

Reliability of Masimo Rainbow Acoustic Monitoring in Patients Undergoing Elective Procedures under General Anesthesia

Mandel J.E., Atkins J.H. *Proceedings of the American Society of Anesthesiologists*, October 13, 2012. Washington DC. A093.

Introduction

Monitoring respiratory rate during surgical procedures under conditions of spontaneous ventilation may aid detect respiratory depression and reduce mortality. Masimo Corp has developed a new and FDA cleared technology for detecting respiratory rate based on an audible signal, called Rainbow Acoustic Monitoring (RRa). While capnography is viewed as a “gold standard” method, accurate measurement of respiratory rate in the perioperative period is complicated by numerous noise sources. In this study, RAM’s bias and precision were compared to that of capnography and respiratory inductance plethysmography (RIP).

Methods

With IRB approval, 50 patients undergoing minor urologic procedures under general anesthesia with LMA were studied. RIP bands (Respirace, Ambulatory Monitoring, Inc.) and RRa sensors (revision C, Rad87 Pulse CO-Oximeter, Masimo) were applied prior to induction; capnography via nasal cannula (Capnostream 20, Oridion) was applied prior to PACU transport. Data was logged continuously to a laptop computer from induction until thirty minutes after arrival in PACU. Respiratory rate was derived from RIP using empirical mode decomposition, resampled at 1 Hz, and filtered with a 34 second moving average. Comparisons between this rate and rates reported by the Rad87, RIP and capnography were made by Bland Altman analysis.

Results

A total of 52 subjects were enrolled. 4 subjects were removed from capnography analysis, while 2 subjects were excluded from RIP analysis due to protocol deviation and incomplete data. Bias and precision of RAM compared to RIP were -0.1 and 4.0 breaths per minute (bpm) and compared to capnography were 0.2 and 3.6 bpm (Figures 1 and 2).

Discussion

RAM displayed good accuracy and precision compared to capnography, demonstrating a good alternative for patients not tolerating capnography. RAM comparison to RIP produced a larger bias and precision, possibly due noise of RIP recordings during patient transport from OR to PACU, showing RAM utility under such interfering conditions for RIP.

Figure 1

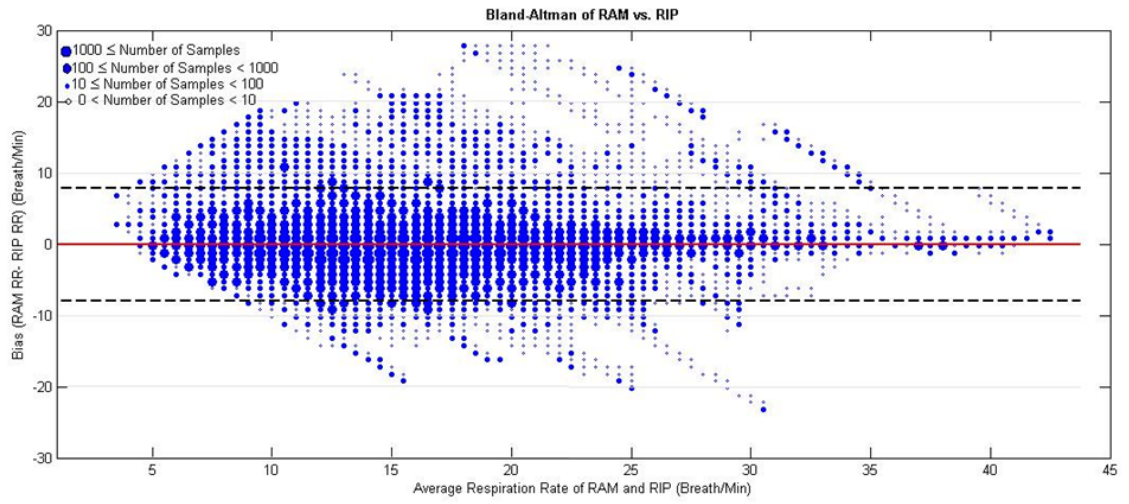


Figure 2

