Management of Amniocentesis in High Risk Pregnancies and The Evaluation of the Results

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OBJECTIVE: To evaluate amniocentesis results applied to high risk pregnancies in our clinic.
STUDY DESIGN: In this study, we have performed amniocentesis in 16th -24th weeks of 447 pregnancies who had previous history of chromosomally abnormal fetus, high risk in triple test screening, in which abnomal fetus was seen in ultrasonography, high maternal anxiety, and maternal age 35 years old and above. Cytogenetic analyses were applied to all specimens.
RESULTS: Appropriate amount of amniotic fluid was obtained by 98.65%, the successful culture rate was 97.31%, cardocentesis was applied to only one case of 12 cases in which no proliferation was detected in culture The cordocentesis result was 47XX+18. According to cytogenetic evaluation results, chromosomal abnormality was detected in 29 cases (6.65%). In 7 patients Trisomy 21, in 3 cases Trisomy 18, in one case Trisomy 13, in 3 cases triploidy (69,XXX), in one case mosaicism (46XY/47XYY), in 5 cases translocation, in 9 cases inversion type chromosomal abnormality was detected. After 447 amniocentesis, 5 (1.11%) fetal losses developed. In 2 cases the leakage of amniotic fluid, in one case premature rupture of membranes, in one case cramps and vaginal bleeding and in only one case spontaneous abortus was detected. When the maternal educational level of the cases were evaluated, it was found that about one half of the cases had high level education.
CONCLUSIONS: If amniocentesis is carried out by highly skilled physicians and if optimal culture conditions are available, amniocentesis is a valuable invasive prenatal diagnosis method with high accuracy and safety, with minimal complications.
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Key Words: High risk pregnancies, Amniocentesis, Chromosomal abnormality

Prominent innovations have been made in prenatal diagnosis methods together with the usage of new technologies. Particularly, in consequence of the fact that as the age of being maternity extends to mid ages, the frequency of chromosomal anomalies are increased and prenatal diagnosis methods have been used more often in order to diagnose these cases effectively. Thanks to developments in the field of genetics, it has been possible to detect the fetus having an anomaly in the early pregnancy period with the assistance of DNA technology and molecular genetics, and it has been possible to give information to families about their pregnancy.

In selecting the cases having a risk in terms of bearing a baby with chromosomal anomaly and suggesting invasive prenatal diagnosis methods, fatal chromosomal anomaly can be diagnosed more effectively through the extensive usage of triple test and first trimester scanning tests such as Nuchal translucency (NT), Human chorionic gonadotropin (HCG), Pregnancy-associated plasma protein-A (PAPP-A), improvements in the ultrasonography (USG) technology; all aimed at the execution of prenatal diagnosis better and more effective.[1,2]

In order to have a definite diagnosis in the pregnancies having a risk in terms of fatal chromosomal abnormality, prenatal diagnosis methods such as chorion villus sampling and early amniocentesis in the first trimester, amniocentesis or cordocentesis in the second trimester can be applied. Among the methods mentioned above, amniocentesis is the most commonly used invasive prenatal diagnosis method owing to the fact that chorion villus sampling requires more experience, the fetal loss and complication rates are high, early amniocentesis lacking controlled studies about the safety of the procedure, having risk of causing deformities in the fetus, and cordocentesis again requiring more experience and having high fetal loss rates.[2,3]

In recent years, owing to the increase in the usage of triple test and the ultrasound technology, a significant increase in the rates of performing amniocentesis is observed.

Material and Methods

Having applied to the clinic of Gynecology and Obstetrics at Meram Medicine Faculty in Selcuk University in Konya, Turkey, 447 cases (patients) submitted between January 2002 to March 2004, on which amniocentesis process executed owing to a number of indications, were included in the study. A repeat amniocentesis or cordocentesis was pro-

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posed to 12 of the patients because amniotic cells could not be produced. None of the patients accepted repeat amniocentesis, and only one patient accepted repeat cordocentesis.

