

ORIGINAL STUDY

Evaluation of the Universal Screening Strategy in Qatar for the Management of Pregnant Women Carrying Group B Streptococci

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Abstract:

Group B Streptococcus infection (GBS) has emerged as a serious disease, infecting 18,000 people in the United States annually including life-threatening illness in about 8,000 newly-born infants. To evaluate the efficiency of the current universal screening strategy for the management of GBS carriers a retrospective analysis was made of the records of 1,620 pregnant women in Qatar, 550 of whom were found to be carriers. These latter were then used as a group to be compared with 450 uninfected pregnant women in terms of nationality, parity, age, treatment, and outcome. Young and nullipara pregnant women had a high incidence of GBS but there was no significant effect on birth mortality and morbidity regardless of whether or not they received treatment with antibiotics. It is suggested that the cost of screening for GBS at the 35th week of gestation cannot be justified.

Keywords: Group B Streptococci, Pregnancy, Qatar

Introduction:

Since 1970 Group B Streptococcus infection (GBS) has emerged as a serious disease, infecting 18,000 people in the United States annually including life-threatening illness in about 8,000 newly-born infants where the mortality from neonatal sepsis can be as high as fifty per cent when not treated^(1,2). The organism (defined by its cell wall antigenicity) can also cause disease in pregnant women, the elderly, and secondarily in adults with other illnesses especially those with weakened or compromised immune systems⁽³⁾ although many people carry Group B streptococcal bacteria in their genital, urinary and gastro-intestinal tracts without developing infection or illness⁽⁴⁾.

The genital tracts of about 10% to 30% of pregnant women are harmlessly colonized with Group B streptococci but fatal infections occur if the bacterium is able to invade the blood-

stream. More frequently, pregnant women carriers can infect the newborn child before or during delivery. The cause of late-onset disease in babies is not well understood⁽⁵⁾ but Group B streptococcal infection is the most common cause of sepsis and meningitis and a common cause of pneumonia in newly-born infants⁽⁴⁾. Most cases of Group B streptococcal infection in newborns can be prevented by giving pregnant women carriers intravenous antibiotics during labor although antibiotic treatment before labor does not prevent infection⁽⁶⁾.

The aim of this study was to determine the prevalence of GBS in Qatar and its effects upon newborns and to provide recommendations on the efficiency of the current universal screening strategy for the management of pregnant women colonized with the bacteria.

Materials and Methods:

The records were reviewed retrospectively of 1,620 pregnant women who attended Hamad Medical Corporation's Women's Hospital, Doha, Qatar, between the 1st January and 30th June 2003. At that time vaginal and ano-rectal swabs and urine samples were taken at 35 weeks of gestation from all pregnant women and were cultured for the presence of GBS. Five hundred and fifty women (34%) were positive for the presence of GBS and formed our Group 1; of these, 109 women had received no antibiotic treatment, the remaining 441 had been treated with various antibiotic regimes. A control Group 2 was formed of 450 randomly chosen pregnant women screening negative for GBS.

Data collected included maternal age, nationality, parity, blood pressure, body mass index, other diseases, family history, previous obstetric history, history of previous infection for mother and baby and investigations in previous pregnancy (diabetes, CBC, vaginal swab, urine culture, presentation, rupture of membrane) and any antibiotic treatment plus prenatal outcome information on sex, weight, mode of delivery, week of delivery, malformation, Apgar score and admission to Neonatal Intensive Care Unit (NICU). The data were analyzed with SPSS statistical software at the Medical Statistic Department of Hamad Medical Corporation by descriptive statistics, crosstab and Chi-square Tests.

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The Results:

Of 1,620 women screened for GBS between January 2003 and June 2003, five hundred and fifty pregnant women were found to be GBS carriers (34 %) and formed Group 1. A control Group 2 was formed from 450 pregnant women screened negative for GBS. Comparisons between GBS carriers and controls were made according to nationality, maternal age, parity, various investigations, delivery, treatments and outcomes.

