Evidence-based national guidelines for the management of suspected fetal growth restriction: comparison, consensus, and controversy

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Small for gestational age is usually defined as an infant with a birthweight <10th centile for a population or customized standard. Fetal growth restriction refers to a fetus that has failed to reach its biological growth potential because of placental dysfunction. Small-for-gestational-age babies make up 28-45% of nonanomalous stillbirths, and have a higher chance of neurodevelopmental delay, childhood and adult obesity, and metabolic disease. The majority of small-for-gestational-age babies are not recognized before birth. Improved identification, accompanied by surveillance and timely delivery, is associated with reduction in small-for-gestational-age stillbirths. Internationally and regionally, detection of small for gestational age and management of fetal growth problems vary considerably. The aim of this review is to: summarize areas of consensus and controversy between recently published national guidelines on small for gestational age or fetal growth restriction; highlight any recent evidence that should be incorporated into existing guidelines; and identify future research priorities in this field. A search of MEDLINE, Google, and the International Guideline Library identified 6 national guidelines on management of pregnancies complicated by fetal growth restriction/small for gestational age published from 2010 onwards. There is general consensus between guidelines (at least 4 of 6 guidelines in agreement) in early pregnancy risk selection, and use of low-dose aspirin for women with major risk factors for placental insufficiency. All highlight the importance of smoking cessation to prevent small for gestational age. While there is consensus in recommending fundal height measurement in the third trimester, 3 specify the use of a customized growth chart, while 2 recommend McDonald rule. Routine third-trimester scanning is not recommended for small-for-gestational-age screening, while women with major risk factors should have serial scanning in the third trimester. Umbilical artery Doppler studies in suspected small-for-gestational-age pregnancies are universally advised, however there is inconsistency in the recommended frequency for growth scans after diagnosis of small for gestational age/fetal growth restriction (2-4 weekly). In late-onset fetal growth restriction (≥32 weeks) general consensus is to use cerebral Doppler studies to influence surveillance and/or delivery timing. Fetal surveillance methods (most recommend cardiotocography) and recommended timing of delivery vary. There is universal agreement on the use of corticosteroids before birth at <34 weeks, and general consensus on the use of magnesium sulfate for neuroprotection in early-onset fetal growth restriction (<32 weeks). Most guidelines advise using cardiotocography surveillance to plan delivery in fetal growth restriction <32 weeks. The recommended gestation at delivery for fetal growth restriction with absent and reversed end-diastolic velocity varies from 32 to ≥34 weeks and 30 to ≥34 weeks, respectively. Overall, where there is high-quality evidence from randomized controlled trials and meta-analyses, eg, use of umbilical artery Doppler and corticosteroids for delivery <34 weeks, there is a high degree of consistency between national small-for-gestational-age guidelines. This review discusses areas where there is potential for convergence between small-for-gestational-age guidelines based on existing randomized controlled trials of management of small-for-gestational-age pregnancies, and areas of controversy. Research priorities include assessing the utility of late third-trimester scanning to prevent major morbidity and mortality and to investigate the optimum timing of delivery in fetuses with late-onset fetal growth restriction and abnormal Doppler parameters. Prospective studies are needed to compare new international population ultrasound standards with those in current use.

Key words: clinical management, fetal growth restriction, national guidelines, small for gestational age

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Introduction

Small for gestational age (SGA) is usually defined as an infant with a birthweight for gestational age <10th centile for a population[1,2] or customized standard.[3,4] These definitions of SGA will include a proportion of babies (18-22%) who are constitutionally small but healthy.[4,5] Fetal growth restriction (FGR)

generally refers to a fetus that has failed to reach its biological growth potential because of placental dysfunction.[6] FGR has considerable overlap with SGA but is more difficult to define in practice, as not all FGR infants have a birthweight <10th centile.[7-9]

Suboptimal fetal growth is important as SGA babies comprise 28-45% of non-anomalous stillbirths.[10,11] Placental insufficiency is a major contributor to the pathophysiology in SGA pregnancies and contributes to the adverse perinatal outcomes.[12] Infants born SGA have higher rates of neurodevelopmental delay, poor school performance, childhood and adult obesity, as well as metabolic disease.[13-18] A limitation of current antenatal care is that the majority of SGA pregnancies are not identified before birth.[19-21] SGA infants recognized before birth who undergo surveillance and timely delivery have a 4- to 5-fold reduction in mortality and/or severe morbidity.[22,23] Therefore, many SGA stillbirths are preventable if detection could be improved and management optimized.