Amniocentesis indications were as follows in our study; Mother's age being ≥35, determination of fetal anomaly with USG, the risk of Down syndrome being 1/250 and over in the triple test carried out during 15th-22nd pregnancy weeks and having an increased risk of Trisomy 18 and neural tube defects (NTD) in the triple test, history of chromosomal abnormality in their former pregnancy and/or stillbirth with unknown cause, fetal abnormality history, extreme maternal anxiety. Six patients on which amniocentesis were applied were not included in the study for having a twin pregnancy.

Patients were informed about the triple test and 10 ml of blood was drawn on 15th to 22nd weeks of pregnancy. On the same day, Biparietal Diameter (BPD) measurement was carried out and they were sent to Selcuk University Meram Faculty of Medicine Biochemistry Laboratory. After the serums were resolved and analysed, Alpha-fetoprotein (AFP), HCG, uE3 levels were monitored through Immulite 2000 kit. The concentrations of the three serum markers were downloaded to a computer program called Prisca and these values were converted into MoM values appropriate for patients in the same pregnancy week. Computer program assessed, besides these three hormone values, as well as the age of the patient, pregnancy week, weight, neural tube defect history, twin pregnancy, diabetes mellitus and cigarette addiction and gave a risk percentage. As a result, 1/250 for Down syndrome, 1/500 for Trisomy 18, 1/200 for NTD cut off value and ratios over this value were assessed as positive in triple test.

Before the amniocentesis was carried out, a detailed interview with the family was actualized. A detailed history was obtained after determining the career position, educational background and economic status. Complications that may arise concerning the process and the risks of the process were explained to the family in detail. The likelihood of abortus risk (0.5-1%) depending on the process was explained to the families and the signatures of the couples were taken permitting the process.

Amniocentesis was applied to 447 cases who accepted the process after being informed about the possible complications. Between their 16th and 24th pregnancy weeks, amniocentesis was applied. Before the attempt, each fetus was examined in detail through USG and the detected anomaly types were assessed. The place of the placenta, amnion fluid quantity, the point that the attempt will be focused on and the distance of the fetus to the attempt point and its position was assessed in advance. Before starting the process of amniocentesis, sterile sets were prepared. There were sterile surgical gauze, two 10 ml sterile injectors, 20 Gauge 15 cm spinal shot needle and a sterile wrap. After cleaning the abdominal region with povidon iodine, abdominal amniocentesis was performed with the guidance of transabdominal US by paying attention not to pass through placenta as much as possible via using a sterile spinal needle with free hand technique. For the cytogenetic analyze, enough amount of amnion fluid was taken with two 10 ml injectors. After the process, fetal heart motion was checked. 300 microgram anti-Rh IgG was injected to the patients having a risk of Rh alloimmunization.

By using standard methods, long-term cell cultures were established from amnion fluids obtained from amniocentesis process in Selcuk University Meram Medicine Faculty Genetic Lab. Cell groups obtained after the centrifugation of amnion fluids were poured into culture cases by using Chang and Bio AMF-2 nutrition stocks and left for incubation at 37 ºC. When the cultures displayed enough cell reproduction and mitotic activity, cells were halted in the phase of metaphase via adding colcemid solution. Through mechanical and enzymatic methods, chromosomes preparations were prepared from the cells taken from culture cases by the help of standard methods. Preparations were sticked by using Seabright's modified GTG-sticking tape technique. Quantitative and structural chromosome disorders observed in the preparations examined in 1000X magnification were assessed with regards to ISCN 1995. The ones who had normal results were called to routine visits until birth. Pregnancies having chromosomal abnormality, which could not accord with life and having multiple anomaly detected in USG, were terminated upon the request of the family.

For the statistical evaluation of the results, SPSS 10.0 windows program was used. The gist of the data was expressed as average and standard deviation. Chi-square test was used in the comparison of the data. Statistical significance was based on $p<0.05$.

