

The impact of amniocentesis on fetal survival in second trimester oligohydramnios cases with intact membrane

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Abstract

Objective: Insufficient amount of amniotic fluid may cause various complications from intrauterine asphyxia to fetal death associated with fetal movement, fetal growth, lung development and cord compression. There are some studies showing that amniotic fluid restoration by amniocentesis is helpful for the extension of gestation and survival in such patients. In this study, we aimed to present amniocentesis results in second trimester oligohydramnios cases.

Methods: In this retrospective study, the medical records of the patients who had amniocentesis in the Perinatology Department of Mustafa Kemal University between January 2013 and March 2015 were analyzed. All patients had detailed sonographic analysis results before and after the procedures. Ages, gravida values, parities, and weeks of gestation during amniocentesis and after delivery of the patients were recorded. The patients were called by phone and information was obtained about the perinatal survival of the babies.

Results: Twenty-six of 34 patients who had amniocentesis were included in the study. In these patients, the mean age was 29.2, gravida was 2.9, parity was 1.1 and the number of abortion was 0.7. It was found that the mean week of gestation for the procedure was 21.5 (range: 15.3 to 27.2) weeks, amniotic fluid index was 2.1 (range: 0.5 to 4) cm, the number of procedure was 1.6 (range: 1 to 5) and mean week of delivery was 26.4 (range: 18 to 35.4) weeks. Ten (45%) fetuses were born alive. It was reported that 6 of them died during perinatal period. Only 4 (18%) babies were alive. The mean period between the procedure and the delivery was 5.1 (range: 0 to 16.7) weeks.

Conclusion: In cases without ruptures of membrane at second trimester, it seems that amniocentesis is associated with perinatal survival at a rate of 18%. It is seen in these patients that amniocentesis did not provide a certain improvement in poor prognosis.

Keywords: Amniocentesis, oligohydramnios, second trimester.

Özet: Amniyoinfüzyonun membran intakt ikinci trimester oligohidramniyos olgularında fetal sağkalıma etkisi

Amaç: Yeterli miktarda amniyon sıvısının olmaması fetüsün hareketi, büyümesi, akciğer gelişimi ve kord basısı ile ilişkili olarak intrauterin asfiksiden fetal ölüme kadar çeşitli komplikasyonlara sebep olabilir. Amniyoinfüzyon ile amniyon sıvı restorasyonunun bu tür hastalarda gebeliğin uzatılmasına ve sağkalıma faydası olduğuna dair çalışmalar mevcuttur. Biz bu çalışmada ikinci trimester oligohidramniyos olgularında amniyoinfüzyon sonuçlarını sunmayı amaçladık.

Yöntem: Retrospektif planlanan çalışmada Ocak 2013 ve Mart 2015 yılları arasında Mustafa Kemal Üniversitesi, Perinatoloji Bölümünde amniyoinfüzyon yapılan hasta kayıtları incelendi. Hastaların tümünün işlem öncesi ve sonrası ayrıntılı sonografik değerlendirilmesi mevcuttu. Hastaların yaşları, gravidaları, pariteleri, amniyoinfüzyonun yapıldığı ve doğum yaptıkları gebelik haftaları kaydedildi. Hastalar telefonla aranarak bebeklerin perinatal sağkalımı ile ilgili bilgi alındı.

Bulgular: Amniyoinfüzyon yapılan 34 hastadan 26'sı çalışmaya dahil edildi. Ortalama yaş 29.2, gravida 2.9, parite 1.1 ve abortus sayısı 0.7 olarak bulundu. İşlem yapılan ortalama gebelik haftası 21.5 (aralık: 15.3–27.2) hafta, amniyon sıvı indeksi 2.1 (aralık: 0.5–4) cm, işlem sayısı 1.6 (aralık: 1–5) ve ortalama doğum haftaları 26.4 (aralık: 18–35.4) hafta olarak bulundu. 10 (%45) fetüs canlı doğdu. Bu bebeklerin 6'sının perinatal dönemde kaybedildiği rapor edildi. Toplam 4 (%18) bebeğin canlı olduğu öğrenildi. Ortalama işlem ve doğum arasındaki süre 5.1 (aralık: 0–16.7) hafta olarak bulundu.

Sonuç: İkinci trimesterde membran rüptürü olmayan olgularda amniyoinfüzyon %18 oranında perinatal sağkalım sıklığı ile ilişkili görünmektedir. Bu hastalarda amniyoinfüzyonun kötü prognozda belirgin iyileşme sağlamadığı görülmektedir.

Anahtar sözcükler: Amniyoinfüzyon, oligohidramniyos, ikinci trimester.

