



## Original Research Article

## Oligohydramnios as a predictor of perinatal and neonatal outcome at a tertiary care centre of Western India

Nilesh T Shah<sup>1</sup>, Shivendra Varshney<sup>2</sup>, Umang Patel<sup>3,\*</sup>, Sheila Aiyer<sup>2</sup>

<sup>1</sup>Dept. of Neonatal Intensive Care Unit., Isha Hospital, Vadodara, Gujarat, India

<sup>2</sup>Dept. of Paediatrics, S.S.G. Hospital, Vadodara, Gujarat, India

<sup>3</sup>Dept. of Forensic Medicine & Toxicology, Vedantaa Institute of Medical Sciences, Palghar, Maharashtra, India



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## ABSTRACT

**Background:** Substantial number of mothers with decreased amniotic fluid volume Index deliver at our hospital. This study was undertaken with an aim to study the Perinatal-Neonatal outcome in mothers having Severe Oligohydramnios.

**Materials and Methods:** Prospective Case-Control study carried from April 2016 to November, 2016. In our study, a total of 236 cases and controls were enrolled, out of which 24 were lost to follow up.

**Results:** There was higher percentage of LSCS as compared to the controls, weight in cases were significantly lower than those of controls, there were more discharged newborns in Controls as compared to Cases, there was higher percentage of Functional Renal morbidities (30.47%) as compared to the controls

**Conclusions:** There was significant difference Neonatal Outcome of Pregnancy with Oligohydramnios with Neonatal Outcome of Gestationally matched Pregnancy with Normal Amniotic Fluid volume. No significant difference found Perinatal-Neonatal Outcome of Pregnancy with Isolated Oligohydramnios and those associated with other Maternal Morbidities.

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### 1. Introduction

Oligohydramnios is one of the major causes for Perinatal-Neonatal morbidity and mortality. The cause of Oligohydramnios multifactorial; however its presence can indicate decrease fetal urine output and renal function.<sup>1</sup> Oligohydramnios is independently associated with a high risk of Low birth wt., Intra-uterine growth retardation, need for interventional delivery, pulmonary hypoplasia, renal anomalies and increased risk for Perinatal-Neonatal adverse outcomes.

Oligohydramnios or a reduced volume of amniotic fluid poses a challenge in obstetric management, particularly when it is diagnosed before term. The meaning of oligohydramnios is derived from greek word ‘oligo’ meaning – ‘few’ or ‘scanty’, ‘hydra’ meaning ‘water’ in greek & a latin word ‘amnion’ meaning – ‘membrane

around a fetus’.

Amniotic fluid, also known as a ‘liquor amnii’ – a latin word also known as ‘pregnant women’s water’ is the protective liquid contained in the amniotic sac of a pregnant female. This fluid serves as a cushion for the growing fetus, also facilitates the exchange of nutrients, water and biochemical products between mother and fetus.

The incidence of oligohydramnios in the literature varies from 0.5% to 5%, depending on the study population and definition of Oligohydramnios. The incidence of oligohydramnios is reported to be 4% in all pregnancies in USA. The incidence is thought to be higher in developing countries owing to high prevalence of PIH and is more complicated due to lack of ANC services and awareness regarding this problem.

However, Oligohydramnios is often accompanied by other maternal conditions like hypertension, diabetes, PROM, etc. and fetal conditions such as Still birth, Intra-

\* Corresponding author.

E-mail address: [umang272@gmail.com](mailto:umang272@gmail.com) (U. Patel).

Uterine Growth Retardation, Congenital Malformations, Low birth weight, Perinatal Asphyxia, Renal abnormalities and other conditions.

Substantial number of mothers with decreased amniotic fluid volume Index deliver at our hospital. This study was undertaken with an aim to study the Perinatal-Neonatal outcome in mothers having Severe Oligohydramnios.

## 2. Materials and Methods

### 2.1. Study design

Prospective Case-Control study

### 2.2. Study setting

Neonatal unit of S.S.G. Hospital, Vadodara.

