusions

Nasal alar PPG correlates well with TF in detecting individual breaths in spontaneously breathing patients.



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