Original Article

Maternal and Foetal Outcome in Term Pregnancy with Oligohydramnios

Begum H[1], Shapla NR[2], Rahman A[3]

DOI: https://doi.org/10.3329/jafmc.v21i2.84079

Abstract

Background: Oligohydramnios is defined where the amniotic fluid index below the 5th centile for gestational age. This can occur 1-5% of all pregnancies, it rises more than 12% in post term pregnancies worldwide. It is associated with adverse perinatal outcome like foetal lung hypoplasia, foetal limb deformities-potters syndrome and preterm delivery, foetal growth restriction and foetal renal congenital anomalies.

Objective: To study the outcome of pregnancies with severe oligohydramnios (AFI <5cm) at or beyond 37 weeks.

Methods: This is a prospective observational study conducted over the course of 6 months from August 2022 to January 2023 in the Department of Obstetrics and Gynaecology in Combined Millitary Hospital (CMH), Dhaka, Bangladesh. Pregnant women at term (≥37 weeks) with oligohydramnios diagnosed on ultrasound were included. Data were collected from both maternal and foetal medical records. Maternal data included age, parity, gestational age, medical history and mode of delivery. Foetal data included birth weight, APGAR score, IUGR, presence of congenital anomalies and admission to the neonatal intensive care unit (NICU). Ultrasonographic parameter including amniotic fluid index was also recorded. Informed consent was obtained from all participants before enrollment. The sample size was calculated using a formula for a single proportion. Based on previous studies, we assumed that the incidence of adverse outcomes in term pregnancies complicated by oligohydramnios was around 1-5%. With an alpha error of 0.05 and a power of 0.80, a minimum sample size of 100 women was required.

Results: The majority of women (50%) were nulliparous, and the mean maternal age at the time of delivery was 22.3±0.9 years. The most common mode of delivery was caesarean section (81%). The majority birth weight (73%) was >2.5 kg, and the mean APGAR score at 5 minutes was 8.2±1.1. The associated IUGR were 38% cases, congenital anomalies were present only in 2% of cases. Forty-seven neonates (47%) required admission to the NICU and no neonatal deaths were reported.

Conlcusion: Oligohydramnios is associated with foetal and neonatal death which may related to underlying cause of oligohydramnios or sequelae of reduced amniotic fluid volume or both.

Keywords: Oligohydramnios, Foetal outcome, Term Pregnancy.

Introduction

For the need of the foetus, to ensure its existence and growth in a sterile environment, to control temperature, to prevent external harm and to lessen the impact of uterine contractions, nature created a floating bed in the gush of amniotic fluid. Adequate amniotic fluid is necessary for normal foetal movement, second trimester foetal lung development and for cushioning for fetus and umbilical cord from uterine compression. Foetal outcome due to oligohydramnios depends on several factor particularly the underlying cause of oligohydramnios, severely reduced versus no amniotic fluid and gestational age at occurrence. Low APGAR score, severe birth asphyxia, meconium aspiration syndrome, Potters syndrome, foetal club foot, limb deformities and foetal renal abnormalities have all been linked to reduced amniotic fluid capacity, also known as oligohydramnios.[1,2] Additionally, oligohydramnios is linked to maternal morbidity in the form of higher rates of operative delivery.[3] Now, it is generally acknowledged that a sufficient volume of amniotic fluid is a necessary requirement for normal intrauterine development and a positive foetal outcome.[4,5] The passive movement of water from the amnion into the amniotic space and the active movement of solutes during early pregnancy are the source of amniotic fluid. It is formed from foetal urine, a discharge from the respiratory tract later in pregnancy, beginning in the second trimester.[6,7] Oligohydramnios has been linked to a number of maternal co-morbity, including uteroplacental insufficiency, hypertension, preeclampsia, chronic HTN,DM, chronic hypoxia, rupture of amniotic membranes, dehydration, and post-term gestation.[8,9] Obstructive uropathy, reduced renal perfusion and congenital absence of renal tissue are examples of renal anomalies that may also be contributory causes.[10] But idiopathic oligohydramnios account for the majority of cases.[8,9] Oligohydramnios can gravely harm a fetus, leading to issues such as pulmonary hypoplasia, meconium aspiration syndrome, foetal compression,prematurity and infections in cases of persistent membrane rupture.[8,9,11,12] Low birth weight and IUGR babies are more likely to be born to women who have oligohydramnios.[13-16] Oligohydramnios has also been linked to a greater rate of cesarean births for foetal distress and neonatal admission to the intensive care unit.[4,8] Early oligohydramnios detection and therapy may contribute to a drop in cesarean deliveries and a reduction in perinatal morbidity and mortality. The study's goal was to determine how Oligohydramnios affects birth outcomes and maternal morbidity.