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Introduction

Oligohydramnios is the condition where amniotic fluid volume is less compared to the week of gestation. Second trimester oligohydramnios may be caused by fetal renal anomaly or obstructive uropathy, preterm premature rupture of membrane (PPRM), fetal growth retardation, placental insufficiency or unknown factors.^[1] Insufficient amount of amniotic fluid may cause various complications from intrauterine asphyxia to fetal death associated with fetal movement, fetal growth, lung development and cord compression.^[2] Second trimester oligohydramnios is seen in about 1% of all pregnancies.^[3] Mortality rate was reported as approximately 80–90% together with the lethal pulmonary hypoplasia. Therefore, early-onset oligohydramnios was mostly considered as a reason for termination in the past.^[4,5] In line with this information, it was determined to prevent potential risks of oligohydramnios and to increase perinatal survival by increasing the volume of amniotic fluid through antepartum transabdominal infusion. Despite the lack of randomized controlled studies, there are studies suggesting that amniotic fluid restoration by amnioinfusion helps the extension of gestation at least until pulmonary maturity is reached.^[6,7] In this study, we aimed to present our amnioinfusion results in second trimester oligohydramnios cases.

Methods

In this retrospective study, the cases that were at their 14–28 weeks of gestation and had amnioinfusion in the Perinatology Department of Mustafa Kemal University between January 2013 and March 2015 were evaluated. All patients had ultrasonographic anatomic analyses before and after amnioinfusion procedure. Ages, gravida values, parities, and weeks of gestation during amnioinfusion and after delivery of the patients and the complications developed after the procedure were recorded. The patients were called by phone and information was obtained about the perinatal survival of the babies. Amnioinfusion procedure was carried out in the direct guidance of ultrasonography after receiving consent forms signed by the patients. Amniotic cavity was reached by 15 mm 20–22 Gauge needle through the localization observed to have the highest volume of amniotic fluid. After it was confirmed that the needle was inside the cavity by about 1 ml fluid aspiration, Ringer's lactate solution warmed at approximate body tempera-

ture was administered at 25–50 ml/min, as 10 ml per each week of gestation. After the procedure, patients had anatomic screening by ultrasonography. All patients had prophylactic antibiotic treatment. Also, the patients with negative Rh factor were applied anti-D prophylaxis.

Results

Six of 34 patients who had amnioinfusion were excluded from the study since their follow-up information could not be accessed, one patient was excluded due to the termination of gestation as fetal anomaly and trisomy 18 in karyotyping were found after the procedure and one patient was excluded since she had amnioinfusion at 31 weeks of gestation, and remaining 26 patients were included in the study. The demographic and clinical characteristics of the patients are shown in the **Table 1**. It was found that the mean week of gestation for the procedure was 21.5 (range: 15.3 to 27.2) weeks, amniotic fluid index was 2.1 (range: 0.5 to 4) cm, the number of procedure was 1.6 (range: 1 to 5) and mean week of delivery was 26.4 (range: 18 to 35.4) weeks. Amnioinfusion was applied once in 18 patients, twice in 4 patients, three times in 2 patients, four times in one patient and five times in one patient. During the follow-up of the patients, termination was carried out in 4 patients by receiving the consent of the patient and her relatives due to the active amniotic fluid discharge during and immediately after the procedure. Nine (41%) fetuses died immediately after the birth, 10 (45%) fetuses were born alive and 2 (9%) of them were found to be intrauterine ex fetus after the post-procedure examination. One (5%) pregnancy resulted in abortion. It was reported that 6 of the live births died during perinatal period. Only 4 (18%)

Table 1. Demographic and clinical characteristics of the patients.

Variable	Mean±SD	Min.	Max.
Age	29.26±5.9	22	24
Gravida	2.9±1.5	1	6
Parity	1.1±1.1	0	4
Week of gestation during amnioinfusion (week)	21.4±3.7	15.3	27.2
Amniotic fluid index (cm)	2.1±0.97	0.5	4
Amnioinfusion number	1.6±1.1	1	5
Week of gestation during delivery	26.4±4.9	18	35.4
Period between procedure and delivery (week)	5.1±4.9	0	17

SD: standard deviation

babies were alive. Demographic characteristics and perinatal survival rates of live births are shown in the **Table 2**. The mean period between the procedure and the delivery was 5.1 (range: 0 to 17) weeks.

Discussion

It is known that fetal urine contaminates amniotic sac in the beginning of the second trimester and fetus starts to swallow amniotic fluid. Therefore, disorders related with fetal urinary/renal system have a significant role in the etiology of oligohydramnios. Maternal and placental factors, rupture of placental membranes in particular, may cause oligohydramnios during second trimester.^[1] In our study, there was no case with fetal renal anomaly, and termination was carried out in 4 patients upon their requests due to active amniotic fluid discharge after amnioinfusion. Therefore, we found in our series including idiopathic oligohydramnios related with the reasons except EMR and renal anomaly that perinatal survival rate was 18% and mean week of gestation extended 5.1 weeks.

