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Evaluation the effectiveness of infra-red skin thermometer in temperature monitoring in operating theatre

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Introduction

Tympanic measurement is the most widely used method for body temperature measurement in Hospital Authority. Because of the speedy, user friendly and non-touch approach measurement features, some departments have introduced infra-red skin thermometer for temperature monitoring. The advantages are really attractive and could benefit for the patient, especially reducing cross infection risk between patients. But, accuracy of temperature monitoring is very important peri-operatively. Thus, an evaluation program was launched to review the accuracy of infra-red skin thermometer before we apply it clinically.

Objectives

To evaluate the accuracy of temperature recorded in infra-red forehead skin thermometry by comparison with temperature recorded in tympanic thermometry.

Methodology

A prospective cohort study was conducted on 100 patients in North District Hospital Operating Theatre from July to Aug 2011. Tympanic thermometer (Temptym, Braun Thermoscan PRO400) and infra-red thermometer (Tempskin, Hygenia HLP9054) were used to measure the temperatures on the same patients at the same time by 2 trained staffs. Data was collected when patients were admitted to and discharged from the recovery room.

Result

Results: From the Intraclass Correlation results, the Cronbach's alpha of temperatures between the two record approaches on admission was 0.67 and on discharge was 0.76. Since only moderate reliability obtained, difference and limit of agreement were further analyzed by the Bland-Altman method. The mean difference between Temptym and Tempskin (n=200) was 0.44oC [95% CI, -0.41 oC to 1.28 oC], with Temptym higher than Tempskin. Agreement between Temptym and Tempskin was greatest for normothermia (36.0 oC to 37.4 oC) (n=138). Mean difference was 0.38 oC [95% CI, -0.31 oC to 1.05 oC]. Besides, mean difference of hypothermia group (n=46) was 0.43 oC [95% CI, -0.47 oC to 1.33 oC]. Agreement was least for

hyperthermia (≥ 37.5 °C) (n=16). Mean difference was 1.08°C [95% CI, 0.49 °C to 1.68 °C]. Conclusions: From the statistical results, we can conclude that TempSkin is lower than TempTym by 0.44 °C in average and the variability ranged from -0.41 °C to 1.28 °C. Thus, sole reliance on TempSkin could adversely affect patient care, infra-red skin thermometer is not recommended to replace tympanic thermometer at this moment. Moreover, the agreement in fever group was poor but those in normothermia and hypothermia group were relatively good. The small sample size of fever group added limitation in this study. Performance of agreement may be improved if larger sample size in fever group would be adopted in the further study. We are looking forward to have a better set of results to be used as an evidence to support further consideration of replacing tympanic thermometer with Infra-red skin thermometer.