

OBSTETRICS

Intrauterine growth restriction: comparison of American College of Obstetricians and Gynecologists practice bulletin with other national guidelines

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OBJECTIVE: The objective of the study was to compare national guidelines regarding small for gestational age (SGA).

STUDY DESIGN: Along with American College of Obstetricians and Gynecologists (ACOG) practice bulletin on abnormal growth, guidelines from England, Canada, Australia, and New Zealand were reviewed.

RESULTS: There are no guidelines on SGA from Canada, Australia, and New Zealand. The Royal College of Obstetricians and Gynaecologists (RCOG) guideline agrees with ACOG's definition of abnormal growth, but there are noticeable variances in the diagnosis and man-

agement of SGA. RCOG has more recommendations than ACOG (18 vs 4, respectively). The articles referenced varied, with only 13 similar articles being cited by the both committees.

CONCLUSION: The differences in the 2 guidelines suggest that there is variance in how 2 committees synthesize the literature and issue recommendations.

Key words: American College of Obstetricians and Gynecologists, national guidelines, recommendations, Royal College of Obstetricians and Gynecologists, small for gestational age

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Written to optimize outcomes, minimize cost, and decrease medical liability,¹ the American College of Obstetricians and Gynecologists (ACOG) practice bulletins are 1 of the most influential publications for clinicians doing obstetrics in the United States.² The bulletins identify pertinent publications on a specific topic, classify the references according to the US Preventive Task Force, synthesize the literature, and formulate evidence-based recommendations.¹

Accustomed to these guidelines since 1998, clinicians in the United States may be unaware that other countries have

analogous publications. The Royal College of Obstetricians and Gynecologists (RCOG), for example, publishes green guidelines; the Society of Obstetricians and Gynecology (SOGC) of Canada, clinical practical guidelines, and the Royal Australian New Zealand College of Obstetricians and Gynecologists (RANZCOG), clinical statements. Because 4 different organizations are synthesizing the publications in English, it occurred to us that comparison of guidelines on a specific topic would be illustrative of practices in different countries and instructive on the formulation of guidelines.

The purpose of this review article was to ascertain the similarities and differences, if any, in national guidelines on a specific topic. Because ACOG characterizes intrauterine growth restriction (IUGR) as "one of the most common and complex problems in modern obstetrics,"³ we chose this topic to compare guidelines from other countries. The review started with accessing the ACOG, RCOG, SOGC and RANZCOG web sites⁴⁻⁷ and determining whether they have any publications on IUGR. As of

March 2008, neither SOGC nor RANZCOG had published national guidelines on this topic. Thus, this review focused on ACOG and RCOG guidelines on IUGR,^{3,8} which were published in 2000 and 2002, respectively.

Terminology and definition

ACOG notes that the terms IUGR and small for gestational age (SGA) have been used interchangeably, creating confusion on the topic. SGA, according to American guidelines, is a newborn with an actual birthweight below 10th percentile for gestational age (GA), whereas IUGR is estimated fetal weight (EFW) below this threshold.³ RCOG does not differentiate between IUGR and SGA.⁸

Regardless of what the national guidelines call suboptimal growth, both acknowledge that there are multiple definitions. Estimated or actual weight below the third or fifth percentiles, for example, are 2 common criteria that both guidelines acknowledge. Despite the various criteria, ACOG and RCOG consider the abnormal condition to be estimated or actual weight below 10%. For RCOG, abdominal cir-

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cumference (AC) less than 10% is sufficient to suspect SGA,⁸ but ACOG does not mention this criterion.³

Risk factors

The practice bulletin on the topic³ lists 33 risk factors for IUGR that can be categorized into 3 broad categories: 24 maternal, 6 placental, and 3 fetal. With some of these conditions, ACOG provides the likelihood of IUGR. The incidence of SGA with heroin addiction, for example, is 50%; with methadone, 35%; and with cocaine, 30%. For some common risk factors like preeclampsia, the practice bulletin does not provide the rate of abnormal growth. Surprisingly, the green guideline does not discuss risk factors for SGA.⁸ By excluding multiple gestation and anomalous fetus, RCOG implies that they may be risk factors for abnormal growth.

