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ORIGINAL ARTICLE

Perinatal Outcome of Oligohydramnios in tertiary level hospital

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Abstract

Background: Oligohydramnios is being an upcoming challenge both for obstetrician and for pediatricians. Its incidence is 2.3% of all the pregnancies. It is often associated with post term pregnancy, premature rupture of membrane (PROM), intra uterine growth retardation (IUGR), congenital malformation, renal agenesis, obstructed uropathy etc. So, it is very important to assess amniotic fluid index (AFI) to find out the high-risk group of oligohydramnios.

Objective: To assess the effect of oligohydramnios on perinatal outcome.

Methods: This cross-sectional observational study was conducted at the Department of Obstetrics and Gynaecology of Dhaka National Medical College Hospital from April to September in 2019. Fifty-eight women admitted with isolated Oligohydramnions at term irrespective of their parity were included for the study subjects. The computer-aided statistical software SPSS version 22 was used to analyze the data that was collected through a pre-formed questionnaire. Tables and graphs were used to present the data.

Result: This study showed that among study group 42(72.4%) had borderline oligohydramnios and 16(27.6%) had severe oligohydramnios. In severe oligohydramnios group caesarean section was significantly higher than borderline oligohydramnios group. 20.7% were normal vaginal delivery, 3.4% were assisted vaginal delivery and 75.9% were caesarean section. Among 58 patients 29.3% were post term deliveries (41 to 42 completed weeks); 70.7% patients were delivered by 37 to 40 completed weeks. 39.7% babies had suffered from neonatal complications. Among them 22.4% suffered from birth asphyxia, 12.1% from meconium aspiration syndrome. Early neonatal death was 3.4% and still birth was 1.7% mainly due to severe birth asphyxia. Alive take home newborn were 94.8%. Among 55 alive babies, 41.8% babies were admitted in neonatal ICU.

Conclusion: Oligohydramnios was responsible for a significantly higher rate of LUCS due to fetal distress at term. Neonatal morbidity like admission in neonatal ward was 41.8% in women with oligohydramnios. Oligohydramnios was increasingly linked to perinatal and neonatal complications. Consequently, each case of oligohydramnios requires meticulous assessment, and appropriate preventive and therapeutic interventions should be implemented accordingly.

Key words: Perinatal outcome, Oligohydramnios, Amniotic fluids.

Introduction

Oligohydramnios is defined as a condition in which the volume of amniotic fluid is insufficient, namely less than 200 mL at term. An accurate diagnosis of oligohydramnios can be achieved sonographically through the ultrasonographic assessment of the amniotic fluid index (AFI) between 20 and 40 weeks of gestation.[1-3] In ultrasonography, a normal Amniotic Fluid Index (AFI) ranges from 8.1 to 20 cm; an AFI between 5 cm and 8 cm indicates moderate oligohydramnios, whereas an AFI of 5 cm or less signifies severe oligohydramnios. The amniotic fluid encasing the fetus fulfills multiple functions throughout gestation. It facilitates musculoskeletal

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development, encourages appropriate fetal lung maturation, and prevents umbilical cord compression. Oligohydramnios impacts roughly 3.9% of all gestations.[4-6] Oligohydramnios is a significant obstetric issue that contributes to perinatal death and morbidity.[3]

Pregnancies complicated by oligohydramnios face a heightened risk of unfavorable perinatal outcomes. Certain studies indicate a robust association between low birth weight in infants and oligohydramnios. Oligohydramnios correlates with a heightened likelihood of cesarean delivery due to fetal discomfort, primarily resulting from head and cord compression.[7-8] Reduced amniotic fluid volume indicates placental insufficiency and serves as a risk factor for fetal growth restriction.[9] Approximately 60% of fetuses with intrauterine growth restriction (IUGR) exhibit reduced amniotic fluid volume. A study indicated that oligohydramnios correlates with meconium staining of amniotic fluid, resulting in heightened occurrences of respiratory distress syndrome, higher NICU admissions, and severe perinatal impairment among affected infants.[10-12]

The Amniotic Fluid Volume (AFV) progressively rises during the majority of pregnancy, starting at approximately 30 ml at 10 weeks gestation and reaching a maximum of around 1 L between 34- and 36-weeks' gestation. Amniotic fluid volume (AFV) diminishes during the late third trimester, averaging 800 ml at 40 weeks gestation.[13] The volume of normal amniotic fluid fluctuates. The mean volume escalates with gestational age, reaching an optimal level of 800-1000 ml at 36-37 weeks of gestation.

