No. 277, May 2012

Counselling Considerations for Prenatal Genetic Screening

This committee opinion has been prepared by the Genetics Committee and approved by the Executive of the Society of Obstetricians and Gynaecologists of Canada.

PRINCIPAL AUTHORS

Lola Cartier, MSc, CCGC, Montreal QC

Lynn Murphy-Kaulbeck, MD, Moncton NB

GENETICS COMMITTEE

R. Douglas Wilson, MD (Chair), Calgary AB

François Audibert, MD, Montreal QC

Jo-Ann Brock, MD, Halifax NS

June Carroll, MD, Toronto ON

Lola Cartier, MSc, CCGC, Montreal QC

Alain Gagnon, MD, Vancouver BC

Jo-Ann Johnson, MD, Calgary AB

Sylvie Langlois, MD, Vancouver BC

Lynn Murphy-Kaulbeck, MD, Moncton NB

Nanette Okun, MD, Toronto ON

Melanie Pastuck, RN, Cochrane AB

Disclosure statements have been received from all members of the committee.

Abstract

This document has been developed to aid clinicians in counselling patients about prenatal screening and to provide assistance in counselling about both positive and negative screening results.

J Obstet Gynaecol Can 2012;34(5):489–493

Key Words: Aneuploidy, prenatal screening, chromosomal anomalies, trisomy

INTRODUCTION

Trisomies 21, 18, and 13 are the most frequently occurring fetal aneuploidies, although all have been observed at term. Eighty percent of fetuses with trisomy 18 or 13 and 30% with trisomy 21 die in utero between 12 and 40 weeks of gestation.

Trisomy 21, or Down syndrome, is the most common viable chromosomal anomaly, with an incidence of 1/770 live births. Individuals with trisomy 21 may have physical abnormalities such as a cardiac defect, early onset Alzheimer disease, and/or increased rates of leukemia, and all will have some degree of developmental delay. The 18- to 20-week ultrasound examination will show no abnormal findings in 50% of fetuses with trisomy 21.

The risk of having an affected fetus increases with maternal age. However, as most pregnancies occur in young women, most fetuses with trisomy 21 occur in younger mothers.

SCREENING

Prenatal screening for fetal aneuploidy is a rapidly changing field, and there are variations in screening protocols both provincially and regionally. Clinicians should be aware of the availability of and protocols for screening in their geographical area.

Biochemical and ultrasound screening tests are now available during pregnancy to assess the risk of having a fetus with trisomy 21. If the risk of trisomy 21 is higher than a specified risk cut-off as determined by the screening program, a diagnostic test (e.g., amniocentesis) is offered to confirm or exclude the presence of trisomy 21 (and some other chromosome abnormalities).

It is important to ensure that these screening tests are offered within the context of an organized program, ensuring laboratory tests and ultrasound operators have appropriate validation to meet quality assurance standards.

Screening is intended to identify women in the general pregnancy population who are at increased risk of having a child with an anomaly. Health care professionals should discuss the screening tests with all pregnant women. Information pamphlets can also be helpful in explaining the purpose and limitations of screening tests, but health care providers should be aware that some women may not have sufficient English or French to understand them. Health care providers must be satisfied that patients understand the screening available and that screening is entirely voluntary, and that they are making an informed decision about whether to have testing. The decision should be documented.

Screening Methods

Screening can be divided into two broad categories:

1. Maternal serum sampling: measure of maternal biochemical markers in the first and/or second trimester of pregnancy. This can be done with or without ultrasound screening.

2. Ultrasound screening: measure of first trimester nuchal translucency and other ultrasound markers in the first and/or second trimester of pregnancy.

Their performance, in terms of sensitivity and specificity, varies according to the approach, but the results are improved by using a combination of these methods. For example, an ultrasound examination is performed in the first trimester, and blood tests in the first and second trimester to provide a single assessment of risk. It is not appropriate to use one method to assess risk and then use another method to give a separate risk assessment. When multiple screening options are available, factors to consider include the detection rate and false-positive rate of the screening test, and the gestational age at the time testing is considered.

Screen Positive Rate

- This is the proportion of the screened population who test positive. It includes both true positives and false positives. Women who screen positive are eligible for and are offered counselling and invasive testing. Most women who screen positive will *not* have a fetus with trisomy 21; that is, they will have a false-positive result.

Sensitivity (Detection Rate)

- Sensitivity refers to the test's ability to detect *all* individuals who have the condition.
- The higher the sensitivity of the screening test, the more likely it is to identify individuals with the condition.
- Sensitivity is the probability that an individual who has the condition will test positive; it is not the risk for trisomy 21 after a positive screening test result.

Specificity

- Specificity refers to the probability that an individual who does *not* have the condition will test negative.
- The higher the specificity of the screening test, the more likely it is to correctly identify individuals who do *not* have the condition.
- Specificity measures the test's ability to identify *only* individuals who have the condition.

Positive Predictive Value

- Positive predictive value is the probability that an individual has the condition given a positive screening result.
- Positive predictive value is determined/assessed on the basis of test sensitivity and specificity, and the prevalence of the condition.

Negative Predictive Value

- Negative predictive value is the probability that an individual *does not* have the condition given a negative screening result.

TIPS FOR PRE-SCREENING COUNSELLING

- Counsel your patient that all pregnant women have some risk of having a fetus affected by trisomy 21, 18, or 13.
- Tell your patient that prenatal screening will use specific maternal and pregnancy factors (e.g., age, ethnicity) to assess her individual *risk* of having an affected fetus.
- Discuss the following points with your patient.
  - Maternal age is one factor used in the assessment of risk, and the screening result is more likely to be positive with increasing age.
  - A positive screening result may provide an older woman with a risk assessment/adjustment lower than the risk associated with her age alone.
  - The screening may assess a younger woman's risk as greater than that indicated by her age alone, but it may not be high enough to result in a positive screening test result.