Diagnosis

Whereas there are similarities between the ACOG and RCOG methods^{3,8} to diagnose inadequate growth, there are noticeable differences. According to the practice bulletin³ the 2 steps involved with antenatal recognition of IUGR are elucidation of maternal risk factors with clinical assessment of uterine size and sonographic measurement of biometric parameters, supplemented with invasive fetal testing for aneuploidy or viral infections if indicated. RCOG⁸ lists 5 methods that can be used to detect SGA: abdominal palpation, measurement of symphyseal fundal height (SFH), sonographic measurement of biometric parameters or EFW derived from them, and ultrasound Doppler flow velocimetry. For RCOG the risk factors are not a part of the algorithm.

Both guidelines agree that clinical evaluation of the patient is not the ideal method to detect abnormal growth. ACOG notes that with clinical examination, one third of cases are undetected and 50% diagnosed inaccurately. RCOG review⁸ of the literature suggests that with abdominal palpation, only 30% of SGA are detected; with SFH, the sensitivity ranges from 27% to 86%. According to RCOG,⁸ use of a customized fundal chart does improve the accuracy of de-

tecting SGA, but this approach is not mentioned by ACOG.³

Because of the shortcomings of detecting IUGR from clinical examination, both ACOG and RCOG recommend biometric measurements of the fetus and EFW. Both guidelines agree that if the abdominal circumference or EFW is less than 10% for GA, abnormal growth should be suspected. For detection of abnormal growth, RCOG³ is specific about which regression equations should be utilized to derive the EFW, whereas ACOG is not.⁸

Interestingly, ACOG considers amniotic fluid (AF) an "important and prognostic parameter in fetuses with IUGR," whereas RCOG notes that assessment of AF has "minimal value in diagnosing" inadequate growth. Both guidelines do agree that umbilical artery Doppler is not a reliable screening technique for IUGR.^{3,8}

Management

ACOG recommends that once IUGR is suspected sonographically, a detailed examination should be done to rule out anomalies. An amniocentesis should be done if there is early or severe IUGR or if there are associated anomalies.³ RCOG suggests that assessment of chromosomal defects should be done if there are anomalies and also if AC or EFW is less than 5% or the AF or Doppler is normal.⁸ Determining whether viral infection is a cause of IUGR is recommended by ACOG and not mentioned by RCOG.

Once a nonanomalous IUGR is identified, ACOG recommends 1 of the antenatal tests: traditional or modified biophysical profile (BPP), contraction stress test, nonstress test, assessment of AF, or Doppler velocity of fetal vessels. Whereas ACOG acknowledges lack of randomized controlled trials (RCTs) regarding the optimum antenatal surveillance, RCOG clearly states that BPP and cardiotocography (CTG) should be used infrequently to monitor IUGR. The green guideline cites Cochrane review of antepartum CTG to assess fetal well-being and that there was a trend toward increased mortality among those that were monitored vs those that were not.

Both guidelines agree on the use of umbilical artery (UA) Doppler in the management of IUGR, although RCOG emphasizes that it should be the primary surveillance tool. For ACOG, UA Doppler can be used to delay delivery with reassurance, and for RCOG, it can be used in predicting poor perinatal outcomes. Additionally, RCOG notes that use of UA Doppler, compared with CTG, reduces the use of resources in the management of abnormal growth.⁸ Lastly, both national guidelines agree that absent or reversed UA Doppler is associated with poor perinatal outcome and high perinatal mortality.^{3,8}

ACOG and RCOG guidelines agree that most interventions do not prevent or improve the perinatal outcomes. Bed rest, nutrient treatment or supplementation, zinc or calcium supplement, maternal oxygen therapy, heparin, and low-dose heparin have not improved the outcome, according to the practice bulletin. To the list of ineffective treatments, RCOG adds the use of betamimetics, calcium channel blockers, and hormonal therapy. Both guidelines agree that smoking cessation may increase the birthweight but does not improve the outcome. In areas endemic to malaria, treatment does benefit according to ACOG.³

Delivery

According to ACOG, GA and results of antenatal testing should be considered when individualizing the timing of delivery. Once extrauterine survival is possible, delivery may be considered if fetal assessment is nonreassuring or if there is complete absence of growth over 2-4 weeks.³ RCOG is more specific and states that if the surveillance is normal and end diastolic flow is present, then delay delivery until 37 weeks. If end diastolic velocity is absent or reversed, then hospitalize, administer steroids, and monitor closely with biophysical profiles and venous Dopplers, delaying delivery until 34 weeks, if reassuring.⁸

Unlike ACOG, with suboptimal growth RCOG encourages administration of steroids if gestational age is less than 36 weeks, continuous monitoring with CTG, and delivery at a unit at which

optimal neonatal expertise and facilities are available.

