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Clinical accuracy and agreement between tympanic and forehead body temperature measurements for screening of patients with COVID-19

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Abstract

Aim: To investigate the accuracy, reliability and agreement between infrared forehead thermometers versus infrared tympanic thermometers temperature, a cross-sectional study was conducted in April 2020.

Methods: The forehead and tympanic temperatures of 615 subjects were measured simultaneously in three exposed SARS-COV-2 groups at one hospital in Iran, during April 2020. These comparisons were evaluated by Bland–Altman Plot, repeatability, Passing–Bablok regression and Lin's concordance correlation coefficient. The receiver operating characteristic (ROC) analysis was done to describe the discrimination accuracy of a diagnostic test. The study adhered to STROBE checklist for cross-sectional studies.

Results: A Bland–Altman plot indicated that the limits of agreement between the forehead and tympanic temperature were −0.259 to +0.19°C. Passing–Bablok regression analysis illustrated that the infrared forehead was not linearly related to tympanic temperatures (reference method), with a slope estimate that was significantly different from 1.00. The infrared forehead thermometer showed poor precision and lower accuracy than the tympanic. The forehead temperature readings had 60.0% sensitivity and 44.4% specificity ($p > .05$) to predict disease.

Conclusion: According to the results of study, there is no evidence that the assessment of temperature by infrared forehead thermometer could discriminate between the two groups (positive and negative).

KEYWORDS
agreement, body temperature, fever, forehead, hospital infection, nursing, SARS-COV-2, screening, thermometer, tympanic