GROUP B STREPTOCOCCUS – AN UPDATE

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Group B streptococcus (GBS) infection has long been recognised as an important cause of neonatal morbidity. It is now known to be the most common serious neonatal infection in the developed world. In the United Kingdom (UK), it is estimated that 1 in 1000 babies develops a GBS infection⁽¹⁾. A recent London study, however, estimated the incidence of culture-proven plus suspected cases of GBS infection to be significantly higher (approximately 3.6 per 1000 babies born⁽²⁾). Despite this, there is no standard of practice in the UK for stopping GBS infections in newborn babies. Mary Singh, specialist registrar at the Royal Lancaster Infirmary, explains.

MATERNAL COLONISATION

GBS are facultatively anaerobic, gram positive bacteria. GBS colonise the intestines of around a third of humans with no symptoms at all. In women, the bacteria often also colonise the vagina and rectum; in approximately 28% of the pregnant population⁽³⁾. Their presence in the genital tract tends to be transient or intermittent and the duration of carriage is unpredictable⁽⁴⁾.

Substantial variation in the incidence of GBS colonisation has been reported. Carriage rates vary between different countries and ethnic groups, with higher rates found in Afro-Caribbean women compared to Caucasians and women of Oriental descent⁽⁵⁾. For most women, if GBS is found in the vagina, it exists as an asymptomatic commensal organism. Rarely, it may cause maternal infections such as urinary tract infection, chorioamnionitis and postpartum endometritis⁽⁶⁾. If found during pregnancy, the greatest risk is that of neonatal infection.

NEONATAL INFECTION

Despite such high carriage rates in the antenatal population, only 1 in 250 of babies exposed to GBS develops infection. Two forms of infection are recognised; an early onset, occurring within the first two days of life, and a late onset.

Early onset GBS infection

Early onset GBS infection occurs eight to nine times more commonly than late onset infection, with a mortality rate of 1 in 8. A small number of survivors develop long term neurodevelopmental impairment. Early onset GBS infection is characterised by the rapid development of respiratory distress and/or septicaemia. The majority of babies develop signs of infection within a few hours of birth.

Most babies with early onset GBS infection present with non-specific signs of systemic infection including grunting, lethargy, irritability, poor feeding and temperature instability. Pneumonia and meningitis are commonly seen, whilst infections such as osteomyelitis and septic arthritis are encountered less frequently. Early onset GBS infection is most common after obstetric complications such as low birth weight, prematurity, prolonged rupture of membranes and maternal pyrexia.

Late onset GBS infection

Late onset GBS infection accounts for 10-20% of GBS infections in babies and has a lower mortality rate than early onset infection (approximately 1 in 20). Typically, infection occurs after the baby is two days old, with the incidence declining with age. Up to 90% of late onset GBS infection includes meningitis with septicaemia. A third of meningitis survivors suffer long term mental and physical handicap.

CURRENT UK PRACTICE

Babies at greatest risk of developing GBS infection are those born to women who carry GBS in labour. Screening women during pregnancy for GBS is currently not done in the UK, mainly because of costs and logistics involved. The National Institute for Clinical Excellence doesn't recommend such screening since evidence of its clinical effectiveness and cost effectiveness is uncertain⁽⁷⁾. Countries such as USA, Australia, Belgium and France which have introduced screening programmes have seen a dramatic reduction in the incidence of GBS infection in newborn babies. The cost effectiveness, however, is less clear.

The Royal College of Obstetricians and Gynaecologists recommends intravenous antibiotics in labour for women in high risk groups⁽⁸⁾. The recommended antibiotic regime is penicillin G 3g (or 5MU) intravenously initially and then 1.5g (or 2.5MU) at four-hourly intervals until delivery. Women who may be allergic to penicillin should be given clindamycin 900mg intravenously every eight hours until delivery.

RISK FACTORS FOR GBS INFECTION

Case-controlled studies have identified several risk factors for the development of GBS infection⁽⁹⁾.

Risk Factor	Increased Risk
Preterm labour or preterm rupture of membranes (<37 weeks)	3x
Prolonged rupture of membranes (>18-24hrs before delivery)	3x
Maternal pyrexia during labour (37.8°C or higher)	3x
GBS colonisation of the genital tract in present pregnancy	4x
GBS bacteriuria	4x
Women with a previous neonate who developed GBS infection	10x

REDUCING GBS INFECTION

Risk based approach

This involves intrapartum antibiotic prophylaxis for all women with any of the above risk factors. Such an approach has been endorsed by the Public Health Laboratory Service GBS Working Group in the UK⁽¹⁰⁾. Adopting such a policy would prevent 50-60% of GBS infections in babies⁽¹¹⁾. However, at least 20% of all cases of neonatal GBS infections occur in babies where there are no apparent risk

factors. Another disadvantage of such a strategy is that a very large number of women would be treated to prevent a single case of GBS infection. Antibiotic administration also carries the potential risk of anaphylaxis. Recommending intrapartum antibiotics for all high risk women would have implications on women's choices, particularly with regard to place of delivery.

Universal screening

A more effective strategy would be universal screening. This would involve bacteriological screening of all pregnant women followed by the use of intrapartum antibiotics for all who screen positive (even those without risk factors). It is estimated that this will reduce neonatal GBS infection by 80-90%.

Taking swabs (vaginal and endoanal) at 35-37 weeks gestation appears to be the best time to predict colonisation with GBS at delivery. Research shows that, if performed within five weeks of delivery, a reliable test giving a negative result is 96% predictive of GBS not being carried at delivery, and a positive result is 87% predictive of carrying GBS at delivery. Some women will undoubtedly acquire or lose carriage between testing and delivery.

Adopting this policy means that women who deliver prematurely would not have been tested. Premature infants are at particularly high risk of developing early onset GBS infection and are more likely to die or suffer long term impairment. It might seem sensible, therefore, to administer intrapartum antibiotics to such patients even in the absence of prior screening.

Standard bacteriological swab plated directly onto agar has a low sensitivity (around 50%). For this policy to be effective, a screening method with higher sensitivity and specificity is needed. This might involve the use of special enrichment broth to grow GBS; this, however, is not routinely available.

FUTURE DEVELOPMENTS

GBS vaccine

Vaccination against GBS could potentially be the best way of reducing neonatal infection. Not only will it reduce maternal colonisation, but the neonate will acquire passive immunity against infection. Such a vaccine, though, is not yet available.

Rapid detection kits

As carriage rates may change between testing and delivery, an intrapartum assay for GBS may be a more accurate way of determining colonisation status of a woman in labour. This would be particularly useful in women presenting in established or threatened preterm labour and preterm rupture of the membranes. The detection kits which are presently available have low sensitivity and are not reliable for use in determining if intervention with antibiotics is appropriate⁽¹²⁾.

CONCLUSIONS

Currently there is no screening standard for GBS in the UK. Reducing GBS infection in the neonate remains a challenge for clinicians. Adoption of a screening policy will undoubtedly lead to a reduction in GBS infection. Which screening strategy, if any, is introduced depends on benefit/cost analysis. If adopted, screening will impact on the provision of antenatal, laboratory and neonatal services.

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