Commentary: Opportunities to decrease mortality and long-term sequellae associated with meningococcal disease in Africa

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Epidemics of meningitis primarily due to Neisseria meningitidis serogroup A have posed a recurring public health challenge in countries in the Sub-Saharan African ‘meningitis belt’ for at least 100 years. In this region, sporadic infections occur in annual cycles with large-scale epidemics superimposed periodically. These epidemics frequently result in attack rates of 250 to 500 cases per 100,000 population, but rates can exceed 1,000 cases per 100,000 population (1%). In 1996, the largest recorded epidemic of meningococcal meningitis occurred in West Africa; more than 153,655 cases primarily from five African countries paralysed medical care systems and exhausted vaccine supplies.

Case-fatality rates from meningococcal disease in Africa are usually reported as 8–12%, but ill patients may not reach medical care and community studies have reported substantially higher mortality. In additional to substantial mortality, many survivors of meningococcal disease are left permanently impaired by hearing loss, loss of limbs or mental retardation but studies of the magnitude of these sequellae are scare, particularly in developing countries. The research by Hodgson et al. published in this issue of the International Journal of Epidemiology takes on the important but difficult task of assessing sequellae among patients with meningococcal meningitis. This study examined only patients with meningitis and did not evaluate patients with meningococcal meningitis who have significantly higher case fatality.

In the study by Hodgson et al., hearing impairment, diagnosed by audiology, was the major sequella and the only significant objective difference identified between patients with meningitis and controls. The rate of severe and moderate hearing loss at 1.6% was actually lower than has been reported in other studies of sequellae among survivors in developed countries. There is evidence that the hearing loss associated with bacterial meningitis improves with time so part of this difference may be explained by the timing of testing. Another explanation may rest in the unusual age distribution of patients in this study. During meningococcal epidemics, the age distribution shifts towards older age; however, most studies have reported at least 20% of patients less than one year of age. In this study, no patient was less than 2 years of age which may represent an ascertainment bias and could certainly impact the results.

Hodgson et al. evaluated psychiatric, neuropsychological and behavioural problems using a structured questionnaire. They did not use more sophisticated testing which may have limited their ability to detect differences in co-ordination, cognition and behaviour. However, these methodologies may be quite difficult to apply to this Ghanaian population. The increased symptoms of depression in cases compared to controls is interesting but the biases in this study make it difficult to draw conclusions. Finally, the authors did not find differences in employment, but in a community where more than 90% of controls report inadequate income, the importance of this finding is unclear.

Early detection of patients with subsequent prompt antimicrobial therapy and utilization of hearing devices may decrease mortality and the impact of long-term sequellae. The key, however, to long-term control and prevention of meningococcal disease in Sub-Saharan Africa is improved meningococcal vaccines. Conjugate meningococcal vaccines, similar to those used for Haemophilus influenzae type b (Hib) vaccines, provoke a T-cell dependent response, which induces a stronger immune response in infants, prime immunological memory, and lead to booster response to subsequent doses. These are expected to provide long-lasting immunity even when given as an infant series and may provide herd immunity through protection from nasopharyngeal carriage. A serogroup A-containing meningococcal conjugate vaccine has recently been chosen by the Research and Development Task Force of the Global Alliance on Vaccines and Immunizations (GAVI) as one of its three highest priorities for new vaccines and the Bill & Melinda Gates Foundation awarded US$70 million to develop, produce and deliver a serogroup A-containing meningococcal conjugate vaccine to the African ‘meningitis belt’. Rapid implementation of strategies incorporating serogroup A conjugate meningococcal vaccines is the surest way to halt the occurrence of epidemics and dramatically decrease the morbidity and mortality due to meningococcal disease in Africa.

References


