NICE National Institute for Health and Care Excellence

NICE guideline

Multiple pregnancy: antenatal care for twin and triplet pregnancies

Clinical guideline

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Contents

This guideline is the basis of QS46.

Introduction

The incidence of multiple births has risen in the last 30 years. In 2009, 16 women per 1000 giving birth in England and Wales had multiple births compared with 10 per 1000 in 1980. This rising multiple birth rate is due mainly to increasing use of assisted reproduction techniques, including in vitro fertilisation (IVF). Up to 24% of successful IVF procedures result in multiple pregnancies. Multiple births currently account for 3% of live births.

Multiple pregnancy is associated with higher risks for the mother and babies. Women with multiple pregnancies have an increased risk of miscarriage, anaemia, hypertensive disorders, haemorrhage, operative delivery and postnatal illness. In general, maternal mortality associated with multiple births is 2.5 times that for singleton births.

The overall stillbirth rate in multiple pregnancies is higher than in singleton pregnancies: in 2009 the stillbirth rate was 12.3 per 1,000 twin births and 31.1 per 1,000 triplet and higher-order multiple births, compared with 5 per 1,000 singleton births. The risk of preterm birth is also considerably higher in multiple pregnancies than in singleton pregnancies, occurring in 50% of twin pregnancies (10% of twin births take place before 32 weeks of gestation). The significantly higher preterm delivery rates in twin and triplet pregnancies mean there is increased demand for specialist neonatal resources.

Risks to the babies depend partly on the chorionicity and amnionicity of the pregnancy (see appendix E). Feto-fetal transfusion syndrome, most commonly occurring in twin pregnancies (where it is termed twin-to-twin transfusion syndrome), is a condition associated with a shared placenta and accounts for about 20% of stillbirths in multiple pregnancies.

Additional risks to the babies include intrauterine growth restriction and congenital abnormalities. In multiple pregnancies, 66% of unexplained stillbirths are associated with a birthweight of less than the tenth centile, compared with 39% for singleton births. Major congenital abnormalities are 4.9% more common in multiple pregnancies than in singleton pregnancies.

Because of the increased risk of complications, women with multiple pregnancies need more monitoring and increased contact with healthcare professionals during their pregnancy than women with singleton pregnancies, and this will impact on NHS resources. An awareness of the

increased risks may also have a significant psychosocial and economic impact on women and their families because this might increase anxiety in the women, resulting in an increased need for psychological support.

The guideline will assume that prescribers will use a drug's summary of product characteristics to inform decisions made with individual patients.

Woman-centred care

This guideline offers best practice advice on the care of women with twin and triplet pregnancies.

Treatment and care should take into account women's needs and preferences. Women with twin and triplet pregnancies should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. If women do not have the capacity to make decisions, healthcare professionals should follow the the Department of Health's advice on consent and the code of practice that accompanies the Mental Capacity Act. In Wales, healthcare professionals should follow advice on consent from the Welsh Government.

Good communication between healthcare professionals and women is essential. It should be supported by evidence-based written information tailored to women's needs. Treatment and care, and the information women are given about it, should be culturally appropriate. It should also be accessible to people with additional needs such as physical, sensory or learning disabilities, and to people who do not speak or read English.

Key priorities for implementation

The following recommendations have been identified as priorities for implementation.

Determining gestational age and chorionicity

- Offer women with twin and triplet pregnancies a first trimester ultrasound scan when crown–rump length measures from 45 mm to 84 mm (at approximately 11 weeks 0 days to 13 weeks 6 days) to estimate gestational age, determine chorionicity and screen for Down's syndrome (ideally, these should all be performed at the same scan)[1].
- Determine chorionicity at the time of detecting twin and triplet pregnancies by ultrasound using the number of placental masses, the lambda or T-sign and membrane thickness.
- Assign nomenclature to babies (for example, upper and lower, or left and right) in twin and triplet pregnancies and document this clearly in the woman's notes to ensure consistency throughout pregnancy.
- Networks should agree care pathways for managing all twin and triplet pregnancies to ensure that each woman has a care plan in place that is appropriate for the chorionicity of her pregnancy.

Specialist care

- Clinical care for women with twin and triplet pregnancies should be provided by a nominated multidisciplinary team consisting of:
    - a core team of named specialist obstetricians, specialist midwives and ultrasonographers, all of whom have experience and knowledge of managing twin and triplet pregnancies
    - an enhanced team for referrals, which should include:
        - a perinatal mental health professional
        - a women's health physiotherapist
        - an infant feeding specialist
        - a dietitian.

Members of the enhanced team should have experience and knowledge relevant to twin and triplet pregnancies.

- Coordinate clinical care for women with twin and triplet pregnancies to:
  - minimise the number of hospital visits
  - provide care as close to the woman's home as possible
  - provide continuity of care within and between hospitals and the community.
- The core team should offer information and emotional support specific to twin and triplet pregnancies at their first contact with the woman and provide ongoing opportunities for further discussion and advice including:
  - antenatal and postnatal mental health and wellbeing
  - antenatal nutrition
  - the risks, symptoms and signs of preterm labour and the potential need for corticosteroids for fetal lung maturation
  - likely timing and possible modes of delivery[2]
  - breastfeeding
  - parenting.

