**ORIGINAL ARTICLE**

An evaluation of tympanic thermometry in a paediatric emergency department

A S El-Radhi, S Patel

**METHODS**

The body temperature of 106 infants attending our A&E department was measured in the daytime using an infrared tympanic thermometer (Thermoscan Pro-3000; San Diego, CA) after obtaining informed, written consent. These measurements were compared with those obtained from the axilla with an electronic thermometer (IVAC, San Diego, CA), representing current practice at the A&E, and the rectum, representing the “gold standard” for measurement of body temperature.

**RESULTS**

For all infants, the tympanic measurement correlated more closely with the rectal ($r = 0.87$, $p = 0.0005$) than the axillary measurement with the rectal ($r = 0.69$, $p < 0.0005$). In febrile infants (rectal temperature $<38.0\, ^\circ C$, $n = 58$), tympanic measurement was closer to the rectal measurement (mean difference $0.38\, ^\circ C$, range $0.25–0.50\, ^\circ C$) compared with the axillary measurement to the rectal measurement (mean difference $1.11\, ^\circ C$, range $0.92–1.31\, ^\circ C$). Axillary measurement from three infants recorded temperatures of less than $35.0\, ^\circ C$, but these infants had a normal body temperature by rectal and tympanic measurements. In febrile infants also (defined as rectal temperature of $38.0\, ^\circ C$ and greater; $n = 48$), tympanic measurements correlated more closely with the rectal ($r = 0.83$, $p < 0.0005$) than the axillary measurements with the rectal ($r = 0.67$, $p < 0.0005$). The mean difference between the tympanic and rectal measurements was $0.42\, ^\circ C$ (range $0.27–0.58\, ^\circ C$) and axillary to rectal measurements was $1.58\, ^\circ C$ (range $1.37–1.80\, ^\circ C$).

The local research ethics committee approved the study.

**Conclusions**

Tympanic thermometry is more accurate than measurement of temperature with an electronic axillary thermometer. It is also quick and safe, and thus it is recommended in the paediatric emergency setting.

**REFERENCES**

1./met references

**Correspondence to:**
Dr A S El-Radhi, Queen Mary’s Hospital, Sidcup, Kent DA14 6LT; sahib.el-radhi@qms.nhs.uk

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lead to savings in time when nursing time for performing temperature measurement is considered.

DISCUSSION

Our findings are consistent with other reports such as a review of 19 studies from 1989 to 1994 which concluded that tympanic measurements had moderate to strong correlation with oral, rectal and, core temperatures. Tympanic thermometry has many potential benefits, particularly for a busy paediatric emergency setting. The technique is quick, safe, does not require the removal of clothing, easy to use without the risk of cross infection, and is not influenced by environmental temperature.

The sensitivity of tympanic measurements to detect fever was significantly higher than that of axillary measurements. The reason why tympanic thermometer could not achieve a higher sensitivity at rectal temperatures of 38.0–38.9 °C may be due to poor technique such as not targeting the eardrum, which emits the infrared energy, or to a small size of the external auditory canal in relation to the size of the scan probe. The latter reason may explain why some reports have shown lower accuracy of tympanic measurements in younger compared with older children.

Fever being missed in a high percentage of children due to measurement at the axilla could have serious consequences regarding investigations and treatment.

CONCLUSION

Tympanic thermometry is a practical method of measuring temperature in children in the emergency setting. It is more accurate than the method of measurement with an electronic axillary thermometer, and it is recommended because of its potential benefits.

Authors’ affiliations

A S El-Radhi, Queen Mary’s Hospital, Sidcup, Kent, UK
S Patel, University of Greenwich, Department of Computing and Mathematical Science, Woolwich, UK

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