GENITAL GROUP B *STREPTOCOCCUS* CARRIAGE IN THE ANTENATAL PERIOD: ITS ROLE IN PROM AND PRETERM LABOUR

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ABSTRACT

Of 326 high vaginal swabs taken during the antenatal period, Group B Streptococcus (GBS) was isolated from the birth canal in 46 women, giving a carrier rate of 14.1%, which is within the often quoted range of between 5% – 25% in different parts of the world. Carriage rates were similar at different gestations.

In a subgroup of 34 women, 2 swabs taken at least 5 weeks apart yielded results which were discordant in over one fifth of the time. This knowledge of the natural history of GBS carriage questions the practice of treating asymptomatic carriers of GBS in the antenatal period to prevent transmission of GBS to the neonate.

The group of women with positive swabs in the antenatal period did not have a significantly higher incidence of preterm labour and / or prelabour rupture of membranes (PROM) compared with the group of women with negative swabs. Routine screening of the antenatal population for GBS carrier status prior to 32 weeks gestation may not identify women at high risk of PROM or preterm labour.

Keywords: *antenatal screening, vaginal carriage of group B streptococcus, lack of persistence of carriage, preterm labour, prelabour rupture of membranes (PROM)*

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INTRODUCTION

Group B *Streptococcus* (GBS) accounts for 1 in 5 cases of postpartum endometritis and 20% of cases of bacteremia following caesarean section[1]. In some studies, GBS has been implicated in the aetiology of preterm birth and prelabour rupture of membranes (PROM)[2-5]. The organism has, over the last decade, become the most frequent cause of overwhelming infection in the newborn[6] and GBS septicaemia in the new born appears to be directly related to the degree of colonisation of the maternal genital tract[7] . The majority of infections are severe, and approximately 20% - 25% are fatal[1]. Maternal GBS carriage is generally asymptomatic. The colonisation rate of GBS shows both geographic and individual variability. Thus observations in each population cannot be generalised elsewhere.

In this study, we set out to identify the incidence of GBS in the general obstetric population. We also attempted to evaluate the relationship, if any, between PROM and preterm labour and colonisation of the lower genital tract with GBS.

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PATIENTS AND METHODS

A total of 326 women were admitted into the study between January 1992 and March 1993. These were women under 32 weeks amenorrhea who attended the general obstetric clinic at the National University Hospital, and who consented to have the swabs taken. No other selection criteria were applied and we did not stratify them according to age or socioeconomic group. Forty-three patients were in the first trimester, 208 patients were in the second trimester, and 75 were in the third trimester between 29 and 32 weeks of amenorrhoea. A high vaginal swab (HVS) was taken at the antenatal visit, and the swab was placed in Amies transport medium without charcoal (Copan, Italy), and sent to the laboratory and plated within 4 hours.

In 34 women, a second HVS was performed at a different trimester in pregnancy, but at least 5 weeks from the first swab. Every 10th woman in the group who had the first swab performed was selected for a second HVS.

The HVS was taken from the posterior fornix using a speculum with a non-bacteriostatic lubricant. The swabs were placed in Stuart's transport media for transport to the laboratory. The swabs were cultured on horse blood agar at 35°C in carbon dioxide and the isolates were identified by latex agglutination tests (Streptex ZL 50 Murex Diagnostics Limited).

The results of the culture and sensitivity studies from the HVS were not revealed to the clinician or the patients. The pregnancy and labour outcome of 279 patients were studied retrospectively; 47 (16.8%) patients were lost to follow-up.

In this study, PROM was diagnosed if rupture of membranes occurred more than 2 hours prior to onset of regular painful contractions. Preterm labour was defined as the onset of labour prior to 36 weeks amenorrhoea. Statistical analysis was performed using chi-square tests.

RESULTS

Of the 326 HVS taken, GBS was isolated from the birth canal in 46 women, giving a GBS carrier rate of 14.1% in the antenatal period.

When the incidence of GBS was analysed according to gestation at which the swab was taken (Table I), the incidence of GBS colonisation was 16.3% (7/43) in the first trimester, 13.5%

(28/208) in the second trimester and 14.7% (11/75) in the third trimester.

Table I – Incidence of GBS carriage in the antenatal population

Gestation (weeks)	Total no. HVS cultured	No. of +ve cultured	Carriage rate (%)
≤ 12	43	7	16.3
13 – 28	208	28	13.5
29 – 32	75	11	14.7
Total	326	46	14.1

GBS : Group B Streptococcus
HVS : High vaginal swab

Of the subgroup of 34 women in whom 2 swabs were taken at least 5 weeks apart, 25 had similar results in both swabs; in 24 GBS was not isolated in both swabs, and in one GBS was isolated in both antenatal swabs. In 6 women, no GBS was isolated in the first swab, but culture of the second swab isolated GBS (Table II). In 3 women, the first swab isolated GBS, but the second swab was negative. None of these 3 women received antibiotics based on the results of these HVS or for other reasons.

