AMNIOCENTESIS AND WOMEN WITH HEPATITIS B, HEPATITIS C, OR HUMAN IMMUNODEFICIENCY VIRUS

This guideline has been reviewed by the Genetics Committee and approved by Executive and Council of the Society of Obstetricians and Gynaecologists of Canada.

Abstract
Objective: To review the risk of in utero infection through amniocentesis in women with hepatitis B, hepatitis C, or human immunodeficiency virus (HIV).

Outcomes: Fetal and neonatal morbidity and mortality.

Evidence: Review articles, meta-analyses, and MEDLINE searches from 1966 to 2002 for English-language articles related to amniocentesis, fetal and neonatal infection, and hepatitis B, hepatitis C, or HIV.

Values: The evidence collected was reviewed by the Genetics Committee of the Society of Obstetricians and Gynaecologists of Canada (SOGC) and quantified using the Evaluation of Evidence guidelines developed by the Canadian Task Force on the Periodic Health Exam.

Recommendations:
1. The risk of fetal hepatitis B infection through amniocentesis is low. However, knowledge of the maternal hepatitis B e antigen status is valuable in the counselling of risks associated with amniocentesis. (II-1C)
2. Amniocentesis in women infected with hepatitis C does not appear to significantly increase the risk of vertical transmission, but women should be counselled that very few studies have properly addressed this possibility. (II-2C)
3. In HIV-positive women all noninvasive screening tools should be used prior to considering amniocentesis. (II-2D)
4. For women infected with hepatitis B, hepatitis C, or HIV, the addition of noninvasive methods of prenatal risk screening, such as nuchal translucency, triple screening, and anatomic ultrasound, may help in reducing the age-related risk to a level below the threshold for genetic amniocentesis. (II-2C)
5. For those women infected with hepatitis B, hepatitis C, or HIV who insist on amniocentesis, every effort should be made to avoid inserting the needle through the placenta. (II-1B)

Validation: These guidelines have been approved by the SOGC Genetics Committee, SOGC Executive, and SOGC Council.


INTRODUCTION

These guidelines are designed to review the risks of in utero infection through amniocentesis in women with hepatitis B, hepatitis C, or the human immunodeficiency virus (HIV), so that obstetric care providers may better counsel these women about the option of genetic or therapeutic amniocentesis.
The quality of evidence reported in these guidelines has been described using the Evaluation of Evidence criteria outlined in the Report of the Canadian Task Force on the Periodic Health Exam (Table).1

**AMNIOCENTESIS AND HEPATITIS B**

In women presenting for prenatal care, hepatitis B has a prevalence of 0.34% to 1.1%.2-4 The rate of vertical transmission in hepatitis B surface antigen (HbsAg) positive women without immunoprophylaxis is approximately 15%, and may be as high as 90% in those women who are HbsAg and hepatitis B e antigen (HbeAg) positive. With appropriate immunoprophylaxis, the rate of vertical transmission drops to 1.5% for women who are HbsAg positive and to 10% for women who are HbsAg and HbeAg positive.5 There have been 115 HbsAg positive women reported to have had genetic amniocentesis.6-9 All of the infants of these pregnancies received hepatitis B vaccination and immunoprophylaxis commencing at birth. In one series, 3 infants (2.6%), delivered of mothers who were HbeAg positive, demonstrated postnatal seroconversion.9 This rate of immunoprophylaxis failure is consistent with rates seen in women who have not undergone amniocentesis.10 These findings would suggest that the risk of fetal hepatitis B infection through amniocentesis is low. However, knowledge of the maternal HbeAg status would be valuable in the counselling of risks associated with amniocentesis.

**RECOMMENDATION**

1. The risk of fetal hepatitis B infection through amniocentesis is low. However, knowledge of the maternal hepatitis B e antigen status is valuable in the counselling of risks associated with amniocentesis. (II-1C)

**AMNIOCENTESIS AND HEPATITIS C**

The prevalence of hepatitis C varies greatly, depending on the population studied. Generally, the prevalence in women of reproductive age is 1% to 2%.11,12 In women in the Canadian federal penitentiary system, however, the prevalence is 40%.13 The prevalence in antenatal clinics in Scotland is 0.6%.13 The rate of vertical transmission is approximately 5% to 10%.14-17 The exact timing of vertical transmission is unknown, but elective Caesarean section does not appear to be preventive.17 The risk of vertical transmission appears to be increased in women whose hepatitis C is associated with active liver disease, in those whose levels of hepatitis C virus ribonucleic acid (HCV RNA) are greater than 10^6/mL, and in women co-infected with HIV.14,17