Monitoring for intrauterine growth restriction

- Estimate fetal weight discordance using two or more biometric parameters at each ultrasound scan from 20 weeks. Aim to undertake scans at intervals of less than 28 days. Consider a 25% or greater difference in size between twins or triplets as a clinically important indicator of intrauterine growth restriction and offer referral to a tertiary level fetal medicine centre.

Indications for referral to a tertiary level fetal medicine centre

- Seek a consultant opinion from a tertiary level fetal medicine centre for:
  - monochorionic monoamniotic twin pregnancies
  - monochorionic monoamniotic triplet pregnancies
  - monochorionic diamniotic triplet pregnancies

- dichorionic diamniotic triplet pregnancies
- pregnancies complicated by any of the following:
  - discordant fetal growth
  - fetal anomaly
  - discordant fetal death
  - feto-fetal transfusion syndrome.

Timing of birth

- Offer women with uncomplicated:
  - monochorionic twin pregnancies elective birth[2] from 36 weeks 0 days, after a course of antenatal corticosteroids has been offered
  - dichorionic twin pregnancies elective birth[2] from 37 weeks 0 days
  - triplet pregnancies elective birth[2] from 35 weeks 0 days, after a course of antenatal corticosteroids has been offered.

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[1] 'Antenatal care' (NICE clinical guideline 62) recommends determination of gestational age from 10 weeks 0 days. However, the aim in this recommendation is to keep to a minimum the number of scan appointments that women need to attend within a short time, especially if it is already known that a woman has a twin or triplet pregnancy.

[2] Specific recommendations about mode of delivery are outside the scope of this guideline.

1 Guidance

The following guidance is based on the best available evidence. The full guideline gives details of the methods and the evidence used to develop the guidance.

> This guideline should be read in conjunction with 'Antenatal care' NICE clinical guideline 62. This guideline specifies the care that women with twin and triplet pregnancies should receive that is additional or different from routine antenatal care for women with singleton pregnancies. Table 5.8 in the full guideline shows a comparison of the schedule of appointments for women with singleton pregnancies and women with multiple pregnancies.
>
> Note that for many women the twin or triplet pregnancy will be detected only after their routine booking appointment. Women should then be offered the specialist antenatal appointments as outlined in section 1.2.3.

1.1 Determining gestational age and chorionicity

See appendix E for definitions of key terms used in this guideline (including chorionicity and amnionicity).

1.1.1 Gestational age

1.1.1.1 Offer women with twin and triplet pregnancies a first trimester ultrasound scan when crown–rump length measures from 45 mm to 84 mm (at approximately 11 weeks 0 days to 13 weeks 6 days) to estimate gestational age, determine chorionicity and screen for Down's syndrome (ideally, these should all be performed at the same scan; see 1.1.2.1 and 1.1.2.2)[3].

1.1.1.2 Use the largest baby to estimate gestational age in twin and triplet pregnancies to avoid the risk of estimating it from a baby with early growth pathology.

1.1.2 Chorionicity

1.1.2.1 Determine chorionicity at the time of detecting twin and triplet pregnancies by ultrasound using the number of placental masses, the lambda or T-sign and membrane thickness.

1.1.2.2 Assign nomenclature to babies (for example, upper and lower, or left and right) in twin and triplet pregnancies and document this clearly in the woman's notes to ensure consistency throughout pregnancy.

1.1.2.3 If a woman with a twin or triplet pregnancy presents after 14 weeks 0 days, determine chorionicity at the earliest opportunity by ultrasound using all of the following:

- the number of placental masses
- the lambda or T-sign
- membrane thickness
- discordant fetal sex.

1.1.2.4 If it is not possible to determine chorionicity by ultrasound at the time of detecting the twin or triplet pregnancy, seek a second opinion from a senior ultrasonographer or offer the woman referral to a healthcare professional who is competent in determining chorionicity by ultrasound scan as soon as possible.

1.1.2.5 If it is difficult to determine chorionicity, even after referral (for example, because the woman has booked late in pregnancy), manage the pregnancy as monochorionic until proved otherwise.

1.1.2.6 Provide regular training so that ultrasonographers can identify the lambda or T-sign accurately and confidently. Less experienced ultrasonographers should have support from senior colleagues.

1.1.2.7 Training should cover ultrasound scan measurements needed for women who book after 14 weeks 0 days and should emphasise that the risks associated with twin and triplet pregnancies are determined by chorionicity and not zygosity.

1.1.2.8 Conduct regular clinical audits to evaluate the accuracy of determining chorionicity.

1.1.2.9 If transabdominal ultrasound scan views are poor because of a retroverted uterus or a high body mass index (BMI), use a transvaginal ultrasound scan to determine chorionicity.

1.1.2.10 Do not use three-dimensional ultrasound scans to determine chorionicity.

1.1.2.11 Networks should agree care pathways for managing all twin and triplet pregnancies to ensure that each woman has a care plan in place that is appropriate for the chorionicity of her pregnancy.

