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Original Research Article

PERINATAL OUTCOME IN OLIGOHYDRAMNIOS (AFI<5) AT TERM

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Abstract

Background: To evaluate the perinatal outcome in oligohydramnios as defined by AFI<5 in term deliveries. **Materials and Methods:** A prospective case-control study was carried out on 100 pregnant woman in the Antenatal Clinic and Labour Room of Command Hospital, Central Command, Lucknow, to study the perinatal outcome in oligohydramnios (AFI<5) at term. **Result:** Age of women ranged from 18 to 35 years with a mean age of 22.92±3.79 years All the pregnancies were term pregnancies (37 to 42 weeks). Majority of women in control group (52%) were multipara, however majority in case group were primipara (54%) but difference between two groups was not significant statistically. NICU requirement was higher in cases (40%) as compared to controls (12%). Proportion of babies with Apgar score <7 at 1 and 5 minutes was higher in cases as compared to controls but the difference was not significant statistically (p>0.05). A total of 4 (8%) of neonates in case group as compared to only 1 (2%) in controls expired. However, there was no significant difference between two groups with respect to neonatal mortality rate (p=0.169). **Conclusion:** AFI<5 is a useful indicator of oligohydramnios and has a clinical application too in terms of recognition of risk for poor perinatal outcome.

INTRODUCTION

Oligohydramnios is a severe and common complication of pregnancy. The finding of oligohydramnios can be associated with fetal anomalies, PROM, uteroplacental insufficiency (e.g., growth retardation, postdatism, abruptio placenta, significant maternal illness), abnormalities of twinning, and idiopathic oligohydramnios (McCurdy and Seeds, 1993).[1] Oligohydramnios complicates between 0.5%- 5% of all pregnancies. The prevalence depends largely upon the definition and criteria used for oligohydramnios and the population studied. Its generalized incidence is reported to be 2.3% of all the pregnancies (Casey et al., 2000).[2] The common etiological factors associated with oligohydramnios are ruptured membranes, congenital abnormalities and placental insufficiency.

Oligohydramnios at term pregnancies is unique as the etiology, management and the outcome is different in late onset oligohydramnios compared to early onset oligohydramnios.[3] Progressive improvements in ultrasonographic techniques have made it possible to assess the amniotic fluid volume relatively accurately. Although subjective and semiquantitative methods of estimating amniotic fluid volume ultrasonographically are in use, the best technique remains controversial. However, the technique of four quadrant method of calculating amniotic fluid index (AFI) is accepted by most of the authors. Numerous factors have been evaluated with respected to the effect on amniotic fluid index including inter observer and intraobsever variation, transducer pressure, maternal hydration, fetal movement, transducer type, fetal presentation and number of gestations. Amniotic fluid index (AFI) of ≤5 cm defines oligohydramnios as, originally described by Phelan et al. (1987).[4] It has been shown in several studies that a low amniotic fluid index (AFI<5) at term is an indicator of poor perinatal outcome and higher rate of caesarean section.[5-7] Some studies in recent past have tried to evaluate the at term AFI as an indicator of perinatal outcome and have shown it to be having a potential role (Jandial et al., 2007; Chate et al., 2013).[3,8] Evaluation at term seems to be a logical choice for evaluation of the role of AFI as it neutralizes the impact of management as done in early detection of AFI.

Hence, the present study was planned to study the perinatal outcome in oligohydramnios as indicated by amniotic fluid <5 at term.

Objectives

To compare the outcome of pregnancy in women having oligohydramnios (AFI<5) at term with that of women having normal amniotic fluid index

(AFI>5) in terms of:Mode of delivery, Status at birth – Live / Stillbirth, Apgar score, UGR, Low birth weight , Neonatal morbidity, NICU Stay.

MATERIALS AND METHODS

A prospective case-control study was carried out on all the pregnant women attending in the Antenatal Clinic and Labour Room of Command Hospital, Central Command, Lucknow during the period starting from Aug 2013 to July 2014.

Inclusion Criteria

- Pregnant women ≥ 37 weeks of pregnancy till 42 weeks.
- Having no known pregnancy complications.
- Aged 18 to 35 years.

Exclusion Criteria

- Preterm labour (<37 weeks) or prolonged labour (>42 weeks).
- Women in advancing age (>35 years).
- Women with known pregnancy complications such as pre-eclampsia, PIH, PCOS.
- Women not consenting to participate in the study.

All the women fulfilling the inclusion criteria and not falling into the domain of exclusion criteria were invited to participate in the study. All the women willing to participate in the study were subjected to sonographic assessment for measurement of amniotic fluid. Amniotic fluid index was determined using the criteria described by Phelan et al. (1989)4. On the basis of AFI values the patients were grouped as follows:

Cases: All those pregnant women with AFI value <5.

