

Fetal and Maternal Outcomes in Oligohydramnios Pregnancy (37–40 Weeks of Gestation) at Labor

Hividar Abdulqahar Majeed, Maida Yousif Shamdeen¹

Department of Gynecology and Obstetrics, Duhok Maternity Hospital, ¹Department of Gynecology and Obstetrics, College of Medicine, University of Duhok, Duhok, Iraq

Abstract

Background: The role of amniotic fluid is to provide a protective environment for fetus growth. The low volume of amniotic fluid (oligohydramnios) has been reported to associate with perinatal and neonatal outcomes. **Objectives:** The aim of this study was to explore the effect of oligohydramnios on fetal outcomes at intrapartum and early neonate, including fetal distress. **Materials and Methods:** In the present investigation, the pregnant women who attended the labor ward of Duhok Maternity Hospital were consecutively screened for eligibility criteria. The patients presented with oligohydramnios from 37 to 40 weeks of gestation to labor room were included in this study and were followed up for neonatal outcomes. The diagnosis of oligohydramnios was established as an amniotic fluid index of 5 cm or less by the ultrasound examination. **Results:** The mean age of the women with oligohydramnios was 26.10 ± 5.20 years ranged between 16 and 40. The mean age of the gestational age was 38.54 ± 1.13 weeks ranging from 37 to 40. The previous history of a dead newborn was so low (mean: 0.02 ± 0.14). Half of the patients delivered their pregnancies by cesarean section (C/S) (50.5%), and most of them had a good Apgar score value (98.8%). The study showed that women who had a past medical history or delivered by C/S, their newborns were more likely to admit to neonatal intensive care unit (NICU), 36.8% versus 12.1% ($P = 0.017$) and 78.9% versus 21.1% ($P = 0.010$), respectively. **Conclusions:** The present study recommends that pregnant patients diagnosed with oligohydramnios are at a higher risk of C/S and NICU admission.

Keywords: Maternal outcome, neonatal outcome, oligohydramnios

INTRODUCTION

The role of amniotic fluid is to provide a protective environment for fetus growth. It makes a cushion for the fetus against mechanical and biological injuries. Furthermore, it provides nutrients for the growth of facilitation and movement.^[1] The presence of amniotic fluid is important for the normal development of the fetal systems, including respiratory, genitourinary, gastrointestinal, and musculoskeletal. The volume of this fluid is different according to the number of gestational weeks. The volume of amniotic fluid is increased from 50 ml at 12 weeks to 400 ml at midpregnancy and 1000 ml at term.^[2]

Oligohydramnios is defined as liquor volume below the 5th percentile for that gestational age. Early onset of oligohydramnios has been reported to associate with congenital fetal anomalies, such as facial distortion, intrauterine growth restriction (IUGR), dysplastic kidney, bladder outlet obstruction, bilateral renal agenesis, pulmonary hypoplasia,

bilateral multicystic kidney, and poor fetal outcomes.^[1] In addition, oligohydramnios in the third trimester is related to umbilical cord compression and thick meconium liquor. Moreover, these women are more likely to be affected by placental abnormality or maternal complications such as preeclampsia or vascular diseases.^[1,3]

Several studies have shown an association of oligohydramnios with an increased rate of cesarian section, an increasing in nonreassuring fetal heart rate pattern, and adverse perinatal outcomes. It affects 3.9% of pregnancies between 37 and 40 weeks and 12% of pregnancies at 41 weeks or later.^[1,3]

Address for correspondence: Dr. Hividar Abdulqahar Majeed, Department of Gynecology and Obstetrics, Duhok Maternity Hospital, Duhok, Iraq. E-mail: hividarabdulqahar4@yahoo.com

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The aim of this study was to assess the fetal and maternal outcomes in patients with oligohydramnios. The patients were screened for neonatal intensive care unit (NICU) admission, Apgar score of newborn babies in relation to oligohydramnios, the incidence of congenital malformation, neonatal death, and stillbirth. In addition, the maternal outcomes regarding the mode of delivery, need for inducing labor, operative delivery, and any maternal morbidity were documented.

MATERIALS AND METHODS

Design and sampling methods

In the present prospective investigation, the pregnant women who attended the labor ward of Duhok Maternity Hospital were consecutively screened for eligibility criteria. The patients presented with oligohydramnios from 37 to 40 weeks of gestation to labor room were included in this study. The study was performed between January 10, 2018, and December 20, 2018.

Inclusion and exclusion criteria^W

Patients met inclusion criteria if they were in gestational age of 37–40 weeks, with single deepest vertical pocket <3 cm, expected to have a single live intrauterine gestation with cephalic presentation, intact membrane, and have not associated with other comorbidities or obstetric indication for cesarean section (C/S). Patients with the following medical conditions were excluded from the study: rupture membrane, multiple gestations, previous two scars and more, other presentations than cephalic, and obstetric indications for C/S.