1.2 General care

1.2.1 Information and emotional support

1.2.1.1 Explain sensitively the aims and possible outcomes of all screening and diagnostic tests to women with twin and triplet pregnancies to minimise their anxiety.

1.2.2 Diet, lifestyle and nutritional supplements

1.2.2.1 Give women with twin and triplet pregnancies the same advice about diet, lifestyle and nutritional supplements as in routine antenatal care[4].

1.2.2.2 Be aware of the higher incidence of anaemia in women with twin and triplet pregnancies compared with women with singleton pregnancies.

1.2.2.3 Perform a full blood count at 20–24 weeks to identify women with twin and triplet pregnancies who need early supplementation with iron or folic acid, and repeat at 28 weeks as in routine antenatal care[5].

1.2.3 Specialist care

1.2.3.1 Clinical care for women with twin and triplet pregnancies should be provided by a nominated multidisciplinary team consisting of:

- a core team of named specialist obstetricians, specialist midwives and ultrasonographers, all of whom have experience and knowledge of managing twin and triplet pregnancies
- an enhanced team for referrals, which should include:
  - a perinatal mental health professional
  - a women's health physiotherapist

- an infant feeding specialist
- a dietitian.

Members of the enhanced team should have experience and knowledge relevant to twin and triplet pregnancies.

1.2.3.2 Referrals to the enhanced team should not be made routinely for women with twin and triplet pregnancies but should be based on each woman's needs.

1.2.3.3 Coordinate clinical care for women with twin and triplet pregnancies to:

- minimise the number of hospital visits
- provide care as close to the woman's home as possible
- provide continuity of care within and between hospitals and the community.

1.2.3.4 The core team should offer information and emotional support specific to twin and triplet pregnancies at their first contact with the woman and provide ongoing opportunities for further discussion and advice including:

- antenatal and postnatal mental health and wellbeing
- antenatal nutrition (see 1.2.2.1)
- the risks, symptoms and signs of preterm labour and the potential need for corticosteroids for fetal lung maturation
- likely timing and possible modes of delivery[6]
- breastfeeding
- parenting.

1.2.3.5 Offer women with uncomplicated monochorionic diamniotic twin pregnancies at least nine antenatal appointments with a healthcare professional from the core team. At least two of these appointments should be with the specialist obstetrician.

- Combine appointments with scans when crown–rump length measures from 45 mm to 84 mm (at approximately 11 weeks 0 days to 13 weeks 6 days) and then at estimated gestations of 16, 18, 20, 22, 24, 28, 32 and 34 weeks (see 1.7.1.1)[7].

1.2.3.6 Offer women with uncomplicated dichorionic twin pregnancies at least eight antenatal appointments with a healthcare professional from the core team. At least two of these appointments should be with the specialist obstetrician.

- Combine appointments with scans when crown–rump length measures from 45 mm to 84 mm (at approximately 11 weeks 0 days to 13 weeks 6 days) and then at estimated gestations of 20, 24, 28, 32 and 36 weeks (see 1.7.1.1)[7].
- Offer additional appointments without scans at 16 and 34 weeks.

1.2.3.7 Offer women with uncomplicated monochorionic triamniotic and dichorionic triamniotic triplet pregnancies at least 11 antenatal appointments with a healthcare professional from the core team. At least two of these appointments should be with the specialist obstetrician.

- Combine appointments with scans when crown–rump length measures from 45 mm to 84 mm (at approximately 11 weeks 0 days to 13 weeks 6 days) and then at estimated gestations of 16, 18, 20, 22, 24, 26, 28, 30, 32 and 34 weeks (see 1.7.1.1)[7].

1.2.3.8 Offer women with uncomplicated trichorionic triamniotic triplet pregnancies at least seven antenatal appointments with a healthcare professional from the core team. At least two of these appointments should be with the specialist obstetrician.

- Combine appointments with scans when crown–rump length measures from 45 mm to 84 mm (at approximately 11 weeks 0 days to 13 weeks 6 days) and then at estimated gestations of 20, 24, 28, 32 and 34 weeks (see 1.7.1.1)[7].
- Offer an additional appointment without a scan at 16 weeks.

1.2.3.9 Women with twin and triplet pregnancies involving a shared amnion should be offered individualised care from a consultant in a tertiary level fetal medicine centre (see 1.6.1.1).

1.3 Fetal complications

1.3.1 Information about screening

1.3.1.1 A healthcare professional with experience of caring for women with twin and triplet pregnancies should offer information and counselling to women before and after every screening test.

1.3.1.2 Inform women with twin and triplet pregnancies about the complexity of decisions they may need to make depending on the outcomes of screening, including different options according to the chorionicity of the pregnancy.

1.3.2 Screening for Down's syndrome

1.3.2.1 Before screening for Down's syndrome offer women with twin and triplet pregnancies information about:

- the greater likelihood of Down's syndrome in twin and triplet pregnancies
- the different options for screening[4]
- the false positive rate of screening tests, which is higher in twin and triplet pregnancies
- the likelihood of being offered invasive testing, which is higher in twin and triplet pregnancies
- the greater likelihood of complications of invasive testing
- the physical risks and psychological implications in the short and long term relating to selective fetal reduction.

