Cerebrospinal Fluid Pleocytosis following Meningococcal B vaccination in an Infant

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ABSTRACT

We describe a case of cerebrospinal fluid pleocytosis in a previously well infant after his first immunisation with the multicomponent meningococcal serogroup B and advice clinicians to be cautious with the interpretation of CSF findings in children post Meningococcal B vaccination until clearer guidelines are available

KEYWORDS
meningococcal B vaccine – cerebrospinal fluid pleocytosis – inflammatory response – infant

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INTRODUCTION

Invasive meningococcal disease remains one of the commonest causes of mortality globally. On 01 September 2015, UK infants were offered a reduced two dose primary immunisation schedule of a multicomponent meningococcal serogroup B vaccine (Meningococcal B vaccine or 4CMenB) at 2 and 4 months followed by a booster at 12 months [1]. This vaccine was highly effective in preventing Meningococcal B disease in infants and cases in vaccine-eligible infants halved in the first 10 months of the programme [2].

This vaccine has been associated with a high rates of fever post-vaccination especially when co-administered with the other routine infant immunisations; parents were, therefore, advised to give their infants three doses of prophylactic paracetamol, with the first dose given around the time of vaccination [1].

There has been an increase in number of children attending emergency department (ED) with fever during the first few days after MenB vaccination [3, 4]. Raised serum white cell count and inflammatory markers such as the C-reactive protein have been reported in infants after MenB vaccination. However, little is known about biochemical changes in Cerebrospinal fluid (CSF) following 4CMenB vaccination. Here, we describe a case of CSF pleocytosis following 4CMenB vaccination in an infant.

CASE

A 10-week-old baby boy presented to the Accident and Emergency Department with a fever of 40.4 degrees Centigrade 18 hours after his first set of routine immunisations. His mother denied using paracetamol prophylaxis as advised. He was a term baby, born by spontaneous vaginal delivery with no risk factors for sepsis, no resuscitation or admission to the neonatal intensive care unit was required. He was exclusively breastfed and thriving, living with his parents and siblings, with no significant family history. The only past medical history of note was his presentation at six weeks of age with, sepsis secondary to group B streptococcus, completing a seven day course of intravenous Ceftriaxone. He had a full septic work up at the time, with a clear cerebrospinal fluid (CSF) and a positive blood culture for Group B streptococcus. The peak CRP at that presentation was 92 mg/L, which normalised with a negative blood culture by the time he was discharged from hospital. His routine immunisations were therefore delayed.

On admission, apart from been miserable, there were no other significant findings on examination. He had a full septic work up which showed a CRP of 112 mg/L, white cell count 19 x 10^9/L, Neutrophil 13 x 10^9, lymphocyte 4.2 x 10^9 platelets 407 x 10^9, and a normal clotting profile. Examination of the CSF showed 29 polymorphs, 7 lymphocytes, 82 red cells, and no organisms were seen. The CSF culture as well as bacterial and viral PCR, were all negative, including the blood culture, urine culture, throat swabs and nasopharyngeal aspirate (NPA).

His fever settled after 48 hours and he remained well in the hospital. The repeat inflammatory markers normalized within 72 hours and he was discharged from hospital after completing 2 weeks course of ceftriaxone. His follow up was unremarkable.

DISCUSSION

In clinical trials, 51–61% of infants developed a fever over 38 °C after administration of 4CMenB with other routine infant vaccines [5]. This was attributed to the inclusion to the outer membrane vesicle (OMV) of the New Zealand MenB outbreak strain to the 4CMenB, making the vaccine very reactogenic, because of additional major and minor surface antigens [6]. Previous studies have shown some inflammatory response to vaccines [7], although the extent of this is unclear and post licensure, the rate

of fever, including local and systemic reactions following menB vaccination were found to be reduced in infants receiving paracetamol without significantly affecting the immune response to any of the vaccine antigen [7]. As a result, parents were advised to administer three doses of prophylactic paracetamol after primary immunisation, with the first dose given at the time of vaccination, followed by two additional doses at 4–6 h intervals [8]. Despite this recommendation, a number of studies have demonstrated increased accident and emergency attendance, increase hospital admissions and more invasive procedures such as venepuncture, lumber punctures and antibiotic use in the first 3 days after 4CMenB vaccination [3, 4, 9]. A number of studies have reported CSF pleocytosis following other condition in children, for example after generalised convulsion and benign migraine-like syndrome in children [10, 11], and following varicella and Influenza vaccination, but to our knowledge, there has never been a case published of CSF pleocytosis following meningococcal B vaccination [12, 13].

Although a causal relationship cannot be drawn, our case indicates a possible CSF inflammatory response to 4CMenB vaccination. This is particularly relevant as the National Institute for Health and Care Excellence on management guidance on fever in under 5s recommends lumbar puncture for all infants aged 1–3 months with fever who appear unwell [14]. Caution is therefore required in the interpretation of CSF findings in children post 4CMenB vaccination and antibiotics can be rationalised once blood and CSF findings are negative for bacterial infection.

MenB vaccination has been shown to be very effective in protecting children from meningococcal diseases, the aim of this publication is therefore not to discourage from 4CMenB vaccination in infants, but recommend that until a more and clearer guidance is available, parents, caregivers and health professionals should encourage the use of prophylactic paracetamol to reduce the rate of adverse events after 4CMenB vaccination, including fever.

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Conflicts of interest
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