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Intrauterine growth restriction and perinatal outcome among oligohydramnios pregnancies

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ABSTRACT

Background: Successful outcome of obstetric well-being is to assess by obtaining healthy mother and child in modern obstetrics. Assessment of fetal well-being is important in timely diagnosis of fetal compromise and management. Amniotic fluid serves a major role in the development of the fetus. **Aims and Objectives:** The present study aims to evaluate the oligohydramnios pregnancies admitted in IPD of G & O, Bankura Sammilani Medical College & Hospital in terms of intrauterine growth restriction (IUGR) and perinatal outcomes. **Materials and Methods:** The study was conducted at Bankura Sammilani Medical College and Hospital, West Bengal, in terms of IUGR and perinatal outcomes from April 2020 to September 2021 among 80 antenatal mothers diagnosed to have oligohydramnios and subsequently admitted in-patients-department. Thorough history taking and clinical examination was done. Template was generated in MS Excel sheet and analysis was done on SPSS software. **Results:** Among 80 antenatal mothers diagnosed with oligohydramnios, the mean age of patients was 22.0750 ± 4.1484. 21 (26.25%) patients had NICU admission and 56 (70.0%) patients had IUGR. In the study, 1 (1.25%) patient was perinatal death and 79 (98.75%) patients survived. In without IUGR, the mean birth weight (mean ± SD) of patients was 2.7483 ± 0.2222. In without IUGR, 1 (4.2%) patient had NICU admission. In with IUGR, 20 (35.7%) patients had NICU admission. **Conclusion:** Ultrasonography plays a major role in early diagnosis of IUGR. IUGR was associated with cesarean section for fetal distress, and NICU admission among oligohydramnios can be predicted using umbilical artery Doppler velocimetry.

Key words: Intrauterine growth restriction; Oligohydramnios; Pregnancy; Perinatal outcome

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INTRODUCTION

Oligohydramnios is associated with fetal morbidity in the form of intrauterine growth restriction (IUGR) and fetal congenital anomalies, poor tolerance of labor by the fetus, and low APGAR scores with poor perinatal outcome. The fetal umbilical artery Doppler evaluates the impedance to the flow of umbilical arteries. An abnormal umbilical artery Doppler is an indicator of fetal peripheral vasoconstriction leading to reduced fetal oxygenation. Hence, Doppler helped to identifying compromised fetus early and thus help to reduce the adverse perinatal outcome.

Suboptimal intrauterine growth affects up to 10% of pregnancies and confers an increased risk of perinatal morbidity and mortality. The perinatal outcome of IUGR fetuses is largely dependent on the severity of growth restriction with those below the 3rd centile and/or abnormal umbilical artery Doppler measurements at greatest risk of adverse outcome.[1] Other important prenatal determinants of perinatal outcome are gestational age at delivery and birth weight, with best prospects of morbidity-free survival to hospital discharge at weights over 800 grams and gestational ages over 29 weeks.[2]

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Advances in obstetrical and critical neonatal care are reflected in a substantial decrease in the overall perinatal mortality rate (PNMR) in high-income countries. While this effect is mainly seen in a reduction of early neonatal deaths, stillbirth rates have remained largely unchanged over the past years.[3,4] In addition to congenital abnormalities, more recent reports have identified fetal growth restriction as one of the main contributors to perinatal mortality.[5]

Ireland consistently reports the highest birth rates among European countries with 16.8 births per 1000 population (compared to 13.0/1000 in the UK and 8.3/1000 in Germany).[6] In 2011, there were 74,265 births and 456 perinatal deaths in Ireland.[7] Stillbirths and early neonatal deaths accounted for 70% (n=318) and 30% (n=138) of perinatal deaths, respectively, corresponding to a PNMR of 6.1/1000 births. Of the 456 perinatal deaths, 155 (34%) were attributed to congenital structural or genetic abnormalities (corrected PNMR 4.1/1000). Over 50% of infants affected by perinatal deaths in 2011 were identified as having birth weights below the 10th customized centile, and only 30% of those were suspected antenatally.[7]

Current antenatal detection rates of IUGR are reported at 25–36%. Therefore, a preventative strategy to reduce stillbirths is to improve the antenatal detection of fetal growth failure. The risk of stillbirth in pregnancies with prenatally identified IUGR is 1% (9.7/1000 births). Pregnancies with unrecognized IUGR carry an over 8-fold increased risk of stillbirth (SB) when compared to pregnancies without IUGR (19.8 vs. 2.4/1000 births).[5] Whenever IUGR is diagnosed prenatally, increased surveillance and timely delivery aims to improve perinatal outcome in IUGR, balancing the risk of antepartum stillbirth by remaining *in utero* and iatrogenic prematurity potentially causing significant morbidity or neonatal death by too early intervention.

