Association of CVS and amniocentesis for Down syndrome with fetal loss

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Abstract

Background: Despite different studies the association of CVS and amniocentesis for Down syndrome with fetal loss is not yet clearly known. Hence in this study, the association of CVS and amniocentesis for Down syndrome with fetal loss was assessed.

Materials and Methods: In this historical-cohort, consecutive subjects with single pregnancy attending the perinatology clinic for first trimester screening in 2014 and 2015 including the CVS and amniocentesis group and control subjects, were enrolled. The fetal loss rates at 7, 14, 60 days, were compared across the groups.

Results: There were no statistically significant differences for fetal loss rates across two groups (P > 0.05) and 1.75% and 1.68% had loss in case and control groups. 9 out of 11 cases in the CVS and amniocentesis group occurred in the first seven days.

Conclusions: Totally, according to obtained results, it may be concluded that there is no association between CVS and amniocentesis for Down syndrome with fetal loss.

Key words: CVS, Amniocentesis, Down syndrome, fetal loss

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Introduction

Amniocentesis and chorionic villus sampling (CVS) are two invasive methods for prenatal diagnosis and pregnant women should be informed about related risk of abortion (1, 2). The total risk of abortion is 1% and 1-2% for amniocentesis and CVS, respectively (1). The reported risks differ in various communities (3-6) and also between amniocentesis and CVS (7). So regarding the risk of abortion the prenatal screening differs according to maternal age and CFTS for Down syndrome leading to alteration of choice from amniocentesis to CVS (8-10).

The related procedure-related risk of fetal loss is decreased to 0.2% and 0.1% for CVS and amniocentesis respectively with improvement of sampling methods (11). High maternal age, smoking, increased nuchal translucency thickness (NT), and low PAPP-A level are related to increased risk of preterm labor and abortion (12-14). These factors are also related to chromosomal abnormalities leading to higher CVS rate (15-18).

Regarding selection bias of those with higher risk of fetal loss in clinical trials and lack of randomization the utilization of results is limited (19). Hence in this study, the association of CVS and amniocentesis for Down syndrome with fetal loss was assessed.

Materials and Methods

In this historical-cohort, 5,216 (with follow-up in 4,078) consecutive subjects with single pregnancy and CRL of 45 to 84 millimeter attending to perinatology clinic for first trimester screening in 2014 and 2015 including CVS and amniocentesis group (n=628) and control subjects (n=3450) were enrolled. The informed consent form was signed and Helsinki Declaration was respected across the study.

NT and β-hCG and PAPP-A at first trimester and data about abortion history, IUFD history, gestational age (according to CRL), type of fertility (IUI, IVF, natural), BMI, smoking, parity, and maternal age were gathered. The fetal loss rates at 7, 14, 60 days, were then compared across the groups. The CVS with double blunt aspiration needle (18-G and 22-G) and amniocentesis with trans-abdominal ultrasound guide single needle 22-G were performed by an expert perinatologist.

The statistical analysis was done with SPSS version 24.0 software. The tests used were Chi-Square and Fisher and independent-sample-T and the significance level was 0.05.

Results

The mean (standard deviation) age was 31.95 (6.89) and 31.07 (7.24) years in case and control groups, respectively (P > 0.05). The mean (standard deviation) gestational age was 11.87 (1.34) and 11.46 (1.32) weeks in case and control groups, respectively (P > 0.05). The mean (standard deviation) BMI was 26.73 (3.51) and 26.49 (3.32) kg/m² in case and control groups, respectively (P > 0.05).

Table 1: Previous gestational history across the groups

Group	Case	Control	P Value
Gravid	1.23 ± 0.701	1.42 ± 0.744	> 0.05
Parity	1.32 ± 0.478	1.10 ± 0.387	> 0.05
Living child	1.05 ± 0.229	1.09 ± 0.422	> 0.05
Abortion	1.38 ± 0.976	1.32 ± 0.637	> 0.05

Previous gestational history, NT, CRL, PAPPA, and Beta-HCG were alike across the groups (Tables 1-3). There were no statistically significant differences for fetal loss rates across the two groups (P > 0.05) and 1.75% and 1.68% had fetal loss in case and control groups, respectively. 9 out of 11 cases in CVS and amniocentesis group occurred in the first seven days. There were no statistically significant differences for preterm labor rates across the two groups (P > 0.05) and 2.07% and 2.06% had preterm labor in case and control groups.

Table 2: NT and CRL across the groups

Group	Case	Control	P Value
NT	1.54 ± 4.643	1.30 ± 1.004	> 0.05
CRL	56.93 ± 57.552	57.55 ± 7.142	> 0.05

Table 3: PAPPA and Beta-HCG across the groups

Group	Case	Control	P Value
Value PAPPA	4.34 ± 0.090	4.10 ± 2.251	> 0.05
Value BHCG	44.07 ± 31.366	41.28 ± 23.787	> 0.05
MOM PAPPA	1.19 ± 0.772	1.13 ± 4.375	> 0.05
MOM BHCG	2.23 ± 2.367	1.67 ± 2.097	> 0.05

Table 4: Fetal loss and Preterm labor across the groups

Group	Case	Control	P Value
Fetal loss	11 (1.75%)	58 (1.68%)	> 0.05
Preterm	13 (2.07%)	71 (2.06%)	> 0.05

Discussion

In this study, the association of CVS and amniocentesis for Down syndrome with fetal loss and preterm labor was assessed. Akolekar et al (20) assessed 33,310 live births, 404 miscarriage, and 142 stillbirth cases and reported that CVS had no effect on miscarriage and stillbirth, as found in our study.

Tabor et al (21) in Denmark reported the fetal loss rates of 1.4% and 1.9% for amniocentesis and CVS which was similar to our study. Antsaklis et al (22) in Greece assessed 69 cases of CVS and 347 amniocentesis cases in the second trimester and reported the fetal loss rates of 4.18% and 4.54% for amniocentesis and CVS. They concluded that CVS is good alternative for amniocentesis as can be concluded from our results.

A review study by Akolekar et al (11) about procedure-related risks for amniocentesis and CVS with use of CINAHL, EMBASE, MEDLINE, and Cochrane databases during 2000 to 2014 showed fetal loss in 324 out of 42,716 amniocentesis cases and 207 out of 8,899 CVS cases. Also the fetal loss was 1.79% in the control group. They showed that risk of fetal loss was low and negligible similar to our study.

Wulff et al (19) assessed 147,987 single pregnancies attending for first trimester screening. The risk of fetal loss was not higher for amniocentesis and CVS in comparison with control group. The rates were 0.08% and 0.21% at third and 21st days for CVS. The rate was 0.56% at 28th day for amniocentesis. They found that the rate of fetal loss was not significantly high as seen in our study.

Totally, according to the obtained results, it may be concluded that there is no association between CVS and amniocentesis for Down syndrome with fetal loss. However further studies with larger sample size and multi-center sampling would result in more definite results with larger generalization potency.

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