1.3.2.2 Healthcare professionals who screen for Down's syndrome in twin pregnancies should:

- map the fetal positions
- use the combined screening test (nuchal translucency, beta-human chorionic gonadotrophin, pregnancy-associated plasma protein-A) for Down's syndrome when crown–rump length measures from 45 mm to 84 mm (at approximately 11 weeks 0 days to 13 weeks 6 days; see 1.1.1.1)

- calculate the risk of Down's syndrome per pregnancy in monochorionic twin pregnancies
- calculate the risk of Down's syndrome for each baby in dichorionic twin pregnancies.

1.3.2.3 Healthcare professionals who screen for Down's syndrome in triplet pregnancies should:

- map the fetal positions
- use nuchal translucency and maternal age to screen for Down's syndrome when crown–rump length measures from 45 mm to 84 mm (at approximately 11 weeks 0 days to 13 weeks 6 days; see 1.1.1.1)
- calculate the risk of Down's syndrome per pregnancy in monochorionic triplet pregnancies
- calculate the risk of Down's syndrome for each baby in dichorionic and trichorionic triplet pregnancies.

1.3.2.4 Where first trimester screening for Down's syndrome cannot be offered to a woman with a twin pregnancy (for example, if the woman books too late in pregnancy) consider second trimester serum screening and explain to the woman the potential problems of such screening. These include the increased likelihood of pregnancy loss associated with double invasive testing because the risk of Down's syndrome cannot be calculated separately for each baby.

1.3.2.5 Do not use second trimester serum screening for Down's syndrome in triplet pregnancies.

1.3.2.6 Offer women with twin and triplet pregnancies who have a high risk of Down's syndrome (use a threshold of 1:150 as defined by the NHS Fetal Anomaly Screening Programme [FASP][8]) referral to a fetal medicine specialist in a tertiary level fetal medicine centre.

1.3.3 Screening for structural abnormalities

1.3.3.1 Offer screening for structural abnormalities (such as cardiac abnormalities) in twin and triplet pregnancies as in routine antenatal care[9].

1.3.3.2 Consider scheduling ultrasound scans in twin and triplet pregnancies at a slightly later gestational age than in singleton pregnancies and be aware that the scans will take longer to perform.

1.3.3.3 Allow 45 minutes for the anomaly scan in twin and triplet pregnancies (as recommended by FASP)[8].

1.3.3.4 Allow 30 minutes for growth scans in twin and triplet pregnancies.

1.3.4 Monitoring for feto-fetal transfusion syndrome

1.3.4.1 Do not monitor for feto-fetal transfusion syndrome in the first trimester.

1.3.4.2 Start diagnostic monitoring with ultrasound for feto-fetal transfusion syndrome (including to identify membrane folding) from 16 weeks. Repeat monitoring fortnightly until 24 weeks.

1.3.4.3 Carry out weekly monitoring of twin and triplet pregnancies with membrane folding or other possible early signs of feto-fetal transfusion syndrome (specifically, pregnancies with intertwin membrane infolding and amniotic fluid discordance) to allow time to intervene if needed.

1.3.5 Monitoring for intrauterine growth restriction

1.3.5.1 Do not use abdominal palpation or symphysis–fundal height measurements to predict intrauterine growth restriction in twin or triplet pregnancies.

1.3.5.2 Estimate fetal weight discordance using two or more biometric parameters at each ultrasound scan from 20 weeks. Aim to undertake scans at intervals of less than 28 days. Consider a 25% or greater difference in size between twins or triplets as a clinically important indicator of intrauterine growth restriction and offer referral to a tertiary level fetal medicine centre.

1.3.5.3 Do not use umbilical artery Doppler ultrasound to monitor for intrauterine growth restriction or birthweight differences in twin or triplet pregnancies.

1.4 Maternal complications

1.4.1 Hypertension

1.4.1.1 Measure blood pressure and test urine for proteinuria to screen for hypertensive disorders at each antenatal appointment in twin and triplet pregnancies as in routine antenatal care[4].

1.4.1.2 Advise women with twin and triplet pregnancies that they should take 75 mg of aspirin[10] daily from 12 weeks until the birth of the babies if they have one or more of the following risk factors for hypertension:

- first pregnancy
- age 40 years or older
- pregnancy interval of more than 10 years
- BMI of 35 kg/m^2 or more at first visit
- family history of pre-eclampsia.

1.5 Preterm birth

1.5.1 Predicting the risk of preterm birth

1.5.1.1 Be aware that women with twin pregnancies have a higher risk of spontaneous preterm birth if they have had a spontaneous preterm birth in a previous singleton pregnancy.

1.5.1.2 Do not use fetal fibronectin testing alone to predict the risk of spontaneous preterm birth in twin or triplet pregnancies.

1.5.1.3 Do not use home uterine activity monitoring to predict the risk of spontaneous preterm birth in twin or triplet pregnancies.

1.5.1.4 Do not use cervical length (with or without fetal fibronectin) routinely to predict the risk of spontaneous preterm birth in twin or triplet pregnancies.

