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Amniocentesis Complications in Yazd Baghaeipour Polyclinic: A Cross-Sectional Study

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ABSTRACT

Background: Amniocentesis, like other invasive methods, has complications such as abortion, premature rupture - second pregnancy and at 29 weeks of membranes, infection, bleeding, etc. Here, we aimed to study the complications of amniocentesis in pregnant women.

Methods: This descriptive cross-sectional study was included 409 women with positive first and second stage screening or required amniocentesis referred to Baghaeipour Clinic in 2017. Data was collected by a pre-prepared questionnaire.

Results: The mean age of the patients and gestational age was 33.49 ± 6.51 years and 17.39 ± 1.36 weeks, respectively. 132 patients (32.2%) had a history of abortion. Regarding the frequency of needle passage through the placenta, the results showed that in 369 people (90.2%) the needle did not pass through the placenta and in 40 people (9.8%). The needle has passed through the pair. Regarding the frequency distribution of amniocentesis complications, fetal death in (2.4%), bleeding in (2.2%) and PROM (1.7%) were observed in patients and no case of infection and abortion was observed. In terms of age, gestational age, gestational number, placental location, needle passage, aspirated fluid color, history of abortion and type of delivery, there were no significant differences.

Conclusion: In this study the most common complication of amniocentesis was fetal death (2.4%), followed by bleeding and Spotting (2.2%), PROM (1.7%), infection and abortion, respectively.

Introduction

Amniotic fluid plays many roles in pregnancy.[1] This fluid is the physical space for movement. The fetus also needs this space for physical, musculoskeletal, and physical development. This fluid allows the fetus to swallow, which is essential for the growth and development of the fetal gastrointestinal tract, and also allows the fetus to breathe, which is normal for the growth and development of the lungs. It prevents the umbilicus and protects the fetus from trauma. This fluid has bacteriostatic properties.

Abnormal amniotic fluid volume disorders may indicate abnormalities in its production or circulation, such as placental or fetal underlying pathologies. Amniotic fluid levels are highest in the early third trimester and decrease throughout the semester.[2,3] Amniotic fluid volume increases from approximately 30 ml at week 10 to 200 ml at week 16 and 800 ml by the middle of the third trimester.

About 98% of this liquid is water. A full-term fetus has about 2,800 ml of water, the placenta has about 400 ml of water, and the uterus contains about 4 liters of water at term.[4]

Materials and Methods

In this descriptive cross-sectional study, a total of 409 pregnant women whose first and second stage screening was positive and they wanted to perform amniocentesis to diagnose chromosomal aneuploidy were recruited. The patients who referred to Yazd Baqaipour polyclinic consecutively included the study in 2017.

Amniocentesis was used to diagnose aneuploidy of chromosomal hockey, and patients whose case information was incomplete and inaccessible were excluded from the study. By referring to the clinical archive, data were collected. For data collection tool, questionnaire from Pre-prepared information included: maternal age, gestational age, multiple pregnancies, history of miscarriage, aspirated fluid color (clear / opaque), placental abruption of the placenta, placental abruption (anterior / posterior), amniotic membrane rupture, bleeding and Spotting, chorioamnionitis, abortion, fetal death and type of delivery (cesarean section) If the information was not sufficient, the necessary information was obtained by telephone. The complications of amniotic membrane rupture, hemorrhage and spotting, chorioamnionitis and miscarriage the following week, and fetal death by the end of pregnancy were examined.

Ethical considerations: Given that the study is based on what lists completed by the researcher and in the form of the study was cross-sectional, no consideration was given; Except for the patient's confidentiality in accordance with the treaty Helsinki and assures people that their information will be confidential and only in the right direction It will be used for research purposes. Also, in carrying out this research, there is no additional cost there will be no patients.

Statistical analysis: For the post-collection and control part, the information on the SPSS version 20 software page descriptive analysis used the criteria of percentage, mean and standard deviation, and for analytical analysis, ANOVA and Fisher Exact, T-test, Chi-square tests were used. $P < 0.05$ was considered as a significant level.

Results

The results showed that the mean age of the patients was 33.49 ± 6.51 years, the mean gestational age of the patients was 17.39 ± 1.36 weeks and the mean gestational number was 1.37 ± 2.88.

Regarding the history of abortion, 132 people (32.2%) had a history of abortion. Regarding the frequency of needle passage through the placenta, the results showed that in 369 people (90.2%) the needle did not pass through the placenta and in 40 people (9.8%) The needle has passed through the pair.

