Group B Streptococcus (Streptococcus agalactiae) Screening During Pregnancy

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Abstract

Background: An audit trial was conducted to review our practice of Universal GBS screening for our pregnant patients and its effect on fetal outcome.

Methods: In this descriptive study, all the patients attending antenatal clinic had their GBS swab performed between 35-37 weeks of pregnancy. Patients were informed about their GBS status on next visit and advised to attend early in labour or in case of rupture of membranes for administration of intra-partum antibiotic prophylaxis. One dose of Benzathine Penicillin 3 mu within 2 hours of delivery to reduce the risk of early onset Group B Streptococcus agalactiae infection. Blood cultures were drawn in all the babies with GBS positive mothers. The cost effectiveness of the screening and treatment were studied by checking for the cost according to the hospital stores department of swab, culture and cost of medication to the patients during this period.

Results: There was a total of 2405 deliveries during this period. Two hundred and nine cases were GBS positive. Intrapartum antibiotic prophylaxis [IAP] was given to 48 patients while 161 did not receive any treatment. All the babies had no growth on blood culture.

Conclusion: The cost involved in the GBS swab, culture and its treatment clearly indicate that the practice is not cost effective. In view of our audit we have to reconsider our practice of universal screening changed to high risk patient screening only.

Key Words: Group B streptococcus, Intra partum antibiotic prophylaxis.

Introduction

Group B streptococcus (Streptococcus agalactiae) (GBS) is considered as a frequent cause of severe early onset (EOGBS) (at less than 7 days of age) infection in newborn infants with increased fetal morbidity and mortality.1,2 There has been controversy regarding prevention of GBS. While in U.S.A and Canada there is universal screening for GBS, in U.K there is screening for high risk patients only. On comparison there is not much difference in the incidence of EOGBS in both countries which is 0.5/1000 births while the vaginal carrier state which is around 25% is comparable in these communities.3,4

The Cochrane Database of Systematic Reviews, DARE, EMBASE, Medline and PubMed (electronic databases) were searched for relevant randomised controlled trials, systematic reviews and meta analysis.5,6 The search was restricted to articles published between 2003 and August 2011 concluded that, while intra-partum antibiotic prophylaxis (IAP) for colonized mothers reduced the incidence of EOGBS disease, it has not been shown to reduce mortality or GBS-related mortality. Routine antenatal screening and treatment have disadvantages for the mother and baby. These include anaphylaxis, increased medication during labour and the neonatal period, and possible infection with antibiotic-resistant organisms, particularly when broad spectrum antibiotics such as amoxicillin are used for prophylaxis.

Patients and Methods

In this descriptive study patients who had attended the labor ward at Tawam Hospital, were included. The
inclusion criteria were all antenatal patients who presented in labor during the period between April 2009 till October 2009. All the patients attending antenatal clinic had their GBS swab performed between 35-37 weeks of pregnancy. Patients were informed about their GBS status on next visit and advised to attend early in labour or in case of rupture of membranes for administration of intra-partum antibiotic prophylaxis. One dose of Benzathine Penicillin 3 mu within 2 hours of delivery to reduce the risk of early onset Group B Streptococcus agalactiae infection. Blood cultures were drawn in all the babies with GBS positive mothers. The cost effectiveness of the screening and treatment were studied by checking for the cost according to the hospital stores department of swab, culture and cost of medication to the patients during this period.

Results

Total number of deliveries was 2405 and GBS positive mothers was 209. The carrier state of GBS in pregnant patients in this time period was 9%. When considering the patients who were treated with IAP it is important to note that the majority were untreated in all these months. Only 48(23%)) patients received treatment with IAP, while 161(77%) patients did not receive any IAP which is 77%(Table 1). When Blood culture was performed on the babies of these GBS positive mothers irrespective of the fact whether they had received IAP or not, none of the babies had a culture growth positive for GBS.