There was no significant relationship between nationality and GBS disease (p=0.052), the incidence of Qatari and Non-Qatari groups being almost the same (Figure 1). The incidence of GBS disease was significantly higher at 20-30 years of age (p=0.03) (Figure 2). In both groups most of the women were pregnant for the first time and there was a significant relationship between the parity and GBS disease (p=0.020) (Table 1). Seven per cent of the women had a previous history of GBS infection and had been treated with antibiotics, 6.5% with ampicillin and 0.5% with erythromycin.

The latest pregnancy showed a high incidence of leukocytosis (49.5%), anemia (28.7%) and diabetes (17.3%) (Figure 3). At the 35th week of gestation most of the cases were checked by low vaginal swab (80.7%) or high vaginal swab (19.3%) (Figure 4). Urine cultures from patients diagnosed as positive for GBS on vaginal swabbing were negative in 93.6% and positive in 6.4% cases (Figure 5).

Table 1: The relation between the parity and GBS disease

Parity	Groups		Chi Square Test Fisher's Exact Test 2 Sided
	CBS Carrier	Control	
0	72.3%	73.3%	0.020*
1 - 2	15.4%	13.3%	
3 - 5	8.7%	10%	
> 5	3.6%	3.4%	

Most GBS cases received one dose of ampicillin (66.8%), 11.4% were given two doses and 0.5% were given three doses of ampicillin. Others (1.5%) were given one dose of erythromycin as they were ampicillin sensitive; 19.8% of GBS carriers did not take any antibiotic (Figure 6).