Therefore, the present study is to evaluate the oligohydramnios pregnancies admitted in IPD of Dept of G&O, Bankura Sammilani Medical College and Hospital, in terms of IUGR and perinatal outcomes.

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Aims and objectives

To evaluate the oligohydramnios pregnancies admitted in patients department, G & O of Bankura Sammilani Medical College & Hospital in terms of intrauterine growth restriction (IUGR) and perinatal outcomes.

MATERIALS AND METHODS

Study area

The study was carried out in the Outpatient Department (OPD) and Indoor of Department of Obstetrics and Gynaecology, Bankura Sammilani Medical College, Bankura.

Study population

The study was carried out among antenatal mothers diagnosed to have oligohydramnios andsubsequently admitted in-patients-department (IPD) of G&O, B.S. Medical College, Bankura.

Study period

The study was conducted from April 2020 to September 2021.

Sample size (SS)/design

SS

SS for the proposed study was calculated based on the formula used for testing diagnostic accuracy of new/test, i.e., n=[Za2xS1x(100-S.)]/(L2+P), where Za=1.96 (two-sided), Sa=sensitivity of the "test" test as reported in previous research, and L=allowable error around the reported prevalence (P) of outcome of interest in general population (here it is IUGR). Considering L=11 (absolute) of IUGR at 24%* and Sn of the umbilical artery Doppler velocimetry of 64.4%, the estimated SS would be: n=(3.84×64.4×35.6)/(11)2=72.76.73. Considering 10% loss to follow up, the revised SS would be 73+10% of 73=80.

Sampling design

As per record on an average 5 oligohydramnios cases get admitted in the G&O Department, Bankura Sammilani Medical College, Bankura. If the data collection is carried out for a tentative period of 10 months, i.e., 43 weeks (approximately), and it is done on twice a week schedule (2 days of each week was chosen by simple random sampling technique using lottery method to be conducted at the beginning of concerned week), one such eligible case will be selected daily via simple random sampling technique (choosing one using currency note/lottery method from the imaginary admission queue for that particular day).

Study design

This was a descriptive evaluation study.

Inclusion criteria

Inclusion criteria were singleton pregnancy with cephalic presentation, AFI <5 c.m, and intact membranes.

Exclusion criteria

Exclusion criteria used were associated fetal malformation, ruptured membrane, multiple gestations, intrauterine death,

fetal malpresentation, polyhydramnios, active labor, post-dated pregnancy, and previous cesarean section.

Study variables

- Input variables wereage, parity, nutritional status, status of antenatal care, addiction, comorbidity, Hb level, place, time and mode of delivery and process of delivery conducted.
- Outcome variables were IUGR, birth asphyxia, and early neonatal morbidity.

Methods of collection of data and interpretation

Data collection was done via interview, scrutinizing of relevant records, clinical examination, and investigation. A predesigned, pretested interviewer-administered questionnaire was used for structured interview of the pregnant women in the antenatal ward. Then, they were undergone Doppler study and followed at labor (either normal delivery if the Doppler findings are favorable otherwise cesarean section) and neonatal period for observing outcomes, e.g., percentage of stillbirth, proportion of fetus developing birth asphyxia, morbidity in the early neonatal period, required admission in SNCU, and death.

Ethical clearance

This study was conducted after getting due permission from the Institutional Ethics Committee, BSMC, and approval of the West Bengal University of Health Sciences. Informed consent of each of the participants was also taken.

For statistical analysis, data were entered into a Microsoft Excel spreadsheet and then analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests done for a difference in mean involved independent samples or unpaired samples. A Chi-squared test (χ^2 test) was any statistical hypothesis test wherein the sampling distribution of the test statistic is a Chi-squared distribution when the null hypothesis is true. Without other qualifications, "Chi-squared test" often is used as short for Pearson's Chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate. $P \leq 0.05$ was considered statistically significant.

RESULTS

This descriptive evaluation study was carried out in the OPD as well IPD of Obstetrics and Gynaecology of the Bankura Sammilani Medical College, Bankura, West Bengal, from April 2020 to September 2021. During the period, 80 antenatal mothers diagnosed with oligohydramniosand subsequently get admitted in IPD of Dept of G&O, B.S. Medical College, Bankura, were included in the study as per inclusion criteria.

In the present study, 35 (43.75%) patients were 15–20 years old, 32 (40.0%) patients were 21–25 years old, 8 (10.0%) patients were 26–30 years old, and 5 (6.25%) patients were 31–35 years old. The mean age (mean±s.d.) of patients was 22.0750±4.1484. In our study, 18 (22.5%) patients had multiparity and 62 (77.5%) patients had primiparity. In our study, 15 (18.75%) patients had mild anemia and 14 (17.5%) patients had PE in high risk. In our study, 28 (35.0%) patients had abnormal FHR and 52 (65.0%) patients had normal FHR. In our study, 6 (7.5%) patients had abnormal UA Doppler and 74 (92.5%) patients had normal UA Doppler. In our study, 25 (31.25%) patients had NR in NST and 55 (68.75%) patients had R in NST (Table 1).