1.5.2 Preventing preterm birth

1.5.2.1 Do not use the following interventions (alone or in combination) routinely to prevent spontaneous preterm birth in twin or triplet pregnancies:

- bed rest at home or in hospital
- intramuscular or vaginal progesterone
- cervical cerclage
- oral tocolytics.

1.5.3 Untargeted corticosteroids

1.5.3.1 Inform women with twin and triplet pregnancies of their increased risk of preterm birth and about the benefits of targeted corticosteroids.

1.5.3.2 Do not use single or multiple untargeted (routine) courses of corticosteroids in twin or triplet pregnancies. Inform women that there is no benefit in using untargeted administration of corticosteroids.

1.6 Indications for referral to a tertiary level fetal medicine centre

1.6.1.1 Seek a consultant opinion from a tertiary level fetal medicine centre for:

- monochorionic monoamniotic twin pregnancies
- monochorionic monoamniotic triplet pregnancies
- monochorionic diamniotic triplet pregnancies
- dichorionic diamniotic triplet pregnancies
- pregnancies complicated by any of the following:
  - discordant fetal growth
  - fetal anomaly
  - discordant fetal death
  - feto-fetal transfusion syndrome.

1.7 Timing of birth

1.7.1.1 Discuss with women with twin and triplet pregnancies the timing of birth and possible modes of delivery[6] early in the third trimester.

1.7.1.2 Inform women with twin pregnancies that about 60% of twin pregnancies result in spontaneous birth before 37 weeks 0 days.

1.7.1.3 Inform women with triplet pregnancies that about 75% of triplet pregnancies result in spontaneous birth before 35 weeks 0 days.

1.7.1.4 Inform women with twin and triplet pregnancies that spontaneous preterm birth and elective preterm birth are associated with an increased risk of admission to a special care baby unit.

1.7.1.5 Inform women with uncomplicated monochorionic twin pregnancies that elective birth from 36 weeks 0 days does not appear to be associated with an increased risk of serious adverse outcomes, and that continuing uncomplicated twin pregnancies beyond 38 weeks 0 days increases the risk of fetal death.

1.7.1.6 Inform women with uncomplicated dichorionic twin pregnancies that elective birth from 37 weeks 0 days does not appear to be associated with an increased risk of serious adverse outcomes, and that continuing uncomplicated twin pregnancies beyond 38 weeks 0 days increases the risk of fetal death.

1.7.1.7 Inform women with triplet pregnancies that continuing uncomplicated triplet pregnancies beyond 36 weeks 0 days increases the risk of fetal death.

1.7.1.8 Offer women with uncomplicated:

- monochorionic twin pregnancies elective birth[6] from 36 weeks 0 days, after a course of antenatal corticosteroids has been offered
- dichorionic twin pregnancies elective birth[6] from 37 weeks 0 days
- triplet pregnancies elective birth[6] from 35 weeks 0 days, after a course of antenatal corticosteroids has been offered.

1.7.1.9 For women who decline elective birth, offer weekly appointments with the specialist obstetrician. At each appointment offer an ultrasound scan, and perform weekly biophysical profile assessments and fortnightly fetal growth scans.

[3] 'Antenatal care' (NICE clinical guideline 62) recommends determination of gestational age from 10 weeks 0 days. However, the aim in this recommendation is to keep to a minimum the number of scan appointments that women need to attend within a short time, especially if it is already known that a woman has a twin or triplet pregnancy.

[4] See 'Antenatal care' (NICE clinical guideline 62).

[5] This is in addition to the test for anaemia at the routine booking appointment; see 'Antenatal care' (NICE clinical guideline 62).

[6] Specific recommendations about mode of delivery are outside the scope of this guideline.

[7] See appendix D for recommendations 1.2.3.5 to 1.2.3.8 in table form.

[8] See the NHS Fetal Anomaly Screening Programme (FASP).

[9] See 'Antenatal care' (NICE clinical guideline 62) and also FASP.

[10] At the time of publication (September 2011) this drug did not have UK marketing authorisation for this indication. Informed consent should be obtained and documented. [This recommendation is adapted from recommendation 1.1.2.2 in 'Hypertension in pregnancy' NICE clinical guideline 107.]

2 Notes on the scope of the guidance

NICE guidelines are developed in accordance with a scope that defines what the guideline will and will not cover.

How this guideline was developed

NICE commissioned the National Collaborating Centre for Women's and Children's Health to develop this guideline. The Centre established a Guideline Development Group (see appendix A), which reviewed the evidence and developed the recommendations. An independent Guideline Review Panel oversaw the development of the guideline (see appendix B).

There is more information about how NICE clinical guidelines are developed on the NICE website. A booklet, 'How NICE clinical guidelines are developed: an overview for stakeholders, the public and the NHS' is available.

3 Implementation

NICE has developed tools to help organisations implement this guidance.

4 Research recommendations

The Guideline Development Group has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future. The Guideline Development Group's full set of research recommendations is detailed in the full guideline (see section 1).

4.1 Information and emotional support

Does additional information and emotional support improve outcomes in twin and triplet pregnancies?