Diagnosis and measures

The information collected from the women at enrollment in the study were age, gravity, parity, number of miscarriages, obstetrical history, and medical history (chronic hypertension, diabetes mellitus, preeclampsia in the previous pregnancy, dehydration, systemic lupus erythematosus, inherited thrombophilia, antiphospholipid syndrome, renal disease, and cardiac disease). In addition, history of smoking, sociodemographic data, infections, surgical history, drug history (nonsteroidal anti-inflammatory drugs, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, and indomethacin), previous history of stillbirth, oligohydramnios, and fetal movement during recent pregnancy were recorded in a predesigned questionnaire.

The sonographic diagnosis of oligohydramnios is usually based on an amniotic fluid index (AFI) ≤ 5 cm or a single deepest pocket of amniotic fluid ≤ 2 cm.^[1]

The patients underwent clinical and physical examinations and ultrasound assessment for the oligohydramnios and other medical conditions. An obstetrician and gynecologist screened the patients for maternal and neonatal complications. The Apgar scores <7 at 5 min was considered as abnormal.

Statistical methods

The descriptive purposes of the study were displayed in frequency distribution, whether in frequency and percentage or mean and standard deviation. The incidence of NICU admission and C/S

was presented in frequency and percentage. The role of mothers' characteristics in newborns admission to NICU was examined in an independent *t*-test, Chi-square, or Fishers' exact tests. The null hypothesis was rejected in $P < 0.05$. The statistical calculations were performed in the Statistical Package for Social Sciences version 25:00 (SPSS 25; IBM Corp; USA; Washington).

Ethical approval

The ethical approval of the present study was taken from the Ethics Committee of the Kurdistan Board for Medical Specialties. The confidentiality of the personal information of the women was protected throughout the study steps.

RESULTS

The mean age of the total 101 patients diagnosed with oligohydramnios and was included in the present study was 26.10 ± 5.02 years ranged between 16 and 40. Furthermore, the mean values of gravida, parity, and several miscarriages were 2.68 ± 2.23 , 1.38 ± 1.90 , and 0.29 ± 0.83 , respectively. The mean value of the previous dead newborns was 0.02. The study revealed that 16.8% and 13.9% of the patients had medical and surgical history, respectively, and 12.9% of them had the previous history of drugs [Table 1].

The study showed that the mean values of deep vertical pocket and white blood count were 2.20 cm and $11.35 \times 10^9/L$, respectively. Half of them delivered births by normal vaginal delivery and the remaining by C/S. The newborns of 18.8% of the women have been admitted to NICU, and the Apgar score of most of them was good (98.8%) expect one baby [Table 2].

The role of mothers' characteristics on newborns admission to NICU showed that those newborns who their mothers

Table 1: Baseline information of the patients with oligohydramnios

Patients' characteristics (n=101)	Statistics
Age (years), mean $\pm$ SD (range)	26.10 $\pm$ 5.20 (16-40)
Age categories (year-old), frequency (%)	
16-20	16 (15.8)
21-25	38 (37.6)
26-30	27 (26.7)
31-35	16 (15.8)
36-40	4 (4.0)
Gravida, mean $\pm$ SD (range)	2.68 $\pm$ 2.23 (1-9)
Parity, mean $\pm$ SD (range)	1.38 $\pm$ 1.90 (0-7)
Parity categories, frequency (%)	
Parity 0-3	86 (85.1)
Parity 4-7	15 (14.9)
Number of miscarriages, mean $\pm$ SD (range)	0.29 $\pm$ 0.83 (0-6)
Previous dead newborn, mean $\pm$ SD (range)	0.02 $\pm$ 0.14 (0-1)
Gestational age (week), mean $\pm$ SD (range)	38.54 $\pm$ 1.13 (37-40)
PMH, frequency (%)	17 (16.8)
PSH, frequency (%)	14 (13.9)
Drug history, frequency (%)	13 (12.9)
SD: Standard deviation, PSH: Past surgical history, PMH: Past medical history	

who had past medical history (such as pre-eclampsia and hypertension) were more likely to admit to NICU (36.8% vs. 12.2%; $P = 0.017$). Furthermore, the newborns of the mothers who did delivery by C/S were more likely to admit to NICU (78.9% vs. 21.1%; $P = 0.010$). The rate of admission to NICU was not significantly different between those women with different age gravida, parity, miscarriage, previous dead baby, gestational weeks, deepest vertical pocket, white blood cells, surgical history, and drug history ($P > 0.05$) [Table 3].

DISCUSSION

The present study revealed that in those women who had a medical history or delivered by C/S, their newborns more frequently were admitted to NICU.