Controls: All those pregnant women with AFI value >5.

Group Assignment

All the consecutive patients fulfilling the inclusion criteria for cases and controls were assigned to their respective group using a quota sampling design.

Interventions if any, such as induction of labour, need for amnioinfusion, Caesarean section, etc. was noted.

The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. The values were represented in Number (%) and Mean±SD.

RESULTS

The present study enrolled a total of 100 pregnant women at term from amongst two groups of women who were matched for age, gestational age, parity, booking status.

Table 1: Distribution of Study Population

S. No.	Group	Description	Number of subjects	Percentage
1-	Controls	Pregnant females with AFI score >5	50	50.00
2-	Cases	Oligohydramnios cases AFI score <5	50	50.00

Table 2: Between Group Comparison of Age of Study Population

Age Group (years)	Controls (n=50)		Cases (n=50)		Total (n=100)	
	No.	%	No.	%	No.	%
18-20	14	28.00	14	28.00	28	28.00
21-25	29	58.00	25	50.00	54	54.00
26-30	4	8.00	7	14.00	11	11.00
31-35	3	6.00	4	8.00	7	7.00
	$\chi 2$ = 1.257 (df=3); p=0.739					
Mean Age	22.92+3.79		23.52+4.00		't'=-0.770; p=0.443	

Majority of subjects belonged to age group 18-25 years (72.0%), in both the groups (Controls and Cases) too this finding was evident. Though proportion of women aged 21-25 years was higher in Controls (58.0%) as compared to Cases (50.0%) but this difference was not found to be statistically significant. Mean age of Controls was found to be lower (22.92+3.79 years) as compared Cases (23.52+4.00 years), but this difference was not found to be statistically significant.

Table 3: Between Group Comparison of Gestational Age

Gestational Age (Weeks)	Controls (n=50)		Cases (n=50)		Total (n=100)	
	No.	%	No.	%	No.	%
37	6	12.00	7	14.00	13	13.00
38	7	14.00	7	14.00	14	14.00
39	10	20.00	11	22.00	21	21.00
40	12	24.00	10	20.00	22	22.00
41	10	20.00	10	20.00	20	20.00
42	5	10.00	5	10.00	10	10.00
	$\chi 2$ = 0.306 (df=5); p=0.998					

Gestational age of study population ranged between 37-42 weeks. No statistically significant difference in gestational age of Controls and cases was found (p=0.998).

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Table 4: Between Group Comparison of Obstetric Index

	Controls (n=50)		Cases (n=50)		Total (n=100)	
	No.	%	No.	%	No.	%
Primi	24	48.00	27	54.00	51	51.00
Multipara	26	52.00	23	46.00	49	49.00

$\chi 2$ = 0.360(df=1); p=0.548

Though proportion of primi-para was found to be higher in Cases (54.00%) as compared to Controls (48.00%) but this difference was not found to be statistically significant (p=0.548).

Out of 50 Control subjects, 31 (62.00%) were booked for delivery with the hospital rest 19 (38.00%) were not booked for delivery while out of 50 Cases, 30 (60.0%) were booked for delivery and rest 20 (40.0%) were unbooked for delivery. Difference in booking status was not found to be statistically significant (p=0.838).

None of the women in either group had any pregnancy complication as per the sampling frame.

Table 5: Between Group Comparison of Type of Labour in Study Population

	Controls (n=50)		Cases (n=50)		Total (n=100)	
	No.	%	No.	%	No.	%
Induced	12	24.00	27	54.00	39	39.00
Spontaneous	38	76.00	23	46.00	61	61.00

$\chi 2$ = 9.458 (df=1); p=0.002

Proportion of subjects with induced pregnancy was higher in cases (54.00%) as compared to controls (24.00%) and this difference was found to be statistically significant (p=-0.002).

Table 6: Between Group Comparison of Mode of Delivery

	Controls (n=50)		Cases (n=50)		Total (n=100)	
	No.	%	No.	%	No.	%
Full term normal delivery	36	72.00	20	40.00	56	56.00
Lower segment caesarean section	11	22.00	24	48.00	35	35.00
Outlet forceps	0	0.00	1	2.00	1	1.00
Vacuum delivery	3	6.00	5	10.00	8	8.00

$\chi 2$ = 10.900 (df=3); p=0.012

Mode of delivery in majority of pregnant women enrolled in the study as Controls was full term normal delivery (72.00%). Mode of delivery in 22% subjects enrolled as Controls was Lower segment caesarean section and in 6% Controls was vacuum delivery.