Why this is important

The guideline review identified insufficient evidence to determine the clinical and cost effectiveness of several specific aspects of information giving and emotional support in twin and triplet pregnancies. The evidence that was identified was generally of low quality. Outstanding research questions include:

- What is the effectiveness of information and emotional support in improving maternal satisfaction and psychological wellbeing, and in increasing the uptake of breastfeeding?
- Should different information and support be offered according to the chorionicity of the pregnancy?

Well-designed prospective studies (including randomised controlled trials or observational studies, and qualitative research to elicit views and experiences of women with twin and triplet pregnancies) should be conducted to inform future NICE guidance.

4.2 Specialist care

Does specialist antenatal care for women with twin and triplet pregnancies improve outcomes for women and their babies?

Why this is important

Important issues for women with twin and triplet pregnancies in the antenatal period include access to care (including the implications of having to travel to a particular location to receive care) and the possibility of transfer to hospital during pregnancy or labour. Current evidence is limited, of

low quality, and originates from a healthcare system that is different from the NHS (in particular, from a system where midwives are not involved in providing care). None of the studies identified in the guideline review made a direct comparison between specialist twin or triplet antenatal care and routine antenatal care (that is, care offered to women with singleton pregnancies).

Although health economic analysis conducted for the guideline demonstrated cost effectiveness of a range of models of specialist antenatal care, the recommendations reflect the clinical experience of the Guideline Development Group rather than strong evidence to support a particular model of care. Further research is, therefore, needed to evaluate the clinical and cost effectiveness of different models of specialist antenatal care for women with twin and triplet pregnancies. This includes evaluating the best mix of resources and skills in multidisciplinary antenatal care services, and identifying the most effective components of care.

Research should cover the roles of different healthcare professionals (including midwives, since their role is not addressed in any existing studies). It should also investigate maternal, perinatal and neonatal morbidity and mortality associated with different models of specialist care, and also long-term outcomes. Maternal outcomes to be considered include satisfaction with care and psychological wellbeing because the increased risks associated with twin and triplet pregnancies may lead to maternal anxiety or even depression. The chorionicity of the pregnancy should also be considered as a factor influencing components of specialist care. The outcomes of such research could identify particular models of care to be implemented in the NHS, which would affect service delivery and organisation (for example, by specifying a need for additional staff or further training for existing staff, both of which have cost implications).

In making this research recommendation the Guideline Development Group recognises that future research needs to provide data relevant to the current clinical context in England and Wales. The research should use cluster randomised trials or observational studies.

4.3 Monitoring for intrauterine growth restriction

What is the pattern of fetal growth in healthy twin and triplet pregnancies, and how should intrauterine growth restriction be defined in twin and triplet pregnancies?

Why this is important

Although the guideline review found some studies relating to the identification of intrauterine growth restriction in twin and triplet pregnancies, the larger existing studies are retrospective in design and, therefore, of low quality. No evidence-based growth charts specific to twin and triplet

pregnancies are available for use in the diagnosis of intrauterine growth restriction. The evidence for the effectiveness of tests for diagnosis of intrauterine growth restriction according to chorionicity of the pregnancy is limited.

There is, therefore, a need for large, prospective cohort studies to develop fetal growth charts specific to twin and triplet pregnancies. This would allow definition and diagnosis of clinically significant intrauterine growth restriction using true growth velocity and trajectories, rather than estimated fetal weight and discrepancy. The charts should distinguish between growth patterns in monochorionic, dichorionic and trichorionic pregnancies, and the research should evaluate clinical outcomes associated with particular growth patterns.

4.4 Preventing preterm birth

What interventions are effective in preventing spontaneous preterm birth in women with twin and triplet pregnancies, especially in those at high risk of preterm birth?

Why this is important

The guideline review considered several interventions aimed at preventing spontaneous preterm birth in women with twin and triplet pregnancies, including cervical cerclage, tocolytic drugs and sexual abstinence. The existing evidence for the effectiveness of cervical cerclage is of low quality (mostly originating from observational studies). The existing evidence in relation to tocolytics is also limited: there is evidence for the effectiveness of betamimetics, but no randomised controlled trials were identified for the effectiveness of ritodrine, magnesium sulphate or nifedipine. No evidence was identified for the effectiveness of sexual abstinence alone in preventing preterm birth.

Further research in the form of randomised controlled trials is, therefore, needed to evaluate the effectiveness of cervical cerclage, tocolytics other than betamimetics, and sexual abstinence. Future research should place particular emphasis on women at high risk of preterm birth in twin and triplet pregnancies. Some evidence suggested that a cervical length of less than 25 mm at 18–24 weeks of gestation in twin pregnancies or 14–20 weeks of gestation in triplet pregnancies, or a history of preterm labour in singleton pregnancies, increases the risk of spontaneous preterm birth in twin and triplet pregnancies. The evidence was limited in quality and additional research into the predictive accuracy of these factors would inform future NICE guidance. All research into the prevention of preterm birth should report spontaneous preterm birth separately from other preterm births. Data should also be reported separately for twin and triplet pregnancies, for

different chorionicities, and for different gestational ages at birth (that is, less than 28 weeks, between 28 and less than 32 weeks, and 32–37 weeks).

4.5 Indications for referral to a tertiary level fetal medicine centre

What is the incidence of monochorionic monoamniotic twin and triplet pregnancies, and what clinical management strategies are most effective in such pregnancies?

