Obstetrics; *Maternal-Fetal Medicine and Perinatology*

Retrospective Evaluation of Amniocentesis Cases

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OBJECTIVE: The aim of this study is to evaluate retrospectively the indications, karyotype results and complications of amniocentesis that we performed in our clinic.
STUDY DESIGN: Between January 2005 and May 2008 at the Department of Obstetrics and Gynecology Clinic of Kahramanmaras Sutcu Imam University, 340 amniocentesis procedure were performed.
RESULTS: The biggest amniocentesis indication group, with 47% (160 in 340), was high risk at triple test followed by the advanced maternal age with 25% (86 in 340). Chromosomal abnormality was found in 15 (4,4%) of 340 cases after the result of karyotype analyses. Chromosomal abnormality was determined in 3 of the 160 patient (1,8%) with high risk at triple test, 3 of the 86 patient (3,5%) with advanced maternal age, 1 of the 29 patient (3,4%) with high risk at double test, 6 of the 41 patient (14,5%) with abnormal ultrasound findings, 2 of the 7 patient (28,6%) with increased NT thickness. Six cases (1,7%) had vaginal bleeding in the week following amniocentesis and 3 of these (0,9%) ended in abortion.
CONCLUSION: Although it might lead to serious complications including fetal loss, amniocentesis is the most commonly and easily performed, and reliable invasive test for prenatal diagnosis of genetic disease.

Key Words: Amniocentesis, Chromosomal abnormality, Kahramanmaraş

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Introduction

Today the main purpose of the modern maternal and fetal medicine is to diagnose the genetic anomalies in the prenatal period and take precautions against to type of their pathologies.[1] Fast progress at biochemical and cytogenetic techniques, advances in imaging technology and application of medical treatment with intrauterine surgery has brought in a patient identity to fetus.[2] In 1980's and 1990's for prenatal screening of chromosomal abnormalities, a non-invasive triple test was used extensively, however, recently, widespread use of early amniocentesis and CVS (chorionic villus sampling) in the first trimester has directed the researchers to double test composed of NT (nuchal translucency) with free B-hCG and PAPP-A.[2]

At the present time fetal karyotype can be diagnosed prenatally with CVS (only in first trimester), amniocentesis (in first or second trimester) and cordocentesis at later weeks.[3] Valenti et al. reported firstly successful diagnoses of Down's syndrome in 1968.[4] While the needle was inserted into amnion fluid blindly during the procedure in 1960's, now it is performed under ultrasound guiding.[3] Although amniocentesis can be performed between 14-22 weeks, it is commonly performed at 16-17 weeks of gestation for prenatal diagnosis, when it is likely that there are sufficient fetal cells to allow successful culture.[3] The risks of amniocentesis are leakage of amniotic fluid, vaginal bleeding, uterine contractions, chorioamnionitis, failure to obtain a sample, fetal loss and possible fetal injury.[5] Complications are in reverse proportion with the experience of clinician.[6] The total fetal loss rate related to the procedure is often calculated to be around 0.5%.[5] Advanced maternal age (>35), habitual abortus, abortus or labour with chromosomal anomalies, abnormal karyotype of parents, history of infant labour with multiple major malformations, high risk at double and triple test, abnormal ultrasound findings and anxiety are the indications of amniocentesis.[7] The most common indication for amniocentesis was advanced maternal age in 1990s, but recently the high risks at non invasive screening tests are foreground.[7]

In this study we aimed to examine retrospectively the indications, karyotype results and complications of amniocentesis that we performed in our clinic in the last 3 years.

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Material and Method

Between January 2005 and May 2008 at the Department of Obstetrics and Gynecology Clinic of Kahramanmaras Sutcu Imam University, 340 amniocentesis procedure were performed. Before amniocentesis, the patients were informed about the importance of karyogram, amniocentesis procedure and complications. Informed consents were obtained from all patients and husbands. Before the procedure, a detailed USG was done and a proper place away from placenta was choosen for needle insertion. Thereafter a sterile sponge, two of 10 ml and one of 5 ml disposable injector, a 22 G spinal needle were prepared on a sterile coat. Maternal abdomen skin is disinfected with poviodine iodine. Without using anestesia, with Aloka 4000 color USG doppler (3,5 mhz probe), a 20-22 G spinal needle was inserted with free hand technique into amnion fluid avoiding the fetus. The first 1-2 ml amnion fluid taken was rejected in order to avoid maternal cell contamination. Following 20 ml of amniotic fluid was aspirated. After the procedure we demonstrated the fetus to the mother, especially the fetal heart beat. We put the light colored and clear amniotic fluid into an empty tube and bloody and blurry fluid into a tube with medium. All the amniotic fluids transported to laboratory in 24 hours. After the the procedure, Anti-D immune globulin is administered to all women with Rh Incompatibility. One week and one month after the procedure patients were appointed for control.

Cases were evaluated retrospectively for indications and complications of amniocentesis, and genetic karyotyping results.

