Basic Versus Detailed Sonography

What Do We Miss?

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Objective. The purpose of this study was to evaluate the impact of restrictive versus routine use of "detailed" second-trimester sonography. ***Methods.*** Records of singleton pregnancies undergoing evaluation from 2004 to 2008 were reviewed. A detailed examination (*Current Procedural Terminology* [*CPT*] code 76811) was routinely performed on all patients. Major structural abnormalities were categorized on the basis of whether the structure would be included in a "basic" examination (*CPT* code 76805). Risk factors for anomalies were identified. The Fisher exact test and Student *t* test were used for statistical comparison. ***Results.*** Major anomalies were identified in 218 patients, 75 of whom elected to undergo abortion. In 88 patients (40.4%), the abnormal structure would not be included in a basic examination. Risk factors were not more prevalent in those with anomalies requiring a detailed examination for diagnosis or in those patients who chose to undergo abortion. ***Conclusions.*** Restricting detailed evaluation to those with risk factors would have prevented detection of a substantial proportion of anomalies. ***Key words:*** fetal anomalies; prenatal diagnosis; sonography.

In 2003, a new *Current Procedural Terminology* (*CPT*) code, 76811, was introduced to describe "detailed" evaluation of fetal anatomy.[1] The 76811 code describes a sonographic examination that evaluates structures not included in the "basic" examination, for which the *CPT* code 76805 is used. The basic examination consists of a survey of intracranial, spinal, and abdominal anatomy, evaluation of the 4-chambered heart, and assessment of the umbilical cord insertion site. The *CPT* code 76811 describes an examination including the components of the basic examination as well as detailed anatomic evaluation of the fetal brain, ventricles, face, heart, outflow tracts, chest anatomy, specific abdominal organ anatomy, and the number, length, and architecture of limbs.[2]

According to the Society for Maternal-Fetal Medicine, "*CPT* 76811 is not intended to be the routine scan performed for all pregnancies. Rather, it is intended for a known or suspected fetal anatomic or genetic abnormality."[3] In patients not considered "high risk," abnormalities of some structures will go undetected when only the basic examination is performed. Our objective was to evaluate the impact of restrictive versus routine use of detailed examinations.

Abbreviations
CPT, Current Procedural Terminology

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Materials and Methods

Records of singleton pregnancies undergoing anatomic evaluation after 14 weeks' gestation from 2004 to 2008 were reviewed. Only those undergoing initial anatomic evaluation were included; all second-opinion referrals were excluded. Pregnancies in which fetal anomalies were identified before 14 weeks were also excluded.

A detailed examination, including evaluation of the cardiac outflow tracts, face, limbs, and genitalia, was routinely performed on all patients evaluated in the second trimester. The study population consisted of all pregnancies with major anomalies identified by second-trimester sonography.

The abnormalities included in this study were those considered "major anomalies potentially detectable by ultrasonography" in the RADIUS (Routine Antenatal Diagnostic Imaging With Ultrasound) study.[4] Fetal abnormalities were categorized as "included" or "not included" according to whether the involved structures were included in the basic anatomic examination described for *CPT* code 76805.[2] If an abnormality involved a structure that was not included in the basic examination but would likely be visualized when evaluating an included structure, the abnormality was categorized as included. For example, a chest mass is likely to be identified when visualizing the 4-chamber view of the heart and would be considered an included abnormality.

Risk factors, including family history, pregestational diabetes, abnormal nuchal translucency or biochemical findings, and teratogen exposure, were identified. Differences in risk factors and maternal decisions regarding abortion were compared between the included and not-included groups. The Fisher exact test and Student *t* test were used for statistical comparison. Institutional Review Board approval was obtained for this study.

Results

Excluding those referred for second opinions, 22,335 singleton pregnancies underwent detailed evaluation in the second trimester during the study period. Most of these patients (64.1%) had been scanned at 11 to 14 weeks for nuchal translucency measurement. In our population, all cases of anencephaly, holoprosencephaly, omphalocele, and gastroschisis were identified before 14 weeks and were not included in this study.

Major structural anomalies were identified in 218 pregnancies (1.0%). Sixty-two patients (28.4%) were noted to have risk factors for structural anomalies, although in 20 of these patients, the risk factors were only identified by reviewing medical records and were not known at the time of the sonographic examinations. The most common risk factors were family history (20), abnormal nuchal translucency (15), and abnormal serum screening results (18).

In 130 patients (59.6%), the abnormalities involved structures included in the basic examination. In 88 patients (40.4%), the abnormalities did not involve structures included in the basic examination (Table 1). Seventy-five patients (34.4%) chose to undergo abortion after the diagnosis. There were no significant differences in maternal age, the proportion of pregnancies with risk factors for structural anomalies, or the rate of abortion based on whether the abnormalities involved structures included in the basic examination (Table 2).