In our study, 50 (62.5%) patients were liquor C, 14 (17.5%) patients were thick MSL, and 16 (20.0%) patients were thin MSL. In our study, 13 (16.25%) patients were I and 10 (12.50%) patients were S in OL and LSCS (71.25 %). In our study, 30 (37.5%) patients had El. LSCS, 27 (33.75%) patients had Em. LSCS, and 23 (28.75%) patients had ND. In our study, 7 (8.75%) patients had CPD, 11 (13.75%) patients had FD, 9 (11.25%) patients had FI, and 30 (37.5%) patients had SL in IND of LSCS (Table 2).

Table 1: Distribution of patients according to age, parity, high risk, FHR, UA Doppler, and NST (n=80)

	Frequency	Percent (9%)
Age in group		
18–20	35	43.75
21–25	32	40.0
26–30	8	10.0
31–35	5	6.25
Total	80	100
Parity		
Multi	18	22.5
Primi	62	77.5
High risk		
Mild anemia	15	18.75
Pre-eclampsia (PE)	14	17.5
No such complications	51	63.75
Fetal health rate		
Abnormal	28	35.0
Normal	52	65.0
UA Doppler		
Abnormal	6	7.5
Normal	74	92.5
No stress test		
Non-reactive	25	31.25
Reactive	55	68.75

Table 2: Distribution of patients according to distribution of liquor, onset of labor, mode of delivery, and indication of LSCS (n=80)

	Frequency	Percent (%)
Liquor		
Liquor clear	50	62.5
Thick meconium-stained liquor	14	17.5
Thin meconium-stained liquor	16	20.0
Onset of labor		
Induction of labor (I)	13	16.25
Spontaneous labor (S)	10	12.50
Lower-segment cesarean section	57	71.25
Mode of delivery		
Elective LSCS	30	37.5
Emergency LSCS	27	33.75
Normal delivery	23	28.75
Indication of LSCS		
Cephalopelvic disproportion	7	8.75
Fetal distress	11	13.75
Failed induction	9	11.25
Scanty liquor/severe oligohydramnios	30	37.5
Normal delivery	23	28.75

In our study, 21 (26.25%) patients had NICU admission. In our study, 56 (70.0%) patients had IUGR. In our study, 21 (26.25%) patients had <7 Apgar score at 1 min and 59 (73.75%) patients had ≥7 Apgar score at 1 min. The value of z is 6.0083. The value of P is <0.00001. The result is significant at P<0.05. In our study, 16 (20.0%) patients had <7 Apgar score at 5 min and 64 (80.0%) patients had ≥7 Apgar score at 5 min. The value of z is 7.5895. The value of P is <0.00001. The result is significant at P<0.05. In our study, 1 (1.25%) patients were perinatal death and 79 (98.75%) patients survived. The value of z is 12.3329. The value of P is <0.00001. The result is significant at P<0.05 (Table 3).

Table 4 shows that the mean POG (mean±s.d.) of patients was 38.7000±1.0238. The mean AFI (mean±s.d.) of patients was 3.3500±1.1811. The mean birth weight (mean±s.d.) of patients was 2.3375±0.3715 (Table 4).

In without IUGR, 11 (45.8%) patients were 18–20 years old, 10 (41.7%) patients were 21–25 years old, 1 (4.2%) patient was 26–30 years old, and 2 (8.3%) patients were 31–35 years old. In with IUGR, 24 (42.9%) patients were 18–20 years old, 22 (39.3%) patients were 21–25 years old, 7 (12.5%) patients were 26–30 years old, and 3 (5.4%) patients were 31–35 years old. Association of age in group with IUGR was not statistically significant.

In without IUGR, 3 (12.5%) patients had multiparity and 21 (87.5%) patients had primiparity. In with IUGR, 15 (26.8%) patients had multiparity and 41 (73.2%) patients had primiparity. Association of parity with IUGR was not statistically significant (P=0.1608) (Table 5).

Table 3: Distribution of patients according to NICU admission, IUGR, APGAR score at 1 min, APGAR score at 5 min, and neonatal death (n=80)

	Frequency	Percent	P-value
NICU admission			
No	59	73.75	
Yes	21	26.25	
IUGR			
No	24	30.0	
Yes	56	70.0	
APGAR score at 1 min			
<7	21	26.25	<0.05
≥7	59	73.75	
APGAR score at 5 min			
<7	16	20.0	<0.05
≥7	64	80.0	
Neonatal death			
Perinatal death	1	1.25	<0.05
Survive	79	98.75	

In without IUGR, 1 (4.2%) patient had mild anemia and 5 (20.8%) patients had PE in high risk.

