

Comparison of Non-contact Infrared Temperature with Digital Axillary Temperature

We measured the Non-contact infrared temperature (NCIT) from the forehead, chest and abdomen, and compared it with Digital axillary temperature (DAT) by Bland Altman Plot. The DAT agreed better with NCIT chest (mean difference 0.13, 95% limit of agreement 0.08, 0.18) as compared to NCIT forehead and abdomen.

Keywords: Fever; Measurement; Thermometry.

Infrared thermometry is a quick and non-invasive method of recording temperature [1]. Forehead is considered to be the preferred site for temperature measurement by Infrared thermometers [2,3], but the evidence-base to support this site is lacking.

This prospective study was done in neonates admitted in the Special Newborn Care Unit (SNCU) of Christian Hospital, Chhatarpur, Madhya Pradesh, India. The study was approved by the Institutional Ethics Committee of Emmanuel Hospital Association (EHA). After obtaining informed consent from parents, a trained nurse measured digital axillary temperature (DAT) and non-contact infrared temperature (NCIT) from the forehead, chest and abdomen within a span of 6 minutes. Multifunctional Infrared thermometer PC808 and Omron Digital Thermometer (Model MC-246) was used in the study. The temperature recordings were obtained from neonates nursed under overhead warmer as well as from those who were nursed in a cot by the mother's side. The warmer was servo-controlled with temperature set at 36.5°C and the room temperature was set between 26-30°C. DAT was compared with the NCIT from forehead, chest and abdomen. The data were entered in Microsoft excel sheet and analyzed by Bland Altman graph [4].

We measured 211 sets of temperature recordings from a conveniently selected sample of 30 neonates over a period of 20 days. The mean (SD) values of DAT, NCIT forehead, NCIT chest and NCIT abdomen were 36.9 (0.48), 36.6 (0.24), 37.0 (0.41) and 37.1 (0.42), respectively. The DAT agreed better with NCIT chest (mean difference 0.13, 95% limit of agreement 0.08, 0.18) as compared to NCIT forehead and abdomen (**Table I**) (**Fig. 1**).

TABLE I AGREEMENT OF DAT WITH NCIT AT VARIOUS SITES (N=211)

Comparison	Mean difference (95% limit of agreement)
DAT vs NCIT Abdomen	0.22 (0.17 to 0.27)
DAT vs NCIT Chest	0.13 (0.08 to 0.18)
DAT vs NCIT Forehead	-0.32 (-0.38 to -0.25)

DAT: digital axillary temperature; NCIT: Non-contact infrared temperature.

According to the manufacturer's manual for Multifunctional Infrared thermometer PC808 and the American Society for Testing and Materials standard specifications, the NCIT should be used in the mid-forehead [2,3]. Chiappini, *et al.* [3] stated forehead NCIT to be the best to measure core body temperature because of the proximity to the temporal artery and is more convenient when the baby is dressed up. Sethi, *et al.* [5] also observed that NCIT forehead do not agree well with DAT in neonates.

We suggest the use of NCIT chest in neonates as it agrees well with the DAT as compared to NCIT forehead and abdomen.

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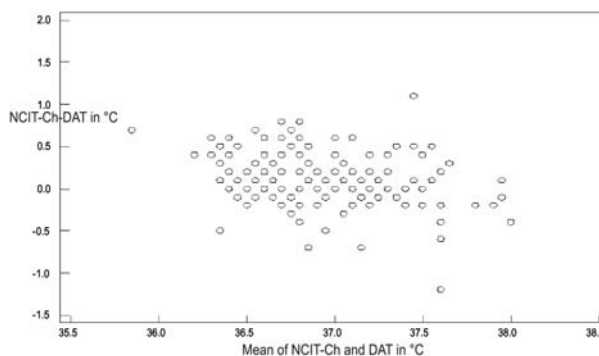


Fig. 1 Bland Altman plot for Non-contact infrared temperature (NCIT) chest and Digital axillary temperature (DAT).

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