Royal College of Obstetricians and Gynaecologists
and London School of Hygiene and Tropical Medicine

The Prevention of Early-onset Neonatal Group B Streptococcal Disease in UK Obstetric Units

An audit of reported practice in England, Scotland, Wales and Northern Ireland

SUMMARY REPORT

Commissioned by the National Screening Committee
Dr David Cromwell
Dr Tracey Joffe
Dr Jan van der Meulen
Mrs Charnjit Dhillon
Dr Rhona Hughes
Professor Deirdre Murphy

January 2007
1. Introduction

Group B streptococcus (GBS) or *Streptococcus agalactiae* is a leading cause of early-onset neonatal infection, resulting in sepsis, pneumonia and meningitis. Early-onset GBS disease is generally defined as an infection appearing within 7 days of a baby being born, although 90% of cases occur within 24 hours. Infection is predominantly caused through a baby’s exposure to maternal GBS during childbirth but the risk is increased if the mother has one or more of the following factors:

- previous infant with early-onset GBS disease
- GBS bacteriuria in current pregnancy or GBS colonisation at term
- prolonged rupture of membranes (an interval of 18 hours or more between rupture and delivery)
- preterm labour at less than 37 weeks of gestation
- maternal temperature higher than 38˚C.

The Royal College of Obstetricians and Gynaecologists published its Green-top guideline on the prevention of early-onset neonatal GBS disease in November 2003 to provide guidance for obstetricians, midwives and neonatologists. The guideline recommended that intrapartum antibiotic prophylaxis (IAP) be offered to women if they had GBS bacteriuria in the current pregnancy, suspected chorioamnionitis or a previous baby with neonatal GBS disease (see Box 1). In addition, it recommended that IAP be considered if women had one of the other recognised risk factors; the presence of two or more risk factors was recognised as strengthening the argument for prophylaxis.

---

**Box 1. Recommendations from RCOG Green-top Guideline no. 36 (summary version)**

**ANTENATAL**
1. Routine screening (either bacteriological or risk based) for antenatal GBS carriage is not recommended.
2. Antenatal treatment with penicillin is not recommended.

**INTRAPARTUM**
1. Clinicians should discuss the use of intrapartum antibiotic prophylaxis in the presence of known risk factors including incidental carriage. Risk factors include:
   - prematurity less than 37 weeks
   - prolonged rupture of membranes 18 hours or more
   - fever in labour higher than 38˚C.
   The argument for prophylaxis becomes stronger in the presence of two or more risk factors.
2. Intrapartum antibiotic prophylaxis should be considered if GBS is detected incidentally in the vagina or the urine in the current pregnancy.
An audit was established to evaluate practice in UK obstetric units on the prevention of early-onset neonatal GBS disease against the recommendations of the RCOG Green-top guideline. With its publication, it was thought that practice would have changed since earlier surveys conducted in 1999 and 2001.1 The audit examined the organisation of screening, the use of IAP and the management of neonates born with increased risk of early-onset GBS disease.

**Audit method**

The clinical directors of the UK obstetric units were contacted in December 2005 and were asked to supply the details of a senior labour ward midwife, lead obstetrician and lead neonatologist who could complete a questionnaire on their current practice for preventing early-onset GBS disease. They were also asked to provide a copy of their local protocol on the prevention of GBS disease. The nominated midwives, obstetricians and neonatologists were sent the questionnaire in February 2006. Responses were received from 202 of the 227 units. Response rates of over 70% were achieved for each profession.
Review of international guidelines

Prior to contacting UK obstetric units, the audit undertook a systematic review of international guidelines to determine the variation in recommended practice between countries. The recommendations in the RCOG Green-top guideline were similar to guidelines by another UK organisation. However, there were differences in the recommendations of guidelines from different countries, particularly in relation to the strategies used to identify which women should be offered IAP. Of the 13 guidelines reviewed:

- seven guidelines recommended universal bacteriological screening, in which the offer of IAP was predominantly based on the results of a cultured swab
- four guidelines, including the RCOG guideline, recommended using a risk-based IAP strategy
- one guideline recommended universal bacteriological screening but women would only be offered IAP if they had a positive GBS culture and another risk factor
- one guideline gave no strong preference but discussed how to implement a strategy based on universal bacteriological screening in more detail.

