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LETTER TO THE EDITOR

Reply to the letter by Moradi M and Cheraghi MR

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To the Editor:

We thank Dr. Moradi M and Dr. Cheraghi MR for their interest in our research [1] and their insightful comments [2].

Core body temperature is an important clinical indicator of abnormal physiological conditions, and accurate temperature measurements are essential for early diagnosis and effective treatment monitoring. There are various methods for measuring the core body temperature, each with its own advantages and disadvantages [3, 4]. Esophageal temperature is considered the most accurate alternative to blood temperature measurement using a pulmonary artery catheter because it closely reflects the core body temperature in pediatric patients [5]. However, its accuracy depends on precise sensor placement in an optimal position, which varies with age [6]. Additionally, it can cause significant discomfort in conscious pediatric patients. As a noninvasive alternative to esophageal temperature measurement, a previous study reported that noninvasive peripheral thermometers, including axillary, tympanic infrared, and zero-heat-flux thermometers, tend to underestimate the core temperature in critically ill patients [7]. Our study demonstrated the accuracy of a different noninvasive heat flux thermometer, Temple Touch Pro™ (TTP), by comparing it against standard esophageal temperature measurements under general anesthesia, with 94% of TTP measurements falling within ± 0.5 ℃ of esophageal temperatures [1]. Furthermore, the results of our unpublished data comparing TTP and axillary temperature in a small cohort of conscious pediatric patients (n = 9, mean age of 1.6 ± 1.8 months) in the intensive care unit indicated that the bias and standard deviation between the two measurements was −0.07 ± 0.35 ℃, with 90.1% of the temperature differences falling within ± 0.5 ℃. These findings suggest that the TTP may be clinically useful, even in conscious pediatric patients in intensive care settings.

As Moradi and Cheraghi pointed out [2], the noninvasive and easy-to-use characteristics of TTP make it applicable not only in perioperative care but also across various clinical settings and even for home use. In particular, continuous temperature monitoring may facilitate early detection of abnormalities in the patient's overall health, thereby contributing to improved patient management. Furthermore, large-scale epidemiological studies on continuous temperature monitoring could not only clarify the clinical characteristics of fever patterns specific to different diseases but also elucidate physiological changes, such as temperature variations influenced by environmental and behavioral factors. Thus, TTP holds great promise for both clinical and home applications and is expected to provide numerous benefits. However, in our study, we were unable to evaluate the tracking ability of the TTP because of small intraoperative temperature changes. Notably, assessments of its performance under situations wherein rapid body temperature changes occur remain insufficient. Therefore, future studies should evaluate the tracking ability of TTP under conditions involving significant body temperature fluctuations. Additionally, for widespread adoption, further development of wearable devices is required. Ideally, body temperature measurements should be unaffected by usage conditions, exhibit excellent responsiveness to temperature changes, and accurately reflect core body temperature across all age groups. Moreover, it should be simple to use, noninvasive, harmless, and independent of specialized techniques.

Once again, we sincerely thank Dr. Moradi M and Dr. Cheraghi MR for facilitating this discussion and look forward to further contributing to the advancement of noninvasive temperature monitoring.

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Data availability Data is available from the corresponding author on reasonable request.

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