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Fluctuation of Group B *Streptococcus* colonization rates in pregnant women according to COVID-19 pandemic-related events in Brazil

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Abstract

Group B *Streptococcus* (GBS) is a leading cause of perinatal infections. GBS can be found in the genitourinary and gastrointestinal tract of up to 40% of pregnant women, being the main source for transmission to newborns. We have recently shown that after COVID-19 pandemic onset GBS colonization rates significantly decreased in our setting, dropping from 13.8% between Jan 2019-Mar 2020 to 5.3% between May 2020-Mar 2021 (Costa *et al*., 2022). Here we aimed to expand the analysis timeframe and determine GBS colonization rate among pregnant women attended at a maternity in Rio de Janeiro, Brazil considering scenarios before (Jan 2019-Mar 2020; 521), after the pandemic onset (May 2020-Jun 2021; 360) and after introduction of COVID-19 vaccine and relaxation of non-pharmaceutical interventions (Jul 2021-Aug 2022; 436). Anovaginal samples (1317) were streaked onto chromogenic media and colonies were identified by MALDI-TOF MS. GBS strains had susceptibility profiles determined according to CLSI and serotypes determined by latex agglutination. Overall, GBS was detected in 10.3% of anovaginal samples. Although GBS colonization rate significantly decreased from before to after the pandemic onset (13.8% before vs 5% after; p<0.0001), rates significantly increased again in the third period (5% vs 10.5%; p=0.004), when COVID-19 vaccines were introduced and non-pharmaceutical interventions were relaxed. Overall, all strains were susceptible to penicillin, vancomycin and levofloxacin, while 83.2%, 17.8% and 8.4% were non-susceptible to tetracycline, erythromycin and clindamycin respectively, and despite no difference (p>0.05) was detected between the three scenarios, increasing trends of resistance to these antimicrobials were observed. In general, serotype Ia was the most frequent (34.6%), followed by serotypes V (25.3%), II (15.9%), III (12.1%), Ib (5.6%), IV (0.9%), VIII (0.9%), and 4.7% non-typeable. Comparing the three different scenarios, serotype Ia significantly decreased in the third scenario (p=0.005), while serotype V increased during pandemic, being the most detected serotype in the third scenario. These results indicate that fluctuations in GBS colonization rates coincided with pandemic-related events in our setting, suggesting that non-pharmaceutical interventions and changes in clinical practices due to the pandemic may have also been impacting other infectious diseases.

Background and aims

- GBS is recognized as a leading cause of perinatal diseases since the 1960's.
- Pregnant women are the main source for newborn colonization since GBS can be found in the anovaginal tract of up to 40% of this population.
- After the onset of COVID-19 pandemic, GBS colonization rates significantly decreased in our setting (Costa *et al*., 2022).

Here we expanded the analysis timeframe and determined GBS colonization rate among pregnant women in Rio de Janeiro, Brazil considering scenarios before, after the pandemic onset and after introduction of COVID-19 vaccine and relaxation of non-pharmaceutical interventions.

Methods

Study population and clinical samples

- 1317 anovaginal specimens were obtained from pregnant women between the 35th and 37th gestational weeks attended at the Teaching Maternity of UFRJ during routine antenatal care.
- Specimens were collected using a combined swab method according to CDC recommendations (2010).
- Clinical samples were divided into pre- (Jan 2019 to Mar 2020; n=521), after pandemic onset (May 2020 to Jun 2021; n=360) and after introduction of COVID-19 vaccine and relaxation of non-pharmaceutical interventions (Jul 2021 to Aug 2022; 436).

Detection, isolation and characterization of GBS

Selective broth (Todd-Hewitt broth with nalidixic acid 15 µg/mL and gentamicin 8 µg/mL)

CHROMagar™ Strep B

MALDI-TOF MS (Bruker Microflex LT)

Latex agglutination kit (Immulex Strep B, SSI Diagnostica)

Disk diffusion test (CLSI guidelines, 2021)

Results

- ✓ GBS was detected in 10.3% of anovaginal samples.
- ✓ Although GBS colonization rate significantly decreased from before to after pandemic onset (13.8% before vs 6.3% after; p<0.0001), rates significantly increased again in the third period (5% vs 10.5%; p=0.004), when COVID-19 vaccines were introduced and non-pharmaceutical interventions were relaxed.
- ✓ No difference (p>0.05) in clinical and sociodemographic data of the study population was detected between different scenarios.

Results

- ✓ Serotype Ia was the most frequent, followed by serotypes V, II, III, Ib IV and VIII (Figure 1).
- ✓ Comparing the three different scenarios, serotype Ia significantly decreased in the third scenario (p=0.005), while serotype V increased during pandemic, being the most detected serotype in the third scenario.(Figure 2).

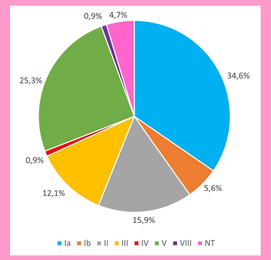

Figure 1: Overall distribution of GBS Serotypes

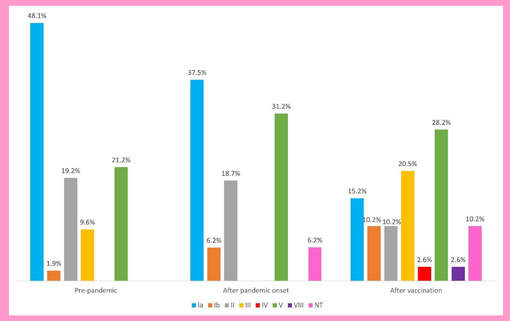

Figure 2: GBS serotypes distribution between the three analyzed scenarios

- ✓ Non-susceptibility was detected for tetracycline, erythromycin and clindamycin (Figure 3).

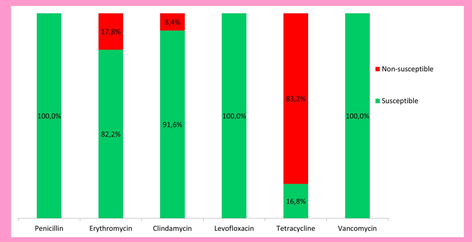

Figure 3: Susceptibility profile of GBS strains

Results

- ✓ Despite increasing trends of resistance were observed after the onset of pandemic, no difference (p>0.05) between three different scenarios was observed (Figure 4).

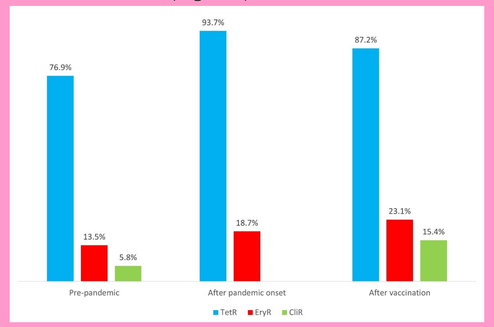

Figure 4: GBS resistance between the three analyzed scenarios

Conclusions

- GBS colonization rate decreased after the pandemic onset and increased after introduction of COVID-19 vaccine and relaxation of non-pharmaceutical interventions;
- These results indicate that fluctuations in GBS colonization rates coincided with pandemic-related events in our setting, suggesting that non-pharmaceutical interventions and changes in clinical practices due to the pandemic may have also been impacting other infectious diseases;
- Continuing GBS surveillance among pregnant women in Brazil is needed.

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