Regarding the frequency distribution of amniocentesis complications, fetal death in (2.4%), bleeding in (2.2%) and PROM (1.7%) were observed in patients and no case of infection and abortion was observed. Between distributions the frequency of amniocentesis

complications was not statistically significant in terms of variables: age, gestational age, gestational number, placental location, needle passage, aspirated fluid color, history of abortion and type of delivery in the studied patients.

The results of the study on the frequency distribution of amniocentesis complications (bleeding and spotting, PROM, infection, miscarriage and fetal death) in the studied patients are shown in Table 1.

Table 1. Frequency distribution of amniocentesis complications in the studied patients

Complications	Complication status		Total
	Yes (%)	No (%)	
Bleeding and spotting	9 (2.2)	400 (97.8)	409
PROM	7 (1.7)	402 (98.3)	409
Infection	0	409 (100)	409
Abortion	0	409 (100)	409
Fetal death	10(2.4)	399 (97.6)	409

As shown in Table 1, the most common complication of amniocentesis was fetal death (2.4%), followed by bleeding and Spotting (2.2%), PROM (1.7%), infection and abortion, respectively.

The results of the study on the distribution of amniocentesis complications according to different variables are shown in Tables 2-4. There was no significant difference in the distribution of bleeding (Table 2), PROM (Table 3) and death (Table 4) in term of age, gestational age, number of pregnancies, placenta location, needle passage through the placenta, liquid turbidity, history of abortion and type of delivery in this study.

Discussion

Amniocentesis was first introduced by Bevis in 1952.[5] Diagnostic methods such as amniocentesis are used to diagnose fetal abnormalities, especially chromosomal abnormalities. In a study conducted in 2014, the most common chromosomal disorder diagnosed after amniocentesis was trisomy 21 with a frequency of 0.8%.[6] Another study by Özcan et al., in Turkey found that the main reason for the invasive procedures was the abnormal results of aneuploid screening for trisomy 21, followed by maternal age and fetal structural disorders. Fetal karyotype was abnormal in 154 cases (26.1%). Trisomy 21 was the most common Ana ploidy, followed by trisomy 18, monosomy X, and trisomy 13, the most common chromosomal abnormalities.[7] The results of another study tests showed that between the frequency distribution of none of the bleeding complications, PROM and there is no statistically significant difference in death depending on the type of delivery.

Results of a study by Hassanzadeh, et al., on 121 pregnant women who underwent amniocentesis to diagnose aneuploidy showed that 11 fetuses had aneuploidy, including 5 with Down syndrome, 3 with trisomy 18 and 1 case of Klein filter was identified. There was a statistically significant relationship between increased risk of Down syndrome and amniocentesis results and between increased NT thickness and amniocentesis results. None of the characteristics of the units had a statistically significant relationship with the screening results in the first trimester of pregnancy. Also in the present study, amniocentesis was identified as aneuploidy among 10 high-risk cases identified by screening test in the first trimester of pregnancy.[8]

Considering the applications mentioned in the above studies on the diagnostic value of amniocentesis, the use of this method as a suitable diagnostic test in high-risk individuals seems necessary. But of course, invasive methods such as amniocentesis also have side effects. Studies have been performed in this regard, some of which have reported abortion, maternal bleeding, amniotic membrane rupture, chorioamnionitis and preterm delivery.[6,9] The risk of fetal mortality in amniocentesis is reported to be about 1%. [5] Due to the fact that the results were contradictory about the complications of amniocentesis, our study was conducted to investigate the complications of amniocentesis.

Table 2. Distribution of bleeding after amniocentesis

Variables	Total number	Bleeding		*P*-value
		Yes (%)	No (%)	
Age (yr.)				
17-34	206	3 (1.5)	203 (98.5)	0.335
35-49	203	6 (3.0)	197 (97.0)	
Gestational Age (week)				
≥16	341	8 (2.3)	333 (97.7)	0.653
<16	68	1 (1.5)	67 (98.5)	
Number of previous pregnancies				
1	71	1 (1.4)	70 (98.6)	
2-3	220	4 (1.8)	216 (98.2)	0.568
4-7	118	4 (3.4)	114 (96.6)	
Placenta Location				
Posterior	245	7 (2.8)	238 (97.2)	0.327
Anterior	155	2 (1.3)	153 (98.7)	
Needle Crossing				
No	369	9 (2.4)	360 (97.6)	0.318
Yes	40	0	40 (100)	
Liquid Turbidity				
Glum	10	0	10 (100)	0.631
Transparent	399	9 (2.3)	390 (97.7)	
History of Abortion				
No	277	7 (2.5)	270 (97.5)	0.514
Yes	132	2 (1.5)	130 (98.5)	
Type of delivery				
Cesarean	218	3 (1.4)	215 (98.6)	0.315
NVD*	191	6 (3.1)	185 (96.9)	