Recommendations

Both national guidelines extensively review the literature on the topic, evaluate the studies according to the method outlined by the US Preventive Service Task Force (ACOG) or US Agency for Healthcare Research and Quality (RCOG), and classify their recommendations as level A, B, or C. Both agree that level C suggestions are based primarily on expert committee reports or consensus of expert opinion. The 2, however, differ on what constitutes B or A recommendations. For ACOG, level B recommendations have limited or inconsistent scientific evidence; for RCOG, it means an availability of well-controlled studies but absence of randomized clinical trials. For level A recommendations, ACOG needs good and consistent scientific evidence, which does not need to be RCT. RCOG, on the other hand, requires at least 1 RCT to grade a recommendation as level A.

One major difference in the classification of the recommendation is that RCOG draws a distinction between effectiveness versus diagnostic accuracy studies. Based on the grading devised by National Health Service Center for Reviews and Dissemination, diagnostic studies are classified differently from effectiveness reports. Thus, for RCOG recommendations are A_E, B_E, or C_E for effectiveness studies and A_D, B_D, or C_D for diagnostic reports.⁸ ACOG does not differentiate.^{1,3}

Because the classification of recommendations differs between the 2 national guidelines, it is understandable that there will be a quantitative difference. Whereas ACOG has 4 recommendations (2 level A and 2 level C), RCOG has 18 (for diagnostic accuracy 10, with 1 being A_D, 8 being B_D, and 1 being C_D; for effectiveness 8 recommendations, with 3 being A_E, and 5 C_E, with no B_E). On the same topic, RCOG has 350% more recommendations. There are noticeable differences in the 2 organizations' suggestions (Table).

RCOG discourages use of BPP, CTG, and uterine artery Doppler, and ACOG considers them either useful or has no

recommendation. RCOG provides 8 level B recommendations to enhance the diagnosis of abnormal growth, whereas ACOG indicates that classical clinical monitoring, consisting of fundal height measurements, is appropriate for routine purpose. Although a level C_D recommendation, RCOG clearly states that abdominal palpation has limited value in the detection of abnormal growth.

Suggestions for the management of inadequately grown fetuses also differ for the 2 guidelines. RCOG recommends administration of steroid until 36 weeks, which is 2 additional weeks than ACOG suggestion for preterm delivery. Whereas RCOG provides specific recommendations for timing, location, and intrapartum management of SGA, ACOG does not (Table).

References and authors

ACOG uses its own internal resources, MEDLINE database and the Cochrane Library, to conduct the literature search; RCOG searches the last 2 sources but also utilizes Embase and National Health Service Economic Evaluation Database. Both guidelines do not provide the reasons for including or excluding references or how consensus was reached among author(s) and the national committee. The date of the last search was March 1999 for ACOG and November 2000 for RCOG, a gap of 20 months. Interestingly, the time interval from stopping the literature search and publication of the guideline was 9 months (March 1999-January 2000, respectively) for ACOG³ and 24 months (November 2000-November 2002) for RCOG.⁸

A comparison of the references cited for the 2 guidelines is instructive. The practice bulletin has 108 references, with the oldest citation being 53 years before publication of the guideline; for the 118 RCOG citations, the corresponding value is 27 years. The median year of publication for references was 1993 for ACOG and 1996 for RCOG. The median time interval from publications of these references vs the guideline is 7 years for ACOG and for RCOG, 6 years.

Because the guideline from the United Kingdom was published after ACOG's, we

determined how many of the references cited by RCOG were published before March 1999, the month ACOG closed their literature search. Of the 112 references by RCOG on SGA, 73% (82) were published before March 1999, and of these 82 citations, only 12%⁹ were referenced by both national guidelines.¹⁰⁻¹⁸

On the topic of management of abnormal growth with maternal nutrient treatment,^{19,20} oxygenation,^{21,22} and plasma volume expansion,^{23,24} Cochrane reviews are referenced by both guidelines, but they were published in different years. Even if these reviews are considered to be equivalent, only 16% (13/82) of the references cited by ACOG and RCOG are the same.