Results

Average motherhood age was 32.74±6.66 (17-45). 229 (51.23%) of the patients were ≥35. There were totally 218 (48.76%) cases below the age of 35. 75 (16.77%) of the pregnants were nullipars, 372 (83.23%) of them were multipar. 401 (89.70%) of the amniocentesis were applied between 16th and 22nd pregnancy week.

When looked into the distribution of the indications of the cases applied on amniocentesis, the biggest group was composed of advanced mother age (≥35). Of the 29 cases in which chromosomal abnormality was detected, 10 (34.48%) were ≥35, 19 (65.51%) were <35. Among these indications 64 (27.94%) out of 229 cases who were ≥35 had no other risk factor. The number of mature age cases being 35 and over, including the ones having risk in the triple test and other risk factors was 165 (72.05%). In the triple test, cases below 35 years old having the risk of Down syndrome, Trisomy 18, NTD risk was 127 (28.41%).

Table 1. Quantitative chromosome anomaly results detected in the cases in which amniocentesis was performed.

Maternal age	Week of AC	Indication of AC	Karyotype results
43	16	≥35	47XY,+21
41	21	≥35	47XX,+21
43	18	≥35	47XX,+21
45	23	≥35	47XX,+21
28	19	Down syndrome risk in TT	47XY,+21
29	20	Down syndrome risk in TT	47XX,+21
20	23	Duodenal atresia+Hydramnios in USG	47XY,+21
23	23	Hydramnios in USG	47XX,+18
25	23	Pes echinovarus+Hydramnios in USG	47XY,+18
42	16	≥35	47XX,+13
20	20	Trisomy 18 risk in TT	69XXX
17	18	Trisomy 18 risk in TT	69XXX
25	18	Trisomy 18 risk in TT	69XXX
26	18	History of Down syndrome	46XY/47XYY (mosaic)

AC: Amniocentesis, TT: Triple test, USG: Ultrasonography

Table 2. Structural chromosome anomaly results obtained through amniocentesis.

Maternal age	Weekof AC	Indication of AC	Karyotype results
40	19	≥35	46XY t(1p;9p)
23	19	Down syndrome risk in TT	46XX t(2;4)(q31;q35)
21	18	History of NTD	46XY t(5;9)(q35;q22)
34	18	Down syndrome risk in TT	46XX t(5;7)(q35;p15)
19	19	Down syndrome risk in TT	45XX t(13q;14q)
26	21	NTD risk in TT	46XX inv (9qh)
21	24	Down syndrome risk in TT	46XY inv (9qh)
19	18	Down syndrome risk in TT	46XX inv (9qh)
35	18	≥35+NTD risk in TT	46XY inv (9qh)
41	19	≥35	46XY inv (9qh)
37	18	≥35	46XX inv (9qh)
27	20	Down syndrome risk in TT	46XX per inv 18
23	16	History of Down syndrome	46XY inv (8)(q13;q24)
31	22	Maternal anxiety	46XY per inv (Y)

NTD: Neural tube defect, t: Translocation, Inv: Inversion

Table 3. Results obtained in amniocentesis cases.

		Successful		Unsuccessful	
	n	n	%	n	%
Cases	447	443	99.10	4	0.89
Sufficient amniotic fluid	447	441	98.65	6	1.34
Cell culture	447	435	97.31	12	2.68
Transamniotic application	390	387	99.23	3	0.76
Transplacental application	57	53	92.98	4	7.01
Cordocentesis	1	1	100	0	0

One hundred and sixty-nine (73.79%) out of 229 cases were applied on triple test. 151 (89.34% of 169 cases) of these cases were found out to be risky in terms of triple test, 18 (10.65% of 169 cases) of them were found out to be having no risk in the triple test. Chromosomal abnormality was detected in the 8 cases (5.29%) of 151 who were ≥35.