Internationally and regionally, detection of SGA and management approaches can vary considerably. Only 2 previous publications have compared SGA management guidelines between countries.[24,25] The first by Chauhan et al[24] compared the now obsolete 2000 American Congress of Obstetricians and Gynecologists (ACOG) guidelines with the 2002 Royal College of Obstetricians and Gynecologists (RCOG) United Kingdom guidelines and noted that there were considerable variations in content, references cited, and recommendations. More recently, Unterscheider et al[25] compared recommendations made in 4 national guidelines but did not include the New Zealand or the French guideline. The aim of this review is to summarize areas of consensus and controversy between recently published national guidelines on SGA or FGR; to highlight any recent evidence that should be incorporated into existing guidelines; and to identify future research priorities in this field.

Materials and Methods

Searches through MEDLINE and Google were performed to identify national guidelines on management of pregnancies complicated by FGR/SGA. MEDLINE searches were undertaken using the terms: "fetal growth retardation/or fetal growth restriction," "small for gestational age," and "clinical practice guideline." The search was confined to articles published from 2010 and published in English. The last search was undertaken on Aug. 7, 2017. Four relevant national guidelines were identified through this process.

The Google searches for national guidelines on diagnosis and management of FGR or SGA identified 3 additional guidelines. The International Guideline Library web site was also searched for fetal growth guidelines, but no additional guidelines were identified from this source. Guidelines published before 2010 were not eligible for inclusion in this review as they did not incorporate recently published evidence.[26]

Each guideline was read by all authors. Summary tables were produced incorporating input from each guideline and included: process for guideline development; definitions, screening, and prevention of SGA; ultrasound surveillance and surveillance after diagnosis of SGA; and timing of delivery. Early-onset SGA (<32 weeks) and late-onset SGA were considered separately as management approaches are different. L.M.M. and N.H.A. developed the tables and checked the tables against the original guideline documents.

Results

National guidelines from 6 countries were identified that met the above criteria. These were produced in the United States (ACOG[27] and Society for Maternal-Fetal Medicine[28]); the United Kingdom (RCOG[29]); Canada (Society of Obstetricians and Gynecologists of Canada[30]); New Zealand (New Zealand Maternal Fetal Medicine Network[31]); Ireland (Health Service Executive[32]); and France (French College of Gynecologists and Obstetricians[33]). The process for guideline development is summarized in Table 1.

All guidelines highlight the importance of an accurate assessment of gestational age to determine whether the pregnancy is complicated by FGR or is possibly misdated. The definitions of SGA and FGR, approaches to risk selection, and early screening and prevention are shown in Table 2. There is broad consensus on definitions of SGA and FGR, as birthweight or estimated fetal weight (EFW) <10th centile but 4 of 6 (67%) recommend using a customized EFW[29,31-33] and 2 (33%) recommend using a population reference for EFW.[27,30] Some require other evidence of severity such as abnormal Doppler studies or an EFW <3rd centile to confirm pathological FGR.[29,31-33]

All guidelines comment on the need for early pregnancy risk selection and 5 of 6 (83%) guidelines recommend low-dose aspirin treatment for women with major risk factors for placental insufficiency.[29-33] All guidelines highlight the importance of smoking cessation to prevent SGA and while all recommend that fundal height should be measured in the third trimester, 3 (50%) recommend using customized growth charts,[29,31,32] 2 (33%) recommend use of McDonald rule,[27,30,34] and 1 does not specify a reference.[33]

In Table 3, approaches to third-trimester ultrasound in low- and high-risk women are compared. Five of 6 (83%) agree that there is no current evidence to support routine third-trimester scanning[27,29-32] and 4 of 6 (67%) specify that women with major risk factors should have serial scans in the third trimester.[27,29,31,32] There is also unanimous agreement about the importance of undertaking umbilical artery (UA) Doppler studies in suspected SGA pregnancies as this has been shown to reduce perinatal mortality[35] and no guideline currently incorporates recommendations on utility of third-trimester biomarkers.

Approaches to surveillance and timing of birth in late-onset SGA/FGR (≥32 weeks) are summarized in Table 4. Four of 6 (83%) recommend undertaking cerebral Doppler studies[29-31,33] and using the information to influence management. There is considerable inconsistency in terms of recommended frequency for ongoing growth scans after diagnosis of SGA/FGR (2-4 weekly), fetal surveillance