Lastly, we compared the authors for the 2 national guidelines. Whereas a maternal-fetal medicine subspecialist wrote the ACOG practice bulletin, 4 obstetricians, 1 of whom is also an epidemiologist, authored the green guideline. Although members of the ACOG committee edited the practice bulletin, there is no mention of the members. The RCOG publication specifically provides the name of 6 clinicians, with 1 being a neonatologist, who reviewed the guideline. Thus, ACOG identifies 1 person who authored the guideline and RCOG identifies 10 clinicians.

A PubMed search (confined to English language and limited to the time period of the national guideline) of these 11 authors with terms "intrauterine growth restriction," or "small for gestational age" indicated that there was 1 publication for the writer of practice bulletin, and it was cited in the guideline. The 10 clinicians involved with green guidelines had published 91 articles and 22%²⁰ were referenced.

Comment

It could be reasoned that comparing national guidelines on the same topic is unnecessary and irrelevant, that recommendations are reflections of regional practice pattern and patient's preference and that synthesis of literature by different committees in separate countries is bound to have differences and varying conclusions. We, however, believe, because comparison of metaanalyses on

TABLE
National guidelines on suboptimal fetal growth

Title	ACOG (January 2000) IUGR	RCOG (November 2002) The investigation and management of the SGA fetus
Level A	<ul style="list-style-type: none"> The use of Doppler ultrasonography to measure umbilical artery waveforms in the management of IUGR is associated with reduction in perinatal death and may be considered a part of fetal evaluation once IUGR is suspected. Nutrient treatment or supplementation, zinc or calcium supplementation, plasma volume expansion, maternal oxygen therapy, antihypertensive therapy, heparin, and aspirin therapy have not been shown to be effective for prevention or treatment of IUGR. 	<ul style="list-style-type: none"> Uterine artery Doppler has limited use in predicting fetal growth restriction (A_D). Use umbilical artery Doppler as the primary surveillance tool (A_E). Use biophysical profile and cardiotocography infrequently (A_E). Administer steroids if gestation is below 36 wks (A_E).
Level B	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Symphyseal fundal height measurement has limited diagnostic accuracy to predict an SGA fetus (B_D). Use of a customized fundal height chart improves accuracy to predict an SGA fetus (B_D). Use abdominal circumference and estimated fetal weight to diagnose SGA (B_D). Use below 10th percentile threshold for both estimated fetal weight and abdominal circumference (B_D). Use customized ultrasound charts (B_D). Use growth velocity in addition to size (B_D). Amniotic fluid volume has minimal value in diagnosing fetal growth restriction (B_D). Measure liquor volume using either amniotic fluid index or pocket depth as both tests have similar diagnostic accuracy (B_D).
Level C	<ul style="list-style-type: none"> Antepartum surveillance should be instituted once the possibility of extrauterine survival of the growth-restricted fetus has been determined. This may include Doppler velocimetry, contraction stress test, nonstress test with amniotic fluid volume assessment, and biophysical profile. Routine screening for IUGR in low-risk patients should comprise classical clinical monitoring techniques. Ultrasound evaluation of the fetus is appropriate in patients determined to be at high risk. 	<ul style="list-style-type: none"> Abdominal palpation has limited diagnostic accuracy to predict an SGA fetus (C_D). When end diastolic flow is present, delay delivery until at least 37 weeks, provided other surveillance findings are normal (C_E). When end diastolic flow is absent or reversed, admission, close surveillance, and administration of steroids are required. If other surveillance results (biophysical profile, venous Doppler) are abnormal, delivery is indicated. If gestation is over 34 weeks, even if other results are normal, delivery may be considered (C_E). Use gestation- and birthweight-specific charts to determine the likelihood of survival if early delivery is required (C_E). Deliver in a unit in which optimal neonatal expertise and facilities are available (C_E). Intrapartum monitoring with continuous cardiotocography is recommended (C_E).

IUGR, intrauterine growth restriction; *SGA*, small for gestational age.

