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Original Research Article

## The association between isolated oligohydramnios at term and pregnancy outcome and perinatal outcome in case of isolated oligohydramnios: a retrospective analysis

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### ABSTRACT

**Background:** Current study was carried out to assess the impact of isolated oligohydramnios on perinatal outcomes and mode of delivery.

**Methods:** A retrospective observational cohort study was conducted at term pregnancy with sonographic finding of isolated oligohydramnios (AFI <5 cm) were recruited for the study. Uterine anomaly and high risk pregnancies were excluded from the study. The mode of delivery and perinatal outcome were compared with control group of pregnancy with normal amniotic fluid (AFI >5-25 cm).

**Results:** When compared to the normal AFI, women with oligohydramnios had significantly lower birth weight babies and were delivered at a significantly earlier gestational age. However there was no difference in the APGAR scores at birth and NICU admissions between the two groups. Reactive NST had more chances of good APGAR score at 1 and 5 minute and that lower the AFI more the probability of nonreactive NST and abnormal Doppler. The number of inductions and caesareans done for foetal reasons were significantly higher in the exposed group.

**Conclusions:** Obstetric and perinatal outcome remains similar in both isolated oligohydramnios with reactive NST as well as in patients with normal amniotic fluid index. Isolated oligohydramnios is not associated with adverse perinatal outcomes. However, it increases the risk for labour induction and caesarean section.

**Keywords:** AFI, Isolated oligohydroamniosis, Perinatal outcome

### INTRODUCTION

The incidence of oligohydramnios at term varies greatly between different studies with a reported incidence of 0.5–5 %, depending on the study population, gestational age and the definition of oligohydramnios.<sup>1,2</sup> Oligohydramnios has been defined as liquor volume less than the 5th percentile for that gestational age single deepest pocket or maximum vertical pocket of less than 2 cm or Amniotic fluid index (AFI) of less than 5 cm.<sup>2</sup> It affects 2.4% of pregnancies between 36-40 weeks and 12% of pregnancies at 41 weeks or later. Oligohydramnios can be isolated or associated with

maternal or fetal conditions such as hypertension, premature rupture of membranes, fetal growth restriction and congenital anomalies. While perinatal outcomes of associated oligohydramnios are related to the underlying condition, the natural history of isolated oligohydramnios is unclear. Several studies have shown association of oligohydramnios with an increased caesarean delivery rate, an increase in non reassuring Fetal heart rate (FHR) pattern and adverse perinatal outcome such as preterm delivery, low birth weight, fetal distress, Meconium passage, low APGAR score, NICU admission.<sup>3-6</sup> These disorders may result from abnormal fetal or maternal conditions and, conversely, may be responsible for alterations of fetal well-being as well. Since, these

disorders of liquor amnii has a significant impact on pregnancy and fetus, it prompted us to carry out this study with sincere efforts to evaluate the effect of isolated oligohydramnios on obstetrics and perinatal outcome.

## METHODS

A retrospective cohort study of all singleton pregnancies at term (37+0 to 40 weeks) who attempted vaginal delivery in a GMERS medical college and hospital between 1 July 2017 and 30 December 2018 were included in this study. All gravid patients who were being assessed in the obstetrical follow-up clinic in our medical center undergo a sonographic assessment of the amniotic fluid volume as an integral part of fetal assessment during the study period. Eligible women (case) for the study group were those with isolated oligohydramnios [amniotic fluid index (AFI) <5cm] with following inclusion and exclusion criterias.

### Inclusion criteria

Inclusion criteria for current study were; single live intrauterine gestation with cephalic presentation, 37-40 weeks of gestation, intact membrane, AFI less than or equal to 5cm.

### Exclusion criteria

Exclusion criteria for current study were; uterine anomaly; high risk pregnancy, hypertensive disorder of pregnancy diabetes, chronic renal disease/cardiac disease and other medical and surgical ailment, connective tissue disorder, preeclampsia, previous scarred uterus.

## Procedure

During the study period in OBGY ward 50 term pregnancies (case) with isolated oligohydramnios were recorded, which were included in this study. Term pregnancies with normal amniotic fluid (AFI >5-25 cm) were taken as control group.

During the study period in OBGY ward 50 term normal pregnancies; amniotic fluid (AFI >5-25 cm) were recorded, which were included in this study and followed up. The mode of delivery and perinatal outcome were compared with control group of pregnancy. Data was entered into a computer database using Microsoft Excel spreadsheet and statistical analysis was performed. Results were presented as frequencies, percentages and appropriate statistical tests were applied.