1. **Lt Col Housneara Begum**, MBBS, FCPS, Classified Specialist in Obstetrics and Gynecology, CMH, Jashore (*E-mail:* housnearamuna@gmail.com)
2. **Brig Gen Nahid Reaz Shapla**, PBGMS, MBBS, MCPS, DGO, FCPS, Professor and Head, Department of Obstetrics and Gynecology, AFMC, Dhaka
3. **Lt Col Asma Rahman**, MBBS, FCPS, Classified Specialist in Obstetrics and Gynecology, BGB, Pillkhana, Dhaka.

Materials and Methods

Oligohydramnios is a common complication of pregnancy that may have serious consequences for both mother and fetus. The aim of this prospective study is to investigate the maternal and foetal outcomes at term pregnancies complicated by oligohydramnios. This prospective observational study was conducted over the course of 6 months in the Department of Obstetrics and Gynaecology in Combined Millitary Hospital (CMH), Dhaka, Bangladesh. Pregnant women at term (≥37 weeks) with oligohydramnios diagnosed on ultrasound were included in this study. Women with pre-existing medical conditions such as hypertension, diabetes or chronic kidney disease were also included from the study. Pregnancy before 37 weeks and premature rupture of membrane were excluded from the study. Informed consent was obtained from all participants before enrollment. The sample size was calculated using a formula for a single proportion. Based on previous studies, we assumed that the incidence of adverse outcomes in term pregnancies complicated by oligohydramnios was around 1-5% with an alpha error of 0.05 and a power of 0.80, a minimum sample size of 100 women was required. Data was collected from both maternal and foetal medical records. Maternal data included age, parity, gestational age, medical history and mode of delivery. Foetal data included birth weight, Apgar score, presence of congenital anomalies and admission to the neonatal intensive care unit (NICU). Ultrasonographic parameter including amniotic fluid index was also recorded.

Maternal management was based on institutional protocols for oligohydramnios. Women with severe oligohydramnios or foetal compromise were induced or delivered via cesarean section. Foetal surveillance was conducted using non-stress tests (NST) and Biophysical profiles (BPP) and daily foetal movement count. Women with abnormal foetal surveillance were delivered or induced. Data were analyzed using descriptive statistics. The chi-square test and Fisher's exact test were used to compare categorical variables and Student's t-test was used to compare continuous variables. Multivariate analysis was performed to identify independent predictors of adverse maternal and foetal outcomes. The study was approved by the institutional review board and informed consent was obtained from all participants. Patient confidentiality was maintained throughout the study. Limitations of this study include its single-center design and the exclusion of women with premature rupture of membrane and pregnancy before 37 weeks with oligohydramnios. To compare outcomes in oligohydramnios to a control group without oligohydramnios.

This study provides insight into the maternal and foetal outcomes of term pregnancies complicated by oligohydramnios. The findings suggest that close monitoring of foetal well-being and timely delivery may be necessary in case of oligohydramnios to ensure optimal maternal and foetal outcomes. Further studies are needed to determine the most effective management strategies for oligohydramnios in term pregnancy.

Results

This study comprised 100 pregnant women with oligohydramnios who were in the third trimester of their pregnancies. Patients between the ages of 20-25 years made up about 47% of the population, while patients between the ages of 26-31 years made up 34%. As a result, patients aged 20 years to 31 years made up the majority of patients, while patients aged 20 to 25 had the extreme cesarean rate, and patients older than 37 had the lowest rate. The average maternal age was 25.80±4.436. Amniotic fluid index of 4 to 5 cm on USG was present in 76% of patients, followed by AFI 2-4 cm at 21% and AFI< 2 cm at 3% (Table-I).

Table-I: Distribution of patients according to Age and AFI

Variables		n	%
Age Category	<20 years	8	8
	20-25 years	47	47
	26-31 years	34	34
	32-37 years	10	10
	>37 years	1	1
	Total	100	100
Amniotic fluid index (AFI)	<2cm	03	3
	2-4cm	21	21
	4-5cm	76	76
	Total	100	100

In the current investigation, oligohydramnios was more common in primipara (50%). Additionally, surgical morbidity was higher in primipara (41%) (Table-II).