Table 1: Overview of Group B streptococcus positive patients

<table>
<thead>
<tr>
<th>Month</th>
<th>Total No of Deliveries</th>
<th>Total No of GBS Pts</th>
<th>Treated</th>
<th>Untreated</th>
<th>% of Treated</th>
<th>% of Untreated</th>
<th>Blood cultures positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>APRIL</td>
<td>385</td>
<td>38</td>
<td>6</td>
<td>32</td>
<td>16%</td>
<td>84%</td>
<td>0</td>
</tr>
<tr>
<td>MAY</td>
<td>374</td>
<td>28</td>
<td>7</td>
<td>21</td>
<td>25%</td>
<td>75%</td>
<td>0</td>
</tr>
<tr>
<td>JUNE</td>
<td>378</td>
<td>29</td>
<td>5</td>
<td>24</td>
<td>17%</td>
<td>83%</td>
<td>0</td>
</tr>
<tr>
<td>JULY</td>
<td>430</td>
<td>45</td>
<td>11</td>
<td>34</td>
<td>24%</td>
<td>76%</td>
<td>0</td>
</tr>
<tr>
<td>AUGUST</td>
<td>371</td>
<td>43</td>
<td>14</td>
<td>29</td>
<td>33%</td>
<td>67%</td>
<td>0</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>396</td>
<td>25</td>
<td>5</td>
<td>20</td>
<td>20%</td>
<td>80%</td>
<td>0</td>
</tr>
<tr>
<td>OCTOBER</td>
<td>71</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2405</td>
<td>209</td>
<td>48</td>
<td>161</td>
<td>23%</td>
<td>77%</td>
<td>0</td>
</tr>
</tbody>
</table>

Maximum number of GBS positive patients who delivered were 45 in the month of July while minimum was 1 in the month of October. The maximum number of 14 patients was treated for GBS with IAP were in the month of August, while minimum number of 5 patients was treated for GBS with IAP in the month of June. The overall patients who received IAP was 32% (Table 2).

Table 2: Group B Streptococcus during pregnancy and intra-partum antibiotic prophylaxis

<table>
<thead>
<tr>
<th>Month</th>
<th>Total GBS + patients</th>
<th>Treated</th>
<th>Untreated</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>38</td>
<td>06</td>
<td>32</td>
</tr>
<tr>
<td>May</td>
<td>28</td>
<td>07</td>
<td>21</td>
</tr>
<tr>
<td>June</td>
<td>29</td>
<td>05</td>
<td>24</td>
</tr>
<tr>
<td>July</td>
<td>45</td>
<td>11</td>
<td>34</td>
</tr>
<tr>
<td>August</td>
<td>43</td>
<td>14</td>
<td>29</td>
</tr>
<tr>
<td>September</td>
<td>25</td>
<td>05</td>
<td>20</td>
</tr>
<tr>
<td>October</td>
<td>01</td>
<td>0</td>
<td>01</td>
</tr>
<tr>
<td>Total</td>
<td>209</td>
<td>48(23%)</td>
<td>161(77%)</td>
</tr>
</tbody>
</table>

To check for the cost effectiveness of our policy we requested the price list from our medical stores. As per Stores Department Tawam Hospital 2009. Cost of this prophylaxis per patient was 176.0 Dhs per patient (Table 3)

Table 3: Intrapartum antibiotic prophylaxis- cost incurred

- Pen G 5mu =Dhs 5/
- Pen G2.5mu =Dhs 2.5/
- Normal Saline 100mls = Dhs3.7/
- Normal Saline 50mls =Dhs3.7/
- Vent Flow =Dhs2.47/
- IV set =Dhs21.01/
- Opsite =Dhs1.67/
- GBS swab =Dhs 1.10/
- Culture testing =Dhs10.0/

TOTAL USED PER PATIENT=Dhs175.9 ( Dhs 176.00)