Among the 156 patients without risk factors, the abnormalities involved structures included in the basic examination in 94 (60.2%). The rates of abortion were similar for those with abnormalities of structures included in the basic examination compared and those with abnormalities of other structures (25.5% versus 30.6%; $P = .58$).

Table 1. Anomalies Involving Structures Not Included in the Basic Anatomic Examination (*CPT* Code 76805)

Anomaly	n
Clubfoot deformity	35
Cardiac outflow tract anomalies	
Transposition of the great vessels	4
Tetralogy of Fallot	8
Truncus arteriosus	2
Cleft lip ± palate	10
Multiple abnormalities	7
Arthrogryposis	6
Limb reduction defect	6
Ambiguous genitalia	3
Facial teratoma	3
Skeletal dysplasia	3
Fetal warfarin syndrome	1

Table 2. Characteristics of Pregnancies With Anomalies Involving Versus Not Involving Structures Included in the Basic Anatomic Examination (*CPT* Code 76805)

Characteristic	Structure Included (n = 130)	Structure Not Included (n = 88)	*P*
Maternal age, y, mean ± SD	32.7 ± 5.7	33.8 ± 4.9	.14[a]
Risk factors, %	27.7	29.5	.76[b]
Abortion, %	34.1	34.6	>.9[b]

[a]Student *t* test.
[b]Fisher exact test.

Nineteen patients without risk factors underwent abortion after identification of abnormalities of structures not included in the basic examination. These 19 anomalies included transposition of the great vessels (4), arthrogryposis (4), limb reduction defects (4), tetralogy of Fallot (2), ambiguous genitalia (2), facial teratoma (2), and multiple anomalies (1).

If a detailed scan had been done only on those with risk factors (n = 62), and anomalies of structures not included in the basic scan were missed in the remaining patients, 71.6% of anomalies would have been identified with routine use of detailed sonography. If only those with risk factors identified at the time of the scan (n = 42) had undergone a detailed scan, 66.5% of anomalies would have been identified with routine use of detailed sonography.

Discussion

In our patient population, restricting evaluation of fetal anatomy to those structures included in the basic examination (*CPT* 76805) would have prevented detection of a substantial proportion of anomalies. Although these include anomalies that are usually associated with good outcomes, such as clubfoot deformity, anomalies associated with major morbidity, such as cardiac outflow abnormalities, skeletal dysplasia, and arthrogryposis, would also go undetected.

Most anomalies occurred in patients without identifiable risk factors. It is also notable that a substantial proportion of patients with risk factors were not known to be high risk at the time the sonographic examinations were performed. Even with diligent efforts to identify risk factors, however, our data show that a substantial proportion of anomalies would go undetected if detailed sonography were restricted to high-risk patients.

It is clear that an examination that does not include visualization of a given structure is unlikely to identify abnormalities of that structure. Thus, it is not surprising that abnormalities involving the extremities and the face would go undetected. Screening for congenital heart disease, the most common category of malformations, is included in the basic examination. Data clearly show, however, that screening with a 4-chamber view alone has a lower detection rate compared with an examination that includes visualization of the outflow tracts.[5,6] In our population, use of a 4-chamber view alone may have prevented detection of major anomalies such as tetralogy of Fallot, truncus arteriosus, and transposition of the great vessels. Because neonatal intervention is often required for these conditions, prenatal diagnosis is important in formulating multidisciplinary management plans.

In 2007, the American College of Radiology described a "standard" anatomic examination that included the upper lip and, when possible, cardiac outflow tracts. In addition, the components of a "specialized" examination were not specifically defined and would depend on the indication for detailed examination.[7] The American College of Obstetricians and Gynecologists recently endorsed these changes.[8] They would improve the quality of the basic examination by including additional structures as well as by allowing physicians to use discretion in determining what structures should be evaluated in a detailed examination. These changes are not, however, reflected in the 2009 *CPT* guidelines.[2]

At its inception, the objective of the *CPT* code 76811 was to identify a fetal examination to be performed for specific indications and to distinguish this from the routine examination to be done for the general population.[1,3] It is reason-

able to have *CPT* codes that distinguish a standard examination from one done in response to suspicious findings on a basic or limited examination or on the basis of the family history or abnormal serum screening results. Such a *CPT* code should be defined by the experience and expertise of the operator rather than by the list of structures to be examined. The *CPT* codes 76805 and 76811 do not achieve these goals. It is clear that a policy limiting the structures to be examined in all pregnant women will lead to a substantial proportion of major anomalies going undetected.

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