Prenatal Screening for Fetal Aneuploidy

Abstract

Objective: To develop a Canadian consensus document with recommendations on maternal screening for fetal aneuploidy (e.g., Down syndrome and trisomy 18) in pregnancy.

Options: Pregnancy screening for fetal aneuploidy started in the mid 1960s, using maternal age as the screening test. New developments in maternal serum and ultrasound screening have made it possible to offer all pregnant patients a non-invasive screening test to assess their risk of having a fetus with Down syndrome or trisomy 18 to determine whether invasive prenatal diagnosis tests are necessary. This document will review the options available for non-invasive screening and make recommendations for Canadian patients and healthcare workers.

Outcomes: To offer non-invasive screening for Down syndrome or trisomy 18 to all pregnant women. Invasive prenatal diagnosis would be limited to women who screen above a set risk cut-off level on non-invasive screening or pregnant women who will be 40 years at time of delivery who, after counselling, chose to go directly to amniocentesis/chorionic villi sampling (CVS). Currently available non-invasive screening options include maternal age combined with (1) first trimester screening (FTS) (nuchal translucency, maternal serum biochemical markers); (2) second trimester serum screening; or (3) two-step integrated screening, which includes first and second trimester serum screening with or without nuchal translucency (IPS, Serum IPS, contingent and sequential). These options are reviewed and recommendations are made.

Evidence: A MEDLINE search was carried out to identify papers related to this topic that were published between 1982 and 2006. Practices across Canada were surveyed. A consensus document was drafted and reviewed by committee members.

Values: The quality of evidence and classification of recommendations followed discussion and consensus by the combined committees of SOGC (Genetics, Diagnostic Imaging) and CCMG (Prenatal Diagnosis).

Benefits, Harms, Costs: These guidelines are intended to reduce the number of amniocenteses done when maternal age is the only indication. This will have the benefit of reducing the numbers of normal pregnancies lost because of complications of invasive procedures. Any screening test has an inherent false positive rate, which may result in undue anxiety. A detailed cost-benefit analysis of the implementation of this guideline has not been done, since this would require health surveillance and research and health resources not presently available; however, these factors need to be evaluated in a prospective approach by provincial and territorial initiatives.

Key Words: Placenta previa, placenta accreta, management, prenatal diagnosis, ultrasound, Caesarean section, transvaginal sonography, low-lying placenta
Recommendations

1. All pregnant women in Canada, regardless of age, should be offered, through an informed consent process, a prenatal screening test for the most common clinically significant fetal aneuploidies in addition to a second trimester ultrasound for dating, growth, and anomalies. (I-A)

2. Maternal age screening is a poor minimum standard for prenatal screening for aneuploidy and should be removed as an indication for invasive testing. Amniocentesis/chorionic villi sampling (CVS) should not be provided without multiple marker screening results except for women over the age of 40. Patients should be counselled accordingly. (I-A)

3. In 2007, as a minimum standard, any prenatal screen offered to Canadian women should have a 75% detection rate with no more than a 5% false positive rate for Down syndrome. The performance of the screen should be substantiated by annual audit. (III-B)

4. First trimester nuchal translucency should be interpreted for risk assessment only when performed by sonographers/sonologists trained and accredited to provide this service and with ongoing quality assurance. (II-2A) It should not be offered as a screen without biochemical markers except in the context of multiple gestation pregnancies. (I-A)

5. For women who undertake first trimester screening (FTS), second trimester serum alpha fetoprotein (AFP) screening and/or ultrasound examination is recommended to screen for open neural tube defect (ONTD). (II-1A)

6. First trimester screening (FTS), the first step of integrated screening (with or without nuchal translucency), contingent, and sequential screening are performed in an early and relatively narrow time window. Timely referral is critical to ensure women are able to undergo the type of screening test they have chosen. (II-1A)

7. Soft markers or anomalies in the 18- to 20-week ultrasound can be used to modify the a priori risk of aneuploidy established by age or prior screening provided the scan is undertaken in an established centre performing tertiary level ultrasound. In the absence of ultrasound soft markers or anomalies, a negative likelihood ratio of 0.5 should be used. (II-2B) Evaluation of the fetal nasal bone in the first trimester remains technically difficult and should not be incorporated as a screen until locally established as an effective risk assessment tool. (III-D)

8. Health care providers should be aware of the screening modalities available in their province or territory. (III-B)

9. Screening programs should be implemented with resources that support audited screening and diagnostic laboratory services, ultrasound, genetic counselling services, patient and health care provider education, and high quality diagnostic testing, as well as resources for administration, annual clinical audit, and data management. In addition, there must be the flexibility and funding to adjust the program to new technology and protocols. (II-3B)

10. Screening programs should show respect for the needs and quality of life of persons with disabilities. Counselling should be nondirective and should respect a woman’s choice to accept or to refuse any or all of the testing or options offered at any point in the process. (III-I)

11. By 2008, screening programs should aim to provide a screen that, as a minimum, offers women who present in first trimester a detection rate of 75% for Down syndrome, with no more than a 3% false positive rate. (III-B)