



COVID-19: Making sense of the literature

Does the infrared thermometer detect temperature accurately?

Journal Articles reviewed

1. Hooper VD, Andrews JO. Accuracy of noninvasive core temperature measurement in acutely ill adults: the state of the science. *Biol Res Nurs* 2006;8:24e34.
2. Bijur PE, Shah PD, Esses D. Temperature measurement in the adult emergency department: oral, tympanic membrane and temporal artery temperatures versus rectal temperature. *Emerg Med J* 2016;33:843e7.
3. Fletcher T, Whittam A, Simpson R, Machin G. Comparison of noncontact infrared skin thermometers. *J Med Engng Technol* 2018;42:65e71.
4. Liu CC, Chang RE, Chang WC. Limitations of forehead infrared body temperature detection for fever screening for severe acute respiratory syndrome. *Infect Control Hosp Epidemiol* 2004;25:1109e11.
5. Hausfater P, Zhao Y, Defrenne S, Bonnet P, Riou B. Cutaneous infrared thermometry for detecting febrile patients. *Emerg Infect Dis* 2008;14:1255e8.
6. Tay MR, Low YL, Zhao X, Cook AR, Lee VJ. Comparison of infrared thermal detection systems for mass fever screening in a tropical healthcare setting. *Publ Health* 2015;129:1471e8.

Summary

Methods used in studies

- Comparison of the handheld infrared thermometer with the tympanic thermometer, or oral thermometer
- Comparison of 3 Infrared thermal detecting systems (ITDS)—the STE Infrared Fever Screening System (IFSS), the Omnisense Sentry MKIII and the handheld Quick Shot Infrared Thermoscope HT-F03B.

Results

- Infrared thermometers require no direct patient contact whereas, all other methods like a tympanic membrane, temporal artery thermometers and oral thermometers, require patient contact
- The handheld cutaneous infra-red thermometer was less accurate than the tympanic thermometer and other infra-red thermal systems for temperature measurements and detection of fever.
- A handheld infrared thermometer has a low sensitivity of 29.4% compared with the oral thermometer to detect fever.
- The infrared thermometer's performance is operator dependent and affected by the distance between the thermometer and skin.
- In a Singapore based study, the three Infrared thermal detecting system (ITDS), the STE Infrared Fever Screening System (IFSS), the Omnisense Sentry MKIII and the handheld Quick Shot Infrared Thermoscope HT-F03B, were evaluated. They concluded that the handheld infrared thermoscope had a very low sensitivity (29.4%) but high specificity (96.8%). The STE ITDS had moderate sensitivity (44.1%), but very high specificity (99.1%). Self-reported fever showed good sensitivity (88.2%) and specificity (93.9%). The sensitivity of the Omnisense ITDS (89.7%) was the highest among the three methods with excellent specificity (92.0%).

Conclusion:

The existing literature suggests that infrared thermometer may miss a significant fraction of patients with pyrexia, giving a false sense of safety.

Opinion

The handheld infrared thermometer does not measure the temperature accurately. The personal experience of the individuals using it presently is that the temperature recorded by the infrared thermometer is lower than the actual temperature.

Appraisers

Senior Residents, GI Surgery; Shalimar, Gastroenterology, AIIMS, New Delhi