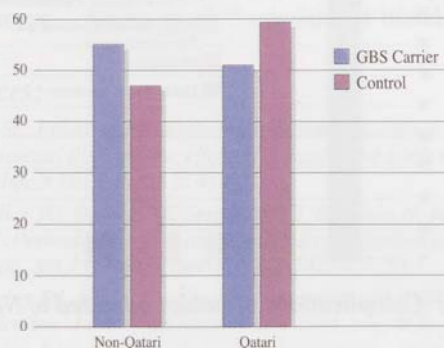


Figure 1: Nationality

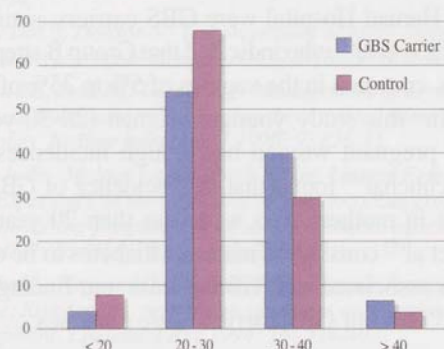


Figure 2: Maternal Age

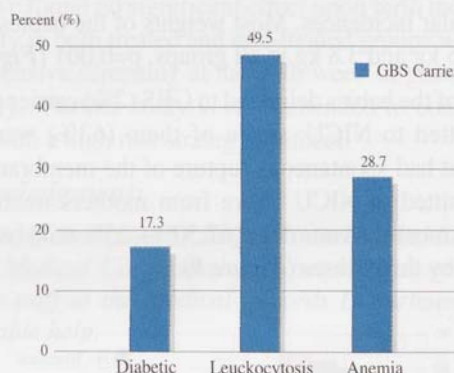


Figure 3: Investigation in the latest pregnancy

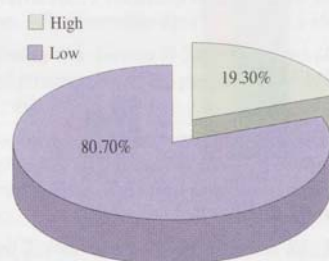


Figure 4: Vaginal swabs

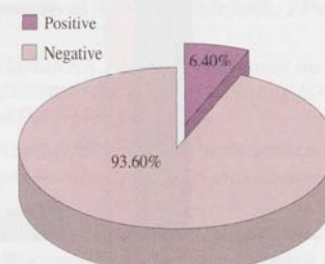


Figure 5: Urine culture

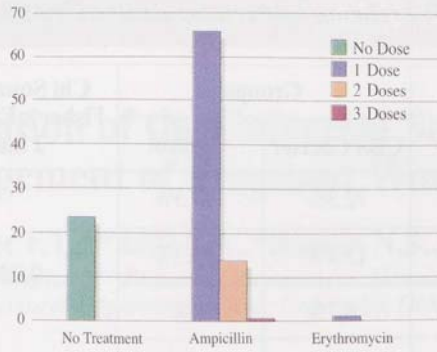


Figure 6: Intravenous antibiotic treatment

There was no significant relationship between the modes of delivery in the three treated, untreated and control groups as most of the women delivered normally. The incidence of lower cesarian section (LSCS) was slightly higher in the untreated group (Figure 7). There was no significant relationship between the gender of the newborn and GBS disease; males and females having similar incidences. Most weights of the babies ranged between 2.5 kg and 3.8 kg in all groups, p=0.001 (Figure 8).

Eleven of the babies delivered to GBS (2%) carrier mothers were admitted to NICU; seven of them (63%) were from mothers that had spontaneous rupture of the membranes. All babies admitted to NICU were from mothers treated with ampicillin, most with one dose (62.50%), 25% with two doses and 12.5% by three doses (Figure 9).

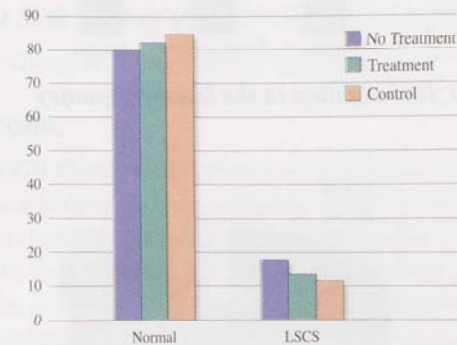


Figure 7: Mode of delivery

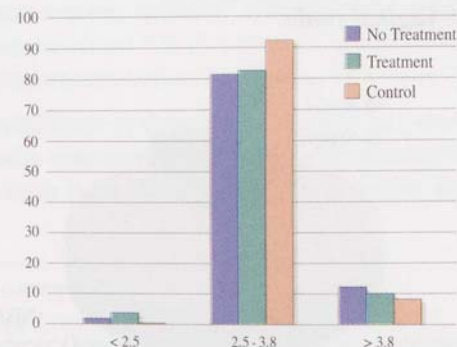


Figure 8: Weight of babies

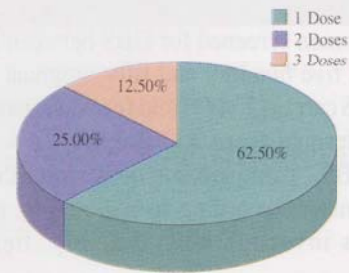


Figure 9: Dosage were given to GBS carrier mothers (their babies admitted to NICU)

All 11 newly born babies admitted to the NICU had pneumonia (100%), two (18%) had bilateral spontaneous pneumothorax, two (18%) had neonatal jaundice, one (9%) had hypoglycemia, sepsis ruled out and thrombocytopenia, and another one (9%) had severe complications of meningitis with blood culture positive for *Streptococcus pneumoniae*. One baby (9%) was late sequence of Dandy-Walker syndrome (Figure 10). All other babies recovered completely with an average stay in NICU of six days. In NICU, as routine, all babies were given eye wash five times a day and 50% of babies were given ampicillin (200-250.000 mg) as prophylaxis five times a day for about five days.