*NVD: Normal Vaginal Delivery

Table 3. Distribution of premature rupture of amniotic membrane (PROM) after amniocentesis

Variables	Total number	PROM		*P*-value
		Yes (%)	No (%)	
Age (yr.)				
17-34	206	2 (1.0)	204 (99.0)	0.282
35-49	203	5 (2.5)	198 (97.5)	
Gestational Age (week)				
≥16	341	6 (1.8)	335 (98.2)	0.867
<16	68	1 (1.5)	67 (98.5)	
Number of Pregnancies				
1	71	2 (2.8)	69 (97.2)	
2-3	220	1 (0.5)	219 (99.5)	0.102
4-7	118	4 (3.4)	114 (96.6)	
Placenta Location				
posterior	245	4 (1.6)	241 (98.4)	1.000
Anterior	155	3 (1.9)	152 (98.1)	
Needle Crossing				
No	369	5 (1.4)	364 (98.6)	0.091
Yes	40	2 (5.0)	38 (95.0)	
Liquid Turbidity				
Glum	10	0	10 (100)	0.673
Transparent	399	7 (1.8)	392 (98.2)	
History of Abortion				
No	277	4 (1.4)	273 (98.6)	0.686
Yes	132	3 (2.3)	129 (97.7)	
Type of delivery				
Cesarean	218	3 (1.4)	215 (98.6)	0.710
NVD	191	4 (2.1)	187 (97.9)	

Table 4. Distribution of death after amniocentesis

Variables	Total number	Death (week)			*P*-value
		≤20 (%)	21-24 (%)	≥25 (%)	
Age (yr.)					
17-34	206	0	2 (1.0)	4 (1.9)	0.576
35-49	203	1 (0.5)	1 (0.5)	2 (1.0)	
Gestational Age (week)					
≥16	341	1 (0.3)	2 (0.6)	4 (1.2)	0.563
<16	68	0	1 (1.5)	2 (2.9)	
Number of Pregnancies					
1	71	0	1 (1.4)	2 (2.8)	
2-3	220	0	2 (9.0)	3 (1.4)	0.531
4-7	118	1 (0.6)	0	1 (0.8)	
Placenta Location					
posterior	245	0	2 (0.8)	1 (0.4)	0.071
Anterior	155	1 (0.6)	1 (0.6)	5 (3.2)	
Needle Crossing					
No	369	1 (0.3)	2 (0.5)	5 (1.4)	0.504
Yes	40	0	1 (2.5)	1 (2.5)	
Liquid Turbidity					
Glum	10	0	0	1 (10.0)	0.155
Transparent	399	1 (0.3)	3 (0.8)	5 (1.3)	
History of Abortion					
No	277	0	3 (1.1)	6 (2.2)	0.092
Yes	132	1 (0.8)	0	0	
Type of delivery					
Cesarean	218	0	1 (0.5)	4 (1.8)	0.561
NVD	191	1 (0.5)	2 (1.0)	2 (1.0)	

The results of the study on the frequency distribution of amniocentesis complications (bleeding and spotting, PROM, infection, abortion and fetal death) showed that the prevalence of amniocentesis complications in the studied patients was 6.3%. Also, fetal death was 2.4% in 1 case (0.2%) at 20 weeks, 3 cases (0.7%) in 24-21 weeks and 6 cases (1.5%) in 25 weeks. Bleeding was observed in 2.2% and PROM in 1.7% of patients. There was no case of infection or miscarriage in the patients. The reason for the high rate of fetal death in our study was because the rate of death the fetus was examined until the end of pregnancy. The results of our study also showed that the variables: age, gestational age, gestational number, placenta location, needle passage, aspirated fluid color, history of abortion and type of delivery affect the frequency of amniocentesis complications the results of different studies on the frequency of amniocentesis complications and the factors affecting it have been different. IN a study conducted by Niromanesh et al., the frequency of amniocentesis complications was reported as follows: total fetal death 2%, fetal death two weeks after Sampling 0.4%, fetal death before 20 weeks of gestation 0.4%, preterm delivery 16.5%, low birth weight 15.5%, very low birth weight 4%, membrane rupture 0.4%, Chorioamnionitis was 0% and vaginal bleeding was 0.2%;[10] in this study, preterm delivery and birth weight They were also considered as a complication of amniocentesis and were the most common complications. Also, in this study, as in our study, no case of infection was observed. However, the rate of bleeding as a complication of amniocentesis in this study was less than in our study. Also, the total fetal mortality rate and fetal mortality rate before the 20th week in this study were close to our

