

Case-Control Study on Fetal Outcomes in Isolated Oligohydramnios in Third Trimester

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Author's Contribution

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Abstract

Introduction: Oligohydramnios is defined as a condition with a low volume of amniotic fluid relative to gestational age. Long-term oligohydramnios can result in pulmonary hypoplasia, intrauterine growth retardation, Potter's syndrome, club hand & foot, and dislocation of the hip. This study was conducted to assess fetomaternal outcomes in isolated oligohydramnios and factors associated with poor outcomes.

Materials and Methods: This case-control study was conducted from January to December 2020 in the Gynecology & Obstetrics and Radiology departments of HBS General Hospital, Islamabad. A total of 300 patients with isolated oligohydramnios fulfilling the criterion were included. For cases, patients with singleton intrauterine pregnancy with AFI ≤ 5 , of any age or parity with a gestational age of more than 34 weeks were included. 300 controls were also taken. Patients with an increased amount of amniotic fluid, diabetics, hypertensive and cardiac patients were excluded. Patients were followed up till delivery. The mode of delivery was checked out. Fetal APGAR scores at 1 minute and 5 minutes were observed. Newborn weight and NICU admissions were recorded. Data were analyzed via SPSS v26.

Results: Forty-six percent (n=138) of patients underwent caesarean section while fifty-four percent (n=162) had a normal vaginal delivery. Significant association (OR=1.85, P<0.001) was found between caesarean section in mothers with oligohydramnios compared to controls. Thirty-eight percent (n=114) of neonates among cases had a low 5 min APGAR score while 120 had a low 1 min APGAR Score. Significant association (OR=3.29, P<0.001) was found between low APGAR scores and mothers with oligohydramnios compared to controls. Thirty percent (n=90) required NICU admission. There were 6 stillbirths. Mothers with oligohydramnios have a double risk of stillbirth and NICU admission compared to women with normal fluid levels.

Conclusion: Neonates born with mothers having oligohydramnios have low birth weight, lower APGAR scores, and a high rate of NICU admissions.

Keywords: Oligohydramnios, Feto-maternal outcome, Caesarean section, APGAR score, Stillbirth.

Introduction

The amniotic fluid surrounding the fetus is a vital component for intrauterine fetal growth and development.¹ It helps in regulating temperature, promotes lung development, provides space for musculoskeletal development, averts umbilical cord compression, and helps in escaping injury and effects of uterine contractions. Therefore, it is an important indicator of fetal well-being and is an important assessment parameter in the surveillance of fetal development.²

Oligohydramnios is defined as a condition with a low volume of amniotic fluid relative to gestational age. Quantitatively, upon ultra-sonographic examination, Amniotic Fluid Index (AFI) less than 5 cm or largest pocket in broadest dimension is less than 2 cm is labelled as oligohydramnios.³ The condition affects 3-5% of the pregnancies.¹ Study conducted in middle low-income countries showed its prevalence to be 1 in 150 pregnancies.⁴ Pakistan is a country with poor maternal hygiene shows a higher rate of oligohydramnios with one study claiming its rate is up to 24%.⁵

Long-term oligohydramnios can result in pulmonary hypoplasia, intrauterine growth retardation, Potter's syndrome, club hand & foot, and dislocation of the hip. Also, in presence of oligohydramnios uterine contraction or fetal mobility can lead to compression of the umbilical cord resulting in severe de-acceleration of fetal cardiac activity associated with low APGAR scores at birth, meconium staining of amniotic fluid, fetal acidosis, birth asphyxia and high rate of emergency caesarian due to fetal distress.⁶

In the majority of the cases, oligohydramnios is idiopathic, however, it can be sequelae of pre-eclampsia, uteroplacental insufficiency, chronic hypoxia, dehydration, diabetes, rupture of amniotic membranes, and postdated pregnancies.⁴ The condition is associated with increased maternal morbidity and burden of care in terms of increased emergency caesarian and induction of labor.⁷ Timely diagnosis and intervention help in improving fetomaternal outcomes. Clinical management includes amnioinfusion, intravenous hydration, early induction of labor, and elective caesarian.⁴

This study was conducted to assess fetomaternal outcomes in isolated oligohydramnios and factors associated with poor outcomes. The study is different from other studies conducted in a country in the aspect that it specifically focuses on patients having idiopathic oligohydramnios without any comorbid.

Materials and Methods

This is a case-control study conducted in the department of obstetrics, gynaecology, and radiology of HBS General Hospital affiliated with HBS medical and dental college, Islamabad. This study was conducted from January 2020 to December 2020. The study was approved by the institution's research ethical committee. Informed verbal consent was also taken from females. Our study included a total of 300 patients with isolated oligohydramnios diagnosed on ultrasound via consecutive sampling techniques. Inclusion criteria included patients with singleton alive intrauterine pregnancy with AFI of ≤ 5 of any parity or age with gestational amenorrhea of more than 34 weeks. Exclusion criteria included patients with diabetes, hypertension, cardiac diseases, multiple pregnancies, ruptured membranes, and increased amounts of liquor.