Oligohydramnios, characterized by an Amniotic Fluid Index (AFI) below 5 centimeters, may indicate several complications during gestation, such as chromosomal anomalies, preterm rupture of membranes, renal dysfunction, and placental insufficiency.[14] It is linked to negative prenatal outcomes such as perinatal mortality, meconium aspiration syndrome, irregular fetal heart rate, and the necessity for surgical procedures during childbirth.[14] Oligohydramnios in intrauterine growth restriction (IUGR) signifies fetal distress, as it demonstrates the diversion of blood flow to save essential organs.[15-17] This disorder frequently results in elevated labor induction rates, more common fetal heart rate decelerations, reduced birth weights, and an increased prevalence of meconium aspiration syndrome.[18] Accurate diagnosis and surveillance, coupled with prompt intervention, are essential for enhancing perinatal outcomes in instances of oligohydramnios. Frequent AFI evaluations throughout the antepartum phase might facilitate the identification of high-risk cases and inform suitable therapy, hence decreasing newborn morbidity and mortality.

Materials & Methods

This cross-sectional, hospital-based observational study was conducted at the Department of Obstetrics and Gynecology in Dhaka National Medical College Hospital, Dhaka, over a period of six months, from September 2019 to February 2020. The sample size was calculated using a specific formula to ensure the accurate measurement of a predetermined proportion at a particular level of statistical significance, resulting in a sample size of 58 participants.

The study population for this research comprised women with isolated oligohydramnios at term, regardless of their parity, who were admitted to the labor and antenatal wards during the six-month study period at Dhaka National Medical College Hospital. Inclusion criteria involved all primiparous and multiparous patients with oligohydramnios, confirmed both clinically and sonographically, and who were at term (≥37 gestational weeks). Exclusion criteria excluded patients with other medical disorders during pregnancy such as heart disease, hypertensive disorders, diabetes, renal disease, etc., as well as those who declined to participate in the study. Purposive sampling was employed as the sampling technique. The study's outcome variables encompassed various factors including sociodemographic variables (age, occupation, socioeconomic status), parity, gravidity, gestational age, past obstetric and medical history (including abortion, preterm delivery, previous oligohydramnios, and hypertension), amniotic fluid index (AFI), appearance of amniotic fluid, mode of delivery, and neonatal outcomes such as maturity, birth weight, APGAR scores, and neonatal complications.

After the research protocol was approved by the committee, permission for the study was taken from the Department of Institutional Review Board (I.R.B). In accordance with the Helsinki Declaration for Medical Research Involving Human Subjects 1964, the study participants were verbally informed of the study's design, objectives, and their right to withdraw from the project at any time and for any reason. Everything was explained to the patients in detail easily understandable language. Subjects who were give informed consent to participate in the study was included as study sample.

Results

Table-I: Distribution of patients according to their age (n=58)

Age(years)	No of patients	Percentage (%)
18-20	7	12.1
21-25	37	63.8
26-30	12	20.7
31-35	2	3.4
Total	**58**	**100.0**

Table-I showed that 12.1% were in age group less than 20 years, 63.8% were 21 to 25 years, 20.7% were in age group 26 to 30 years. The mean age of the study respondents was 23.84±3.47 years.

Table-II: Distribution of study subjects according to parity (n=58)

Parity	Number of patients	Percentage (%)
Nulliparous	20	34.5
Multiparous	38	65.5
Total	**58**	**100.0**

Table-II showed that among 58 patient's nulliparous patients were 34.5% & multiparous patient were 65.5%.