Chate *et al.*^[4] conducted a prospective case-control study and included 50 cases diagnosed with oligohydramnios by ultrasound following 37 weeks of gestation and compared the perinatal outcomes and maternal risk factors to 50 patients with oligohydramnios. They found the significantly higher incidence of nonreactive Non-Stress Test (NST), fetal distress development, the rate of lower segment cesarean section, low 5-min Apgar score, low-birth weight (LBW), perinatal morbidity, and mortality. We included 101 patients diagnosed with oligohydramnios in the present study. The present study found that the majority of the newborns had a good Apgar score. Half of the patients delivered their pregnancies by a C/S. The C/S inserts the additional future risk to the newborns and mothers.

Mir and Habib^[5] compared the pregnancy outcomes between patients with oligohydramnios and controls. They included 80 pregnant women which included 40 patients with oligohydramnios and 40 patients without oligohydramnios as controls. The ultrasound was used to diagnose oligohydramnios, an AFI of 5 cm or less. They found higher substantial rates of induced labor, C/S, IUGR, stillbirths, and lower Apgar score values.^[5]

Asnafi *et al.*^[6] reviewed adverse perinatal outcomes retrospectively between 590 patients with oligohydramnios and 597 patients with oligohydramnios following hospital admission between 2000 and 2010 in Iran. They found that patients with oligohydramnios were more likely to affect newborn resuscitation and admitted to NICU. In this study, 18.8% of the newborns were admitted to NICU, which were indicated by C/S delivery and past medical history of mothers. Furthermore, they found higher birth death after 24 h, IUGR, and meconium passage. Besides, the lower Apgar score was found in cases compared to controls.

In uncomplicated pregnancies at 40.0 and 41.6 weeks of gestation, oligohydramnios is indecently related to a higher risk of LBW.^[7] A large number of investigations have linked an increased risk of abnormal fetal heart rate,^[8-10] pulmonary hypoplasia,^[11,12] IUGR,^[13] lower Apgar scores,^[13] increased

Table 2: Maternal and neonatal outcomes in patients with oligohydramnios

Patients' characteristics (n=101)	Frequency distribution
Deep vertical pocket (cm), mean±SD (range)	2.20±0.62 (0-2.90)
WBC (10 ⁹ /L), mean±SD (range)	11.35±2.95 (5.90-19.70)
Delivery, frequency (%)	
NVD	50 (49.5)
C/S	51 (50.5)
NICU admission, frequency (%)	
Yes	19 (18.8)
No	82 (81.2)
Apgar score categories, frequency (%)	
Good	81 (98.8)
Bad	1 (1.2)

SD: Standard deviation, NICU: Neonatal intensive care unit, C/S: Cesarean section, WBC: White blood count, NVD: Normal vaginal delivery

Table 3: Association of oligohydramnios patients' characteristics with the admission of their newborns to neonatal intensive care unit

Patients' characteristics (n=101)	NICU admitted	Non-NICU admitted	P (two-sided)
Age (years)*	27.32±5.06	25.82±5.23	0.257
Gravida (n)*	2.68±2.26	2.68±2.24	0.998
Parity (n)*	1.21±1.78	1.41±1.94	0.662
Miscarriage (n)*	0.47±1.07	0.24±0.76	0.387
Previous dead baby (n)*	0.00±0.00	0.02±0.16	0.159
Gestational weeks*	38.45±1.19	38.59±1.12	0.721
Deepest vertical pocket*	2.26±0.49	2.18±0.64	0.586
WBC*	11.46±2.97	11.33±2.96	0.867
PMH			
No	12 (63.2)	72 (87.8)	0.017***
Yes	7 (36.8)	10 (12.2)	
PSH			
No	16 (84.2)	71 (86.6)	0.724***
Yes	3 (15.8)	11 (13.4)	
Drug history			
No	15 (78.9)	73 (89.0)	0.260***
Yes	4 (21.1)	9 (11.0)	
Delivery			
NVD	4 (21.1)	46 (56.1)	0.010**
C/S	15 (78.9)	36 (43.9)	

*Independent t-test, **Chi-square test, ***Fishers' exact test were performed for statistical analyses. SD: Standard deviation, NICU: Neonatal intensive care unit, C/S: Cesarean section, WBC: White blood count, NVD: Normal vaginal delivery, PSH: Past surgical history, PMH: Past medical history

risk of cesarean delivery,^[9] NICU admission, and neonatal mortality.^[8]

There is a high pressure on the umbilical cord in patients with oligohydramnios; in addition, the fetal distress is increased and leads to a newborn with a low Apgar score.^[9] Locatelli *et al.* demonstrated that the women with AFI ≤5 cm had a higher rate of C/S owing to nonreassuring fetal heart rate tracing.^[7]

CONCLUSIONS

The results of the present study indicate that the risk of adverse pregnancy outcome is increased in patients with oligohydramnios. Hence, its management warrants increased antepartum surveillance for the early detection of pregnancy complications and fetal scanning to diagnose malformations or growth restriction.

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Conflicts of interest

There are no conflicts of interest.

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