Reviewer's report

Title: Cognitive deficits following exposure to Pneumococcal Meningitis: An Event-Related Potential study

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Reviewer: A.M. M van Furth

Reviewer's report:

General comments: In this paper auditory testing (Cortical Auditory Evoked Potentials) is used as a means to investigate cognitive deficits following PM. Although an audiological test was used the paper lacks information about the auditory functioning of the subjects. The reviewers advise to consult an audiologist for revision of the paper.

Specific comments:

In: Methods / subjects

• Hearing loss is specified as “unable to hear 81 – 105dB on better ear”. This is not an adequate description of hearing loss. Hearing loss should be specified as a loss (in dB) or as a hearing threshold (in dB HL). Specify test frequencies or use a Pure Tone Average (PTA, e.g. 500, 1000, 2000 or 1000, 2000, 4000 Hz).

• Please specify in more detail the hearing thresholds of the remaining 58 subjects (after excluding subjects with severe and profound hearing loss), specify at least average and SD hearing loss.

• Please specify whether or not subjects with hearing thresholds exceeding 40 dB HL (PTA 1,2,4 kHz) were fitted with hearing aids.

• Please specify whether or not subjects with hearing thresholds exceeding 60 dB HL (PTA 1,2,4 kHz) were fitted with hearing aids.

• Please specify age at which subjects were infected with PM.

In: Methods/ERP recordings

• Test stimuli used do not exceed 70 dB SPL: please specify if subjects with hearing thresholds exceeding 40 and 60 dB (PTA 1,2,4 kHz) used hearing aids during auditory testing.

In: Discussion

general: the discussion is far too long, please make it much shorter

P10/11

“Children exposed to PM had longer auditory P1 latencies than unexposed children. The P1 component has been thought to be an objective measure of cortical auditory function in children.”
Longer P1 latencies in children with exposure to PM suggest slower or impaired development of their auditory functions. In general, there are age-related decreases in P1 latency with increasing age, which is shown in children studies [29-31]. These decreases can thus be viewed as the development of the auditory pathways [30].”

Please study some of the more recent papers of e.g. Sharma et. al. These authors have produced many papers after 1997 which contain more relevant information. P1 latency is considered to be a measure of auditory functioning. P1 latency decreases with the duration of auditory stimulation. Hence, in normal hearing subjects P1 latency decreases with age. In hearing impaired subjects P1 maturation only starts after adequate hearing rehabilitation. Therefore more specific information about the hearing status of the subjects, the age at which subjects were infected with PM and whether or not hearing impaired subjects word hearing aids (during test as well as in the period since PM) is essential for interpretation of the results. All this information is missing.

Also note that part of the subjects included may not be able to hear the test stimuli (which do not exceed 70 dB SPL).

“In the present study, novel sounds (environmental noises) provided a deviation from the standard tones (1000Hz SPL) and target tones (2000Hz SPL)” Incorrect: should be 1000 Hz, XX dB SPL, please add dB and the actual sound pressure level

“Limitation of the study
In the present study, children with profound to severe hearing loss were excluded from the ERP paradigms to minimize biases arising from sensory impairments. However, it is possible that subtle hearing loss and cortical blindness could have accounted for the differences in children with pneumococcal meningitis.”

Children with hearing loss up to 80 dB may be included in the study. This should not be refeered to as “Subtle hearing loss” for the following reasons:
• Some of the subjects may not be able to hear the test stimuli
• Some of the subject may have had PM at young ages, cuasing hearing loss and auditory deprivation leading to unmatured P1 latencies.
It is the opinion of the reviewers that from the auditory potentials recordings it is not possible to conclude cognitive deficits are present. It is more likely that the average outcomes are influenced by hearing impaired subjects participating and reflect the results of auditory impairment during the test as well as lack of auditory stimulation in the past.

references: please update ref 4-10 since there are much more recent papers on cognitive functions in bacterial meningitis

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

'I declare that I have no competing interests'