Table-III: Distribution of Study subjects according to their Gestation age at the time of delivery (n=58)

Gestational age (weeks)	Number of patients	Percentage (%)
37 to 40 completed weeks	41	70.7
41 to 42 completed weeks	17	29.3
Total	**58**	**100.0**
Mean±SD	38.5±2.1 weeks	

Table-III showed that among 58 patient 29.3% were post term deliveries (41 to 42 completed weeks); 70.7% patients were delivered by 37 to 40 completed weeks.

Table-IV: Amniotic fluid index (AFI) of the patients (n=58)

AFI	Number of patients	Percentage (%)
5.1-8cm (Borderline oligohydrammios)	42	72.4
< 5 cm (Severe oligohydramnios)	16	27.6
Mean±SD	5.88±1.43	

Table-IV showed that among 58 patients borderline oligohydramios was 72.4% and severe oligohydramnios was 27.6%.

Table-V: Color of liquor at the time of rupture of membranes (n=58)

Colour of Liquor	Number of patients	Percentage (%)
Normal in colour	42	72.4
Meconium-stained liquor	16	27.6
Total	**58**	**100.0**

Table-V showed that 6 among 58 patients meconium stained liquor was found only in 27.6% and normal liquor colour 72.4%.

Table-VI: Distribution of study subject according to mode of delivery (n=58)

Mode of delivery	Number of patients	Percentage (%)
Normal Vaginal delivery	12	20.7
Assisted Vaginal delivery	2	3.4
Caesarean section	44	75.9
Total	**58**	**100.0**

Table-VI showed 20.7% were normal vaginal delivery, 3.4% were assisted vaginal delivery and 75.9% were caesarean section.

Table-VII: Indications of caesarean section (n=44)

Indication	Number of patients	Percentage (%)
Foetal distress	24	54.5
Failed induction	12	27.3
Mal presentation	8	18.2
Total	**44**	**100.0**

Table-VII showed that the indication of caesarean section maximum 55.5% was due to fetal distress, 27.3% due to failed induction, and 18.2% were due to presentation.

Table-VIII: Mode of delivery in borderline &severe oligohydramnios (n=58)

Oligohydramnios	Caesarea Section	NVD	X^2	p-value
Borderline oligohydramnios (n=42)	28(66.7%)	14(33.3%)	7.03	0.008
Severe oligohydramnios (n=16)	16(100.0%)	0(0.0%)		

Table-VIII showed that in severe oligohydramnios group caesarean section was significantly higher than borderline oligohydramnios group. The difference was statistically significant (p=0.008).

Table-IX: Birth weight of the baby (n=58)

Birth weight	Number of patients	Percentage (%)
1.5 to 2.5kg	35	60.3
> 2.5 kg	23	39.7
Mean±SD	2.39±0.61	

Table-IX showed that among 58 babies Low birth weight baby was 60.3% and more than 2.5 kg were 39.7%.

Table-X: Distribution of the study subjects according to APGAR score of the baby at 1st minute and 5th minute

APGAR Score	At 1st minute		At 5th minute	
	No of patients	Percentage (%)	No of patients	Percentage (%)
0 to 4	6	10.3	6	10.3
5 to 6	29	50.0	20	34.5
>7	23	39.7	32	55.2

Table-X showed that APGAR score > 7 at 1stminute was found in39.7% babies, at 5th minute was found in 55.2% babies. APGAP score 5 to 6 at 1st minute was found in 50% babies, at 5th minute was found in 34.5% babies. APGAR score 0 to 4 at 1st minute was found in 10.3% babies, at 5th minute was found in 10.3% babies.

Table-XI: Comparison of AFGAR score less than 7 in borderline & severe oligohydramnios group at 5th minute.

APGAR Score	In borderline Oligohydramnios group (n=42)	In severe Oligohydramnios group (n=16)	X^2	p-value
<7	12(28.6%)	13 (81.3%)	13.11	<0.001
≥7	30(71.4%)	3 (18.7%)		

Table-XI showed that APGAR score <7 was significantly higher in severe oligohydramnios group (X2=13.11, P<0.001) than borderline oligohydramnios group, which is statistically significant.