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the same topic is instructive,²⁵ that scrutinizing national guidelines is useful to everyday clinicians because if there is a weakness in 1, it may be mitigated by the other. Moreover, comparing them, especially when differing conclusions are reached, may help focus on areas of research and perhaps provide material for future editions of these guidelines. Because guidelines are supposed to mini-

mize regional variation and be evidence based, it is reasonable to compare them.

Lastly, if guidelines from different countries use the literature in the same language and similar principles to synthesize the pertinent references, then it is not unreasonable to expect that they will reach similar conclusions.

Our review of 4 national guidelines on the suboptimal growth is notable for 4

things. First, Canada, Australia, and New Zealand do not have a national guideline on this topic, whereas the United Kingdom and the United States do. Second, ACOG and RCOG agree on not only the definition of abnormal growth but also that AC or EFW has to be below 10% to diagnose abnormal growth. But there are differences between the 2 guidelines with regard to diagnosis and management.

Whereas ACOG emphasizes risk factors and AF level to enhance the diagnosis, RCOG stresses customised fundal height and ultrasound charts to enhance detection. The management of suspected IUGR is in agreement in that it requires antenatal testing but differs in that RCOG emphasizes umbilical artery Doppler and discourages BPP and cardiotocography, whereas ACOG considers nonstress test, contraction stress test, and BPP to be equivalent.

The third finding of this comparative study is the type and number of recommendations in each guideline. Whereas both provide graded suggestions, RCOG differentiates between effectiveness and diagnostic accuracy studies. The fact that ACOG has not drawn this distinction can be confusing to clinicians in the United States. One wonders if the differentiation is clinically relevant and whether ACOG is possibly remiss or that level A_D and A_E recommendations are equivalent and warrant rapid compliance in practice. The fact that RCOG has 350% more recommendations (4 vs 18, respectively) on the same topic raises the question on what constitutes a recommendation in national guidelines.

Our fourth finding focuses on the references cited by the national guidelines. Within the 20 months ACOG and RCOG ended their literature search, there were 30 publications on the topic that a national committee considered sufficiently important to cite. Because there is at least 1 focal article per month on this topic, it seems that guideline should be revised or updated frequently. It is noteworthy that almost 75% of RCOG citations were published by March 1999, when ACOG closed its search for relevant articles, and yet only about 16% of references are common to both guidelines.

The fact that the majority of references are not similar in the 2 guidelines implies that 2 organizations were addressing different aspects of the same problem or they reviewed and interpreted the literature differently. Because both guidelines focused on the same aspects (definition, diagnosis, management, and prevention) of abnormal condition, we think that ACOG and RCOG emphasize pub-

lications differently. Because almost 25% of RCOG references were available after ACOG ended its search, this suggests that important publications have occurred since the practice bulletin was available and perhaps the practice bulletin needs revision.²

There are limitations of the study that need to be acknowledged. We reviewed the 2 guidelines without obtaining information from the authors or the organizations. It would be useful to know, for example, how each organization decided which publication on the topic to include or exclude, what constitutes a recommendation, and whether RCOG was aware of the ACOG guideline on the topic along with the differences between them. Because we compared guidelines on only 1 topic, we cannot generalize the differences we noted to other subject matters. Additional comparison of national guidelines on the same topic could permit a better understanding on how to manage various conditions and to ascertain whether the practice bulletin needs to be modified to be consistent with other evidence-based guidelines. Lastly, we acknowledge that although ACOG¹ and RCOG²⁶ have published how the national guidelines should be developed, we did not determine their compliance.

In conclusion, the comparison of national guidelines on intrauterine growth restriction indicates that whereas they agree on the diagnosis, they differ in methods on how to detect the condition and how to manage it. On the same topic, 2 organizations may not synthesize the literature similarly and make similar recommendations, raising some concerns about the reproducibility of guidelines. Additional detailed comparisons of ACOG, RANZCOG, RCOG, and SOGC guidelines are warranted to assess the consistency among 4 national guidelines and to prompt further research to unify them.

Clinical implications

National guidelines on the same topic, although similar in some aspects, had noticeable variations in the content, references cited, and recommendations made. Variations in national guidelines on the

same topic raise the concern of the reproducibility of synthesizing literature.

Further studies are needed in comparing national guidelines from various countries in recognizing and resolving differences in the synthesis of literature and how recommendations are derived. ■

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