MULTICOMPONENT MENINGOCOCCAL SEROGROUP B VACCINE (4CMENB) MAY ELICIT FUNCTIONAL IMMUNITY AGAINST SEROGROUP A STRAINS

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BACKGROUND AND AIM

- 4CMenB vaccine (Bistem, GSK) is currently indicated for immunisation against invasive meningococcal disease caused by N. meningitidis serogroup B (MenB).
- However, genes encoding the 4CMenB vaccine antigens are also present and expressed in strains belonging to other meningococcal serogroups.²
- We have recently demonstrated that sera from infants immunised with 4CMenB were able to kill 109 out of 147 genetically diverse isolates (collected in Europe and Brazil) belonging to meningococcal serogroups C, W and Y.³

AIM OF THE STUDY: Adolescent sera taken after 4CMenB immunisation was tested to investigate the coverage against meningococcal serogroup A (MenA) strains.

Are antibodies raised by 4CMenB immunisation able to kill non-MenB strains?

4CMenB vaccine contains 4 antigens and is designed for broad coverage against MenB strains.

Sera derived from adolescents vaccinated with 2 doses of 4CMenB (NCT02212457) were tested in serum bactericidal antibody assay using human complement (hSBA) against a panel of strains representative of the current MenA epidemiology.

The strain panel was selected based on the frequency of genetic profiles (clonal complex and 4CMenB antigen typing) in a dataset of MenA isolates, collected in different countries between 2000-2016, and available in PubMLST database.

The majority of ST-5 complex strains have been isolated in Africa, while ST-1 complex strains are mostly present in Asia. Presence of MenA in Europe and USA is very low.

MATERIALS

Selection and characteristics of MenA strain isolates

- 1046 MenA isolates from PubMLST
  - All MenA strains were highly clonal
  - 20.8% of the total isolates belong to the ST-5 complex/subgroup III
  - 2.1% to the ST-1 complex/subgroup I/II
  - 77.1% of the total isolates are Other
  - Isolates belonging to ST-5 complex/subgroup III
    - carried the genes encoding for Hbp variant 1.5; NasA and PorA VR2 20
  - Isolates belonging to ST-1 complex/subgroup I/II
    - carried the genes encoding for Hbp variant 1.4 and PorA VR2 9
    - did not carry the NadA gene
  - Selection for hSBA testing
    - 3 strains from the ST-5 complex/subgroup III
    - 1 strain from the ST-1 complex/subgroup I/II

RESULTS

The percentage of MenA strains killed at hSBA titre ≥4* by adolescent post-immunisation sera ranged between 58.3% and 91.7%.

- The percentage of MenA strains killed at hSBA titre ≥4* by adolescent post-immunisation sera ranged between 45.8% and 83.3%.
- The percentage of adolescents with ≥4-fold rise in hSBA titres at 1 month post-dose 2 versus baseline ranged between 58.3% and 91.7%.
- The percentage of adolescents with ≥4-fold rise in hSBA titres at 1 month post-dose 2 versus baseline ranged between 45.8% and 83.3%.

CONCLUSIONS

- Sera from adolescents vaccinated with 4CMenB showed hSBA activity against MenA strains.
- These results further support the evidence that 4CMenB vaccination may have an impact on meningococcal disease caused by serogroups other than MenB.

References

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