### Statistical analysis

Data in continuous variables were presented as mean with standard deviation and ranges. Differences in continuous variables were analyzed with test of significance of difference between two means. categorical data was compared using Chi-Square test or Fisher's Exact test. Statistically significant differences were evaluated using Chi-Square or Fisher's Exact test.

## RESULTS

Total 60.00% of cases and 92.00% of controls had normal vaginal delivery whereas 40.00% of cases and 8.00% of controls underwent LSCS (Table 1).

**Table 1: Correlation of mode of delivery between two groups.**

Mode of delivery	Groups				Total	P value
	Case	%	Control	%		
Vaginal	30	60.00	46	92.00	76	0.0004
LSCS	20	40.00	4	8.00	24	
Total	50	100.00	50	100.00	100	

**Table 2: Correlation of NST and mode of delivery among cases.**

NST	Mode of delivery				Total	P value
	Vaginal	%	LSCS	%		
Reactive	24	48.00	09	18.00	33	0.0241
Non reactive	06	12.00	11	22.00	17	
Total	30	60.00	20	40.00	50	

Data suggests that difference in cesarean section rate was significant,  $p=0.0004$ . Correlation of NST and mode of delivery among cases is depicted in (Table 2). A total of 33 cases were reactive NST.

Out of which 09 (18%) underwent LSCS and 24 (48%) had vaginal delivery. A total of 17 cases were Non reactive NST. Out of which 11

(22%) underwent LSCS and 06 (12%) had vaginal delivery. Thus, indicating that non reactive NST had higher chances of undergoing LSCS. This result was found statistically significant ( $p=0.0241$ ). Nature of amniotic fluid in both the groups is shown in (Table 3). 64% of cases and 82% of controls had clear liquor whereas 36 % of cases and 18% controls had meconium stained liquor.

**Table 3: Nature of amniotic fluid.**

Liquor	Groups				Total	P value
	Case	%	Control	%		
Clear	32	64.00	41	82.00	73	0.070
MSL	18	36.00	9	18.00	27	
Total	50	100.00	50	100.00	100	

**Table 4: Correlation of AFI and mode of delivery among cases.**

AFI (cm)	Groups				Total	P value
	Vaginal	%	LSCS	%		
0-2	10	20.00	14	28.00	24	0.024
3-5	20	40.00	06	12.00	26	
Total	30	60.00	20	40.00	50	

**Table 5: Correlation of mean AFI with Doppler and mean APGAR score at 1 and 5 minutes and NST with Doppler among cases.**

NST with Doppler group	Mean AFI	Mean APGAR score at 1 minute	Mean APGAR score at 5 minutes
Reactive NST	3.39	8.06	9.63
Non reactive NST+normal Doppler	1.81	6.72	8.63
Non reactive NST+abnormal Doppler	0.66	5.33	7.33

**Table 6: Requirement of NICU admission.**

Requirement of NICU admission	Groups				Total	P value
	Case	%	Control	%		
Yes	12	24.00	5	10.00	17	0.110
No	38	76.00	45	90.00	83	
Total	50	100.00	50	100.00	100	

This result was found statistically non significant ( $p=0.070$ ). Correlation of AFI and mode of delivery among cases is shown in (Table 4). Out of 20 cases undergoing LSCS, maximum cases were seen in women with AFI=02 cm. In cases with AFI=0, all women underwent LSCS. None of the women with AFI=5 cm underwent LSCS. Out of 30 cases of successful vaginal delivery, maximum cases were seen in women with AFI=3-5 cm. Thus, indicating that lower the AFI more the probability of undergoing LSCS. This result was found statistically significant ( $p=0.024$ ). Correlation of mean APGAR score at 1 and 5 min and NST with Doppler among cases. Mean APGAR score at 1 and 5 minute in reactive NST group was 8.06 and 9.63 respectively. Mean APGAR score at 1 and 5 minute in nonreactive NST with normal Doppler group was 6.72 and 8.63 respectively.

Mean Apgar score at 1 and 5 minute in nonreactive NST with abnormal Doppler group was 5.33 and 7.33 respectively. Thus, indicating that reactive NST had more chances of good APGAR score at 1 and 5 minute and that lower the AFI more the probability of nonreactive NST and abnormal Doppler. Requirement of NICU admission in both groups is shown

in (Table 6). 12 (24.00%) newborn in cases and 5 (10.00%) newborn in controls required NICU admission. This result was found statistically non significant ( $p=0.110$ ).