Informed consent was taken from all the patients. A detailed history was taken from all the patients followed by a general physical examination, obstetrics, and abdominal examination. Routine investigations were performed along with obstetrical sonography and perfoforma was filled and patients were followed up till the delivery.

The amniotic fluid index was measured with an ultrasound machine (Xario Toshiba) by dividing the uterus into four imaginary quadrants. The linea nigra was used to divide the uterus into the left half and right half and the umbilicus is used to divide both halves into the upper and lower half. We measured the deepest vertical pool (DVP) in all the four quadrants and get AFI by adding the four values. Those patients who had AFI ≤ 5 were included and data filled in Perfoforma.

The mode of delivery of all the patients included in the study depends upon post obstetrical history on Cardiotocography (CTG), Biophysical Profile (BPP), and Umbilical Artery Doppler (UAD). Those patients who had abnormal CTG or BPP or UAD alone or all of them were considered for lower segment caesarian section.

Neonatal APGAR score was measured at 1 min and 5 min and recorded for the neonatal outcome. The birth weight of neonates and NICU admissions were recorded for the neonatal outcome.

Data were analyzed by SPSS version 26. Descriptive statistics were performed on qualitative data. Data were analyzed by mean and standard deviation measurement, relative risk, and Odd's Ratio were applied for risk assessment.

Results

Majority of the females among cases belong to age group 25-35 years (n=168, 56%) followed by <25 years (n=128, 42%) and >35 years (n=6, 2%). The majority of cases were multigravida (n=180, 60%) (Table 1). The mean AFI of cases was 4.34±1.15 while that for controls was 10.48±1.56.

Table 1: Gravidity of Females

		Frequency	Percent
Valid	I	120	40.0
	II	84	28.0
	III	72	24.0
	IV	18	6.0
	V	6	2.0
Total		300	100.0

Among cases, the majority of the fetuses had a gestational age of 34-36 weeks (n=180, 60%) at the time of delivery followed by 37-39 weeks (n=120, 40%). Forty-six percent (n=138) of patients underwent caesarean section while fifty-four percent (n=162) had a normal vaginal delivery. Significant association (OR=1.85, P<0.001) was found between caesarean section in mothers with oligohydramnios. Thirty-eight percent (n=114) of neonates had low APGAR scores. Significant association (OR=3.29, P<0.001) was found between low APGAR scores and mothers with oligohydramnios. Thirty percent (n=90) required NICU admission (Figure 1). There were 6 stillbirths. Mothers with oligohydramnios have a double risk of stillbirth and NICU admission compared to women with normal fluid levels. The mean fetal weight of cases was 2.9±0.31 Kg while that for controls was 3.05±0.27. Table 2 shows the fetomaternal outcomes in isolated oligohydramnios compared to controls.

Table 2: Fetomaternal outcomes in isolated oligohydramnios compared to controls

Outcomes	Cases (n=300)	Controls (n=300)	ODDs Ratio
Low APGAR (<7)	114	47	3.29, P<0.001
Caesarean Delivery	138	92	1.85, P<0.001
NICU Admission	90	45	2.42, P<0.001
Still Births	6	3	2.02, P>0.05

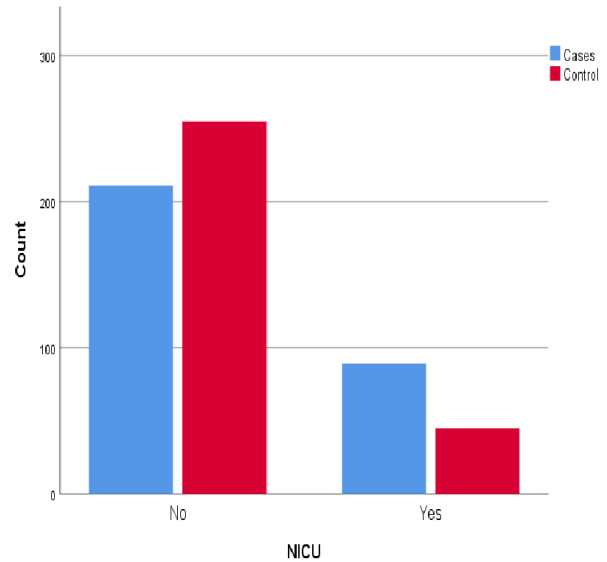


Figure 1: NICU admissions in comparison between cases and control

All the stillbirths among cases were recorded in women with a gestational age of 37-39 weeks having a vaginal delivery. APGAR score was significantly lower in neonates born with caesarean section to mothers with oligohydramnios (OR=3.11, RR=2.01, P-value<0.001) compared to vaginal delivery. NICU admission was also significantly higher for neonates born with caesarean section (OR=3.38, RR=2.34, P-value<0.001) compared to vaginal delivery. Figure 2 shows the NICU admissions against the mode of delivery in mothers with oligohydramnios.

