ORIGINAL REPORT

Pregnancy Outcome of Chorionic Villus Sampling on 260 Couples with Beta-Thalassemia Trait in North of Iran

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Received: 26 Aug. 2009; Received in revised form: 2 Dec. 2009; Accepted: 3 Jan. 2010

Abstract- Chorionic villus sampling (CVS) is a new method and its true risk of fetal loss and complications is not still clearly determined. The objective of this study was to review the clinical pregnancy outcome of transabdominal CVS (TA-CVS) performed on women with minor beta thalassemia. TA-CVS performed on 300 women with a singleton pregnancy and we could follow 213 women until delivery. Data regarding induced legal abortion, spontaneous abortion, vaginal leakage, Vaginal bleeding and deformity of extremities (limb reduction) were obtained by questionnaire in five years. All CVS were performed by one operator. The mean gestation at time of CVS was 82.4±11.3 days. 79.2% of the procedures were made between 10-13 completed weeks and in other women (20.7%) TA-CVS was performed at 13-16 weeks. The majority (86.9%) required only one puncture. There were 47 pregnancy terminations because of fetal major beta thalassemia diagnosis (18 %). The rate of spontaneous abortion in our study was over ally (1.4%) and in two patients vaginal bleeding was noticed. We didn't find any vaginal leakage and limb reduction in our survey. TA-CVS is an accurate and safe procedure in experienced hands. It should be considered as one of the safe available procedures for women who require prenatal genetic diagnosis and wish to receive earlier diagnostic information for probable termination of pregnancy.

Acta Medica Iranica 2010; 48(3): 168-171.

Key words: Chorionic villi sampling; beta- thalassemia; pregnancy outcome

Introduction

Beta thalassemia is the most common hereditary disorder in Iran, with a 10% incidence of beta thalassemia trait in the north of the country (1).

Contrary to most Muslim countries, since 1998 a Fetwa was issued, allowing pregnancy termination up to 16 weeks of gestation for some genetic disabling disorders including beta thalassemia. This time limitation due to religious believes promotes earlier fetal sampling procedures such as early amniocentesis or choirionic villus sampling (CVS). Although traditional amniocentesis at 16-18 gestational weeks is a well established prenatal diagnosis (PND) procedure which allows collection of fetal cell samples for genetic studies (2,3), but early amniocentesis before 14 gestational weeks has been shown to be associated with a significantly higher fetal loss rate, neonatal talipes equinovarus, respiratory distress and other complications in newborn (2-9). In addition, we need cell culture in early amniocentesis before any genetic study is performed and it takes time at least 2-3 weeks but there is no need of cell culture as enough fetal cell DNA can be obtained from one villi in order to perform fetal genotyping. Although the risk of maternal cell contamination in received samples from CVS are higher than amniocenteses but this risk is nearly inexistent since villi are observed and selected under inverted microscope by a trained operator .Thus if CVS is performed at 10-12 weeks of gestation the final results are usually available within 2 weeks. Therefore if the fetus is affected, pregnancy termination can be performed at a reasonable and legal time in a safer manner (9, l0). So in many genetic centers CVS is the method of choice for fetal sampling for single gene disorders studies (11, 12). Also transabdominal-CVS (TA-CVS) appears to have lower fetal loss rate than transcervical CVS (TC-CVS) (7,13).

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Although CVS is believed to decrease the religious, medical and psychological complications for termination of affected pregnancy compared with later amniocentesis, it's real performance risk is poorly understood and controversial (3,10,12,14-19) and knowing the true adverse effects and their frequency is very important for pregnant women who undergo invasive fetal sampling and for their clinicians. So each woman undergoing such procedure should be informed about the possible risks. Thus there's a need to obtain more information on the potential risks in CVS.

The aim of this study was to evaluate the fetal loss, fetal malformations and other post procedure adverse outcomes in patients undergoing TA -CVS.

Patients and Methods

This study was performed on all pregnant women who referred by genetic laboratory of Babol University of Medical Sciences in order to rollout of fetal major beta thalassemia since March 2001-April 2006.