In with IUGR, 14 (25.0%) patients had mild anemia and 9 (16.1%) patients had PE in high risk.

Association of high risk with IUGR was not statistically significant (P=0.0913). In without IUGR, 8 (33.3%) patients had abnormal FHR and 16 (66.7%) patients had normal FHR. In with IUGR, 20 (35.7%) patients had abnormal FHR and 36 (64.3%) patients had normal FHR. Association of FHR with IUGR was not statistically significant (P=0.8378) (Table 6).

In without IUGR, 3 (12.5%) patients had abnormal UA Doppler and 21 (87.5%) patients had normal UA Doppler. In with IUGR, 3 (5.4%) patients had abnormal UA Doppler and 53 (94.6%) patients had normal UA Doppler. Association of UA Doppler with IUGR was not statistically significant (P=0.2663). In without IUGR, 8 (33.3%) patients had NR in NST and 16 (66.7%) patients had R in NST. In with IUGR, 17 (30.4%) patients had NR in NST and 39 (69.6%) patients had R in NST. Association of NST with IUGR was not statistically significant (P=0.7924). In without IUGR, 16 (66.7%) patients were liquor C, 3 (12.5%) patients were thick MSL, and 5 (20.8%) patients were thin MSL. In with IUGR, 34 (60.7%) patients were liquor C, 11 (19.6%) patients were thick MSL, and 11 (19.6%) patients were thin MSL. Association of liquor with IUGR was not statistically significant (P=0.7420) (Table 7).

In without IUGR, all patients (2 [100.0%]) were S in OL. In with IUGR, 13 (68.4%) patients were I and 6 (31.6%) patients were S in OL. Association of OL with IUGR was not statistically significant (P=0.0580). In without IUGR,

Table 4: Distribution of patients according to mean POG, AFI, and birth weight (n=80)

	Number	Mean	SD	Minimum	Maximum	Median
Period of gestation	80	38.7000	1.0238	37.0000	40.0000	39.0000
Lower-segment cesarean section (AFI)	80	3.3500	1.1811	2.0000	5.0000	3.0000
Birth weight	80	2.3375	0.3715	1.5200	3.2800	2.3600

Table 5: Association between age in group and parity with IUGR

IUGR			
Age in group	**No**	**Yes**	**Total**
18–20	11	24	35
Row %	31.4	68.6	100.0
Col %	45.8	42.9	43.8
21–25	10	22	32
Row %	31.3	68.8	100.0
Col %	41.7	39.3	40.0
26–30	1	7	8
Row %	12.5	87.5	100.0
Col %	4.2	12.5	10.0
31–35	2	3	5
Row %	40.0	60.0	100.0
Col %	8.3	5.4	6.3
Total	24	56	80
Row %	30.0	70.0	100.0
Col %	100.0	100.0	100.0
Chi-square value: 1.4626; P value: 0.6909			
Parity			
Multi	3	15	18
Row %	16.7	83.3	100.0
Col %	12.5	26.8	22.5
Primi	21	41	62
Row %	33.9	66.1	100.0
Col %	87.5	73.2	77.5
Total	24	56	80
Row %	30.0	70.0	100.0
Col %	100.0	100.0	100.0
Chi-square value: 1.9662; P value: 0.1608; Odds ratio: 0.3905 (0.1016, 1.5011)			

Table 6: Association between high risk and FHR with IUGR

IUGR			
High risk	**No**	**Yes**	**Total**
Mild anemia	1	14	15
Row %	6.7	93.3	100.0
Col %	4.2	25.0	18.8
No	18	33	51
Row %	35.3	64.7	100.0
Col %	75.0	58.9	63.8
Pre-eclampsia	5	9	14
Row %	35.7	64.3	100.0
Col %	20.8	16.1	17.5
Total	24	56	80
Row %	30.0	70.0	100.0
Col %	100.0	100.0	100.0
Chi-square value: 4.7872; P: 0.0913			
Fetal heart rate			
Abnormal	8	20	28
Row %	28.6	71.4	100.0
Col %	33.3	35.7	35.0
Normal	16	36	52
Row %	30.8	69.2	100.0
Col %	66.7	64.3	65.0
Total	24	56	80
Row %	30.0	70.0	100.0
Col %	100.0	100.0	100.0
Chi-square value: 0.0419; P: 0.8378; Odds ratio: 0.9000 (0.3280, 2.4698)			

7 (29.2%) patients had El. LSCS, 13 (54.2%) patients had Em. LSCS, and 4 (16.7%) patients had ND. In with IUGR, 23 (41.1%) patients had El. LSCS, 14 (25.0%) patients had Em. LSCS, and 19 (33.9%) patients had ND. Association of MOD with IUGR was statistically significant (P=0.0367) (Table 8).