Most common mode of delivery in Cases was Lower segment caesarean section (48.00%) followed by full term normal delivery (40.00%), Vacuum delivery (10.0%) and Outlet forceps (2.00%).

Difference in mode of delivery in Controls and Cases was found to be statistically significant (p=0.012).

Table 7: Between Group Comparison of Indication for LSCS/Instrumental Delivery

	Controls (n=50)		Cases (n=50)		Total (n=100)	
	No.	%	No.	%	No.	%
Non indicative	38	76.00	28	56.00	66	66.00
Fetal distress	10	20.00	22	44.00	32	32.00
Prophylactic	2	4.00	0	0.00	2	2.00

$\chi 2$ = 8.015 (df=2); p=0.018

Indication for LSCS/instrumentation was fetal distress in 32.00% and prophylactic in 2.00% of Study population. Fetal distress was indication for LSCS/instrumentation in higher proportion of Cases (44.00%) as compared to Controls (20.00%), Prophylactic indication observed in only 2 (4.00%) of subjects enrolled as Controls.

Difference in indication for LSCS in Controls and Cases was found to be statistically significant.

Table 8: Between Group Comparison of Admission to NICU

Admission to NICU	Controls (n=50)		Cases (n=50)		Total (n=100)	
	No.	%	No.	%	No.	%
Not required	44	88.00	30	60.00	74	74.00
Required	6	12.00	20	40.00	26	26.00

$\chi 2$ = 10.187 (df=1); p=0.001

Only 6 (12.00%) neonates born to pregnant women enrolled as Controls and 20 (40.00%) enrolled as Cases were admitted to NICU for complications. This difference was found to be statistically significant (p=0.001).

Table 9: Between Group Comparison of Apgar Score at 1 min and 5 min

Apgar Score	Controls (n=50)		Cases (n=50)		Total (n=100)	
	No.	%	No.	%	No.	%
At 1 min						
>=7	41	82.00	34	68.00	75	75.00
<7	9	18.00	16	32.00	25	25.00

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	$\chi^2 = 2.613$ (df=1); p=0.106					
At 5 min						
>=7	47	94.00	42	84.00	89	89.00
<7	3	6.00	8	16.00	11	11.00
	$\chi^2 = 2.554$ (df=1); p=0.110					

At 1 minute, proportion of patients with Apgar score>7 was found to be higher in Control group (94%) as compared to Cases (68%).

At 5 minutes too, proportion of cases Apgar score <7 was higher (16%) as compared to Controls (6%) but this difference was not found to be statistically significant (p=0.110).

Table 10: Between Group Comparison of Prevalence of Neonatal Death

Neonatal Death	**Controls (n=50)**		**Cases (n=50)**		**Total (n=100)**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Absent	49	98.00	46	92.00	95	95.00
Present	1	2.00	4	8.00	5	5.00

$\chi^2 = 1.895$ (df=1); p=0.169

Only 1 (2.00%) of neonate born to pregnant women enrolled as Controls expired as compared to 4 (8.00%) neonates born to pregnant women enrolled as Cases. Difference in neonatal mortality was higher in Cases as compared to Controls but this difference was not found to be statistically significant (p=0.169).

DISCUSSION

In our present study randomized case-control study was planned in which a total of 100 pregnant women at term were enrolled. Of these 100 women, 50 had AFI<5 and were thus termed as cases while remaining 50 had AFI >5 and were termed controls.

Both the groups were matched for age, gestational age, parity, booking status and pregnancy complications. Thus showing that the groups were comparable.

Non-stress testing was done as a measurement of antenatal well-being of fetus. It was seen that cases had significantly higher proportion of women with non-reactive NST (38%) as compared to controls (20%) (p=0.047). In a similar study Bachhav and Walker (2014),[9] have also shown that lower AFI influences the NST outcomes of fetuses. Similar to our study, they also found that 65% of cases in low AFI group had a non-reactive NST as compared to only 24% in control group. Riahin et al. (2013),[10] in their study seeking association between NST and decreased amniotic fluid index also found the prevalence of non-reactive NST to be higher in patients with low AFI (73.4%) as compared to those having normal AFI (19.5%). Harding et al (1991),[11] in an assessment that included daily assessment of AFI and NST found that nonreactive nonstress tests was associated with a significantly lower overall average daily amniotic fluid index, but these differences were beyond the standard precision of the amniotic fluid index examination. The present study included pregnant women at term and in them AFI was assessed only once. Hence, we are not in a position to comment on the day-to-day variability but the relationship between NST results and AFI as observed in present study was in accordance with the literature. In another study, Anandkumar et al (1993),[12] evaluated the association between AFI and NST among high risk pregnancies did not find a significant association between two. However, this varied relationship could be attributed to selection of high-risk group of pregnancies and could not be generalized. In present study, diagnosed high risk pregnancies were excluded from the study.