Table II – Longitudinal study of vaginal flora in 34 patient

Culture results of 1st -------> 2nd swab	No.
– / –	24
– / +	6
+ / –	3
+ / +	1

*Note: swabs were taken at least 5 weeks apart

In 40 women who had been colonised with GBS in the antenatal period, 4 (10%) had preterm labour or PROM. In the 239 women in whom GBS was not isolated in the antenatal period, 34 (14.2%) had preterm labour or presented with PROM (Table III).

Table III – Incidence of preterm labour and prelabour rupture of membranes in mothers colonised with GBS

HVS culture	Preterm labour/ PROM*		Spontaneous labour at term	Total
GBS +ve	2 (5%)	2 (5%)	36 (90%)	40 (100%)
GBS -ve	22 (9%)	12 (5%)	205 (86%)	239 (100%)

PROM: prelabour rupture of membranes
GBS : Group B *Streptococcus*; +ve = present; -ve = absent
HVS : High vaginal swab

DISCUSSION

The incidence of GBS colonisation was 14.1% in our antenatal population. This is within the often quoted range of between 5% - 25%[6] in different parts of the world. The wide variation of incidence depends on the population, the site, and the number of sites sampled. The culture techniques used to isolate an organism will also influence the incidence[8]. Carriage rates in this study were similar at different gestations, and are similar to the pattern of prevalence of GBS previously reported in other centres outside Singapore[8,9]. In this screening exercise, we used a single HVS and a non-selective transport medium and non-selective solid culture medium. It has been reported that this method may diminish the detection of GBS vaginal colonisation by 50% or more[10]. However selective, broth medium used specifically for diagnosis of GBS may not promote the growth of other organisms and would not be cost effective or appropriate for use in screening a low risk population such as this.

In the longitudinal study of 34 women (Table II), 20% of the 30 women who had initially negative culture had acquired the organism 5 weeks later. In 75% of the 4 women in whom GBS was isolated in the initial culture, the bacteria was not isolated in the second culture. This discrepancy is unlikely to be due to the swab taking or culture techniques as the same methodology was used both times. Although numbers are small, it confirms the lack of persistence of carriage of GBS which has been found in populations screening elsewhere[6,7,11,12]. This knowledge of the natural history of GBS carriage questions the practice of treating asymptomatic carriers of GBS in the antenatal period to prevent transmission of GBS to the neonate. Treatment may be unnecessary in the asymptomatic woman who has no rupture of membranes. Screening of the entire antenatal population prior to 32 weeks amenorrhoea will fail to identify some women who subsequently become colonised and will also result in unnecessary antibiotic therapy of women who will no longer be colonised at delivery. Hence screening and treatment for maternal GBS has fallen into disfavour in many centres[10].

It has been shown that early onset GBS septicaemia may be prevented by administering ampicillin during labour and delivery to women colonised with GBS[13,14]. Screening of high risk women (eg PROM, preterm labour and a past history of GBS colonisation in the mother or neonate) for GBS vaginal colonisation early in labour, and subsequent selective administration of antibiotics would perhaps be more cost effective in bringing down the incidence of GBS infection in the neonate rather than a routine antenatal screening programme. Rapid test kits are commercially available which give reliable results in the presence of heavy colonisation with GBS[15]. The sensitivity of the tests depends in part on whether it is expected to identify all colonised patients or just those with heavy colonisation. Sensitivities of the various tests in use vary from 40% to 91.7%. Specificities range from 93% - 99.6%. More importantly, the negative predictive values in most of these tests are reported to be above 93%[15]. Such tests used in high risk women may help in identifying the women and neonates at risk and to offer them treatment.

Some investigators have found an association between GBS carriage in the vagina in the antenatal period and increased incidence of preterm labour and/or PROM[2,3,16]. Others have not found this association[17-19]. In this study, the group of women with negative swabs had a higher incidence of preterm labour and PROM although this difference was not statistically significant (Table III). Thus routine screening of the antenatal population for GBS carrier status prior to 32 weeks gestation did not identify the women at high risk of premature labour or PROM. Even if GBS carriers were treated with antibiotics in the antenatal period prior to 32 weeks amenorrhoea, it may not prevent recolonisation.

Based on the results of this study, performing HVS on all pregnant women in our antenatal population appears to be unnecessary, and may cause unnecessary anxiety to the mother. If such a policy is implemented, 15% of asymptomatic pregnant women would require treatment with antibiotics, potentially leading to problems to resistance or adverse reactions, with little benefits in terms of decreasing the incidence of premature labour, PROM, or the incidence of neonatal sepsis.

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