In without IUGR, 7 (29.2%) patients had CPD, 5 (20.8%) patients had FD, and 9 (37.5%) patients had FI in IND of LSCS. In with IUGR, 6 (10.7%) patients had FD in IND of LSCS. Association of IND of LSCS with IUGR was statistically significant (P<0.0001). In without IUGR, 1 (4.2%) patient had NICU admission. In with IUGR, 20 (35.7%) patients had NICU admission. Association of NICU admission with IUGR was statistically significant (P=0.0032) (Table 9).

In without IUGR, the mean age (mean±s.d.) of patients was 22.0417±3.8840. In with IUGR, the mean age (mean±s.d.) of patients was 22.0893±4.2907. Distribution of mean age with IUGR was not statistically significant (P=0.9628). In without IUGR, the mean POG (mean±s.d.) of patients was 38.4583±1.1413. In with IUGR, the mean POG (mean±s.d.) of patients was 38.8036±0.9614. Distribution of mean POG with IUGR was not statistically significant (P=0.1684). In without IUGR, the mean AFI (mean±s.d.) of patients was 3.2500±1.2597. In with IUGR, the mean AFI (mean±s.d.) of patients was 3.3929±1.1549. Distribution of mean AFI with IUGR was not statistically significant (P=0.6231). In without IUGR, the mean birth weight (mean±s.d.) of patients was 2.7483±0.2222. In with IUGR, the mean birth weight (mean±s.d.) of patients was 2.1614±0.2691. Distribution of mean birth weight with IUGR was statistically significant (P<0.0001) (Table 10).

DISCUSSION

The present study revealed that 35 (43.75%) patients were 18–20 years old, 32 (40.0%) patients were 21–25 years old, 8 (10.0%) patients were 26–30 years old, and 5 (6.25%)

Table 7: Association between UA Doppler, NST, and liquor with IUGR

IUGR			
UA Doppler	**No**	**Yes**	**Total**
Abnormal	3	3	6
Row %	50.0	50.0	100.0
Col %	12.5	5.4	7.5
Normal	21	53	74
Row %	28.4	71.6	100.0
Col %	87.5	94.6	92.5
Total	24	56	80
Row %	30.0	70.0	100.0
Col %	100.0	100.0	100.0
Chi-square value: 1.2355; P: 0.2663; Odds ratio: 2.5238 (0.4712, 13.5178)			
Non-stress test			
Non-reactive	8	17	25
Row %	32.0	68.0	100.0
Col %	33.3	30.4	31.3
Reactive (R)	16	39	55
Row %	29.1	70.9	100.0
Col %	66.7	69.6	68.8
Total	24	56	80
Row %	30.0	70.0	100.0
Col %	100.0	100.0	100.0
Chi-square value: 0.0693; P: 0.7924; Odds ratio: 1.1471 (0.4127, 3.1878)			
Liquor			
Liquor clear (C)	16	34	50
Row %	32.0	68.0	100.0
Col %	66.7	60.7	62.5
Thick MSL	3	11	14
Row %	21.4	78.6	100.0
Col %	12.5	19.6	17.5
Thin MSL	5	11	16
Row %	31.3	68.8	100.0
Col %	20.8	19.6	20.0
Total	24	56	80
Row %	30.0	70.0	100.0
Col %	100.0	100.0	100.0
Chi-square value: 0.5969; P: 0.7420			

patients were 31–35 years old. The mean age of patients was 22.0750±4.1484 years. In our study, 18 (22.5%) patients had multiparity and 62 (77.5%) patients had primiparity. We observed that 15 (18.75%) patients had mild anemia and 14 (17.5%) patients had PE in high risk. In the study, 28 (35.0%) patients had abnormal FHR and 52 (65.0%) patients had normal FHR. It was found that 6 (7.5%) patients had abnormal UA Doppler and 74 (92.5%) patients had normal UA Doppler. In our study, 25 (31.25%) patients had NR in NST and 55 (68.75%) patients had R in NST. The present study showed that 50 (62.5%) patients were liquor C, 14 (17.5%) patients were thick MSL, and 16 (20.0%) patients were thin MSL. We found that 13 (16.75%) patients were I and 10 (12.5%) patients were S in OL. In the present study, 30 (37.5%) patients had El. lower-segment cesarean section, 27 (33.75%) patients had Em. lower-segment cesarean section, and 23 (28.75%) patients had ND. We examined that 7 (8.75%) patients had