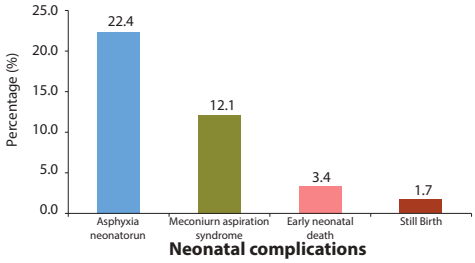

Figure-I: Bar diagram showing the neonatal complications.

Figure-I showed that out of 58 deliveries 23(39.7%) babies had suffered from neonatal complications. Among them 13(22.4%) suffered from birth asphyxia, 7(12.1%) from meconium aspiration syndrome. Early neonatal death was 2(3.4%) and still birth was 1(1.7%) mainly due to severe birth asphyxia. Alive take home newborn were 55(94.8%)

Table-XII: Admission in neonatal ward

Number of alive babies	Babies admitted In NICU		Admission not needed in NICU	
	No of patients	Percentage (%)	No of patients	Percentage (%)
55	23	41.8	32	58.2

Table-XII showed that among 55 alive babies, 41.8% babies were admitted in neonatal ward.

Discussion

The mean age of the patients in this study was 23.84±3.47 years, with a maximum of 63.8% aged between 21 and 25 years. Birandar & Shamanewadiet al.[19] showed that the mean age of pregnant women with oligohydramnios was 22.4±3.5 years, with the majority (64%) falling within the age group of 21-25 years. Comparable data were documented by other researchers, indicating that the mean age of women with oligohydramnios was 23.98±3.89 years, with 80.49% falling within the 20-29 age group.[20-22] According to our country's statistics, the majority of patients become pregnant in this age range.

This study's elevated incidence of oligohydramnios in multiparous women was likely attributable to the limited sample size, with a majority of patients being multiparous. In the study of 58 patients, only 16 (27.6%) exhibited meconium-stained amniotic fluid. Cosey's[23] study of 147 patients with oligohydramnios revealed meconium-stained amniotic fluid in only 9 individuals, representing a mere 6%. He asserted that meconium-stained amniotic fluid infrequently complicated the pregnancy with oligohydramnios. This study demonstrated no significant correlation between meconium-stained amniotic fluid and oligohydramnios. Meconium-stained liquid, however, was discovered to be substantially higher in the severe oligohydramnios group than in the borderline oligohydramnios group (in the borderline oligohydramnios 8/36 and in the severe

oligohydramnios 6/14, p>0.05). Nath et al.[24] showed no significant difference in meconium-stained amniotic fluid between the borderline and severe oligohydramnios groups. This study shown that an increased severity of oligohydramnios correlates with a higher incidence of liquor staining and an elevated risk of meconium aspiration syndrome (12.1% in our study compared to 5% in Cosey's study[23]).

In this study, the caesarean section rate was 44 (75.9%), with 54.5% of the indications attributed to foetal distress. Chudalet al.[5] observed an increased rate of caesarean section deliveries attributable to fetal distress. Magannet al.[25] discovered that the incidence of caesarean section birth was 15.2% among 341 individuals with oligohydramnios. Voxmanet al.[15] also identified an increased rate of cesarean sections (14.7%) due to fetal distress in the oligohydramnios cohort. Magannet al.[25] and Voxman[8] demonstrated in their research that the caesarean section rate was elevated among patients with oligohydramnios, albeit not considerably higher than observed in this study. This is likely attributable to inadequate fetal monitoring throughout the antepartum and intrapartum periods. To avert negative impacts on neonatal outcomes, a caesarean section was performed in most instances. Voxman's study indicated that the caesarean section rate was elevated in the severe oligohydramnios group compared to the borderline oligohydramnios group (9.7% vs 5%, p<0.05).[8] The study indicated that the incidence of caesarean section delivery was markedly greater in the severe oligohydramnios group compared to the borderline oligohydramnios group.