Table-II: Surgical Morbidity

Gravida	Vaginal Delivery	LUCS
Primi	9	41
2nd	5	21
3rd	4	12
4th	1	7
Total	19	81

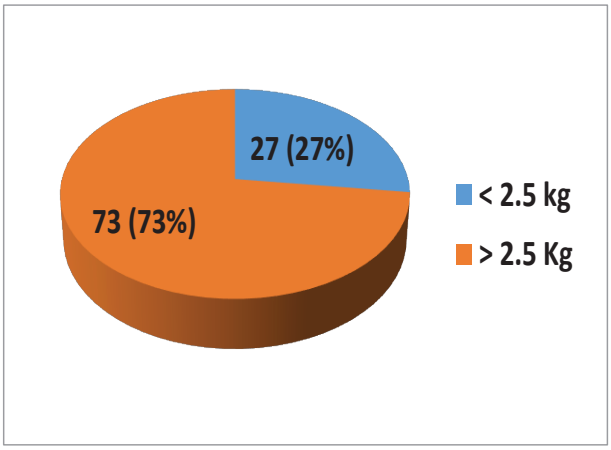

Figure-1: Distribution according to the weight of the baby

Idiopathic causes make up the majority of oligohydramnios cases (56%). PIH is the second most typical cause (15%). The highest rate of operative morbidity (11%) is found in PIH. Doppler studies were performed on about 63% of the patients (Table-III).

Table-III: Distribution of patients according to the presence of IUGR, APGAR Score and congenital anomaly

Variables		n	%
IUGR	Yes	38	38
	No	62	62
	Total	100	100
APGAR Score	6/10	76	76
	8/10	24	24
	Total	100	100
Congenital Anomaly	Yes	2	2
	No	98	98
	Total	100	100

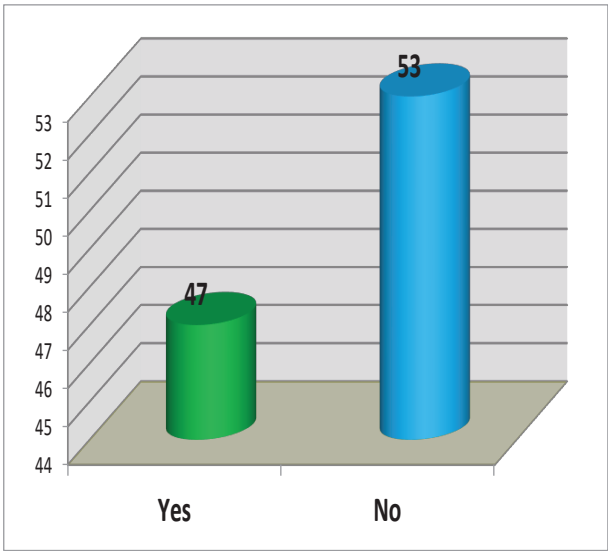

Figure-2: Distribution according to the need of NICU admission

Table-IV: Distribution according to the mode of delivery

Variable	n	%
LUCS	81	81
Vaginal delivery	19	19
Total	100	100

Intrauterine growth retardation (IUGR) (38%) and NICU admission (47%) were more common in oligohydramnios.

Discussion

The mean gestational age of pregnant women in a study[17] conducted after 37 weeks of gestation was found to be 23.9 years, which is comparable to the current study. In a different study[18], the prevalence of oligohydramnios in primigravida was 60 percent, which is comparable to the current study's 52 percent. In another study, induced patients with oligohydramnios had 68 percent vaginal deliveries and 32 percent cesarean sections, which is equivalent to this study.[19] In another data, induced patients with oligohydramnios had 84 percent vaginal deliveries and 16 percent cesarean sections.[20] Patients with abnormal Doppler studies had considerably higher postoperative morbidity. It was equivalent to this study in other studies where it was 71 percent[21] for age 21 and 69.7 percent[22] respectively. About 27 percent of the newborns in the current study were under 2.5 kg in weight. The average birth weight in this study was 2.8 kg which is comparable to another study's average birth weight of 2.4 kg.[23] Except in post-maturity, where the babies may have an average birth weight, oligohydramnios has a greater frequency of low-birth-weight babies. A study found that 15% of infants had an APGAR score below 7.[24] According to several studies, approximately 20%[21], 43%[19] and 88.88%[24] of infants, respectively, were admitted to the NICU. In births of patients with oligohydramnios, there were 6.3% newborn deaths[19], in several studies but our study shows no neonatal death during study period.

Conclusion

Oligohydramnios is associated with increased rate of non-assuring NST. Routine induction of Labour is not recommanded in that cases. It is prefarable to allow patient in spontaneous onset of labour with close intraparum foetal monitoring. Oligohydramnios is a common finding in pregnancies with IUGR, PIH and pregnancies that last longer than 40 weeks. Cesarean-section rates Neonatal intensive care admission rate increasing as a result of intrapartum complications. Antepartum diagnosis of oligohydramnios needs close monitoring of foetal surveillance and proper antepartum and intrapartum care so that perinatal mortality and morbidity can curtailed.

References

1. Dasari P, Nivedita G, Raghavan S. The maximal vertical pocket and amniotic fluid index in predicting foetal distress in prolonged pregnancy. Int J Gynaecol Obstet. 2007; 96(2):89-93.