Table 8: Association between onset of labor and mode of delivery with IUGR

IUGR			
Onset of labor	**No**	**Yes**	**Total**
Induction of labor (I)	0	13	13
Row %	0.0	100.0	100.0
Col %	0.0	68.4	61.9
Spontaneous labor (S)	2	6	8
Row %	25.0	75.0	100.0
Col %	100.0	31.6	38.1
Total	2	19	21
Row %	9.5	90.5	100.0
Col %	100.0	100.0	100.0
Chi-square value: 3.5921; P: 0.0580			
MOD			
El. LSCS	7	23	30
Row %	23.3	76.7	100.0
Col %	29.2	41.1	37.5
Em. LSCS	13	14	27
Row %	48.1	51.9	100.0
Col %	54.2	25.0	33.8
Normal delivery	4	19	23
Row %	17.4	82.6	100.0
Col %	16.7	33.9	28.8
Total	24	56	80
Row %	30.0	70.0	100.0
Col %	100.0	100.0	100.0
Chi-square value: 6.6107; P: 0.0367			

Table 9: Association between IND of LSCS and NICU admission with IUGR

IUGR			
IND of LSCS	**No**	**Yes**	**Total**
Cephalopelvic disproportion	7	0	7
Row %	100.0	0.0	100.0
Col %	29.2	0.0	8.8
Fetal distress	5	6	11
Row %	45.5	54.5	100.0
Col %	20.8	10.7	13.8
Failed induction	9	0	9
Row %	100.0	0.0	100.0
Col %	37.5	0.0	11.3
No	3	50	53
Row %	5.7	94.3	100.0
Col %	12.5	89.3	66.3
Total	24	56	80
Row %	30.0	70.0	100.0
Col %	100.0	100.0	100.0
Chi-square value: 53.5359; P:<0.0001			
NICU admission			
No	23	36	59
Row %	39.0	61.0	100.0
Col %	95.8	64.3	73.8
Yes	1	20	21
Row %	4.8	95.2	100.0
Col %	4.2	35.7	26.3
Total	24	56	80
Row %	30.0	70.0	100.0
Col %	100.0	100.0	100.0
Chi-square value: 8.6368; *P* value: 0.0032; Odds ratio: 12.7778 (1.6036, 101.8132)			

Table 10: Distribution of mean age, POG, AFI, and birth weight with IUGR

	Number	Mean	SD	Minimum	Maximum	Median	P-value
Age							
No	24	22.0417	3.8840	18.0000	32.0000	22.5000	0.9628
Yes	56	22.0893	4.2907	18.0000	35.0000	21.0000	
Period of gestation							
No	24	38.4583	1.1413	37.0000	40.0000	38.0000	0.1684
Yes	56	38.8036	0.9614	37.0000	40.0000	39.0000	
Amniotic fluid index							
No	24	3.2500	1.2597	2.0000	5.0000	3.0000	0.6231
Yes	56	3.3929	1.1549	2.0000	5.0000	3.5000	
Birth weight							
No	24	2.7483	0.2222	2.3600	3.2800	2.7800	<0.0001
Yes	56	2.1614	0.2691	1.5200	2.6000	2.1850	

CPD, 11 (13.75%) patients had FD, and 9 (11.25%) patients had FI in IND of LSCS. It was found that 21 (26.25%) patients had NICU admission and 56 (70.0%) patients had IUGR. Our study showed that the mean POG of patients was 38.7000±1.0238, the mean AFI of patients was 3.3500±1.1811, and the mean birth weight of patients was 2.3375±0.3715. We found that in without IUGR, 11 (45.8%) patients were 18–20 years old, 10 (41.7%) patients were 21–25 years old, 1 (4.2%) patient was 26–30 years old, and 2 (8.3%) patients were 31–35 years old. In with IUGR, 24 (42.9%) patients were 18–20 years old, 22 (39.3%) patients were 21–25 years old, 7 (12.5%) patients were 26–30 years old, and 3 (5.4%) patients were 31-35 years old. This was not statistically significant (P=0.6909). In our study, 1 (1.25%) IUGR baby not survived and 79 (98.75%) neonates survived. The present study showed that in without IUGR, 3 (12.5%) patients had multiparity and 21 (87.5%) patients had primiparity. In with IUGR, 15 (26.8%) patients had multiparity and 41 (73.2%) patients had primiparity. This was not statistically significant (P=0.1608). The present study showed that in without IUGR, 1 (4.2%) patients had mild anemia and 5 (20.8%) patients had PE in high risk. In with IUGR, 14 (25.0%) patients had mild anemia and 9 (16.1%) patients had PE in high risk. This was not statistically significant (P=0.0913).

Kaur et al.,[8] (2016) found that normal quantity of liquor amnii is essential for neonatal and successful outcome of pregnancy, as it provides a safe milieu interior for the fetus *in utero*. Deprivation of required quantity will adversely affect the neonatal outcome. Oligohydramnios in itself is enough to cause such damage, by creating chronic hypoxic situation.

We examined that in without IUGR, 16 (66.7%) patients were liquor C, 3 (12.5%) patients were thick MSL, and 5 (20.8%) patients were thin MSL. In with IUGR, 34 (60.7%) patients were liquor C, 11 (19.6%) patients were thick MSL, and 11 (19.6%) patients were thin MSL. This was not statistically significant (P=0.7420).