## DISCUSSION

Mathuriya et al reported that 35% of women in case group had undergone LSCS in comparison to 10% of control group. The p value was 0.0004 (significant). Elective cesarean section 48.5% was the most common indication for LSCS in cases, while other indications were fetal distress, MSL, NPOL and failure of induction. Sowmya et al reported incidence of LSCS was 68% in cases compared to 28% in control group. It was significant statistically ( $p=0.0001$ ). In patients with isolated oligohydramnios, 50% underwent cesarean section for fetal distress.<sup>8</sup> In a study by Kavitha et al incidence of LSCS was 56% in cases and 08% in control group as compared to (62% vs. 24%) and (64% vs. 22%) in Padmini et al and Chate et al study respectively ( $p<0.01$ ).<sup>9,10</sup>

In a study by Purvi et al higher incidence of LSCS was reported, 81.25% in cases and 26.56% in control group;

there was a higher incidence of LSCS in comparison to our study. In this study incidence of LSCS was 40% in case group and 08% in control group. Rate of LSCS was higher in isolated oligohydramnios group and it was statistically significant ( $p=0.004$ ). Most common indication of LSCS reported in present study was fetal distress in 15 (30%) cases and 4 (8%) in control group.<sup>7</sup> Jagatia et al reported operative morbidity was significantly higher in nonreactive NST (24%) group than NST reactive (18%) group. Vaginal delivery was significantly higher in NST reactive (50%) group than non-reactive NST (08%) group ( $p=0.003$ ). In the present study it was observed that LSCS was significantly higher in nonreactive NST (22%) group than NST reactive (18%) group. Vaginal delivery was significantly higher in NST reactive (48%) group than non-reactive NST (12%) group ( $p=0.0241$ ).<sup>5</sup>

Purvi et al investigated the relationship of isolated oligohydramnios at term and meconium stained liquor and they found that occurrence of meconium stained liquor in the case group was 51.25% while it was 35% in the control group, and Found out that occurrence of meconium staining of liquor was affected by presence of isolated oligohydramnios at term ( $p=0.009$ ).<sup>7</sup> Similarly in 2016 Padmini et al found significantly increased incidence meconium stained liquor in study group. Sowmya et al investigated that occurrence of meconium stained liquor in the cases was 32% while it was 18% in the control group but it was statistically not significant ( $p=0.165$ ). Similarly Kavitha et al found that occurrence of meconium stained liquor in cases and control group was 22% and 10% respectively ( $p>0.05$ ).<sup>8,9</sup> In comparison to that, in the present study occurrence of meconium stained liquor in cases and control group was 36% and 18% respectively with  $p=0.07$ , which is statistically not significant. Kavitha et al observed that APGAR score  $<7$  at 1 min and 5 min was 24% and 8% in cases respectively while 12% and 4% in control group respectively.<sup>9</sup> Padmini CP et al reported APGAR score  $<7$  at 5 min was 8% in cases and 4% in control group which is comparable to study conducted by Kavitha et al. Chate et al reported APGAR score  $<7$  at 5 min was 16% in cases and 6% in control group; there was a higher incidence of low APGAR score in comparison to our study.<sup>9,10</sup> In the present study, it was observed that APGAR score  $<7$  at 1 min and 5 min was 24% and 4% in cases respectively while it was 4% and 0% in control group respectively, and concluded that Mean APGAR score at 1 and 5 minute in reactive NST group was 8.06 and 9.63 respectively while in nonreactive NST with abnormal Doppler group was 5.33 and 7.33 respectively. Purvi et al and Sowmya et al reported higher rate of NICU admission, but it was not significant statistically ( $p$  value  $>0.05$ ).<sup>7,8</sup> Padmini et al and Chate et al reported higher rate of NICU admission; they have shown a higher incidence of NICU admission in comparison to our study. ( $p=0.0007$ ).<sup>10,11</sup> Kavitha et al reported 18% of babies among cases and 4% of babies among controls went to NICU; they have shown a lower incidence of NICU

admission in comparison to our study.<sup>9</sup> In the present study, it was observed that neonatal intensive care unit admission was needed in 24% of newborns in cases and 10% in the control group, which is statistically not significant with  $p=0.108$ . 2 (4%) newborn required assisted ventilation while 10 (20%) required only bag and mask ventilation in case group. No newborn required assisted ventilation in the control group.

### Limitations

Current study was a unicentric study. Multicentric study should be carried out to validate the findings of our study. Sample size in our study is small. The study should be conducted with large sample size to see that observation is reproducible. The study was restricted to gestational age of 40 weeks. The study can be further conducted with extension of gestational age.

### CONCLUSION

Obstetric and perinatal outcome remains similar in both isolated oligohydramnios with reactive NST as well as in patients with normal amniotic fluid index. Isolated oligohydramnios is not an indication of elective caesarean section or induction of labour before 40 weeks of gestation unless it is associated with non-reactive NST with abnormal Doppler. Isolated oligohydramnios is not associated with adverse perinatal outcomes. However, it increases the risk for labour induction and Caesarean section.

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