Why this is important

Monochorionic monoamniotic twin pregnancies occur rarely, as do all triplet pregnancies (fewer than 200 women give birth to triplets each year in England and Wales). Across the guideline, the evidence relating to such pregnancies was very limited in quantity and quality, with monochorionic monoamniotic pregnancy often listed as an exclusion criterion in studies reviewed for the guideline. Monochorionic monoamniotic pregnancies and triplet pregnancies are associated with greater complexity and risks to the woman and babies than other pregnancies considered in the guideline. The lack of evidence for effective clinical management of these pregnancies influenced the Guideline Development Group to recommend referral to a tertiary level fetal medicine centre for monochorionic monoamniotic twin pregnancies and complicated triplet pregnancies (including monochorionic and dichorionic triplet pregnancies).

Further research to determine the incidence of monochorionic monoamniotic pregnancies and triplet pregnancies of different chorionicities would inform future provision of NHS services, as would research into the most effective models for clinical management of such pregnancies. Studies could include national audits of clinical care and outcomes in such pregnancies before and after publication of the guideline. They should also include consideration of the impact of referral (or non-referral) to a tertiary level fetal medicine centre on perinatal psychological and emotional wellbeing of women and their partners.

4.6 Timing of birth

What is the incidence of perinatal and neonatal morbidity and mortality in babies born by elective birth in twin and triplet pregnancies?

Why this is important

The existing evidence in relation to perinatal and neonatal outcomes associated with elective birth in twin and triplet pregnancies is limited in quantity and quality. Evidence suggests a consistently

higher fetal death rate (at all gestational ages) in monochorionic twin pregnancies than in dichorionic twin pregnancies. It is uncertain whether elective birth in monochorionic twin pregnancies at 1 week earlier than recommended in the guideline (that is, from 35 weeks 0 days) would reduce fetal death rates significantly without increasing adverse neonatal outcomes significantly (for example, immaturity of the babies' respiratory systems). The research could be conducted through national audits of perinatal and neonatal morbidities in babies born by elective birth in twin and triplet pregnancies, taking account of the chorionicity of the pregnancy and gestational age at birth. If data from more than one study were available, then the technique of meta-regression might be useful for determining the optimal timing of birth precisely (according to gestational age).

5 Other versions of this guideline

5.1 Full guideline

The full guideline, 'Multiple pregnancy: the management of twin and triplet pregnancies in the antenatal period' contains details of the methods and evidence used to develop the guideline. It is published by the National Collaborating Centre for Women's and Children's Health.

5.2 Information for the public

A summary for women and their partners/carers ('Information for the public') is available.

We encourage NHS and voluntary sector organisations to use text from this booklet in their own information about twin and triplet pregnancies.

6 Related NICE guidance

Published

- Caesarean section. NICE clinical guideline 13 (2011).
- Pregnancy and complex social factors. NICE clinical guideline 110 (2010).
- Hypertension in pregnancy. NICE clinical guideline 107 (2010).
- Induction of labour. NICE clinical guideline 70 (2008).
- Diabetes in pregnancy. NICE clinical guideline 63 (2008).
- Antenatal care. NICE clinical guideline 62 (2008).
- Maternal and child nutrition. NICE public health guidance 11 (2008).
- Antenatal and postnatal mental health. NICE clinical guideline 45 (2007).
- Laparoscopic cerclage for prevention of recurrent pregnancy loss due to cervical incompetence. NICE interventional procedure guidance 228 (2007).
- Septostomy with or without amnioreduction for the treatment of twin-to-twin transfusion syndrome. NICE interventional procedure guidance 199 (2006).
- Intrauterine laser ablation of placental vessels for the treatment of twin-to-twin transfusion syndrome. NICE interventional procedure guidance 198 (2006).
- Fertility. NICE clinical guideline 11 (2004) (this guideline is currently being updated).

7 Updating the guideline

NICE clinical guidelines are updated so that recommendations take into account important new information. New evidence is checked 3 years after publication, and healthcare professionals and patients are asked for their views; we use this information to decide whether all or part of a guideline needs updating. If important new evidence is published at other times, we may decide to do a more rapid update of some recommendations. Please see our website for information about updating the guideline.

Appendix A: The Guideline Development Group, National Collaborating Centre and NICE project team

Guideline Development Group

Jane Anderson Lead Sonographer, Obstetric and Gynaecology Ultrasound, Southampton University Hospitals NHS Trust

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National Collaborating Centre for Women's and Children's Health

David James (from December 2009) Clinical Co-Director (Women's Health), National Collaborating Centre for Women's and Children's Health

Paul Jacklin (from February 2011) Senior Health Economist, National Collaborating Centre for Women's and Children's Health

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Sarah Catchpole Editor

Appendix B: The Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring adherence to NICE guideline development processes. In particular, the panel ensures that stakeholder comments have been adequately considered and responded to. The panel includes members from the following perspectives: primary care, secondary care, lay, public health and industry.