Results

Median age of 340 patient was 29 years (18-46), median age of 86 patient that amniocentesis performed due to advanced maternal age was 38,6 years (35-46). The amniocentesis indications were as; advanced maternal age (35 years and above), high risk at double test (1/300 and above) and triple test (1/270 and above), increased NT thickness (≥2,5 mm), history of child with Down syndrome, history of baby anomalies other than trisomy, abnormal ultrasound findings (cystic higroma, choroid plexus cyst, ompholocele etc.). Amniocentesis indications of patients is seen in Table I. Karyotype analysis after amnion cell culture was available for all the subjects.

Table I: Amniocentesis indications

Amniocentesis indications	Number of subjects (%)
High risk at triple test (1/270 and above)	160 (47%)
Advanced maternal age(35 and above)	86 (25%)
Abnormal ultrasound findings	41 (12%)
High risk at double test(1/300 and above)	29 (9%)
History of child with Down syndrome	11 (3%)
Increased NT thickness	7 (2%)
History of baby with anomalies other than Trisomy	6 (2%)

Six cases (1,7%) had vaginal bleeding in the week following amniocentesis and 3 of these (0,9%) ended in abortion. One of these 3 patients had normal karyotype and the other 2 had Trisomi 21. Chromosomal abnormality was found in 15 (4,4%) of 340 cases after the result of karyotype analyses. Abnormal karyotype was determined in 3 of the 160 patient (1,8%) with high risk at triple test, 3 of the 86 patient (3,5%) with advanced maternal age, 1 of the 29 patient (3,4%) with high risk at double test, 6 of the 41 patient (14,5%) with abnormal ultrasound findings, 2 of the 7 patient (28,6%) with increased NT thickness (Table II). No chromosomal abnormality was detected in 17 patient due to indications of history of child with Down syndrome or history of baby with anomalies other than Trisomy.

Table II: Distribution of karyotype results due to amniocentesis indications

	High risk at triple test n:160	Advanced maternal age n: 86	High risk at double test n: 29	Abnormal USG findings n: 41	İncreased NT thickness N: 7	History of child with Down syndrome n: 11	History of baby with anomalies other than Trisomy n:6
Normal	157(98,2%)	83(96,5%)	28(96,6%)	35(85,5%)	5(71,4%)	11(100%)	6 (100%)
Trisomy 21	1(0,6%)	1(1,2%)	1(3,4%)	–	2(28,6%)	–	–
Trisomy 13	–	–	–	–	_	–	–
Trisomy 18	–	–	–	5(12,1%)	_	–	–
Turner syndrome	–	–	–	1(2,4%)	–	–	–
Other chromosomal abnormalities	2(1,2%)	2(2,3%)	–	–	–	–	–

Discussion

The biggest amniocentesis indication group in our study was high risk at triple test as 47% (160 in 340). In the second place was the advanced maternal age with 25% (86 in 340). In 1990's advanced maternal age was in the first place with the incidence ranging from 77,2% to 86,3 %.[7] Later years with the wide use of triple test and recently double test with NT has caused a change in distribution of amniocentesis indications.[7] Like our results Erdemoğlu et al. reported that high risk at triple test, with a rate of 54,09 %, was the biggest indication group in their study.[8] High risk in triple test takes the biggest part among amniocentesis indications because patients usually apply to us in the fourth month of gestation, which is a late time for double test with NT, in our region.

Kong et al. determined 1,9 % chromosomal abnormality at amniocentesis culture.[9] At a multicenter study performed by Karaoguz et al. in our country demonstrated 3% (179 in 6041) chromosomal abnormality.[10] Similar to this Centini et al.[11] and Tseng et al.[12] reported 2,9 % (111 in 3769), 2.9% (207 in 7028) abnormal karyotype respectively. As seen in these studies, the detection rate of abnormal karyotype ranges between 1.9 % and 3%. On the other hand, in our study we detected 4.4% (15 in 340) abnormal karyotype, at a much more ratio than literature. Five of 15 anomaly were Trisomy 21,5 were Trisomy 18, 1 was Turner syndrome, 1 was Triple X (47 XXX) in our study. Remaining 3 cases were (45 XY), rob (14;21) (g10:g10); 46XY, inv^{9} (p11q13) and 46 XY, inv^{9} (p11q13). We attributed the higher rates than the literature to being the only tertiary clinic in our region, so all the high risk pregnancies have sent to our clinic. Again, a similar situation to our clinic, at Dicle University in 2007 Erdemoğlu et al. reported detection of chromosomal abnormality ratio as 4,91%.[8] Especially recent studies concern about the cost effectiveness of the tests made for chromosomal abnormality detection. The most asked and investigated topic is how much of these tests are done unnecessarily. From this point of view 4,4% rate is thought to be a good result.

Although it composed our biggest indication group, the lowest chromosomal abnormality detection rate was 1,8% (3 in 160) in high risk at triple test group. Similar to our results, Kim SK et al.[13] and Hu [14] found an abnormality rate of 1,9 % (9 in 458) and 1,5 % (20 in 1349) in amniocentesis. On the other hand Kim JM et al. determined 4,1% (83 in 2033) chromosomal abnormality.[15] This rate is twice of ours and the 2 studies mentioned above. But general view is that the triple test performed at 16-18 gestational weeks has 70% Down syndrome detection rate with 5% false positive ratio.[1] Due to the false positivity of triple test 60 amniocentesis should be performed to detect one Down syndrome subject.[1] In our study, 1,8% (3/160) ratio is parallel with this.