- 6th April 2009 till 6th October 2009

Cost of GBS swab and culture of Dhs 11.10 = 2405 patients x 1.10 x10 = Dhs 26,455 =

Cost of treatment Dhs 40.05 = 48 patients x 40.05= Dhs 1922.4 =

Total cost 26,455 + 1922.4= 28,377.4/

Discussion

CDC recommendation is to screen all the pregnant females for GBS attending antenatal clinic. Their GBS swab should be performed between 35 – 37 weeks of
pregnancy. Ideally patients with GBS positive status should receive at least one dose of Benzathine penicillin 3 mu within 2 hours of delivery to reduce the risk of EOGBS. In patients who are carrier for GBS the transmission rate is not 100%. The risk of EOGBS is reduced by the administration of IAP. 

Present audit has clearly shown that the carrier rate for GBS is around 9% which is one third of the incidence in the U.K and U.S.A which is nearly 25%. Therefore the recommendation of CDC might not hold true for our community. Considering the fact that we are spending such a large amount of our resources on screening of a condition which is not as prevalent as in the developed countries is an eye opener and these funds can be used in other research, screening and treatment strategies of diseases which are more prevalent in our community. 

The main limitation of our study was the fact that although all the patients were screened for GBS only 23% of the total positive patients received IAP. We need to review and study the factors and reasons for the low rate of administration of the IAP in our patients. The effectiveness of any screening test according to the WHO definition depends on the uptake of the test, the prevalence of the disease in the community and treating the positive cases to prevent disease.

The CC1 Conference on Preventive Aspects of Chronic Disease, held in 1951, defined screening as “the presumptive identification of unrecognized disease or defect by the application of tests, examinations, or other procedures which can be applied rapidly. Screening tests sort out apparently well persons who probably have a disease from those who probably do not. A screening test is not intended to be diagnostic. Persons with positive or suspicious findings must be referred to their physicians for diagnosis and necessary treatment.

The audit has shown that there were no babies with positive GBS culture even though mothers were positive for GBS and less than 50% of these patients received treatment. For an effective screening programme all test positive patients should be given to all those patients.

The RCOG guideline for the prevention of EOGBS advises the use of selective screening for GBS. The guideline has specific criteria for including patients for the GBS screening and prophylaxis. These include:

1. Patients with a previously affected baby with EOGBS septicemia. If GBS was detected in a previous pregnancy, the likelihood of carriage in a subsequent pregnancy is around 38%. This gives a risk estimate of

neonatal EOGBS disease of approximately 0.9 cases/1000 births versus a background risk of 0.5 cases/1000 births or 2.3 cases/1000 births in women with GBS detected in the current pregnancy. The time interval between the two pregnancies and the intensity of colonisation in the previous pregnancy are predictive of recurrent GBS colonisation.

2. GBS bacteuriya anytime in this current pregnancy GBS bacteriuria is associated with a higher risk of chorioamnionitis and neonatal disease. It is not possible to accurately quantify these increased risks. These women should be offered IAP. Women with GBS urinary tract infection (growth of greater than 105 cfu/ml) during pregnancy should receive appropriate treatment at the time of diagnosis as well as IAP.

3. Intrapartum fever >38°C
4. Prolonged rupture of membranes >18 hrs
5. Prematurity <37 weeks and <35 weeks

Keeping the above criteria we can introduce a policy of selective screening for GBS in our hospital. This will make it more cost effective without increasing patient morbidity and mortality. The incidence of EOGBS disease in the UK in the absence of systematic screening or widespread intra partum antibiotic prophylaxis (IAP) is 0.5/1000 births, which is similar to that seen in the USA after universal screening and IAP, despite comparable vaginal carriage rates.

**Conclusion**

1. As compared to developed world, there is a low carrier rate of GBS in developing world.
2. The treatment of screened positive patients is inadequate in our set up.
3. Selective screening and treatment of GBS in high risk patients is advisable

**References**