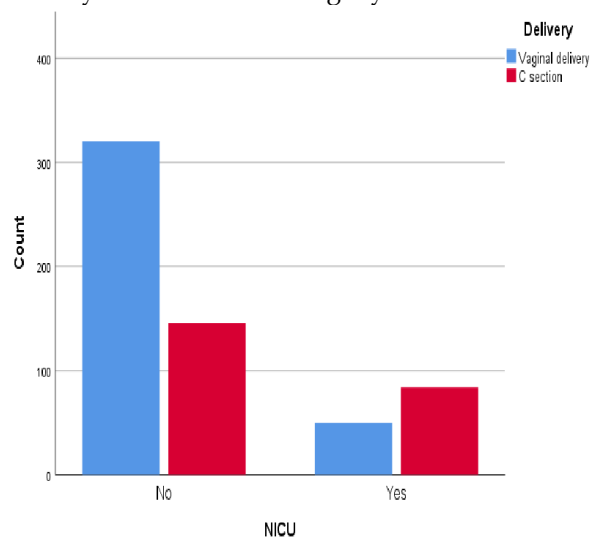


Figure 2: NICU admissions against the mode of delivery among cases of oligohydramnios.

Discussion

Management of oligohydramnios remains a dilemma due to risks involving to fetus upon the continuation of pregnancy on one side and operative complications on the other. The current study focuses on fetomaternal outcomes in isolated oligohydramnios and their association with the mode of delivery. In this study rate of caesarean section was forty-six percent. This was in concord with studies conducted in other parts of the world.^{4,8} Patients with oligohydramnios usually have a high rate of caesarian section than normal pregnancies.⁹ Amir et al also reported the rate of caesarian to be forty-two percent in females with oligohydramnios in Peshawar.⁶

The mean gestational age in oligohydramnios is usually 29-34 weeks to prevent fetal distress at a late age. The incidence of stillbirth is associated with late gestational age. Therefore, in the case of oligohydramnios, early induction of labor is recommended.^{10,11} In the current study all stillbirths were recorded in females with a gestational age of 37-39 weeks and vaginal mode of delivery. A study by Hamed & Mohammed indicates poor fetal outcomes with neonates born with oligohydramnios after 36 weeks of gestation.¹² Prolonged pregnancy is itself a risk for stillbirth.¹³ This was in concord with our study where the majority of stillbirths were noted in 37-39 weeks.

Radhamani et al showed that neonates born with mothers having oligohydramnios have low birth weight, lower APGAR scores, and a high rate of NICU admissions. In this study, the mean neonate weight was 2.9kg, thirty-eight percent had low APGAR scores and thirty percent required NICU admissions. This was in concord with a study by Radhamani with seventy percent neonates below 3Kg, five percent having low APGAR scores, and twenty-three percent requiring NICU care.¹⁴ Study by Sharma shows a low APGAR score of fifty-five percent, NICU admission rate of forty percent, and five percent deaths which were in accord with our study.⁷ Another study conducted in Peshawar also showed comparable results with a NICU admission rate of thirty-one percent and a low APGAR score in sixteen percent of the cases.⁶ In the current study, a positive association was also found between low APGAR score, NICU admission, and caesarean delivery. Studies in other parts of the world also show caesarean mode of delivery is associated with poor perinatal outcomes.⁹ Oligohydramnios is common in all parts of the world, especially in middle-income developing countries.

Skilled management of oligohydramnios is necessary to prevent poor fetomaternal outcomes. Though caesarean delivery itself has a high risk of low APGAR score and high NICU admission rate, elective caesarean in 34 weeks instead of emergency caesarean can decrease the complications.^{15,16} In the current study, vaginal delivery at 34 to 36 weeks among mothers having oligohydramnios showed the best fetomaternal outcomes i.e. high APGAR score, less NICU admission, and no stillbirth. These results are in concord with studies recommending induction of labor in 34 to 36 week in isolated oligohydramnios to prevent poor outcomes.¹¹

Different studies showed poor fetal outcomes in oligohydramnios. The study by Tajinder and Ruchika shows high rates of low APGAR score, preterm labor, and IUGR.¹⁷ Study by Babitha et al also showed the association between low birth weight, low APGAR score, meconium-stained liquor, and high rates of NICU admissions in neonates born with oligohydramnios.¹⁸ Our results also confirmed these findings.

Conclusion

Neonates born with mothers having oligohydramnios have low birth weight, lower APGAR scores, and a high rate of NICU admissions. Delivery at 37-39 weeks in oligohydramnios is associated with a higher rate of stillbirths. Therefore, in the case of oligohydramnios, early induction of labor must be considered.

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