Dr Graham Archard General Practitioner, Dorset

Catherine Arkley Lay member

Professor Mike Drummond - Chair Director, Centre for Health Economics, University of York

Dr David Gillen Medical Director, Wyeth Pharmaceutical

Dr Ruth Stephenson Consultant in Anaesthetics Clinical Ethics Lead, NHS Grampian

Appendix C: The algorithms

There are care pathways for the management of multiple pregnancy in the full guideline.

Appendix D: Schedule of specialist antenatal appointments

Type of pregnancy (uncomplicated)	Minimum contacts with core multidisciplinary team	Timing of appointments PLUS scans	Additional appointments WITHOUT scans
Monochorionic diamniotic twins	9 (including 2 with specialist obstetrician)	Approximately 11 weeks 0 days to 13 weeks 6 days* and 16, 18, 20, 22, 24, 28, 32 and 34 weeks	_
Dichorionic twins	8 (including 2 with specialist obstetrician)	Approximately 11 weeks 0 days to 13 weeks 6 days* and 20, 24, 28, 32 and 36 weeks	16 and 34 weeks
Monochorionic triamniotic triplets and dichorionic triamniotic triplets	11 (including 2 with specialist obstetrician)	Approximately 11 weeks 0 days to 13 weeks 6 days* and 16, 18, 20, 22, 24, 26, 28, 30, 32 and 34 weeks	_
Trichorionic triamniotic triplets	7 (including 2 with specialist obstetrician)	Approximately 11 weeks 0 days to 13 weeks 6 days* and 20, 24, 28, 32 and 34 weeks	16 weeks
* When crown–rump length measures from 45 mm to 84 mm			

Appendix E: Definitions of key terms

A full glossary is provided in the full guideline.

Amnionicity: The number of amnions (inner membranes) that surround babies in a multiple pregnancy. Pregnancies with one amnion (so that all babies share an amniotic sac) are described as monoamniotic; pregnancies with two amnions are diamniotic; and pregnancies with three amnions are triamniotic. Also see table 1 below.

Biophysical profile assessment: An antenatal ultrasound evaluation of fetal wellbeing based on fetal movement, fetal tone, fetal breathing, amniotic fluid volume and the nonstress test of the fetal heart rate (or cardiotocography).

Chorionicity: The number of chorionic (outer) membranes that surround babies in a multiple pregnancy. If there is only one membrane the pregnancy is described as monochorionic; if there are two, the pregnancy is dichorionic; and if there are three, the pregnancy is trichorionic. Monochorionic twin pregnancies and dichorionic triplet pregnancies carry higher risks because babies share a placenta. Also see table 1 below.

Feto-fetal transfusion syndrome: Feto-fetal transfusion syndrome occurs when blood moves from one baby to another. The baby that loses the blood is called the donor and the baby receiving the blood is called the recipient. Feto-fetal transfusion syndrome is a complication of monochorionic multiple pregnancies arising from shared placental circulation. It is also referred to as twin-to-twin transfusion syndrome in twin pregnancies.

Specialist obstetrician: An obstetrician with a special interest, experience and knowledge of managing multiple pregnancies, and who works regularly with women with multiple pregnancies.

Tertiary level fetal medicine centre: A regionally commissioned centre with the experience and expertise for managing complicated twin and triplet pregnancies.

Zygosity: The number of fertilised eggs that result in a multiple pregnancy. If one egg is fertilised and divides into two embryos the pregnancy is described as monozygous, whereas if two eggs are fertilised and result in separate embryos the pregnancy is described as dizygous.

Table 1 Chorionicity and amnionicity

Types of twin pregnancy

Dichorionic twins: Each baby has a separate placenta. **Monochorionic diamniotic twins:** Both babies share a placenta but have separate amniotic sacs. **Monochorionic monoamniotic twins:** Both babies share a placenta and amniotic sac.
Types of triplet pregnancy
Trichorionic triplets: Each baby has a separate placenta and amniotic sac. **Dichorionic triamniotic triplets:** One baby has a separate placenta and two of the babies share a placenta. All three babies have separate amniotic sacs. **Dichorionic diamniotic triplets:** One baby has a separate placenta and amniotic sac and two of the babies share a placenta and amniotic sac. **Monochorionic triamniotic triplets:** All three babies share one placenta but each has its own amniotic sac. **Monochorionic diamniotic triplets:** All three babies share one placenta. One baby has a separate amniotic sac and two babies share one sac. **Monochorionic monoamniotic triplets:** All three babies share a placenta and amniotic sac.

About this guideline

NICE clinical guidelines are recommendations about the treatment and care of people with specific diseases and conditions in the NHS in England and Wales.

The guideline was developed by the National Collaborating Centre for Women's and Children's Health. The Collaborating Centre worked with a group of healthcare professionals (including consultants, GPs and nurses), patients and carers, and technical staff, who reviewed the evidence and drafted the recommendations. The recommendations were finalised after public consultation.

The methods and processes for developing NICE clinical guidelines are described in The guidelines manual.

We have produced information for the public explaining this guideline. Tools to help you put the guideline into practice and information about the evidence it is based on are also available.

Changes since publication

October 2012: minor maintenance

January 2012: minor maintenance.

Your responsibility

This guidance represents the view of NICE, which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summary of product characteristics of any drugs they are considering.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.

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