In the 18 (4.02%) of our cases, there was a history of a child having Down syndrome. In 17 of them, fetal karyotype was determined and in 2 (11.76%) cases, structural chromosome abnormality was detected, no quantitative chromosome abnormality was determined. One of them was 46XY/47XYY (mosaic), the other one was 46XY inv^{8} (q13;

q24). Reproduction was not attained in the amnion culture of our 1 case. This case did not accept repeat amniocentesis or cordocentesis. This case gave birth at term in our clinic and no abnormality was detected in the baby.

In 12 (2.68%) of the 447 cases on which amniocentesis was applied, no reproduction in the amnion culture was obtained. Repeat amniocentesis or cordocentesis was offered to these cases; however, only 1 case accepted cordocentesis and 11 cases rejected the repeat offer. The karyotype result of this case was determined as 47XX,+18 in cordocentesis by the indication of the advanced mother age, choroid plexus cyst and hydrocephalus. Therefore, karyotype result was determined in 436 (97.53%) of 447 cases which are in the prenatal period. Totally 29 (6.65%) chromosomal abnormality was determined in 436 cases. 15 (3.44%) out of them were quantitative chromosomal abnormalities, 14 (3.21%) of them were structural chromosomal abnormalities. 5 of the structural chromosomal abnormalities were translocation and 9 of them were as inversions.

Quantitative chromosomal abnormality results obtained by amniocentesis were given in Table 1. Also, structural chromosomal abnormality results obtained through amniocentesis was shown in Table 2.

In 436 cases on which amniocentesis was performed and karyotype result was determined, there were following disorders: 7 (1.60%) Down syndrome, 3 (0.68%) Trisomy 18, 1 (0.22%) Trisomy 13, 3 (0.68%) triploid, 1 (0.22%) mosaic, 5 (1.14%) translocation, 9 (2.06%) inversion type chromosomal abnormality were detected.

Pregnancy of 3 cases out of 4 cases in which quantitative and also structural abnormality was detected by USG were terminated through the approval of the family. The other one case (karyotype 47XY+21) did not want any termination, and gave birth in the 33th week as a result of preterm labor.

One case who was applied amniocentesis due to advanced age and whose karyotype was 47XY+21 rejected termination. We learned that this case, who never returned for a visit, gave stillbirth as a result of intrauterine ex fetus. We also learned that another case, who had history of Down syndrome and so amniocentesis was applied, had 46XY/-47XYY (mosaic) karyotype, and she gave birth in a different clinic in the 40th week, with a healthy infant.

All of the other cases (9 cases) with whom quantitative chromosomal abnormality was detected had termination with the family approval in the 18th-25th week.

10 out of 14 cases in which structural chromosomal abnormality was detected gave birth in our clinic on time and no abnormality was detected in the babies. It was learned that other 4 cases gave birth in other centers and the babies were all right. It was detected that 3 of translocations were of paternal-origin and 1 of them was of maternal-origin. In another translocation case, chromosomal abnormality could not be of maternal or paternal origin. Thus, it was thought that de-novo translocations have been formed. All of the translocations were balanced translocations.

Number of the cases in which risk was detected by performing triple test was 127 (28.41%). There were following disorders in them: Down syndrome in 107 (84.25%) cases, NTD risk in 11 (8.66%) cases, Trisomy 18 risk in 9 (7.08%) cases, were detected. The karyotype result was detected in the prenatal period of 122 cases. Totally 12 (9.83%) abnormal karyotypes were determined. 5 (4.09%) of them were quantitative chromosomal abnormality, 7 (5.73%) of them were structural chromosomal abnormality.

In the 102 of 107 cases with whom Down syndrome risk was detected through triple test, karyotype result was detected: In 2 (1.96%) of them, Down syndrome was detected as a result of chromosomal analysis and there were structural chromosomal abnormality in 6 (5.88%) cases.