The survival rate of the fetuses with second trimester oligohydramnios was reported less than the rates of the cases found at third trimester (10.2%–14.4% vs. 57.7%–85.3%). Hadi et al. reported perinatal mortality rate as 90.1% in patients who admitted with PPRM at weeks 20–25 of gestation and had amniotic fluid below 2 cm during admission.^[9] It was reported in a review that only 8 (14%) of 57 babies had neonatal survival in second trimester oligohydram-

nios.^[10] However, an increase in the survival rates of fetuses after amnioinfusion was reported in the studies. Fisk et al.^[11] reported survival in 3 of 8 patients who were below 22 weeks of gestation and had weekly transabdominal amnioinfusion. In their study, Ogunyemi et al.^[12] done a series of amnioinfusion to a group consisting of patients with second trimester PPRM and did no treatment on the other group, and showed that the perinatal mortality rate decreased in the treatment group (83% vs. 33%). In another study performed on idiopathic oligohydramnios cases, it was seen that 8 of 12 cases died after the procedure.^[13]

Extending gestational age by amnioinfusion and improving gestational outcomes as a result were reported in various studies and their results are similar to our study. Ogunyemi et al.^[12] found that the period from antepartum amnioinfusion to delivery was approximately 33 days. Garzetti et al.^[14] found the latent period as 3 weeks in patients who had prophylactic amnioinfusion for PPRM below 25 weeks of gestation. In another study carried out on persistent oligohydramnios cases, it was found that the period up to delivery in cases which did not have amnioinfusion were significantly less.^[6] Turhan and Atacan^[15] showed that amnioinfusion extended the latent period but did not change perinatal outcomes. In their studies, they applied amnioinfusion to 15 of 29 women with oligohydramnios and followed up 14 of them spontaneously without any treatment and found that the latent period was extended 15 days in the amnioinfusion group while the extension was only 8 days in the other group.

Table 2. Demographic characteristics and perinatal survival conditions of live birth cases after amnioinfusion.

Case	Age	Gravida	Parity	Amnioinfusion week	AFI (cm)	Birth week	Peripartum survival
1	22	1	0	19.3	1.5	34	Live
2	30	2	0	23.3	4	35.4	Live
3	23	3	2	16.3	1.6	33	Live
4	34	4	2	19	1.8	27	Ex
5	23	1	0	26.3	1.9	26.6	Ex
6	39	3	2	24	1.4	25	Ex
7	29	1	0	26	0.5	32	Live
8	27	5	3	23	1.2	26	Ex
9	36	4	2	23	1.5	23	Ex
10	28	2	1	27	1.1	29	Ex

AFI: amniotic fluid index

The first condition stating that amniofusion is beneficial in second trimester oligohydramnios is that fetal anomalies can be detected better. As oligohydramnios may spoil ultrasonographic examination under optimal conditions, it was reported that such cases could be screened better with approximately 200 ml amnioinfusion. In a review including unexplained second trimester oligohydramnios cases, it was reported that imaging fetal structures with amnioinfusion increased from 51% to 77%. Also, detection of obstructive uropathies with amnioinfusion increased from 12% to 31%.^[16] In our study, we found trisomy 18 findings in a patient and carried out termination procedure. Hsu et al.^[17] found fetal anomaly in 5 cases after amnioinfusion in their study. The second condition stating that amnioinfusion is beneficial is the facilitation of external cephalic version. However, there is no sufficient relevant data in the literature.^[18] Despite the insufficient data in the literature, it can be considered that the advantage provided by the amnioinfusion can be compensated with the high-resolution ultrasonography devices without any amnioinfusion thanks to the software such as 3D-HD live.^[19] The third condition recommending amnioinfusion is the prevention of sequelae caused by oligohydramnios. It was shown in the sheep models developing full obstructive uropathy that pulmonary hypoplasia is prevented by intraamniotic port in those which had serial amnioinfusion compared to non-amnioinfusion group, and that their lung volumes were comparable compared to the sham group.^[20] Also, there are studies showing that meconium aspiration syndrome can be decreased by amnioinfusion lowering tracheal meconium volume in fetuses with meconium.^[21]

Complications such as chorioamnionitis, endometritis, ablatio placentae, preterm labor, fetal loss and fetal trauma due to the procedure were all reported in the literature. Hsu et al.^[17] reported intrauterine fetal loss in 4 of 17 patients within 2 weeks following amnioinfusion. In our study, we lost two fetuses and had an abortion in one patient after the procedure. However, no major maternal complication developed.

Lack of control group and not knowing long-term follow-up outcomes of the patients are the limitations of our study.

Conclusion

In conclusion, we found that antepartum amnioinfusion in early-onset oligohydramnios cases has a minimal risk

for the mother except PPRM and renal anomaly; however, the prognosis was poor although a slight increase was observed in the fetal survival rates after the procedure.

Conflicts of Interest: No conflicts declared.

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