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Evaluation of Pregnancy Outcomes of Women with Borderline Amniotic Fluid Index Measured in the Second Trimester

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ABSTRACT

Objective: The aim of this study is to evaluate the pregnancy outcomes of pregnant women who had borderline amniotic fluid index (AFI) in second trimester.

Materials and Methods: 71 patients who underwent second trimester ultrasound scan (18-24 weeks) between 1 February and 1 August 2021 at our clinic were investigated retrospectively. Patients with borderline AFI (5-8 cm) and who gave birth in the same center were selected. Pregnancy outcomes such as mode of delivery, gestational age at birth, 1st minute APGAR score and birth weights were examined. All data were obtained from the hospital database.

Results: In the study sample, the mean age was 28.2±6.7, the mean gravida was 2±1.4 and the mean week of gestation in which AFI was measured was 22±2.5. 38.1% of the pregnancies (27 patients) resulted in cesarean section. 18.3% of births (13 patients) occurred at preterm. 16.9% of pregnancies (12 patients) resulted in low birth weight. APGAR score at 1-minute was 8 and above in all term newborns.

Conclusions: Borderline AFI detected in the second trimester is a challenging issue for the obstetricians in terms of clinical management. There is insufficient evidence in the literature regarding the effect of borderline AFI on pregnancy outcomes, and previous studies have reported controversial results. Compared to the findings of previous studies, our results support the studies reporting adverse effects of borderline AFI on pregnancy outcomes.

KEYWORDS
Amniotic fluid index (AFI); borderline AFI; pregnancy outcomes; second trimester.

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Introduction

Assessing the amniotic fluid index (AFI) by ultrasound is important for evaluation of pregnancy and fetal well-being. AFI is calculated by adding the depths in centimeters of largest vertical pockets in each of four uterine quadrants and normal range is 8-24 cm. AFI less than 5 cm is defined as oligohydramnios, and AFI over 24 cm as polyhydramnios[1]. Both oligohydramnios and polyhydramnios are associated with poor pregnancy outcomes. Decreased amniotic fluid, particularly at term gestational weeks, is associated with adverse pregnancy outcomes such as small-for-gestational age newborns, non-reassuring fetal heart rate, stillbirth, and neonatal death.[2]

AFI between 5-8 cm is defined as borderline.[3,4] The potential risks of having borderline AFI during pregnancy are not fully understood and the data on this subject in the literature are limited. Gumus et al.[5] reported that pregnancies with borderline AFI are at high risk for preterm birth, fetal distress and birth weight below the tenth percentile. In another study examining borderline AFI reported that borderline AFI was associated with an increased risk of intrauterine growth restriction (IUGR) and adverse perinatal outcome.[6] However, as in these two studies, most of the studies are based on ultrasound measurements made during term pregnancy. There are very few studies on pregnancy outcomes in case of borderline AFI detected in preterm pregnancy. In this study, we aimed to evaluate the pregnancy outcomes of pregnant women with borderline AFI detected in the second trimester.

Material and Methods

This research is a retrospective study investigating 71 patients who underwent second trimester ultrasound scan (18-24 weeks) between 1 February and 1 August 2021 at perinatology clinic of Erzurum Regional Training and Research Hospital in Türkiye. The patients who had borderline oligohydramnios, and gave birth in this hospital were included in the study. Those with premature rupture of membranes, fetal anomalies, uterine anomalies and twin pregnancies were excluded. All patients who met these criteria were included in the study.

All ultrasound examinations were performed by a single experienced clinician, a maternal-fetal medicine specialist, using the same ultrasound device (Voluson E6; GE Healthcare Ultrasound) with a 3-5 MHz curvilinear transducer. Standardized ultrasonographic examination included assessment of AFI, location of the placenta, uterine and adnexal pathologies, number of fetuses, fetal biometry and fetal anomalies. AFI was obtained by measuring and summing the vertical diameter of the largest amniotic fluid pocket in each of the four quadrants. Borderline oligohydramnios was defined as AFİ was 51 to 80mm.

The following perinatal outcomes were examined in the study: mode of delivery, gestational age at birth, 1st minute APGAR score and birth weights. Birth weight below the third percentile was defined as low birth weight (LBW).

All data (demographic characteristic, ultrasound scan results and birth outcomes) were obtained from the hospital database.

Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki principles. It was approved by the Ethics Review Committee of Erzurum Regional Training and Research Hospital (approval number: 2022/13-141).

