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RES43

A Comparison of Measurements from a Temporal Artery Thermometer and a Pulmonary Artery Catheter Thermistor

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Inferior thermometry increases the risk of morbidity and mortality, and increases cost. The readings from the thermistor of a pulmonary artery (PA) catheter is considered the 'gold standard' as the readings from the PA reflect the temperature of the deep tissues of the body. The use of a PA catheter requires invasive insertion with potential risks and complications. Therefore in seeking out improved thermometry, the temporal artery (TA) infrared thermometer has been developed. The purpose of this study is to compare differences between the measurement of body temperature from the thermistor of the PA catheter and temperatures collected with the non-invasive Exergen infrared (IR) TA thermometer, Model LXTA.

Using a design where the subject acts as their own control, data were collected to measure the difference between PA catheter thermistor and TA thermometer readings. Each of the investigators participated in a training session with an expert in TA thermometry to insure inter-rater reliability. Subjects with a PA catheter were recruited from two Intensive Care Units. For each subject, measurements were recorded from readings from the PA catheter thermistor, a set of readings from the Exergen TA thermometer (forehead and behind the ear continuously, only the forehead, from only behind the ear), and rectal and oral temperatures when available.



			Paired readings PA vs. TA
Reading Site	n	Temperature	Difference st P
PA thermistor	86	98.61 ±1.3	---
Serviced TA-forehead and behind ear	86	98.77 ±1.5	+0.16 ±1.11.40.17
Serviced TA-forehead only	73	97.52 ±1.3	-1.03 ±1.18.0<.001
Serviced TA-behind ear only	73	98.44 ±1.5	-0.11 ±1.10.90.39
All PA thermistor	299	98.28 ±1.4	---
All TA-forehead and behind ear	300	97.69 ±1.6	-0.59 ±1.37.8<.001
All TA-forehead only	287	96.71 ±1.3	-1.54 ±1.319.8<.001
All TA-behind ear only	287	97.80 ±1.5	-0.45 ±1.26.5<.001
Rectal	15	99.41 ±1.4	-0.20 ±1.00.40.69
Oral	30	97.21 ±1.6	-1.44 ±1.55.3<.001

There were 300 subjects with a mean age of 66 years and 67% were male. Seventy percent of the subjects were post-cardiac surgery, with 52% having coronary bypass surgery. The primary admitting diagnosis was coronary artery disease. Forty-six percent were felt to be in the warming stage after hypothermic cardiac surgery, with 17% actually diaphoretic. PA catheter thermistor readings were compared to TA

readings at the three locations to assess for differences. To assess the possible effect of skin oil build-up on the TA thermometer's IR lens, one unit serviced the lenses regularly (cleaned) and the other unit serviced only sporadically.

There were no statistically significant differences between the PA thermistor reading and the TA temperature when taken both on the forehead and behind the ear, the measurement and cleaning in accordance with the manufacturer's recommendation, or when using just behind the ear. There was, however, significant difference when using the forehead alone. This suggests that diaphoresis, which tends to cool forehead and increase the behind-the-ear temperature, is common in this patient population. The rate of reading error of TA vs. PA due to not cleaning the TA IR lens was found to be -0.19F/month (95% CI: -0.28 to -0.09).

Therefore these results demonstrate that the TA thermometer is as accurate as a PA thermistor when utilizing the technique of forehead and behind the ear and cleaning every two weeks as recommended by the manufacturer. This technique should be promoted as the most accurate method to collect TA temperature. TA predicts PA as accurately as rectal temperature, and significantly more accurately than oral temperature.

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