2. Sultana S, Khan MNA, Akhtar KAK, Aslam M. Low amniotic fluid index in high-risk pregnancy and poor APGAR score at birth. J Coll Physicians Surg Pak. 2008; 18(10):630-4.

3. Rainford M, Adair R, Scialli AR, Ghidini A, Spong CY. Amniotic fluid index in the uncomplicated term pregnancy. Prediction of outcome. J Reprod Med. 2001; 46(6):589-92.

4. Oosterhoof H, Haak MC, Arnoudes JG. Acute Maternal Rehydration increases the urine production rate in the near-term human fetus. Am J Obstet Gynecol. 2011; 183(1):226–9.

5. Sherer DM. A review of amniotic fluid dynamics and the enigma of isolated oligohydramnios. Am J Perinatol. 2002; 19:253–66.

6. Brace RA. Physiology of amniotic fluid volume regulation. Clin Obstet Gynecol. 2013; 40(2):280–9.

7. Kehl S, Schelkle A, Thomas A, Puhl A, Meqdad K, Tuschy B et al. Single deepest vertical pocket or amniotic fluid index as evaluation test for predicting adverse pregnancy outcome (SAFE trial): A multicenter, open-label, randomized controlled trial. Ultrasound Obstet Gynecol. 2016; 47(6):674–9.

8. Cunningham FG, Williams JW (John W. Williams Obstetrics. McGraw-Hill Medical; 2010. Available at https://www.ncbi.nlm.nih.gov/nlmcatalog/101510655.

9. Fischer RL. Amniotic fluid: physiology and assessment. Glob Libr Women's Med. 2009. Available at https://doi.org/10.3843/GLOWM.10208.

10. Boubred F, Simeoni U. Pathophysiology of foetal and neonatal kidneys. In: Neonatology. Cham: Springer International Publishing. 2017:1-15.

11. Patel A, Patel HV. Role of the amniotic fluid index in pregnancy outcome. IAIM. 2015; 2:1-12.

12. Voxman EG, Tran S, Wing DA. Low amniotic fluid index as a predictor of adverse perinatal outcome. J Perinatol. 2002; 22:282–5.

13. Mathuriya G, Verma M, Rajpoot S. Comparative study of maternal and foetal outcome between low and normal amniotic fluid index at term. Int J Reprod contraception. Obstet Gynecol. 2017; 6:640.

14. Rabie N, Magann E, Steelman S, Ounpraseuth S. Oligohydramnios in complicated and uncomplicated pregnancy: A systematic review and meta-analysis. Ultrasound Obstet Gynecol. 2017; 49:442–9.

15. Madhavi K, Pc R, Professor A. Clinical study of oligohydramnios, mode of delivery and perinatal outcome. IOSR J Dent Med Sci. 2015; 14:2279–861.

16. Butt FT, Ahmed B. The role of antepartum transabdominal amnioinfusion in the management of oligohydramnios in pregnancy. J Matern Foetal Neonatal Med. 2011; 24:453–7.

17. Casey BM, McIntire DD, Bloom SL, Lucas MJ, Santos R, Twickler DM et al. Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks of gestation. Am J Obstet Gynecol. 2000; 182(4):909-12

18. Petrozella LN, Dashe JS, McIntire DD, Leveno KJ. Clinical Significance of Borderline Amniotic Fluid Index and Oligohydramnios in Preterm Pregnancy. Obstetrics and Gynecology. 2011; 117(2 Pt 1):338-42.

19. Umber A. Perinatal Outcome in Pregnancies Complicated by Isolated Oligohydramnios at Term. Annals. 2009; 15:35-7.

20. Manzanares S, Carrillo MP, González-Perán E, Puertas A, Montoya F. Isolated oligohydramnios in term pregnancy as an indication for induction of labor. J Matern Foetal Neonatal Med. 2007; 20(3):221-4.

21. Hitschold T, Weiss E, Berle P, Muntefering H. Histologic placenta findings in prolonged pregnancy: Correlation of placental retarded maturation, foetal outcome and Doppler sonographic findings in the umbilical artery. Z Geburtshilfe Perinatol. 1989; 193(1):42–6.

22. Kwon JY, Kwon HS, Kim YH, Park YW. Abnormal Doppler Velocimetry is related to the adverse perinatal outcomes for the borderline amniotic fluid index during the third trimester. J Obstet Gynecol Res. 2006; 32(6):545-9.

23. Casey BM, McIntire DD, Bloom SL, Lucas MJ, Santos R et al. Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks of gestation. Am J Obstet Gynecol. 2000; 182(4):909-12.

24. Manning FA, Hill LM, Platt LD. Qualitative amniotic fluid volume determination by ultrasound: Antepartum detection of intrauterine growth retardation. Am J Obstet Gynecol. 1981; 139(3):254-8.