Results

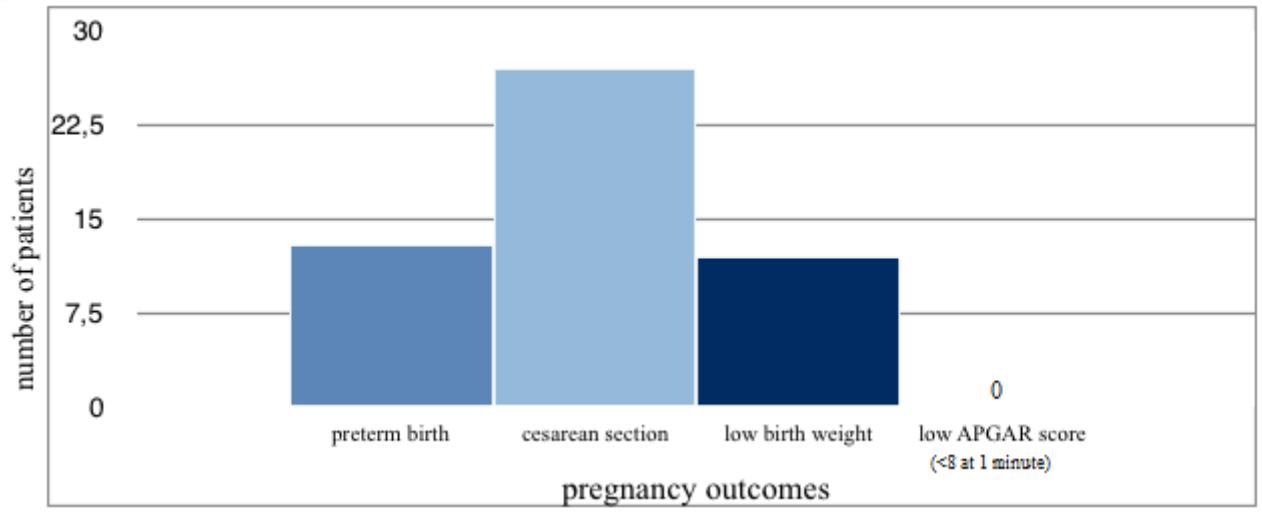
Demographic and obstetric characteristics are presented in Table 1. The mean age was 28.2±6.7, the mean gravida was 2±1.4 and the mean week of gestation in which AFI was measured was 22±2.5. Pregnancy outcomes of these patients are shown in Figure 1. 38.1% of the pregnancies (27 patients) resulted in cesarean section. 18.3% of births (13 patients) occurred at preterm. Indications for preterm delivery were severe preeclampsia in 2 patients, premature rupture of membranes in 3 patients, detachment of placenta in 1 patient, and preterm labor in other cases (7 patients). 16.9% of pregnancies (12 patients) resulted in LBW.

The 1-minute Apgar scores of the newborns were also evaluated. Since it is usual to have low APGAR scores in preterm pregnancies, only term pregnancies were evaluated. And APGAR score at 1-minute was 8 and above in all newborns.

Table 1. Demographic and Obstetric Characteristics

Characteristics (n:71)	
Mean age (year)	28.2±6.7
Gravidity	2±1.4
Parity	0.8±1.06
Gestational week of ultrasound examination	22±2.5

Figure 1. Pregnancy outcomes



Discussion

Amniotic fluid is necessary for the normal fetal development and protection of the fetus. Adequate amniotic fluid volume is provided by the balance between fluid production and absorption. It also reflects the metabolic status of the fetoplacental unit. There is strong evidence that oligohydramnios has adverse effects on pregnancy outcomes and therefore it changes clinical management.[2] However, there is insufficient evidence in the literature regarding the effect of borderline AFI on pregnancy outcomes, and previous studies have reported controversial results.

Of the 71 patients participating our study, 13 patients (18,3 %) had preterm birth, and 12 pregnancies (16.9%) resulted in LBW. In a previous study, the rate of preterm birth in normal AFI and borderline AFI (5-8 cm) groups were 36% and 7%, respectively. In the same study, the rate of LBW were 4% and 21% in normal AFI and borderline AFI groups, respectively. These results mean that preterm birth and LBW are significantly higher in the borderline AFI group than in the normal AFI group.[7] In our study, although the preterm birth rate in the borderline AFI group is quite low (about half) compared to the results of this study, it is higher compared to the preterm birth rate in the normal AFI group. In terms of LBW rate in the borderline AFI group, our results are quite close to the results of this study. Our results support some other studies[5,6,8] showing that borderline AFI has a negative impact on pregnancy outcomes.