We accepted the advanced maternal age as 35 years or above, and we found 3,5 % (3 in 86) chromosomal abnormalities. Tseng et al. reported 2.31% (93 in 4026) chromosomal abnormality.[12] Zoppi et al. performed amniocentesis and CVS in pregnants 35 years old and above in 1995 and 1999 and determined 2,4% (39 in 1606) chromosomal abnormality.[16] Recently NT measurement is argued for detecting chromosomal abnormalities due to advanced maternal age. Zoppi et al. reported NT measurement can decrease the necessity of invasive procedures at advanced maternal age.[16]

We determined 3% (1 in 29) chromosomal abnormality in high risk (1/300 and above) at double test group. Von Kaisenberg et al.[17] and Bindra et al.[18] reported 14,7% (40 in 273), 11,7% (129 in 1096) chromosomal abnormality respectively. Our rate is much lower than literature.

We determined 28,6% (2 in 7) chromosomal abnormality in high NT thickness group. Chromosomal abnormality rate with high NT thickness (≥ 2,5 mm) ranged from 14,2 to 33 % in literature.[19-22] Contrary to double test, our rate in high NT thickness group was much more higher than literature. If we incorporate these patients to double test group, 3 (8,33%) chromosomal abnormalities would be detected in 36 subjects, which is similar to the literature. Obido et al. reported nt+biochemistry as the most sensitive test in 11-14 week pregnants, when they compared to only nt measurement, and only biochemistry in their study.[23]

We determined chromosomal abnormality in 6 of 41 patient (14,5%) with abnormal ultrasound findings. This was the highest chromosomal abnormality detection rate between the indication groups in our study. This rate was reported 8.86 % (49 in 553) by Tseng et al.[12] Five of our 6 patients had trisomy 18. Besides no other trisomy 18 was determined in other groups, which has of importance to show that trisomy 18 has major anomalies that can be detected at ultrasound.

Six of the 340 patient (1,7%) that we performed amniocentesis had vaginal bleeding in the first week following the procedure. 3 of them (0,9%) ended in abortion. Borelli et al. reported 1,06 % amnionic fluid leakage, 0,85 % bleeding and 0,78 % abortion after amniocentesis.[24] At a multicenter study performed by Ager and Oliver, total fetal loss, spontonous abortion and intrauterine death ratios were changing between 2,4% and 5,2%.[25] Kong et al. reported fetal loss as 0,86 %.[9]

As a result, although it might lead to serious complications including fetal loss, amniocentesis is the most commonly and easily performed, and reliable invasive test for prenatal diagnosis of genetic disease. Although the usage of the triple test for prenatal anomaly screening is declining recently, it still makes the most common indication of amniocentesis since most of the pregnants in our region apply usually in the 4th month of gestation which is a late time for double test.

Amniyosentez Olgularının Retrospektif Olarak İncelenmesi

AMAÇ: Bu çalışmada kliniğimizde uyguladığımız amniyosentez olgularının endikasyonlarını, karyotip sonuçlarını ve komplikasyonlarını retrospektif olarak incelemeyi amaçladık.

GEREÇ ve YÖNTEM: Kahramanmaraş Sütçü İmam Üniversitesi Kadın Hastalıkları ve Doğum Kliniği'nde Ocak 2005 ve Mayıs 2008 tarihleri arasında 340 amniyosentez işlemi uygulandı.

BULGULAR: Çalışmamızda en yüksek amniyosentez endikasyon grubunu %47 (340 da 160) ile üçlü testte yüksek risk saptanan olgular oluşturmaktaydı. İleri anne yaşı %25 (340 da 86) ile ikinci sırada yer alıyordu. Amniyosentez yapılan 340 hastadan 15 (%4,4)'inde karyotip analizi sonucunda kromozomal anomali saptandı. Üçlü teste yüksek risk nedeniyle amniyosentez yapılan 160 hastanın 3 (%1.8)'ünde, ileri anne yaşı nedeniyle amniyosentez yapılan 86 hastanın 3 (%3,5)'ünde, ikili testte yüksek risk nedeniyle amniyosentez yapılan 29 hastanın 1 (%3,4)'inde, anormal ultrasonografi bulgusu olan 41 hastanın 6 (%15)'sında, NT artışı nedeniyle amniyosentez yapılan 7 hastanın 2 (%29)'sinde kromozomal anomali saptandı. Amiyosentez işlemini takip eden hafta içerisinde 6 (% 1.7) olguda vajinal kanama oldu ve bunların 3 (%0.9)'ü düşükle sonuçlandı.

SONUÇ: Fetal kayıp gibi kötü bir komplikasyonu olsa da amniyosentez günümüzde prenatal tanıda en çok tercih edilen, uygulaması en kolay ve güvenilir invazif bir tanı yöntemidir.

Anahtar Kelimeler: Amniyosentez, Kromozomal anomali, Kahramanmaraş

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