

Comparison of pharyngeal temperature and TEMPLE TOUCH PRO™ in robot-assisted laparoscopic total prostatectomy

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Background

TEMPLE TOUCH PRO™ is a monitoring device for measuring a core temperature that uses a proprietary algorithm to measure the heat flux from the blood vessels to the skin surface by attaching a body surface sensor on the temporal artery [Figure 1, Figure 2].

In robot-assisted laparoscopic total prostatectomy (RALP), bladder and rectal temperatures cannot be measured, and pharyngeal temperature is mainly used for core temperature monitoring. In this study, we compared a pharyngeal temperature and TTP™ during RALP.

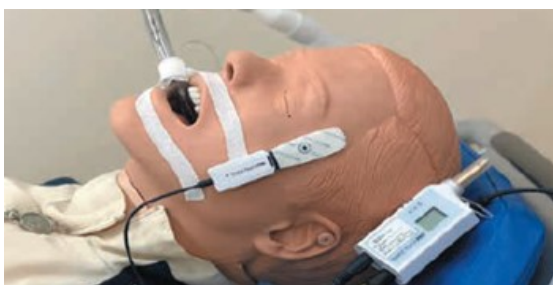


Figure 1: Example of body surface sensor attachment

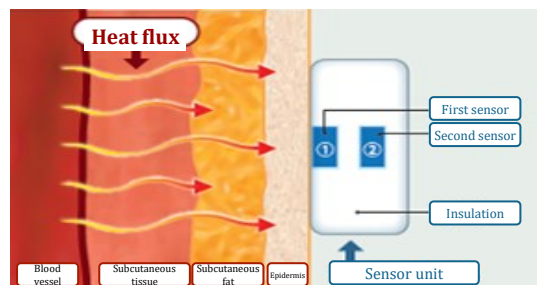


Figure 2: Schematic diagram of measurement principle

Method

► **Subject** 55 patients who underwent RALP from March 2019 to October 2019 [Table 1].

► **Method** Room temperature conditions were controlled between 24°C and 26°C, and pharyngeal temperature and TTP were measured simultaneously during RALP. A total of 10 points were extracted at the beginning of surgery, at the start of head lowering, every 30 minutes from the start of head lowering to 180 minutes, at the end of head lowering, and at the end of surgery, in order to compare the two temperature sets by calculating the mean value with the Wilcoxon test. The number of occurrences was compared using the χ -square test, with values below 35°C at each point of measurement as outliers.

Table 1

Age	Min - Max:	53-79 years
BMI	Min - Max:	20.0-34.4Kg/m ²
Surgery time	Min - Max:	190-433 min

Result

The mean temperature change at each point of pharyngeal temperature and TTP is shown [Figure 3].

Pharyngeal and TTP temperatures were significantly different between 30 and 60 minutes after the start of the head low position [Figure 4].

Out of a total of 539 points measured, outliers occurred a total of 31 times for pharyngeal temperature and 10 times for TTP, with a significant difference in the number of occurrences with a p-value of 0.001.