The variation appeared to reflect the limited evidence base on the prevention of early-onset GBS disease, as well as concerns about the applicability of research in different contexts and cultural perspectives on childbirth.

Content of maternity unit protocols

The audit reviewed the protocols from 171 obstetric units. The RCOG guideline was cited by 80% of the 120 protocols created in 2004 or after and was the most cited publication. The clinical recommendations in the protocols were broadly consistent with the RCOG guideline. No protocol appeared to recommend universal bacteriological screening and most units (78%) had protocols recommending a risk-based IAP strategy. The other units (22%) recommended a combination of risk-based IAP and risk-based bacteriological testing, in which women with certain risk factors had a bacteriological test and received IAP if found to be GBS positive.

The risk factors for which IAP was recommended in the protocols generally reflected the RCOG guideline, with 93% of units recommending IAP for women with a previous baby affected by early-onset GBS disease and around 85% recommending IAP for GBS bacteriuria or an incidental finding of GBS in the current pregnancy. A lower proportion of protocols recommended IAP for fever during labour, preterm labour and prolonged rupture of membranes (respectively, 61%, 49% and 52%). These three risks were often included in combinations of risks for which IAP was advised. However, while the RCOG guideline stated that the argument for prophylaxis becomes stronger with two or more risk factors, many combinations contained in the protocols did not conform to the options presented in the guideline. Another notable difference between the protocols and guideline was the inclusion in 29 unit protocols of ‘maternal GBS colonisation in a previous pregnancy’ as an indication for IAP, although the RCOG guideline states that there is no good evidence to support this practice.
The primary antibiotic regimens specified in the protocols generally conformed to the RCOG guideline, with 74% of units recommending penicillin G (benzylpenicillin) with a 3 g loading dose, followed by 1.5 g every 4 hours. The main variants, typically different doses of penicillin G rather than an alternative antibiotic, did not appear to be evidence-based. For women allergic to penicillin, 83% of unit protocols specified the recommended clindamycin regimen.

**Reported practice**

A similar pattern of practice was observed in the responses to the audit questionnaire from midwives and obstetricians, being broadly consistent with the RCOG guideline. Only 2% of midwives and obstetricians reported using universal bacteriological screening, while 18% of midwives and 24% of obstetricians said that they routinely took swabs to test for GBS colonisation in selected groups of women (risk-based bacteriological testing).

Interestingly, a higher proportion of clinicians reported taking swabs for GBS when asked about their practice in specific clinical situations. This result was unexpected for women with a previous baby affected by GBS disease or who had GBS bacteriuria in the current pregnancy. IAP is recommended by almost all international guidelines for women with these risk factors, regardless of whether or not a woman is colonised with GBS. Consequently, a significant proportion of clinicians may be incorrectly interpreting a negative swab as indicating that IAP is unnecessary.

In terms of which women are offered IAP, reported practice generally reflected the RCOG guideline. Over 90% of clinicians would offer IAP to women who had had a previous baby with early-onset GBS disease or who had GBS bacteriuria or an incidental GBS finding in current pregnancy. There was greater variation among clinicians in whether or not IAP would be offered for women with intrapartum fever, preterm labour or prolonged rupture of membranes, a pattern consistent with that observed among the protocols for these risk factors. In particular, less than 50% of midwives and obstetricians would offer IAP for preterm labour. Another area of practice that differed from the RCOG guideline concerned women who were colonised with GBS in a previous pregnancy. IAP is not recommended for these women. However, among those clinicians who wouldn’t take a swab if this risk factor was present, 70% of midwives and 75% of obstetricians reported that they would offer IAP. If a woman in this situation had a swab that proved GBS positive, the proportion of clinicians who would offer IAP exceeded 90%.

