Equivalence Study of Two Temperature-Measurement Methods in Febrile Adult Patients With Cancer

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Purpose/Objectives: To assess equivalence of temperatures taken via temporal artery and oral methods in febrile inpatients with cancer.

Design: Repeated measures equivalence design.

Setting: 24-bed hematology-oncology unit and 36-bed blood and marrow transplantation unit at H. Lee Moffitt Cancer Center and Research Institute, a National Cancer Institute–designated comprehensive cancer center in Tampa, Florida.

Sample: Convenience sample of 58 febrile inpatients using 60 temperature measurements.

Methods: Two instruments were used: Welch Allyn SureTemp® Plus 690 (oral) and Exergen TAT-5000 (temporal artery). Temperatures were measured closely following instrument instructions by three highly experienced nurses.

Main Research Variables: Temperature readings from oral and temporal artery measurements.

Findings: A two one-sided test (TOST) technique with a delta of 0.2°F was performed to assess equivalence of the oral and temporal artery measures. Within each team member, the oral and temporal artery measures were assessed using the TOST technique. The hypothesis of equivalence was rejected for all three team members.

Conclusions: The use of the Exergen TAT-5000 for temperature measurement as a noninvasive alternate to the oral method for febrile adult patients in the hematology-oncology population was not supported.

Implications for Nursing: The Exergen TAT-5000 is not a reliable instrument for detecting fevers in the hematology-oncology patient population because the temporal artery measures were not equivalent to oral measures, and considerable variation occurred for the three nurses. Alternative methods for accurate temperature collection need to be investigated, particularly for febrile, neutropenic patients who cannot tolerate the oral probe.

Fever in immunocompromised patients, particularly those with neutropenia, is widely recognized as an oncologic emergency that may indicate sepsis or impending septic shock. In the event of sepsis, the initial change in vital signs is often temperature elevation greater than or equal to 100.5°F. A new onset of fever will activate the need for clinical decisions, initiation of a neutropenic fever protocol, and other potentially lifesaving measures. Early recognition of fever in the oncology population depends on accurate and precise monitoring of body temperature. Some methods of body temperature measurement are problematic in immunocompromised patients.