The present study showed that in without IUGR, all patients (2 [100.0%]) were S in OL. In with IUGR, 13 (68.4%) patients were I and 6 (31.6%) patients were S in OL. It was not statistically significant (P=0.0580).

We observed that in without IUGR, 7 (29.2%) patients had El. LSCS, 13 (54.2%) patients had Em. LSCS, and 4 (16.7%) patients had ND. In with IUGR, 23 (41.1%) patients had El. LSCS, 14 (25.0%) patients had Em. LSCS, and 19 (33.9%) patients had ND. Association of MOD with IUGR was statistically significant (P=0.0367).

Our study showed that in without IUGR, 7 (29.2%) patients had CPD, 5 (20.8%) patients had FD, and 9 (37.5%) patients had FI in IND of LSCS. In with IUGR, 6 (10.7%) patients had FD in IND of LSCS. This was statistically significant (P<0.0001).

We found that in without IUGR, the mean age (mean±s.d.) of patients was 22.0417±3.8840, and in with IUGR, the mean age (mean±s.d.) of patients was 22.0893±4.2907. Distribution was not statistically significant (P=0.9628).

Our study showed that in without IUGR, the mean POG (mean±s.d.) of patients was 38.4583±1.1413, and in with IUGR, the mean POG (mean±s.d.) of patients was 38.8036±.9614, which was not statistically significant (P=0.1684).

Shivalingaiah et al.,[9] (2015) found that there was an increased incidence of IUGR, labor induction, and cesarean section for fetal distress and NICU admission in cases with AFI (less than or equal to) 5 cm, compared to cases with normal AFI. Among the cases with oligohydramnios, cases with abnormal umbilical artery Doppler velocimetry had a higher incidence of IUGR, LSCS for fetal distress, and NICU admissions compared with normal umbilical artery Doppler. AFI (less than or equal to) 5 cm after 34 weeks of gestation is an indicator of poor perinatal outcome. Umbilical artery Doppler velocimetry in cases with oligohydramnios would help in identifying high-risk cases for poor perinatal outcome.

We found that in without IUGR, 3 (12.5%) patients had abnormal UA Doppler and 21 (87.5%) patients had normal UA Doppler. In with IUGR, 3 (5.4%) patients had abnormal UA Doppler and 53 (94.6%) patients had normal UA Doppler. This was not statistically significant (P=0.2663).

Singhal et al.,[10] (2015) found that an AFI <5 cm was associated with significant high rate of induction of labor (P<0.001), cesarean section (P=0.04), and fetal distress (P<0.05). Meconium-stained liquor (P=0.76), Apgar score less than 7 at 5 min (p=0.307), low birth weight (P=0.130), or NICU admission (P=1) was comparable in the two groups. Low AFI (<5 cm) at term is associated with significantly high rate of intrapartum fetal distress and cesarean section, though the neonatal outcome is not affected by the AFI levels.

In our study, in without IUGR, 1 (4.2%) patient had NICU admission, and in with IUGR, 20 (35.7%) patients had NICU admission, which was statistically significant (P=0.0032).

Mishra et al.,[11] (2020) found that the mean maternal age in borderline AFI group was 25.96±5.92 years and in normal AFI group was 27.88±6.5 years (P=0.023). Maternal outcomes such as preterm delivery and labor induction in women with borderline AFI were considerably higher than those in normal group (P=0.01 and P=0.001). There were no significant differences between the two groups in terms of high blood pressure, pre-eclampsia, diabetes, and neonatal respiratory distress. The borderline AFI group had a higher rate of neonatal complications such as Apgar score of <7 (P=0.004), IUGR (0.0001), LBW (0.001), and crucial need to NICU (0.003). Findings indicated that there are statistical differences between adverse outcomes in borderline AFI group and normal group.

We examined that in without IUGR, the mean AFI (mean±s.d.) of patients was 3.2500±1.2597, and in with IUGR, the mean AFI (mean±s.d.) of patients was 3.3929±1.1549, which was not statistically significant (P=0.6231).

Bhagat and Chawla[12] (2014) showed that the cesarean section rate for fetal distress and low birth weight babies, <2.5 kg, was higher in patients with oligohydramnios (P=0.048 and 0.001, respectively). There was no significant difference in meconium staining, Apgar score at 5 min <7, and cord pH at birth between the two groups (P=0.881, 0.884, and 0.764, respectively). Oligohydramnios has a significant correlation with cesarean section for fetal distress and low birth weight babies.

In the present study, it was found that in without IUGR, the mean birth weight (mean±s.d.) of patients was 2.7483±0.2222, and in with IUGR, the mean birth weight (mean±s.d.) of patients was 2.1614±0.2691, which was statistically significant (P<0.0001).

