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A COMPARATIVE STUDY OF CONTACT FREE INFRARED THERMOMETER AND MERCURY-IN GLASS THERMOMETER IN NEONATAL TEMPERATURE MEASUREMENT WITH SPECIAL REFERENCE TO PHOTOTHERAPY

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ABSTRACT

This study was to asses concordance of contact free infrared thermometer and mercury-in-glass thermometer in neonates with special reference to effect of phototherapy in interpretation of both methods.

KEYWORDS : Neonates,Temperature Measurement, Contact Free Infrared Thermometer

Measurement of temperature in neonates can be obtained either through the rectal or axillary route (Jirapaet and Jirapaet, 2000). The gold-standard of such methods is the mercury-in-glass thermometer. Such a device must be held in place for a relatively long time in order to achieve accurate temperature measurement (Craig et al., 1991). During such periods, the method necessitates that each neonate is subjected to cold exposure. Moreover, mercury contamination is a true concern should the glass thermometer break. As well as intestinal perforation from glass splinter injuries (Frank, 1978; Goldman and Shannon, 2001; Fonkalsrud 1965). Most infrared contact free thermometers gives accurate temperature reading in a shortened amount of time.

MATERIALS AND METHODS

Prior to the study, four mercury-in-glass thermo meters were standardized in a water bath (set at 37 ˚c). The technique for taking temperatures using the mercury- in-glass thermometer was based on routine practice in our division. Recordings were made in the celsius scale and timed with a stop clock followed immediately by contact free infrared thermometre. The mercury-in-glass thermometer was placed in the interaxillary fold; the temperature was read after 5min.

Subjects

One hundred and twenty neonates aged 0-28 days, of which 60 were on phototherapy and 60 not on phototherapy admitted NICU at the department of pediatrics, civil hospital participated in the study. The criteria for exclusion included.

Newborn infants who had a serious illness with signs or symptoms of cardiovascular instability.

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Statistical Analysis

The bland altman statistical test was used to assess the concordance by the 95% limits of agreement between the contact free infrared thermometer and the mercury-in-glass thermometer in table, 1 & 2 (Bland and Altman, 1986).

RESULT

The tighter the limits of agreement and the closer the mean difference to zero indicater better concardance in not on phototherapy patients than on phototherapy patients. This indicates that infrared contact free thermometer can be reliable source of temperature measurement in not on phototherapy patient than in phototherapy patient. (Figure 1, 2 and Table, 3)

DISCUSSION

Glass thermometers have been considered the gold standard method of temperature measurement in newborn infants. However, anal perforation, accidental breakage and mercury contamination are risks associated with this method, in addition to being time-consuming and exposing neonates to room temperature which can cause hypothermia. Bland and Altmann test was used as a method this gold standard method with newer method which takes less time (Jirapaet V. and Jirapaet, 2000). The study indicates that infrared contact free thermometer is reliable source of temperature measurement in patients not on phototherapy. Temperature increases in phototherapy patient. patients. The study indicates that infrared contact free thermometer gives a higher reading in phototherapy patients than in not on phototherapy patients as compared to mercury in glass thermometer.

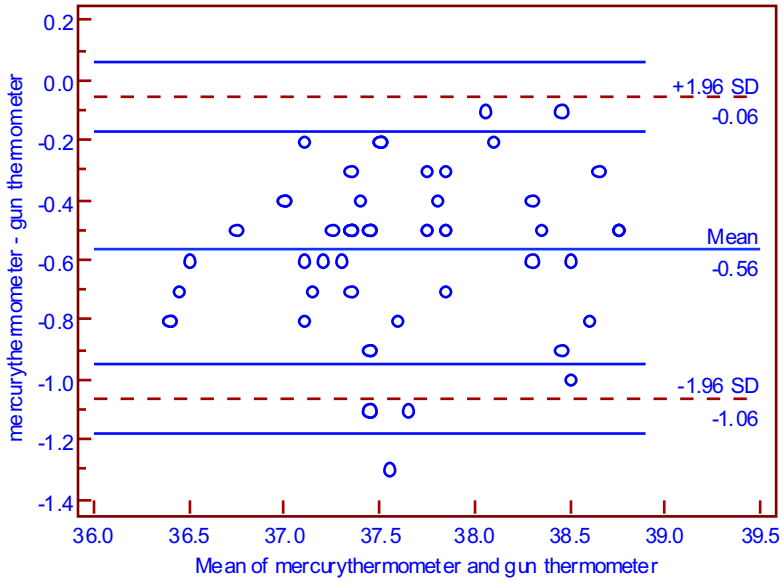

Figure1: On Phototherapy 1

Table 1 : Statistical Analysis

	Mean	95% confidence interval	Standard deviation	Minimum	Maximum
Gun thermometer	37.928	37.769 - 38.088	0.6184	36.800	39.000
Mercury thermometer	37.368	37.200 - 37.537	0.6524	36.000	38.500

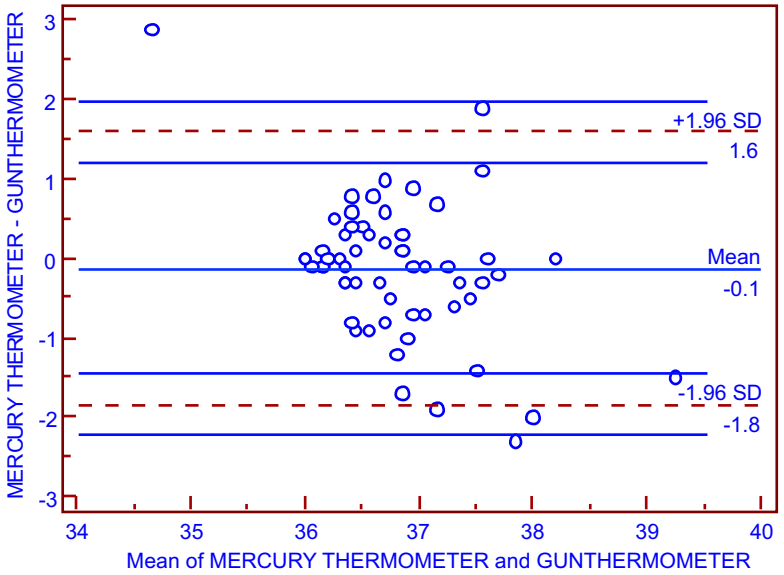

Figure 2 : Not on Phototherapy 2

Table 2 : Statistical Analysis

	Mean	95% confidence interval	Standard deviation	Minimum	Maximum
Mercury thermometer	36.738	36.578 - 36.899	0.6203	36.000	38.500
Gunthermometer	36.867	36.620 - 37.113	0.9550	33.200	40.000

Table 3 : The Bland Altman plot

	Mean Difference	Limits of Agreement
On phototherapy	-0.56	-0.06-1.6
Not on phototherapy	-0.1	1.6-1.8

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