Association of GBS-Alp proteins specific serum IgG antibodies and recto-vaginal GBS colonization and new acquisition among pregnant women in South Africa

Nisha Dhar[1,2], Gaurav Kwatra[1,2], Ziyaad Dangor[1,2,3], Alane Izu[1,2], Per Fischer [4], Bengt Johansson Lindbom[5], Shabir A. Madhi[1,2]

[1] South African Medical Research Council Vaccines and Infectious Diseases Analytics Research Unit, University of the Witwatersrand, South Africa, [2] Department of Science and Technology/National Research Foundation: Vaccine Preventable Diseases, University of the Witwatersrand, South Africa, [3]Department of Paediatrics & Child Health, Faculty of Health Sciences, University of the Witwatersrand, South Africa, [4] Minervax A/S, Ole Maaløes Vej 3, DK-2200 Copenhagen N, Denmark, [5] Immunology Section, Department of Experimental Medical Science, Lund University, Sweden

Introduction

- Mother to child transmission of Group B Streptococcus infections is associated with adverse GBS foetal outcomes and invasive disease in newborns.
- Widely distributed GBS surface proteins epitopes are being explored as vaccine candidates to prevent maternal GBS recto-vaginal acquisition and reduce the risk of GBS vertical transmission.
- This study investigated association of naturally induced serum IgG antibodies against the N-terminal domains of the GBS surface Alpha-like proteins (Alps) Rib and Alp1 (Rib-N and Alp1-N, respectively) with reduced risk of recto-vaginal GBS acquisition in pregnant women (Kwatra et al., 2014)

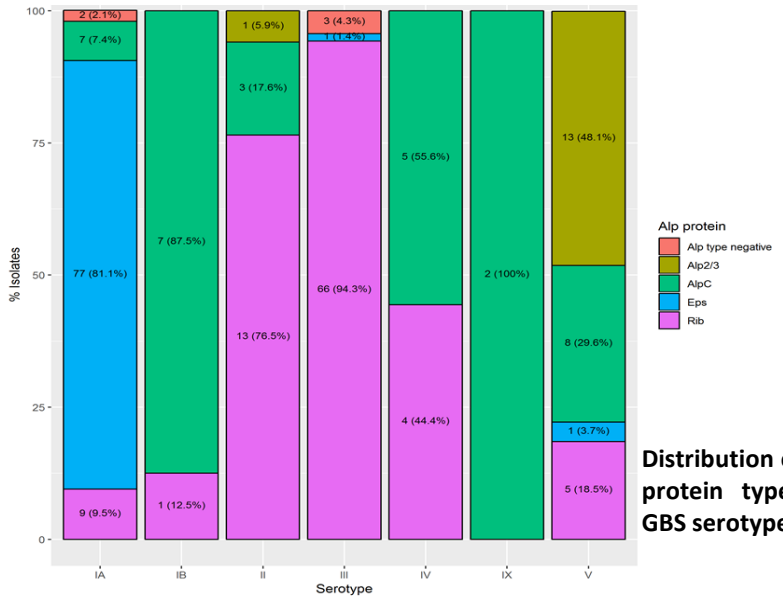
Method

- Pregnant women were evaluated for recto-vaginal colonisation every 4–5 weeks from 20-25 weeks of gestation using standard culture methods at five to six weekly intervals until 37+ weeks.
- Serum Rib-N and Alp1-N specific IgG concentrations were measured by ELISA at 20-25 weeks.
- Alp protein typing on the GBS isolates was performed by PCR for Alp 1(Epsilon), Rib, Alp C, Alp 2/3 with primers that target the specific genomic regions for Epsilon, Rib, Alp C, Alp 2/3 at Staten serum institute, Denmark.

Reference

Kwatra G, Adrian PV, Shiri T, Buchmann EJ, Cutland CL, Madhi SA. Serotype-specific acquisition and loss of group B streptococcus recto-vaginal colonization in late pregnancy. PloS one. 2014;9(6):e98778.

Results



Distribution of Alp protein types by GBS serotype

Geometric mean concentration (GMC) of Alp1 and Rib antibody (ng/ml) in women who were colonized and not colonized by the Alp type at visit-1.

Alp type	Colonized	Not Colonized	p-value [a]
Alp 1	255.45 (202.71-321.9) n=79	168.32 (154.28-183.63) n=525	0.001
RIb	95.86 (77.65-118.34) n=97	61.97 (56.54-67.91) n=516	<0.001

[a] p-value using t-test to compare the mean of the log antibody concentrations between persistent and clearance groups

Results

Geometric mean concentration (GMC) of EPS and Rib antibody (ng/ml) in women who remain non- colonized and acquired homotypic serotype

Alp type	New-acquisition	Non-colonized	p value [a]
Rib	57.78 (43.32-77.08) n=52	60.82* (54.43-67.95) n=362	0.741
Alp 1	108.41 (81.73-143.79) n=31	177.58* (160.89-196.01) n=382	0.002
Rib	57.78 (43.32-77.08) n=52	61.4** (53.89-69.95) n=259	0.702
Alp 1	108.41 (81.73-143.79) n=31	178.4** (158.86-200.36) n=259	0.002

[a] p-value using t-test to compare the mean of the log antibody concentrations between new acquisition and non-colonized
*Non-colonised with homotypic Alp type
**Non-colonised with any GBS

Conclusion and Discussion

- Alp1-N specific IgG GMC was significantly lower among women who had new acquisition of Alp1 type colonisation compared to women who remained non-colonised with the homotypic Alp type or any GBS type. No Association of Rib-N specific IgG and homotypic Rib new acquisition was observed.
- A GBS vaccine designed to induce sufficient maternal antibodies to the N-terminal domain of the Alp1 protein could reduce GBS acquisition and subsequently lower vertical transmission to the foetus/newborns, hence, decreasing the risk of invasive GBS disease among neonates.

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