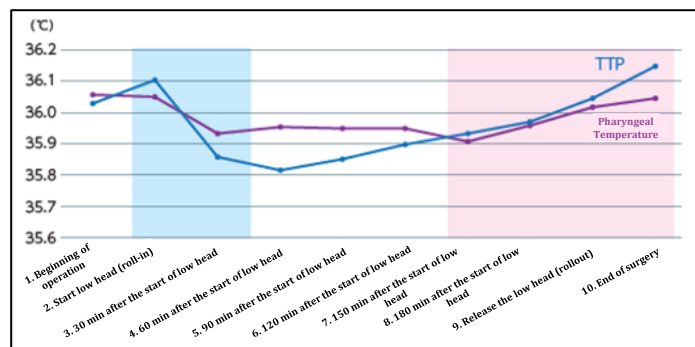


Figure 3: Mean temperature change at each point

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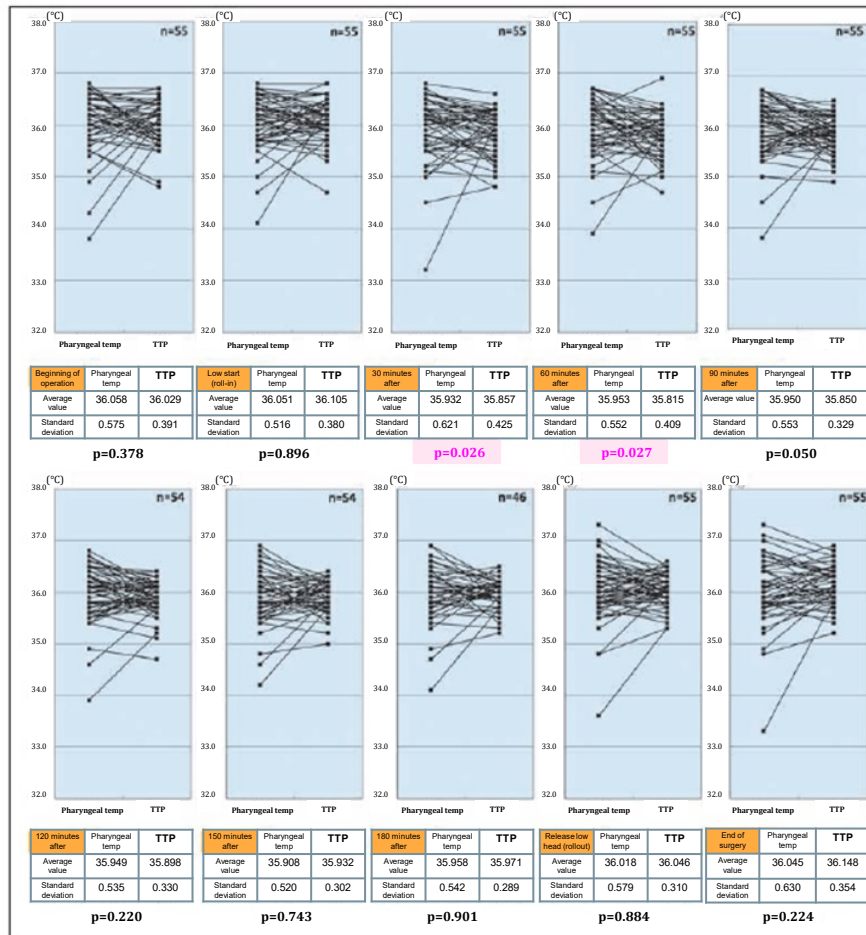


Figure 4: Comparison at 30 and 60 minutes after the start of the cranial hypotension

Consideration

Pharyngeal Sensor is inserted without pre-determined depth, and the tip position is not only different for techniques, but also susceptible to displacement over time and environmental temperatures. On the other hand, TTP is simply applied on the temporal artery, so differences in technique are less likely to occur, and TTP is less affected by displacement during positional changes such as rotation during “Trocar insertion” and head lowering before “Roll-in”, and by environmental temperatures compared to pharyngeal temperatures. This may have made a difference in the number of outlier occurrences.

In the first half of the surgery, the mean temperature change at each point of pharyngeal temperature and TTP showed a decrease in temperature of more than 0.1°C at 30 minutes after the start of head lowering in both cases, but TTP showed a greater decrease in temperature. It is conceivable that CO2 insufflation initiated at “Trocar” insertion caused a decrease in body temperature, and that TTP may have responded more finely to temperature changes than pharyngeal temperature for about 30 minutes.

In the second half of surgery, both pharyngeal temperature and TTP showed a gradual increase in body temperature, with no temperature change greater than 0.1°C at each point, suggesting no difference between pharyngeal temperature and TTP in their overall follow-up to temperature change.

Conclusion

TTP was thought to provide more stable core temperature monitoring than pharyngeal temperature during prolonged hypoglossal surgery in RALP.