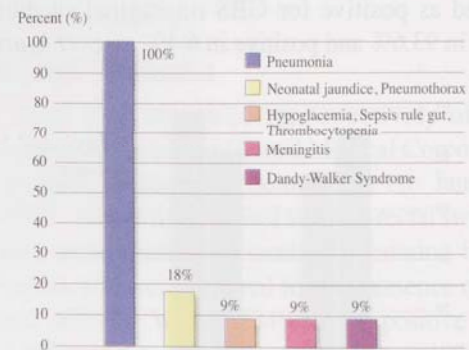


Figure 10: Complications of babies admitted to NICU

Discussion:

At the time of this study, it was found that 34% of pregnant women at Hamad Hospital were GBS carriers, similar to the study of Szabo et al⁽⁷⁾ who indicated that Group B streptococcus (GBS) was common in the vaginas of 5% to 35% of pregnant women. In this study younger women (20-30 years) and nulliparas pregnant women had a high incidences of GBS disease; Schuchat⁽⁸⁾ found that the incidence of GBS disease was higher in mothers who were less than 20 years of age. Schwartz et al⁽⁹⁾ considered maternal diabetes to be one of the risk factors associated with GBS disease; our findings support this as 17.3% of our GBS carriers were diabetics.

We found that 49.5% of GBS pregnant women had leukocytosis, but all of them had a normal platelet count. This

nearly agrees with the study by Miura et al⁽¹⁰⁾ who found a left shift with a platelet count rarely less than 100,000 per mm³.

The screening for GBS vaginal carriage at 35 weeks of gestation for all pregnant women by vaginal, anorectal and urine cultures was similar to that of Bloom & Ewing⁽¹¹⁾ who found the vagina and anorectal areas most commonly colonized by GBS. The use of intravenous antibiotics (mainly ampicillin) was in agreement with Pinto et al⁽¹²⁾, who suggested four strategies for the prevention of early neonatal group B streptococcal (GBS) sepsis: A) routine antenatal screening for GBS vaginal carriage at 26-28 weeks' gestation followed by intrapartum antibiotic prophylaxis for all carriers; B) screening as above but prophylaxis only for carriers with risk factors for sepsis; C) prophylaxis for all women with risk factors; D) as for C plus screening at 37 weeks' gestation and prophylaxis for carriers. At Hamad Hospital erythromycin is used as treatment for mothers with ampicillin allergy although Fiore-Mitchell⁽¹³⁾ considered cefazolin a better alternative to erythromycin for patients with a non-anaphylactic penicillin allergy.

In this study the weight of most neonates (62.5%) admitted to the NICU was within the normal range (2.5-3.8 kg) in contrast to the findings of Pass et al⁽¹⁴⁾ and Cochi & Feldman⁽¹⁵⁾ where most neonates from GBS cases were underweight.

As reported by Pass et al⁽¹⁶⁾ we also found pneumonia to be the most common presentation in infants who developed symptoms during the first seven days of life. All suffered pneumonia, some with pneumothorax or bilateral spontaneous pneumothorax.. Miura et al⁽¹⁰⁾ considered blood and CSF

cultures appropriate for early and late-onset sepsis neonates but WBC counts and ratios were more sensitive in determining sepsis although normal WBC counts might be observed in culture-proven sepsis in as many as 50% of cases. Infants who were not infected might also have abnormal WBC counts related to the stress of delivery.

Our data showed that all babies admitted to NICU were from mothers treated with ampicillin at the time of delivery. In contrast babies were in good health from the mothers who had received no treatment. Siegel et al⁽¹⁷⁾ observed no differences between treated and untreated groups in either the incidence of early or late onset GBS disease or in mortality of the neonate. Baker⁽⁴⁾ estimated the case-fatality rate for GBS disease to be 5%-20% for newborns although the data from our study shows no significant effect on mortality in both treated and non-treated groups of newborns.

Conclusion and Recommendations:

As we found no significant effect upon birth mortality and morbidity in both treated and non-treated groups we consider that expensive screening at the 35th week of gestation is unnecessary. Further study is recommended to compare these results with a high risk strategy protocol.

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