Reviewer's report

Title: Temporal artery versus bladder thermometry during adult medical-surgical intensive care monitoring: an observational study

Version: 1 Date: 8 July 2010

Reviewer: Elizabeth Bridges

Reviewer's report:

1. Is the question posed by the authors well defined? Yes
2. Are the methods appropriate and well described? There are some methodological issues that need to be resolved before publication
3. Are the data sound? See note regarding methodological issues
4. Does the manuscript adhere to the relevant standards for reporting and data deposition? Yes
5. Are the discussion and conclusions well balanced and adequately supported by the data? See notes - there is some overstatement regarding hypothermia. Also need to be very clear that given the methodological limitations of the study the best we can say is that the two methods do not agree.
6. Are limitations of the work clearly stated? Some are alluded to - this area requires revision
7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished? Yes - there are some missing references (noted below)
8. Do the title and abstract accurately convey what has been found? Yes
9. Is the writing acceptable? Yes

Thank you for the opportunity to read this practical study, which addresses an important question regarding TAT. Although the Bland Altman plots and overall results are consistent with the results comparing TAT to other methods (in both normothermic and febrile patients) there are several areas that need to be addressed to strengthen this report. Areas that I would recommend strengthening include (1) citing primary evidence that the bladder temperature is the appropriate standard for comparison (cite primary literature comparing the bladder to PA or other core measures – particularly in adult febrile patients) and (2) also please address the potential effects of the lack of control in the study methods on the accuracy and reliability of both measures (see specifics below).

Background: Please discuss/cite evidence for the accuracy and reliability of bladder temperature as a core measure (compared to PA temperature – in addition to citing the consensus paper) – this would strengthen your conclusions and support your use of the bladder measurement as the standard for comparison. Also discuss validity of bladder temperature as an indicator of
hyperthermia and the accuracy and reliability of bladder temperature measurements under conditions of rapidly changing core temperature.

Methods
Inclusion criteria – please provide rationale for selecting patients with > 1C variability as indicated by the TAT. What was the time period of the study (how many weeks/months?)

Thermometer calibration conducted only by manufacturer - not validated (were there multiple TAT thermometers used – or only one?). No post hoc validation of the accuracy of the bladder catheter thermister. No discussion of control of other factors associated with accuracy of measures (confirming TAT clean lens). Please discuss these methodological limitations in the interpretation of your results.

No validation of the correct procedure for performance of the temporal artery measurements (other than yearly inservice). Although this lack of validation is discussed in the limitations section this lack of control needs to be considered in the interpretation of the results. Additionally, did you control for (or assess) the effect of factors that affect the accuracy of bladder temperature measurements (e.g., urine output). Was there confirmation of the procedure for nurses to validate the bladder temperature – how was this decision made? Given lack of standardized procedures the results of this study only demonstrate the bias between the TAT and bladder temperature measurements methods as they would be used in uncontrolled clinical practice environment.

Results
Please provide information on the number of patients who were febrile (how many accounted for the 166 measurements).

Based on the results of the study the bladder temperature was less precise. How does this lower precision affect your interpretation of the results? All you can say is that the two methods are not comparable – (see note above establishing the bladder temperature as the appropriate method indicative of core temperature, particularly in febrile patients).

Discussion – there is insufficient evidence to state that the TAT systematically overestimated temperature in a hypothermic state given the small sample size – would avoid this terminology when discussing the hypothermia component of this study.

Please discuss why you think the temperatures are so discordant for hyperthermic patients in a bit more detail. Theoretically if the behind the ear method was used for TAT this should control for the effect of diaphoresis. (Note we are also seeing this lack of agreement in a study of febrile patients comparing TAT to oral temperature and in a study of TAT-esophageal in induced hypothermia)

Reference list – see study by Lawson, which compares the temporal artery to
pulmonary artery temperature. Results of this current study are consistent with the results in Lawson’s study relative to normothermic patients.

Graphics - appropriate

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

No