In all of the 9 cases in which Trisomy 18 risk was detected through triple test, karyotype result was determined, karyotype result was detected as 69XXX in three of them. Karyotype result in 11 cases in which NTD risk was detected was determined and chromosomal abnormality was found out in 1 of them. The karyotype of this case was 46XX, inv (9qh).

In 4 of the 229 cases of ≥35, no reproduction was attained. Cordocentesis was performed on 1 case among these; other 3 cases rejected a new attempt. Therefore, karyotypes in the prenatal period of 226 cases were detected. Chromosomal abnormality was detected in 10 (4.42%) of them. Number of cases in which down syndrome was detected was 4 (1.76%). Trisomy 13 was detected in 1 (0.44) case, Trisomy 18 was detected in 1 (0.44%) case; structural chromosomal abnormality was detected in 4 (1.76%) cases.

Karyotype was determined in prenatal period in all of 21 (4.69%) cases on which amniocentesis was performed owing to the maternal anxiety. Chromosomal abnormality was detected in one case. Its structural chromosomal abnormality was [46XY per inv (Y)]. The educational distribution of the cases was as follows: 15 (71.42%) of them were graduates of university, 4 (19.04%) of them graduates of high school, 2 (9.52%) of them were graduates of elementary school. There were no risk factors in terms of chromosomal abnormality in these cases.

447 amniocenteses and 1 cordocentesis were applied on our cases (n: 447). The results obtained as an attempt technique and cell culture success was shown in Table 3.

Plenty of amnion fluid was taken from 443 cases, where as in 4 cases amnion fluid taken from owing to oligohydramnios was found out to be insufficient. Also no cell culture was obtained in 4 of them. These cases rejected new attempt. Reproduction was obtained in amnion culture of 2 cases.

No reproduction was obtained in 12 (2.68%) of 447 cases on which amniocentesis was performed. Cordocentesis was performed on one of them and karyotype result was brought in as 47XX, +18, whereas 11 cases rejected new attempt. The reasons for no reproduction in culture were reported as inadequate amnion fluid in 4 (33.33%) cases, colorful amnion fluid in 5 (41.66%) cases and contamination in 3 (25%) cases.

Transamniotic attempt on 390 (87.24%) of the cases, and transplacental attempt on 57 (12.75%) of them was performed as there was anterior lying placenta.

Transamniotic first attempt on 3 cases and transplacental first attempt on 4 cases became unsuccessful, second attempts became successful. 4 (1.02% 0f 390 cases) of 5 abortus were formed in transamniotic attempt, 1 (1.75% of 57 cases) of them was formed transplacental attempt. No significant difference was observed between the frames of the attempts in terms of fetal morbidity and fetal loss ($p>0.05$).

Cases were taken into surveillance with regard to possible complications at least 21 days. Complications emerged after amniocentesis was shown in Table 4.

Table 4. Complications emerged in the cases on which amniocentesis was applied.

Complications	Number of cases (n:34)	%(n:447)
Cramp	10	2.23
Vaginal bleeding	2	0.44
Amniotic fluid leakage	4	0.89
Pain	12	2.68
Early membrane rupture	1	0.22
Abort	5	1.11

Total fetal losses depending on the process in our cases were 5 (1.11%). Out of them, 3 were the ones in which fetal abnormality was detected on USG, but their karyotypes were normal. 1 of these 3 cases was aborted owing to amnion fluid leak, 1 was aborted owing to premature membrane rupture and the other was aborted spontaneously. The karyotype results of other 2 cases which were aborted were normal. 1 of them was aborted after amniotic fluid leak, 1 of them was aborted owing to cramp preceding vaginal bleeding. No complications were emerged in any of our 12 cases which described pain after amniocentesis.

We determined that the cases on which we performed amniocentesis were university graduates. 172 (38.47%) motherhood candidates were graduates of universities, 159 (35.57%) of them were graduates of high schools and secondary schools and 116 (25.95%) were graduates of elementary schools.

