Reviewer’s report

Title: Measuring nasal bacterial load in children at low and high risk of tympanic membrane perforation

Version: 2 Date: 22 December 2005

Reviewer: Sten Hellstrom

Reviewer’s report:

General
The present study shows a significant association between the nasal load of otitis media pathogens and severity of middle ear disease. Aboriginal children in remote areas of northern Australia is compared with non-aboriginal children attending Darwin child-care centres. Samples from previous studies – up to six years earlier – are analysed regarding semi-quantitative colony counts, quantitative serial dilution colony counts, and real-time quantitative PCR. By use of the latter total bacterial load, total S. pneumoniae load, total H. influenzae load and total M. catarrhalis load are estimated. Valid statistical methods are used.

The study is well performed and should be recommended for publication after minor essential revision.

However, I have the following questions and comments:
1. I do not feel completely satisfied with the terminology used; OM, OM with effusion (OME) and suppurative OM. The terminology has been agreed upon at several OM conferences headed by Bluestone and Lim. Instead of “suppurative OM” I would prefer acute otitis media (AOM).
2. The title and the aim of the study focus on the bacterial load and the risk for tympanic membrane perforations. However the Results section does really not directly analyse the nasal bacterial load and the risk for perforation – it is mainly describing the nasal bacterial load and various states of middle ear inflammatory conditions. In fact perforations are hardly mentioned in the Results section.
3. p 2 – Abstract – Conclusions. “Nasal bacterial load was significantly higher among Aboriginal children who are at risk of severe ear disease.” What is the definition of severe ear disease? I cannot see that a permanent tympanic membrane (TM) perforation is a “severe ear disease” – I would say a “a complication to or a sequelae to an inflammatory middle ear condition.”
4. p 2 – Background – Do we have significant evidence that “The conductive hearing loss associated with TM perforation has implications for language development and educational outcomes.”?
5. p 4 – Suppurative OM – It would have been of interest to see the distribution of the various types of “Suppurative OM” - how many had fresh discharge? How many with a dry perforation and how many with a discharge through a chronic TM perforation? In particular it would be of interest how these various OM types correlated to the nasal bacterial load.
6. There is a weakness of the study that the bacterial sampling is difficult to standardize; both regarding the site of collecting the sample and the volume accumulated in the nasal swab. This should be commented upon.
7. p 8 – 2nd paragraph – “Total bacterial mean RTQ-PCR counts were substantially higher (average 75%) than respiratory pathogen counts.” Which means?
8. p 11 – regarding findings which show that PCR can detect bacterial fragments in secretions that do not show any bacterial growth in cultures. This is not surprising as at least fragments of non-vital H. influenzae may act as endotoxins.
9. In Conclusion – p11 – it is mentioned that “…alternative ways of measuring bacterial load (including volume of nasal discharge) will have more relevance to clinical practice and in predicting the clinical course of OM”. I do not understand the significance of this statement. Would it really be possible to predict the clinical course of OM through analysis of the nasal bacterial load? Would not
the appearance of the TM status be as predictive as measuring the bacterial load of the nose?

10. I also lack some discussion on the reason for the difference between the nasal bacterial load in the Arborginal and non-arborginal children. In Europe, prior to the antibiotic era, S. pyogenes middle ear infections was very common and often caused a total necrosis of the TM resulting in chronic TM perforations. S. pyogenes is nowadays a rather uncommon bacteria in AOM and so are TM perforations. The introduction of antibiotic treatment and different nutritional states have been mentioned in relation to this phenomenon.

11. Figs 1-6. the text to figures is rather comprehensive and could be written more brief.

Finally to answer the specific questions raised in the Guidelines:

1. The questions posed by the authors are new but not fully well defined. See my remark on bacterial load and relation to OM status and not directly to perforations.
2. The methods are appropriate and well described and sufficient details are provided to replicate the work. But see also my comment 6 above.
3. The data are sound and well controlled.
4. The manuscript adhere to relevant standards for reporting and data deposition.
5. The discussion and conclusion are well balanced and adequately supported by the data. Please see my comments 8 and 9 above.
6. The title and abstract do not completely agree with the data. See comment 2 above.
7. The writing is acceptable.

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Quality of written English: Acceptable