study and were consistent with the results of our study.

In a study performed by Anuwutnavin et al., the rate of abortion following amniocentesis was reported to be 0.2%. [6] A study by Pitukkijronnakorn et al., found that the most common pre-abortion symptom was abdominal pain. Almost all cases that lead to miscarriage occur 48 hours after amniocentesis. Also, abortion in pregnant women over 35 years after amniocentesis before 24 and 28 weeks was 0.17 and 0.50%, respectively.[11]

The results of a study by Theodora et al, in 2016 showed that the fetal mortality rate up to 24 weeks was 1.19%. Risk factors associated with an increased risk of miscarriage after amniocentesis include maternal age, spotting and heavy bleeding during pregnancy, a history of termination of pregnancy in the second trimester, a history of more than three miscarriages, fibroids, and dark amniotic fluid.[12] The results of this study did not agree with the results of our study in which none of the factors examined the frequency of amniocentesis complications.

In a study conducted in Turkey, 2 cases of abortion following amniocentesis were reported.[8] The results of Shahbazian et al., study also showed that there were 2 cases (1.2%) of premature rupture of amniotic membrane (PROM) in amniocentesis, one of which occurred 10 days after surgery and caused abortion before 20 weeks. We had one case (0.7%) of abortion in CVS, which occurred 10 days after this operation. In addition, there was 1 case of amniotic fluid leakage (0.7%) which after entering the hospital and observation, the leakage stopped and the pregnancy continued normally. In this study, it was also mentioned that amniocentesis has more complications than CVS.[13] The results of another study by Cederholm et al., showed that neither amniocentesis nor chorionic sampling was associated with severe pregnancy complications such as placental abruption. Women in the amniocentesis group have a lower chance of having a normal birth and also have an increased risk of complications from the amniotic cavity and membrane and hypotonic uterine dysfunction. The risk of amniocentesis complications was higher before 15 weeks of gestation.[14] The results of Shirazi et al., study also showed that the most common complication in the amniocentesis group was membrane rupture and in the CVS group, intrauterine fetal death. As a result, the symptoms, outcomes, and complications of CVS and amniocentesis are different.[15]

The results of a study conducted by Tara et al., which was performed to evaluate the early and late complications of amniocentesis in 1000 patients, showed that among the newborns born, 887 newborns (88.7%) were healthy. In the study of complications in amniocentesis, spontaneous abortion in 10 patients (1%), amniotic fluid leakage in 16 patients (1.6%), spotting in 16 patients (1.6%), amniocentesis in 2 patients (0.2%) and delivery before 37 weeks was reported in 173 patients (17.3%). There were no reports of ocular, cutaneous or orthopedic complications in this study. Also, according to the results of this study, the most common complication of premature amniocentesis was the occurrence of spotting and amniotic fluid leakage and the most common complication of late amniocentesis was before 37 weeks of delivery.[16] The results of another study conducted by Hassanzadeh et al., showed that age, number of deliveries and number of children and history of anomalies in the previous child are statistically significant with the results of amniocentesis.[8]

In general, it can be said that the frequency of amniocentesis complications in different studies varies according to the complications, the community and the country (in terms of health) and the most common complication in different studies is different. It can also be said that the overall frequency of amniocentesis complications is low.

Conclusion

According to the findings of this study, it can be concluded that the prevalence of amniocentesis complications is low and the variables including age, gestational age, gestational number of pregnancies, placenta location, needle passage, aspirated fluid color, history of abortion and type of delivery, they do not affect the frequency of amniocentesis complications.

Conflict of Interests

Authors have no conflict of interests.

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