Limitations of the study

The limitation of our present study is that it was conducted in a single-center hospital based study. The sample size was small, only 80 cases are not sufficient for this kind of study. The diagnosis of fetal distress was made depending on fetal heart rate tracing. However, the fetal acidosis was not proved by fetal scalp blood sampling or other methods because of non-availability. On-going COVID 19 pandemic and lockdown has further hampered the study Therefore, further studies should be conducted with bigger sample size and hospitals in rural and urban areas.

CONCLUSIONS

Health baby and healthy mother are the goal obstetrical management. Oligohydramnios is one of the indicators of poor perinatal outcome. From this study, we conclude that oligohydramnios is a high-risk pregnancy and proper antepartum care, intensive fetal surveillance, and intrapartum care are required in patients with oligohydramnios. Every case of oligohydramnios needs careful antenatal evaluation, parental counseling, individualization, decisions regarding time, and mode of delivery. Continuous intrapartum fetal monitoring and good neonatal care are necessary for better perinatal outcome.

Therefore, early detection of oligohydramnios with IUGR and its management and delivery at centers equipped with NICU can definitely reduce neonatal mortality and morbidity and decreased cesarean deliveries.

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Ethical approval

The study was approved by the Institutional Ethics Committee.

REFERENCES

1. Unterscheider J, Daly S, Geary MP, McAuliffe FM, Kennelly MM, Morrison JJ, et al. Optimizing the definition of intrauterine growth restriction-results of the multicenter prospective PORTO study. Am J Obstet Gynecol. 2013;208(4):290.e1-6.
   https://doi.org/10.1097/ogx.0b013e3182a0597f
2. Baschat AA, Cosmi E, Bilardo CM, Wolf H, Berg C, Rigano S, et al. Predictors of neonatal outcome in early onset placental dysfunction. Obstet Gynecol. 2007;109(2 Pt 1):253-261.
3. Lawn JE, Blencowe H, Pattinson R, Cousens S, Kumar R, Ibiebele I, et al. Stillbirths: Where? When? Why? How to make

the data count? Lancet. 2011;377(9775):1448-1463.
https://doi.org/10.1016/s0140-6736(10)62187-3

4. Cousens S, Blencowe H, Stanton C, Chou D, Ahmed S, Steinhardt L, et al. National, regional and worldwide estimates of stillbirth rates in 2009 with trends since 1995: A systematic analysis. Lancet. 2011;377(9774):1319-1330.
https://doi.org/10.1016/s0140-6736(10)62310-0
5. Gardosi J, Madurasinghe V, Williams M, Malik A and Francis A. Maternal and fetal risk factors for stillbirth: Population based study. BMJ. 2013;346:f108.
https://doi.org/10.1136/bmj.f108
6. National Perinatal Reporting System (NPRS): Health Research and Information Division, the Economic and Social Research Institute. Ireland: Perinatal Statistics Report; 2010.
https://doi.org/10.1007/s11845-013-1012-0
7. Manning E, Corcoran P, Meaney S and Greene RA. Perinatal Mortality Group: Perinatal Mortality in Ireland Annual Report, National Perinatal Epidemiology Centre, Cork; 2011. Available from: https://www.rte.ie/documents/news/perinatal-mortality-in-ireland-annual-report-2011.pdf [Last accessed on 2022 Mar 11].
https://doi.org/10.1136/jech-2019-ssmabstracts.229
8. Kaur P, Desai DA and Taraiya A. A study on the perinatal outcome in cases of oligohydramnios. Int J Reprod Contracept Obstet Gynecol. 2016;5(1):98-110.
https://doi.org/10.18203/2320-1770.ijrcog20151608
9. Shivalingaiah N, Varadarajan R and Mamatha MS. A clinical study of amniotic fluid index and umbilical artery Doppler study at or beyond 34 weeks gestation and its relation to perinatal outcome. J Evol Med Dent Sci. 2015;4(18):3040-7.
https://doi.org/10.14260/jemds/2015/442
10. Singhal SR, Gupta R and Sen J. Low amniotic fluid index as a predictor of adverse perinatal outcome-an Indian perspective. Clin Mother Child Health. 2015;12:201.
https://doi.org/10.4172/2090-7214.1000201
11. Mishra A, Neupane RP, Prasad PN and Thakur AK. Perinatal outcomes of pregnancies with borderline versus normal amniotic fluid index a prospective study. J Gen Pract Emerg Med Nepal. 2020;7(9):21-5.
https://doi.org/10.18535/jmscr/v8i1.152
12. Bhagat M and Chawla I. Correlation of amniotic fluid index with perinatal outcome. J Obstet Gynecol India. 2014;64(1):32-5.
https://doi.org/10.1007/s13224-013-0467-2

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