In this study, decelerations (both late as well as variable decelerations) were more common in cases as compared to controls and this difference was significant statistically too (p=0.010). Role of amniotic fluid in fetal nutrition and growth is well established in animal models (Mulvihill et al 1985).[13] Decelerations might be an outcome of growth restriction or cord compression. Similar to results in present study, Kreiser et al (2001),[14] in their study also found variable decelerations to be significantly higher in women with AFI>5 cm. Desai et al (2004),[15] also found the variable decelerations to be higher in women with AFI<5 as compared to controls but did not find this difference to be significant. Despite the absence of this relationship in some studies, most of the literature supports the possibility of decelerations in low AFI groups (Chae et al 2013).[3] In another study, Grubb and Paul (1992),[16] not only showed an association between FHR decelerations and amniotic fluid indices but also showed that presence of both the parameters necessitates the need for an operative intervention.

In this assessment, presence of thick meconium was found to be present in significantly higher proportion of women with low AFI (46%) as compared to control group (16%). Thick meconium early in labour generally reflects low amniotic fluid volume, a risk factor for neonatal morbidity and mortality itself. Infants with thin meconium are more likely to have passed meconium as a physiologic maturational process and are more likely to be healthy at birth (McCurdy and Seeds, 1993; Meis et al., 1978; Starks, 1980; Leveno et al., 1984; Wiswell and Bent, 1993; Kreiser et al., 2001; Chate et al., 2013).[1,3,14,17-20]

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In this study, rate of induced labour was significantly higher in cases (54%) as compared to controls (24%) (p=0.002). Locatelli et al (2004),[6] in their study evaluated the effect of oligohydramnios on perinatal outcome in uncomplicated term pregnancies and found a direct relationship between low amniotic fluid indices and induced labour. In present study, the rate of induction deliveries in low AFI group (54%) was close to the that reported by Jandial et al (2007),[8] in a similar group of patients who reported this rate to be 58%. In another study, Bachhav and Walkar (2014),[9] though reported a high rate of induction (53%) in control cases, however, they specified that this high rate was for reasons other than oligohydramnios. At the same time, they reported the rate of induction deliveries to be much higher (86%) in cases, thus showing that if the rate of induction in a population increase for reasons other than oligohydramnios then it has a multiplier/additive effect on cases having low AFI. Seffah and Armah (1999),[5] while quantifying this increased risk of induction deliveries in cases as compared to controls reported it to be 6.08 in relative terms.

It was observed that rate of caesarean and instrumented deliveries was significantly higher in low AFI group as compared to those having AFI>5 cm. On exploring further, it was found that decision to conduct induction/cesarean delivery was based mainly on the fetal distress in both the groups, however rate of fetal distress was much higher in cases (44%) as compared to controls (20%). These findings suggested that oligohydramnios was responsible for fetal growth restriction and thus in turn was also responsible for higher rates of induction/cesarean decisions owing to fetal distress. A number of workers in their studies have found similar trends.[5,9,21-25] The role of amniotic fluid index as a predictor of fetal distress during labour was evaluated in a separate study by Ghosh et al. (2002),[21] who concluded that measurement of the amniotic fluid index in low-risk pregnant women admitted for labour might identify parturients with an increased risk of intrapartum fetal distress. The findings of present study also endorse same observation.

Subsequent to pregnancy complications, higher rate of fetal distress, induction decisions and caesarean deliveries, the NICU admission rate was also higher in cases (40%) as compared to controls (12%) (p=0.001). With this relationship higher NICU admission in the study could be justified. Various studies in literature also support this observation.[8,15,23,24,26]

In present study, neonatal mortality was reported in 4 (8%) cases and 2% controls. Though mortality rate was higher in cases as compared to controls yet this difference was not significant statistically.

The possible explanation of the increased Perinatal Morbidity and Mortality could be due to umbilical cord compression, potential utero-placental insufficiency and the increased incidence of meconium stained amniotic fluid and oligohydramnios.[27-30]

CONCLUSION

We can conclude that oligohydramnios is a potential risk factor for perinatal complications and poor outcome of pregnancy and AFI<5 cm proved to be an acceptable criteria for evaluating oligohydramnios. Regular validation of diagnostic cut-offs is essential in view of the fast technological advancements, recognizing potential areas for improvement and emergence of new threats, thus present study validated that AFI<5 is a useful criteria for recognizing a potential risk and to take essential measures to reduce poor outcomes owing to this risk by necessary intervention, upgradation of skills and technological upgradation.

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