Pregnancy outcome in amniocentesis and chorionic villous sampling: 10-year report

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Abstract

Background: Chorionic villus sampling (CVS) and amniocentesis are two invasive methods of diagnostic approaches for prenatal diagnosis. The indication, adverse effects and final outcome of these two methods aredifferent. The goal of this study was to compare indication, complications and outcomes of CVS and amniocentesis in pregnant women underwent prenatal screening program.**Methods:** Medical records of 1464 women who underwent CVS, or amniocentesis were reviewed in two tertiary hospitals (imam and women hospitals, affiliated hospitals of Tehran University of Medical Sciences). **Results:** For 1073 patients amniocentesis was performed while for 391 cases CVS was one. Mean maternal age, gestational age, and age at birth of the neonates were significantly lower in CVS group than the other group. Mean needle time was significantly higher in CVS group. Mean needle time was significantly higher in CVS Group (1.3 vs. 1.5, P < 0.001). The most finding of CVS result was minor Thalassemia while trisomy 21 was the most finding in amniocentesis group. Rupture of membranes was the most side effects in amniocentesis group and intrauterine fetal death was the most complication in CVS group. **Conclusions:** Indication, results and complications of CVS and amniocentesis are different. © 2014 Tehran University of Medical Sciences. All rights reserved.

Keywords: Amniocentesis, Chorionic villi sampling, Pregnant women, Prenatal diagnosis, Indication, Complications

Introduction

Chorionic villus sampling (CVS) is an ambulatoryprocedure conducted prior to 12 weeks of gestation for prenatal diagnosis (1). CVS is performed in pregnancies with advanced maternal age, first trimester screening for Down's syndrome, and in high risk groups according to US preventive services task force and the society of obstetricians and gynecologists Canada, in conjunction with the Canadian College of Medical Geneticists (2). It is a safe procedure with reported fetal loss between 0.5% and 1.5% (3). Miscarriage, infection, rhesus sensitization are complications of CVS. Amniocentesis is another invasive diagnostic method for prenatal diagnosis which is invasive and provides information regarding chromosomal abnormalities (4). Although, it is an invasive method, fetal loss rate reported in 0.06% and 1% of performed procedures (5,6). Procedure-related complications after amniocentesis include miscarriage, infection, club foot, and puncture of the placenta. Different factors such as trans-placental needle insertion, angle of puncture, numerous punctures, fetal abnormalities and experience of the operator are related with fetal loss following amniocentesis (7-10). Previous studies showed that different diameters of the needle are important in the occurrence of adverse effects (5,8,11). We designed this study to find out indications, complications and outcomes of CVS and amniocentesis in pregnant women underwent prenatal screening programs..

Materials and Methods

In this retrospective study, medical records of 1464 women who underwent CVS, or amniocentesis were reviewed in two tertiary hospitals (Imam and Women hospitals, affiliated hospitals of Tehran University of Medical Sciences). The procedures were conducted during 10 years, using 22 gauze needles. A structured questionnaire applied to collect information regarding (age, gravidity, live birth, gestational age, placenta location, indication of procedure, alpha-fetoprotein level, procedure complications, final outcome (abortion, live birth, intrauterine fetal death [IUFD]), number of needling, human chorionic gonadotropin level, and age at birth. Statistical analyses performed with SPSS (version 18; SPSS Inc., Chicago, IL, USA). Results are presented as mean ± standard deviations, and frequencies. The χ^2 test with Fisher's exact test was applied for comparing categorical variables and ANOVA test used to compare continuous variables. P < 0.050 was considered statistically significant.

Results

Medical records of 1464 patients reviewed. For 1073 patients amniocentesis was performed while for 391 cases CVS was one. Table 1 shows basic characteristics of patients in both groups. Mean needle time was significantly higher in CVS group (Table 2). The mean number of needle time according to placenta location was not significantly different in both groups (Table 3). The most finding of CVS result was minor thalassemia while trisomy 21 was the most finding in amniocentesis group (Table 4). Rupture of membranes was the most side effects in amniocentesis group, and IUFD was the most complication in CVS group (Table 5).

Discussion

The result of the current study showed that mean maternal age, gestational age, and age at birth of the neonates were significantly lower in CVS group than the other group (Table 6). The results also showed that in both groups, the placenta was located mainly at the anterior position and mean number of needle time in two groups according to the location of the placenta was not significantly different. In CVS group, the previous history of the problem was the most reason for doing the procedure while in amniocentesis group the main reason was abnormal biomarkers. Daniilidis et al. reviewed medical records of patients attended to their clinic for amniocentesis during 4 years (12). In their study, amniocentesis result was normal in 93% and Down syndrome was detected in 4%. The outcome of pregnancy was live births in 89%, stillbirths in 3% (2/73), miscarriages in 1% and terminations in 7%. In our study, down syndrome detected in 5% of cases who underwent amniocentesis and abortion or termination done in 7%. Brambati et al. performed CVS on 1,844 women at weeks 13-20 of gestational age in whom the indication of the procedure was chromosomal anomalies in 85% (13). Tchirikov et al. evaluated 311 patients who underwent amniocentesis. They reported that the indication for amniocentesis was mostly advanced maternal age, followed by positive family anamnesis (4). The most karyotype in their study was trisomy 21, followed by trisomy 18 which is consistent with our finding. They reported no procedure complication in their cases while we detected 8 complications related to the amniocentesis. The mean rate of complications of amniocentesis such as miscarriage, amniotic fluid loss, bleeding, pyrexia, etc.) reported between 1% and 2% in previous studies (5,6,14,15). In a single center 16 years experience, Odibo et al. reported a total fetal loss in 0.4% of patients underwent amniocentesis and 0.26% in the group without this procedure (10).

In CVS group, abortion occurred in 2 (0.5%) which is lower than the rate reported by Choudry et al. (1.5%) (3). Since-mid 1960, when chromosome analysis after amniocentesis introduced by Steele and Breg (16), screening for chrosomal abnormalities before birth becomes possible. Amniocentesis is an invasive method which is the most common prenatal diagnostic procedure. The aim of amniocentesis is obtaining fetal cells derived from skin, mucous membranes, amnion,and umbilical cord for karyotyping or DNA analysis (12). It is usually performed between 15 and 20 weeks of gestational age and performing the procedure before 14 weeks of gestational age is related to the higher rate of miscarriage (12). Literature showed that procedure related complications could be controlled by the size of the needle used for the procedure (5,11,17). In most centers, it is performed by means of a 22- gauze spinal needle transabdominally under ultrasound guidance. The needle size which was used for both procedures in our cases was 22 gauge.In a previous study, Tchirikov et al. used 29 gauge needle for amniocentesis for 316 patients and reported no procedure-related fetal loss. No other complications were observed (4). However, the 29 gauge needle has its limitations such as higher risk of bending and it needs more attention for obese cases (4). The cost of the needle in our center is 1$ but the cost is near 25$ in other countries. CVS is a diagnostic test for inherited disorders which involves removing some chorionic villi cells from the placenta before 14th weeks of gestational age (3). The most indication for CVS is an increased risk of fetal aneuploidies due to advanced maternal age, family history or abnormal screening tests (3). CVS is related with fetal limb reduction defects, preeclampsia, focal placental hemorrhage and inflammation (18). We found none of these complications in this study. **Conclusion** Indication, results and complications of CVS and amniocentesis are different. So, the proper method should be considered for a specific patient.

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