There was also some variation in reported practice regarding the antibiotic prophylaxis regimen. While over 60% of respondents followed the recommended penicillin G (benzylpenicillin) regimen, a sizeable majority reported using penicillin with an alternative dose. There was also some variation in the regimens used for women with a penicillin allergy, with the recommended clindamycin regimen reportedly used by 73% of midwives and 64% of obstetricians.

Finally, the audit found variation in the management of neonates at risk of GBS disease. Clinicians either preferred to assess and observe ‘at risk’ babies or to take a culture and start antibiotic treatment while awaiting the result. This variation reflects the lack of available evidence to guide practice in this area and current practice followed the established patterns of care described in the RCOG guideline.
Conclusion

The practice reported by midwives and obstetricians is in broad agreement with the risk-based IAP strategy described in the RCOG Green-top guideline. There would appear to be a slight improvement in the proportion of units offering IAP to appropriate women since the previous surveys in 1999 and 2001. Nonetheless, variation in reported practice was evident in each aspect of the care process. This variation would appear to arise from a number of sources. First, the variation in which women are offered IAP seems to increase as the benefits of IAP becomes smaller or more uncertain. This uncertainty is associated with a lack of research evidence on the risk posed by individual factors or combinations thereof. Second, some variation in practice is probably due to the limitations of the RCOG guideline. In particular, some recommendations were phrased in terms of the quality of the evidence rather than specific behaviour and could therefore lead to inconsistencies in their interpretation. A third source of variation is the variety of recommendations contained in the protocols. While some of these differences may reflect local conditions, others appear to be due to flaws in the development process. Finally, variation may be due to difficulties inherent in implementing a risk-based IAP strategy.

Recommendations

1. Obstetric units should continue to offer intrapartum antibiotic prophylaxis to women with risk factors in accordance with the RCOG guideline.

2. A local GBS protocol should be readily available to staff and units should ensure that it is interpreted and implemented consistently.

3. Units should ensure that their protocols are up to date and consistent with national guidelines albeit adapted for the local context. Protocols should also cite the most important sources of evidence and give the date of development and review.

4. When revising the RCOG Green-top guideline, care should be taken to ensure that recommendations are unambiguous and comprehensive.

5. The revised RCOG Green-top guideline should include clearly defined audit criteria.

6. Research should be commissioned to fill the current gaps in the evidence base on which strategies to identify women for IAP are most effective in preventing early-onset GBS disease in the UK.

Acknowledgements

The audit was a collaborative project of the Royal College of Obstetricians and Gynaecologists (RCOG) and the London School of Hygiene and Tropical Medicine (LSHTM). The National Screening Committee provided funding.

The audit was developed in consultation with the Health and Social Care Information Centre (HSCIC) Review of Central Returns (ROCR) Committee, who considered the data collection to be useful and reasonable.
Project Team
Dr Tracey Joffe, Research Fellow, LSHTM
Dr David Cromwell, Lecturer, LSHTM
Professor Deirdre Murphy, Chair of the Guidelines and Audit Committee, RCOG
Dr Rhona Hughes, Lead author on RCOG GBS guideline, RCOG
Dr Jan van der Meulen, Reader, LSHTM
Mrs Charnjit Dhillon, Director of Standards, RCOG

Contributions
CD, DM and RH initiated the Audit; JVM and DC developed the protocol for the audit; TJ carried out the systematic search and comparison of international guidelines, with support from DC to perform the AGREE analysis; TJ designed the audit questionnaire with contributions from all team members; TJ and DC undertook the collection, management and analysis of the audit data and hospital protocols; TJ and DC wrote the final report with contributions from all team members.

We would also like to thank Elaine Garrett, Assistant Librarian, RCOG, who conducted the initial literature search and Nicola Betton and Emily Symington (RCOG) who provided additional administration support.

Finally, we would like to thank Dr Ben Stenson, Consultant Neonatologist, Royal Infirmary of Edinburgh at Little France, for his clinical advice and comments on the draft report.

Reference