Chorionic Villous Sampling: Differences in Patients' Perspectives According to Indication, Ethnic Group and Religion

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Abstract

Background: The decision to undergo prenatal testing may be influenced by ethnic or religious factors.

Objectives: To evaluate factors that might influence the decision of pregnant women to choose chorionic villous sampling for prenatal testing.

Methods: The study group comprised 239 women referred for prenatal diagnosis who elected to undergo CVS. The data were analyzed according to indication, ethnic group and religion.

Results: Among women undergoing CVS because of advanced maternal age and anxiety, we noted a significantly high proportion of unbalanced families, i.e., with three or more children of the same gender and deviated gender ratio. We found a significant excess of males among the Jewish families and a significant excess of females among the non-Jewish families. Jews were over-represented in the monogenic group while Christian Arabs were over-represented in the maternal age/anxiety group.

Conclusions: The proportion of women who chose CVS for prenatal diagnosis varied according to indication, ethnic group and religion. The data in this study indicate that CVS may have been utilized for balancing families with ≥ 3 or more children of the same sex. Christian Arabs chose CVS more often than the other groups. Jewish women may have utilized CVS for family balancing of both sexes, while non-Jews may have utilized CVS for balancing families with ≥ 3 daughters.

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Decisions concerning prenatal testing involve many factors, and attitudes toward prenatal testing might vary according to cultural background [1], ethnic origin and religion [2]. Utilization of prenatal diagnosis for gender selection in developing countries like India and China, where there is a strong preference for sons, has been widely reported, and unbalanced gender ratios are acknowledged social problems [3,4]. In recent years there is a trend toward honoring requests for gender selection. In the absence of imminent demographic problems arising from sex selection, it becomes an extension of the family's rights to choose the number and spacing of its children [3].

The population of northern Israel is comprised mainly of four ethnic groups: Jews (60%), Moslem Arabs (29.8%), Christian Arabs (5.1%), and Druze (4.6%) [5]. These groups have different cultural backgrounds that might affect their attitudes toward prenatal testing. The present study evaluates the differences in utilization of chorionic villous sampling by the various ethnic groups.

CVS = chorionic villous sampling

Patients and Methods

The study group was recruited from a cohort of 7544 consecutive pregnant women referred to the Bnei-Zion Medical Center, Haifa, Israel, for prenatal diagnosis, and consisted of 239 women (3.2%) who underwent CVS between January 1998 and December 2002. A national program for the prevention of genetic disorders is available free of charge to all Israeli citizens. Prenatal testing is offered to women at risk for severe disorders that can be diagnosed prenatally, and to women aged 35 years or older. Women who opt for prenatal diagnosis without a medical indication have to pay for the test. Patients referred for consultation early in gestation may choose between CVS and amniocentesis. A maternal-fetal medicine specialist and/or a genetic counselor discuss with the parents the advantages and limitations of each of the procedures. CVS is particularly recommended for women at high risk for affected fetuses, i.e., following certain sonographic findings or in cases at high risk for monogenic disorders. However, the final decision regarding which procedure should be used is made by the patient and a written informed consent is obtained. CVS procedures are performed by a maternal-fetal medicine specialist, via either the trans-cervical or trans-abdominal route, between the 10th and 12th week of gestation. Cytogenetic evaluation is performed using a combined procedure of short-term and long-term cultures. Fetal gender is communicated to the parents only if specifically requested. Chi-square test was used for statistical analysis.

Results

During the study period we performed 239 CVS procedures. The number of women who chose CVS according to indication, ethnic group and religion is presented in Table 1. Advanced maternal age was the most common indication for CVS (38.9%), followed by women who named anxiety as their indication for the test (24.3%). Twenty-three percent chose CVS following the birth of a child with a monogenic disorder, or after the diagnosis of the parents as carriers of a gene for a monogenic disorder that could be prenatally diagnosed (the high risk group). The percentage of cases with other indications was much lower. All but three women, with a history of a monogenic disorder, requested to know the fetal gender.