The only series reporting the use of amniocentesis in hepatitis C positive women describes 22 women, of whom 16 had HCV RNA identified in their serum. All women (median age 39 years) underwent amniocentesis in the fourth month of pregnancy.18 The amniotic fluid samples were tested using polymerase chain reaction for HCV RNA. Of the 16 viremic women, HCV RNA was detected in the amniotic fluid of 1 patient. The placenta was anterior in this case. None of the children from these pregnancies, including the child from the pregnancy with HCV RNA positive amniotic fluid, was found to be HCV RNA positive on postnatal testing.18 Although somewhat reassuring, little is learned from this series, as the expected number of seropositive children would be only 1 or 2,
thus it may be by chance that no seroconversion was identified. Amniocentesis in women infected with hepatitis C does not significantly increase the risk of vertical transmission, but women should be counselled that very few studies have properly addressed this possibility.

RECOMMENDATION
2. Amniocentesis in women infected with hepatitis C does not appear to significantly increase the risk of vertical transmission, but women should be counselled that very few studies have properly addressed this possibility. (II-2C)

HUMAN IMMUNODEFICIENCY VIRUS

The prevalence of HIV in an obstetric population varies greatly, depending on the population studied. The reported prevalence in British Columbia is 0.03%, while in some inner city populations in the United States, the prevalence is as high as 1.5%.19,20 The AIDS Clinical Trials Group 076 study clearly demonstrated a 26% vertical transmission rate, which was lowered to 8% in women who received antepartum, intrapartum, and neonatal zidovudine therapy.21 Many HIV-positive women are now taking multidrug therapy.22 In one French series of 1,632 HIV-positive women in which only 5% received antenatal zidovudine therapy,23 the rate of vertical transmission was 19%.23 Amniocentesis was performed on 13 women and amnioscopy on 26 women, with a vertical transmission rate of 36%. This rate was significantly elevated, compared to that observed in women who did not have invasive needling procedures. The rate of vertical transmission of HIV after amniocentesis in women who have received zidovudine or combined therapy antenatally has not been described. Given the significant elevation in vertical transmission described, efforts should be made to avoid amniocentesis in HIV-positive women.

RECOMMENDATION
3. In HIV-positive women all noninvasive screening tools should be used prior to considering amniocentesis. (II-2D)

RISK OF AMNIOTIC FLUID CONTAMINATION AT AMNIOCENTESIS

Contamination of the fetal amniotic cavity with maternal blood at amniocentesis is common.24 In a study by Giorlandino et al., 20 women underwent a second amniocentesis two weeks after the original amniocentesis because of cell culture contamination.24 At the second amniocentesis all 20 were found to have amniotic fluid contamination based on red blood cell and hemoglobin concentrations.24 Women undergoing their first amniocentesis were used as matched controls and no blood contamination was found at the onset of the procedure. The amount of blood in the amniotic fluid was significantly increased when an anterior placenta was present.24

ASSESSMENT OF RISK AND AMNIOCENTESIS

For women infected with hepatitis B, hepatitis C, or HIV, the addition of noninvasive methods of prenatal risk screening, such as nuchal translucency, triple screening, and anatomic ultrasound, may help in reducing the age-related risk to a level below the threshold for genetic amniocentesis. For those women infected with hepatitis B, hepatitis C, or HIV who insist on amniocentesis, every effort should be made to avoid inserting the needle through the placenta.

RECOMMENDATIONS
4. For women infected with hepatitis B, hepatitis C, or HIV, the addition of noninvasive methods of prenatal risk screening, such as nuchal translucency, triple screening, and anatomic ultrasound, may help in reducing the age-related risk to a level below the threshold for genetic amniocentesis. (II-2C)
5. For those women infected with hepatitis B, hepatitis C, or HIV who insist on amniocentesis, every effort should be made to avoid inserting the needle through the placenta. (II-1B)

CONCLUSION

There is a critical lack of evidence to determine the impact of amniocentesis on the risk of vertical transmission in women with hepatitis B, hepatitis C, or HIV. For this reason, the addition of noninvasive methods of prenatal risk screening, such as nuchal translucency, triple screening, and anatomic ultrasound, may help in reducing the age-related risk to a level below the threshold for genetic amniocentesis. The available evidence suggests the risk of vertical transmission through amniocentesis in women with hepatitis B and hepatitis C is not greatly increased. In contrast, the risk of vertical transmission of HIV appears to be increased through amniocentesis. Efforts should be made to avoid inserting the needle through the placenta in all cases.

REFERENCES