Discussion

Significant innovations in the prenatal diagnosis methods have been carried out recently. Particularly, the chromosomal disorders increased owing to the fact that motherhood age moved towards to middle age, amniocentesis was started to be used more frequently to diagnose such cases. However, 20% of the babies having chromosomal abnormality, particularly, Down syndrome, are infants of mothers of age over 35, 80% of them are born from mothers <35.[1] The reason is that the fertility rate of the young ages is higher than the mature group. That's why, only if age is taken into consideration, the most parts of fetus having chromosomal abnormality can not be determined. Thus, such scan methods as the triple tests were developed in order to detect the fetuses having chromosomal abnormality of young mothers. Furthermore, the developments in the field of USG scanning make it possible to detect the fetal abnormalities earlier. In the conditions in which there is risk with triple test, fetal anomaly with USG, advanced mother age (≥35), history of chromosomal abnormality, fetal invasive attempts should be implemented to obtain an exact diagnosis. As a consequence of these, there have been a quite a lot of increase in the number of patients on which amniocentesis have been performed.

In a recent study, chromosomal abnormality rate in 436 risky pregnancies that was obtained via amniocentesis was 6.65% with 29 cases. Basaran et al. found chromosomal abnormality as 3.5% with 11 cases out of 301 cases.[4] Chaabouni et al. of Tunusia reported this rate as 4.18% with 130 cases out of 3110 cases. What is more, they stated that 65.05% of the cases were older than 35.[5] Evans et al. reported this rate as 1.2% in the normal population.[6] Our 6.65% rate is fairly high. We think that this high rate depends on the facts that there were more cases with older ages with higher risk, and other cases incited to us from other clinics. Chromosome anomaly was 6 times higher than of normal population. This result puts forth the necessity of amniocentesis that we performed.

The most frequent amniocentesis indication was older motherhood age by 229 cases of (%51.23). Second frequency rate was mothers below 35 who were detected by triple test of 127 (28.41%) cases. Bal et al. recorded 51% old age participation.[7] Chaabouni et al. reported older age indication as 65.05%.[5]

229 (51.23%) cases were above age 35, 218 (48.76%) cases were below 35. 10 (34.48%) chromosomal abnormality was detected in older age group, whereas 19 (65.51%) of them were detected in young age group. Duric et al. reported that 73.10% of their total 2833 cases were in the older age group, 16.66% of 24 cases in which chromosomal abnormality was detected were in the young group, 83.33% were in the older group.[8] Chaabouni et al. gave the same results as follows: Out of 3110 total cases; 65.05% were in the older group, 38.46% of 130 chromosomal anomaly cases were in

the young group, %61.53 were in the older group.[5] The fact is that lower chromosomal abnormality rates detected in our older age group was surprising. We think that this is so owing to the fact that risky patients were forwarded to our clinic from other centers.

We determined 7 (1.60%) Down syndromes, 3 (0.68%) Trisomy 18, 1 (0.22%) Trisomy 13, 3 (0.68%) triploidy, 1 (0.22%) mosaic, 5 (1.14%) translocation and 9 (2.06%) inversion type chromosome anomaly, totally. These rates were as follows in Chaabouni et al. study respectively: 1.67%, 0.38%, 0.16%, 0.09%, 0.25%, 0.86% and 0.19%.[5]

In a recent study, karyotypes in prenatal period were detected in 226 cases and chromosomal abnormality was detected in 10 cases (4.42%). Cruikshank et al. detected 3% fetal chromosomal abnormality in older motherhood group.[9] Antsaklis et al. reported this rate as 2.34% in 35 and older mothers among 1406 cases.[10] Chromosomal abnormality rate of our study is concordant with the literature (4.42%).