Jews comprised 60% of the general population and accounted for 52.3% of the study group. A significantly higher representation of Jews was found in the monogenic disease group. In this

Table 1. CVS according to indication and ethnic group

	Jews No. (%)	Moslem Arabs No. (%)	Christian Arabs No. (%)	Druze No. (%)	Total No. (%)
Maternal age (>35)	42 (45.2)	18 (19.3)	28 (30.1)*	5 (5.4)	93 (38.9)
Anxiety	14 (24.1)	8 (13.8)	36 (62.1)*	–	58 (24.3)
Previous child with chromosomal anomaly	7 (58.4)	4 (33.3)	1 (8.3)	–	12 (5)
Sonographic findings	13 (81.3)	3 (18.7)	–	–	16 (6.7)
Monogenic disease	46 (82.2)*	5 (8.9)	5 (8.9)	–	56 (23.4)
Parental chromosomal abnormalities	3 (75.0)	1 (25.0)	–	–	4 (1.7)
Total	125 (52.3)	39 (16.3)	70 (29.3)*	5 (2.1)	239 (100)

* Significantly higher compared to the representation of the ethnic group in the general population ($P < 0/001$).

Table 2. Sex ratio in families that opted for CVS according to indication and ethnic group*

	Jews	Moslem Arabs	Christian Arabs	Druze	Total non-Jews
Advanced maternal age					
No. of families	40	9	22	2	33
Males/females	72/34	6/45	9/53	0/10	15/98
Gender ratio	2.11**	0.13**	0.17**	–	0.15**
Anxiety					
No. of families	11	3	20	0	23
Males/females	15/13	1/16	14/58	–	15/74
Sex ratio	1.15	0.06**	0.24**	–	0.20**
High risk indications* **					
No. of families	61	8	3	0	11
Males/females	33/25	4/7	4/4	–	8/11
Sex ratio	1.32	0.57	1.0	–	0.73

* Only families with fully recorded gender distribution were included.

** Gender ratio is significantly different from 1:1 ratio ($P < 0.001$).

*** High risk indications: monogenic diseases, parenteral chromosome abnormality, sonographic findings.

Table 3. Families with ≥ 3 children of the same sex that opted for CVS according to indication and ethnic group*

	≥ 3 males	≥ 3 females	Total (%)
Jews			
Age/anxiety (n=51)	16	4	20 (39.2)
High risk (n=61)	0	2	2 (3.3)
Non-Jews			
Age/anxiety (n=56)	0	19	19 (33.9)
High risk (n=11)	0	1	1 (9.3)
Total			
Age/anxiety (n=107)	16	23	39 (36.4)
High risk (n=72)	0	3	3 (4.2)

* Only families with fully recorded gender distribution were included. (The number of families in each indication group is in parentheses.)

indication group, Jews accounted for 46/56 CVS cases (82.1%) ($P < 0.001$). Moslem Arabs as well as Druze were under-represented in the study group. Together they comprise 34.4% of the general population, yet they accounted for only 18.4% of the study group ($P < 0.001$) [Table 1]. Christian Arabs comprised only 5.1% of the general population but accounted for 29.3% of the study group ($P < 0.001$). The over-representation was particularly marked in the advanced maternal age group and in the anxiety group, where they accounted for 30.1% and 62.1% of the cases within these indication groups, respectively ($P < 0.001$).

Gender ratios in families that requested CVS, according to indication and ethnic group, are shown in Table 2. Only families with a fully recorded gender distribution were included. Among Jewish families, a significant excess of males (72/34) was recorded in the advanced maternal age group, yielding a gender ratio of 2.12 ($P < 0.001$). Gender ratios in the other indication groups were not significantly different from the expected 1:1. In the non-Jewish population, a significant excess of females was noted in the advanced maternal age group as well as in the anxiety group. The gender ratios were 0.15 (15/98) and 0.20 (15/74) respectively. The ratio among non-Jewish families who were in the high risk indication groups – i.e., monogenic disease, parental chromosomal abnormality and sonographic findings – was not statistically different from the expected 1:1 ratio.