However, some studies in the literature did not find any negative effect of borderline AFI on pregnancy outcomes.[9,10] One reason for these controversial results in the literature may be the difference in the definition of borderline AFI. Borderline AFI is accepted as 5-8 cm in most studies[4,8,9] while in some studies it is accepted as 5-10 cm.[5,6]

The gestational age when AFI is measured may be another factor that creates controversial results in the literature. In one study, the cut-off for borderline AFI was accepted as 5-8 cm, borderline AFI was compared with normal AFI and pregnancy outcomes were evaluated. There was no difference in meconium staining of the amniotic fluid, cesarean delivery for fetal distress, birth weight of less than 2500 g, 5-minute Apgar scores of less than 7, or the number of neonates admitted to the neonatal intensive care unit (NICU).[9] Kwon et al.[8] used the same cut-off values and observed a greater risk for low-birth weight neonates, cesarean delivery for fetal distress, 5-minute Apgar scores of less than 7, and NICU admissions in the group with an AFI of less than 8. These different results may be attributed to the difference in method between these two studies. While the first study evaluated pregnant women with a gestational age of 26 weeks and above, Kwon et al. evaluated term pregnancies.

Borderline AFI detected in the second trimester is a challenging issue for the obstetrician in terms of clinical management. Most of the studies are based on AFI measurements in term pregnancy. In our study, this issue was evaluated in the second trimester and all ultrasonographic measurements were taken by only one single experienced clinician. In addition, we used strict diagnostic criteria performing speculum examination and AmniSure test in all patients with borderline AFI to exclude premature rupture of membranes. However, the small number of patients is the weaknesses of our study. There is a

need for more studies on the effect of borderline AFI on pregnancy outcomes and the follow-up plan of these pregnant women.

Conflict of interest

The authors declare that they have no conflicts of interest.

References

1. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 101: Ultrasonography in pregnancy. *Obstet Gynecol.* 2009;113(2 Pt 1):451-461. doi:10.1097/AOG.0b013e31819930b0
2. Locatelli A, Vergani P, Toso L, Verderio M, Pezzullo JC, Ghidini A. Perinatal outcome associated with oligohydramnios in uncomplicated term pregnancies. *Arch Gynecol Obstet.* 2004;269(2):130-133. doi:10.1007/s00404-003-0525-6
3. Moore TR. Clinical assessment of amniotic fluid. Clin Obstet Gynecol. 1997;40(2):303-313. doi:10.1097/00003081-199706000-00007
4. Phelan JP, Smith CV, Broussard P, Small M. Amniotic fluid volume assessment with the four-quadrant technique at 36-42 weeks' gestation. *J Reprod Med.* 1987;32(7):540-542.
5. Gumus II, Koktener A, Turhan NO. Perinatal outcomes of pregnancies with borderline amniotic fluid index. *Arch Gynecol Obstet.* 2007;276(1):17-19. doi:10.1007/s00404-006-0309-x
6. Banks EH, Miller DA. Perinatal risks associated with borderline amniotic fluid index. *Am J Obstet Gynecol.* 1999;180(6 Pt 1):1461-1463. doi:10.1016/s0002-9378(99)70037-2
7. Petrozella LN, Dashe JS, McIntire DD, Leveno KJ. Clinical significance of borderline amniotic fluid index and oligohydramnios in preterm pregnancy. *Obstet Gynecol.* 2011;117(2 Pt 1):338-342. doi:10.1097/AOG.0b013e3182056766
8. Kwon JY, Kwon HS, Kim YH, Park YW. Abnormal Doppler velocimetry is related to adverse perinatal outcome for borderline amniotic fluid index during third trimester. *J Obstet Gynaecol Res.* 2006;32(6):545-549. doi:10.1111/j.1447-0756.2006.00459.x
9. Baron C, Morgan MA, Garite TJ. The impact of amniotic fluid volume assessed intrapartum on perinatal outcome. *Am J Obstet Gynecol.* 1995;173(1):167-174. doi:10.1016/0002-9378(95)90185-x
10. Magann EF, Chauhan SP, Hitt WC, Dubil EA, Morrison JC. Borderline or marginal amniotic fluid index and peripartum outcomes: a review of the literature. *J Ultrasound Med.* 2011;30(4):523-528. doi:10.7863/jum.2011.30.4.523