Women with multiple gestation, active vaginal bleeding before procedure, gestational age more than 16 weeks , recurrent (more than three) unexplained abortions, and systemic medical disease such as overt diabetes, chronic hypertension were excluded from the study. In all women, gestational age, fetal heart motion and uterine and placental position were determined by ultrasound before sampling. CVS was performed under freehand continues ultrasound guidance technique using a 20 gauge (0.9×88^{mm}) spinal needle (B. Braun®, America) by a single principle trained operator and for extracting sample, maximum three needle insertions were done on the same day. After each sampling fetal heart pulsation was shown to the patients. For those cases that sampling failed, the same procedure was repeated one week later. All women also were monitored 30 minutes after CVS and then discharged. The health status of the patients was evaluated by phone at 23-24 gestational weeks (as our first follow up) and by visit at 4-5 weeks after the estimated date of delivery to obtain any information about possible complications and pregnancy outcome (as second follow up), besides all patient were advised to report any complications at any time. Vaginal bleeding, leakage of amniotic fluid and induced or spontaneous abortion until 20 gestational weeks were assessed by the first follow up and out come of the neonate such as neonatal malformation was determined after delivery in the second follow up .

Data were collected and analyzed by SPSS 10. The study was approved by the ethical committee and all women gave their informed consent prior to the procedure.

Results

During the study period, 300 cases of CVS were performed but we were unable to follow 40 women as they moved or changed their phone number. Table 1 shows the baseline characteristics of 260 remaining cases. On the other hand Forty seven women (18%) underwent legal abortion due to the major thalassemia genotype of their fetus, so 213 stayed in the study which their pregnancy outcome is shown in Table 2.

Overally CVS complication was seen in 5 persons (2.3%) (Table 2). No anomaly was seen after delivery in neonates. Mean gestational age and mean age in women at procedure time were 82.4± 11.3 days and 26.02 ± 5.2 years respectively .

Table 1. Baseline characteristics of 260 pregnant women undergoing TA-CVS *

Characteristic	N (%)
Nulliparous	115(44.2%)
Number of puncture:	
1	226(86.9%)
2	27(10.4%)
3	5(1.9%)
>3	2(0.8%)
First trimester puncture	206(79.2%)
Early midtrimester puncture	54(20.7%)

* **TA-CVS**: Transabdominal -chorionic villous sampling

Table 2. Pregnancy outcome in 213 women undergoing TA-CVS

pregnancy outcome	First trimester (n=162)	Early second trimester (n=51)	Total (n=213)
Frequency of spontaneous abortion	3(1.9 %)	0(0%)	3(1.4%)
Vaginal bleeding	2(1.2 %)	0(0%)	2(0.9%)
Vaginal leakage	0	0	0
Deformity of extremity in neonate	0	0	0

Discussion

Invasive prenatal diagnosis using sampling procedures such as CVS provides important information which can be very useful for both the woman and her clinician in making decisions about the management of pregnancy.

In our study we had three patients with pregnancy loss (1.9%) in first trimester TA-CVS, in a Chinese study by LAU kin *et al.* on 1355 women with first trimester TA-CVS, the fetal loss was reported in 1.54% (20).

We didn't have any pregnancy loss at the second trimester CVS which is in accordance with the finding of Philip J *et al.* in America, who found 0.8% spontaneous loss in late CVS between 13-15 gestational weeks (6). Similar results were reported by Bram Bati B *et al.* . in Italy which their CVS fetal loss rate at 11-12,13-14 and 15-20 gestational weeks was 1.02%,0.86%and 0.46% respectively (13).

Although our pregnancy loss rate was found over ally (1.4%), the background of spontaneous loss rate is not clear to us. Tabor *et al.* in their randomized trial reported a back ground fetal loss rate of 0.7% among low risk control group of patients (21). So the incidence of potentially CVS related unintended fetal loss rate can be lower than which we found in our study.

In our survey, no limb reduction was detected while Firth *et al.* suggested a true risk of limb reduction in CVS made at 9 weeks or before, although they mentioned a drop in this risk with advanced gestation after 11 weeks (9). Therefore the reason of no limb reduction in our study may because we preformed CVS after 10 weeks(mean gestational age:82.4±11.3days).

At 2002, Schaap A.H.P *et al.* . in Netherlands studied 1509 women who had transcervical CVS and they found 4.3% fetal loss and also 7.3% congenital malformations in TV-CVS group while the best available data on the incidence of congenital malformations in the general Dutch population was 2.7% of live born children (22).

Although the fetal loss and congenital anomalies in Schaap *et al.* study was higher than ours, it may be explained by the larger sample size, higher maternal age(>32 years) ,and performing Transcervical CVS (instead of TA-CVS) in their study.

So we believe that our complication in CVS was low probably due to our good technique that not invaded the amnion whenever possible and also due to the maternal age in our study (mean: 26.02±5.4 years) which was lower than other studies.

In summary first trimester TA-CVS is an accurate and safe invasive sampling procedure for prenatal diagnostic purposes and should be present as available sampling options in genetic prevention centers.

Acknowledgements

We are indebted to all personnel's of the prenatal clinic for their helping to obtain the information. This study was supported financially by Babol University of Medical sciences.

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