The distribution of unbalanced families, i.e., with at least three children all of the same sex, that have undergone CVS is shown in Table 3 according to indication and ethnic group. The study includes 179 families, 112 Jewish and 67 non-Jewish, with fully recorded gender distribution. Forty-two (23.5%) of these families had at least three children, all of the same sex. While unbalanced families constituted only 4.2% (3/72) of the high risk indication group, they constituted 36.4% (39/107) of the advanced maternal age/anxiety group. The proportion of unbalanced families was significantly different between these groups ($P < 0.001$), and the proportion of unbalanced families among the advanced maternal age/anxiety group was markedly higher than that expected by chance. The 20 Jewish unbalanced families in the advanced maternal age/anxiety group comprised 16 families with three or more sons and 4 families with three or more daughters, while the 19 non-Jewish unbalanced families comprised only families with at least three daughters.

Discussion

The results of this study show that in our population CVS is utilized by only 3.2% of the women who undergo genetic prenatal diagnostic procedures. The most common indication for CVS was advanced maternal age; however, approximately 25% of the procedures were performed without a sound genetic indication in women who named anxiety as the reason for their request. We found differences in the representation of the various ethnic groups among the different indication groups. The significantly higher representation of Jews in the "monogenic disease" group may reflect the higher prevalence of these diseases among Jews, as well as the higher awareness of genetic screenings in this population. Christian Arabs were significantly over-represented in the "anxiety" group ($P < 0.001$). Indeed, more than half (36/70) of the Christian Arab women requesting CVS named anxiety as the indication for testing. This proportion is significantly higher than that of Moslem Arabs, 8/39 (20%), or Jews, 14/125

(11.2%), who mentioned anxiety as the indication for the test ($P < 0.001$). There was a significantly higher proportion of unbalanced families, with respect to gender distribution, among all the ethnic groups in the "advanced maternal age" group, but not in the "high risk" group. In the "anxiety" group this difference was significant only among Christian and Moslem Arabs. However, while the Jewish families with unbalanced families had an excess of males, each of the non-Jewish ethnic groups with unbalanced families had a significant excess of females. Though there were very few women who mentioned gender selection as the reason for the test, it is reasonable to assume that in many of the cases these requests were covert, with women requesting prenatal testing on the basis of anxiety or advanced maternal age. Assuming that the desire for gender selection accounted for most of the unbalanced families in this cohort, it is interesting to note the gender preferences in the various ethnic groups. While among the Jewish families, gender selection may have been carried out for the purpose of attaining either a son or a daughter in families with three or more children of the same gender, in the non-Jewish population all the procedures among unbalanced families were performed in families with three or more daughters, most likely for the purpose of attaining a son.

Our policy with respect to sex selection is in accordance with that of the Ethics Committee of the American Society of Reproduction [6]. The committee discouraged the use of prenatal diagnosis solely for gender selection, yet it recommended that the professionals involved respect and weigh ethical concerns that are sometimes in conflict. According to the Israeli abortion law, all requests for termination of pregnancy must receive approval by a committee comprising a social worker and a gynecologist. Gender selection is not among the indications for abortion; however, since it is not difficult to obtain an approval for abortion it is not unreasonable to assume that a request based on another indication may sometimes be a cover for gender selection. The data presented in this study emphasize that despite the official policy the desire to balance families probably exists in all the ethnic groups that we evaluated. Moreover, as long as CVS is available, even without a sound genetic indication, gender selection cannot be prevented.

This study has a limitation: gender selection is not considered an acceptable indication for CVS in our system; thus, the evidence that CVS was indeed performed for gender selection is indirect. Nevertheless, we have no other explanation for the preponderance of unbalanced families with respect to gender distribution among women whose indication for CVS was either advanced maternal age or anxiety.

In summary, our data show that while the majority of CVS procedures are performed for sound genetic indications, such as advanced maternal age and monogenic diseases, some of the tests in the advanced maternal age group as well as many of the tests in the anxiety group may have been performed with the desire for gender selection as a covert indication. Moreover, there are ethnic differences in both the attitude and the gender preference among families that carry out sex selection. Jews may try to balance families with an excess of either sons or daughters, whereas among Arab families if gender selection is carried out it is usually in families with an excess of daughters.

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