Manning et al.[16] conducted a study including 120 individuals referred for suspected intrauterine growth restriction (IUGR) and discovered that 91 had normal amniotic fluid content, of which 86 (94.5%) delivered healthy infants. Conversely, amniotic fluid content has diminished in 29 individuals, of whom 20 (89.9%) delivered infants with intrauterine growth restriction (IUGR). Moreover, neonatal morbidity has escalated tenfold in patients with decreased amniotic fluid volume. Rathurford et al. have proposed that an amniotic fluid index of 5 cm or less, aligning with prevalent sonographic criteria for oligohydramnios, serves as a criterion for the delivery of a fetus at or near term. [10]

Senvo et al.[17] observed a markedly elevated risk of cesarean section due to fetal distress and a low APGAR score in patients with an amniotic fluid index below 5 cm. This study found that 60.3% of babies were born weighing less than 2.5 kg. A study conducted by Magannet al.[25] revealed that among 79 patients with oligohydramnios, the preportion of low birth weight infants was 10%. Coseyet al.[23] noted that out of 147 individuals with oligohydramnios, 41 (35%) delivered low birth weight infants. Oligohydramnios may indicate inadequate intrauterine nourishment for the fetus.

This study found that the APGAR score at 5 minutes was considerably lower than 7 in the severe oligohydramnios group (p<0.001). Other researchers made nearly identical observations.[26]

In this study, neonatal complications were observed in 23 out of 58 babies. Birth asphyxia occurred in 22.4% of cases, while meconium aspiration syndrome was present in 12.1% of cases. In the study by Coseyset al.[23] respiratory distress syndrome occurred in 10% of cases, while meconium aspiration syndrome was seen in 1.4% of cases.

The analysis indicated one stillbirth (1.7%) and two early neonatal deaths (3.4%). The infants had a birth weight exceeding 2.5 kg, the amniotic fluid was stained with meconium, and there was a real knot in the umbilical cord around the neck.

In this study, admission to the neonatal care unit was reported to be 23 (41.8%). Neonatal admissions in two further investigations were 10% and 7%, respectively.[24-27]

The current investigation revealed that 35 (60.3%) of the babies exhibited low birth weight. Twenty-three (39.7%) infants experienced neonatal problems. Of these, 22.4% experienced birth asphyxia, while 12.1% were affected by meconium aspiration syndrome. Early newborn mortality was 3.4%, and stillbirth occurred at a rate of 1.7%, primarily attributed to severe birth asphyxia. The incidence of an APGAR score below 7 was markedly greater in the severe oligohydramnios group compared to the borderline oligohydramnios group, which is statistically significant. 41.8% of infants were admitted to the neonatal intensive care unit. In a study conducted by Sowmya K et al.[28], low birth weight was observed in 48%, an APGAR score of less than 7 was noted in 14%, and 14% were admitted to the NICU. A study conducted by Madhavi K et al reported a 36% incidence of meconium-stained amniotic fluid, with 20% of neonates exhibiting an APGAR score below 7 at 5 minutes, a 34% rate of NICU admissions, and a 6% incidence of meconium aspiration syndrome (MAS).[29]

Oligohydramnios is acknowledged as a clinical indicator of impending severe neonatal distress. . We identified 3 prenatal deaths (1 stillbirth and 2 early neonatal deaths), constituting 5.2%, while Casey et al. [23] reported a rate of 6.4% perinatal deaths. Ja and Young et al.30 concluded in their study that in the borderline AFI group, aberrant dorsal velocimetry measurements were associated with worse perinatal outcomes, necessitating enhanced antenatal surveillance. In conclusion, an adverse perinatal outcome was observed in the severe oligohydramnios group. The incidence of an APGAR score below 7 was markedly greater in the severe oligohydramnios group compared to the borderline oligohydramnios group, a finding that is statistically significant.

Conclusion

It has been determined that the rate of Caesarean section deliveries was significantly high at 75.9%. Secondly, foetal distress was the primary indication for Caesarean section, which accounted for 54.5% of cases. Additionally, a substantial proportion of neonates with APGAR scores below 7 at the fifth minute were notably associated with severe oligohydramnios, at 81.3%. Furthermore, a significant number of mothers with oligohydramnios delivered low-birth-weight infants, with a prevalence of 60.3%. Finally, it was noted that a significant number of neonates, 41.8%, necessitated admission to the neonatal ward. These results emphasize the significance of early detection and appropriate management of oligohydramnios in order to enhance perinatal outcomes and decrease the chance of adverse events during childbirth.

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