Disorders in our older group are as follows: Down syndrome 1.76%, Trisomy 13 0.44%, Trisomy 18 0.44%, structural chromosomal abnormality (translocation and inversion) 1.76%. Yeagashi et al. reported the same results as follows respectfully in 5484 cases: 0.76%, 0.13%, 0.24% and 0.49%.[11]

Wenstrom et al. encountered with 15 (3%) fetal karyotype abnormality in the risky cases of 516.[12] Cheng et al. reported the sensitivity of the test as 91% by finding out the 20 Down syndrome of 22 fetuses having 20 Down syndrome among 7718 patients.[13] Chaabouni et al. detected chromosomal abnormality in the 3.33% of cases on which they performed amniocentesis owing to the detection of risk in the triple test.[5] On the other hand in our study we detected chromosomal abnormality high as well as 9.83% in the risky cases determined via triple test. We think that this is due to the fact that the patients sent from other clinics to our clinic were risky cases.

One hundred and sixty nine (73.79%) of the 229 cases who are ≥35 were performed on triple test. A risk was detected in 151 (89.34%) of these cases, whereas no risk was detected in 18 (10.65%) of them in the triple test. Chromosomal abnormality was detected in 8 (5.29%) of 151 older age group, 4 (50%) of them were Down syndrome. Antsaklis et al. detected risk via triple test in 487 (34.63%) of 1406 cases. They reported that 21 (63.63%) of 33 cases in which chromosomal abnormality was detected via amniocentesis, took place in this group. They stated that 14 (66.66%) of them were Down syndrome. They told that 12 among 919 cases chromosomal abnormality could not be detected by triple test. As a result, they stated that they proposed amniocentesis to all pregnant patients who were ≥35.[10] We determined 89.34% positive in our cases in the triple test. There fore, we propose every pregnant amniocentesis who is over age ≥35.

Fetal loss was detected in 5 (1.11%) cases of 447 amniocentesis. 2 cases was aborted because of amnion fluid leak, 1 case was aborted because of premature rupture of membranes, 1 case was aborted because of cramp and vaginal bleeding, 1 case was aborted spontaneously. Basaran et al. detected fetal loss rate as 2.45% in their study having the scope of 427 cases.[4] Antsaklis et al. reported fetal loss rate as 1.77% among 1406 cases.[10] Roper et al. reported this rate as 1.2% in their study.[14]

Transamniotic attempt was performed on 390 (87.24%) of our cases, transplacental attempt was performed on 57 (12.75%) of our cases. 4 (1.02%) of our 5 fetal losses was recorded in transamniotic and 1 (1.75%) of them was recorded in transplacental attempt. In some studies, it was reported that there had been an increase in the frequency of complication depending on the process when amniocentesis was performed by passing transplacental.[15, 16] In some publications such risk increase could not be displayed.[17, 18] No statistically significant difference was observed between both attempts frames in terms of fetal loss and fetal morbidity in our study.

Cases which had no reproduction in culture at amniocentesis were determined as 12 (2.68%). Insufficient amnion fluid was detected in 4 (33.33%) of them, colorful amnion fluid was detected in 5 (41.66%) of them and contamination was detected in 3 (25%) of them. No reproduction in 64 (2.05%) cases was reported by Chaabouni et al. among 3110 cases and they stated that there had been contamination in 78% of them.[5] Our failure rate is consistent with the literature.

Amniocentesis was performed on 21 (4.69%) of our cases because of maternal anxiety. According to Wertz and Fletcher, 75% of the experts approach the execution of amniocentesis owing to such indication and as a reason they point out the elimination of maternal anxiety.[19] No complications were appeared in our study in the cases on which we performed amniocentesis because of maternal anxiety and 1 inversion was detected in karyotype result (46XX per inv Y).

We detected that the patients who had had amniocentesis were generally university graduates (38.47%). Verjaal et al. reported that the cases of university graduates (65%) were in majority.[20] This fact displays that when the educational status enhances, cases accepting prenatal diagnosis also increase.

As a consequence; if amniocentesis is performed by expert physicians and optimum culture conditions are present, we may say that it is still the most valuable invasive prenatal diagnosis method of all, because in this method complications are few and its accuracy and reliability is high.

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