Sample Size with calculation:

### 2.3. Inclusion criteria

Neonates born to the Mothers having Oligohydramnios with AFI  $\leq 5$  by USG and delivered in S.S.G. Hospital, and gestationally matched Non-Oligohydramnios delivery in S.S.G. Hospital.

### 2.4. Exclusion criteria

Included neonates born to Multiple gestation or having no USG proof of Oligohydramnios.

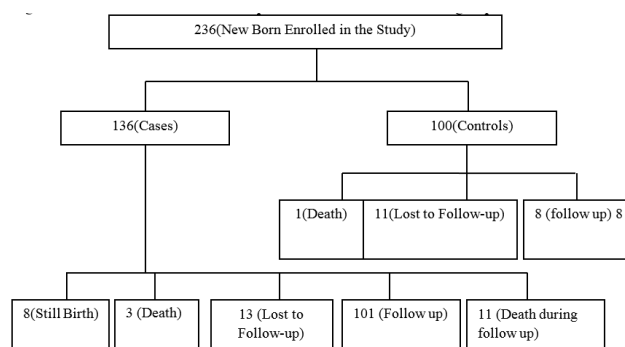
1. Total 236 newborns satisfying the inclusion criteria were enrolled for the study. A written and informed consent was taken from the parents about enrolment in the study, and sampling procedures was taken and adequate confidentiality was maintained.
2. The neonates were closely followed from the delivery room and resuscitated as per NRP Protocol and admitted to NICU as per the morbidity. Renal functions were done which included Blood Urea and Serum Creatinine in all the newborns with severe Oligohydramnios after 72 hrs of birth and USG-KUB was done in all the newborns in the study after 72 hrs of life. Repeat Renal functions were done if earlier reports were deranged. Other investigations were done as per their morbidities. Discharge was planned when the baby was out of morbidity and mother was confident enough to look after the feeding and routine care of the baby at home.
3. Follow up of the babies enrolled in the study was done up to 3 months. The parents were called and for regular follow up. At follow up, apart from the routine advise on feeding, immunization, and counselling on child rearing and the felt needs of the parents, repeat renal functions were done in those babies with deranged Renal function tests, and repeat USG-KUB was done in babies with abnormal USG-KUB during hospital

stay. Study tool: All data related to maternal near miss will be collected from maternal near miss sheet of Obstetrics Department (1st February 2020 to 31st July 2020), SPSS version 21, MS excel 2016.

4. Statistical tests: Descriptive statistics, rate, ratio, mean, Chi-Square test with Fischer-exact test. 100 exposed and 100 non-exposed matched required to get Odd's ratio 1.68 for perinatal mortality and morbidity with 95% confidence interval and 80% power with one sided test.

## 3. Results and Discussion

Total 236 newborns were enrolled in the study, out of these 236, 136 were cases (Mother having severe oligohydramnios) and 100 controls (Newborns born to mother with normal amniotic fluid volume). Final data analysis has been done on 236 newborns, 136 CASES and 100 CONTROLS.



**Fig. 1:** Distribution of newborns as per enrolment in case-controls group.

Mean Maternal age of Case ( $24.92 \pm 4.65$  years) and Control ( $24.9 \pm 4.28$  years) were comparable. Among cases, there was lower percentage of male birth 43.38%( $n=59$ ) as compared to the controls 51%( $n=51$ ) among cases, there was higher percentage of female birth 56.62%( $n=77$ ) as compared to the controls 49%( $n=49$ ). This relation is statistically not significant ( $p$  value= $0.31$ ) for gender distribution between 2 groups ( $P=0.3043$ ).

**Table 1:** Distribution of maternal morbidities between the two groups

MORB.	Case	Control	P-value
PIH	29 (21.32%)	19 (19%)	0.7836
APH	2 (1.47%)	3 (3%)	0.7272
HBSAg	1 (0.74%)	1 (1%)	0.6176
VDRL/RPR	0 (0.0%)	0 (0.0%)	-
GDM	0(0.00%)	0(0.00%)	-
HIV	0(0.00%)	0(0.00%)	-
Other DS	5 (3.68%)	0 (0%)	0.1387

Maternal morbidities were comparable in both cases and controls, PIH were slightly higher in cases 21.3%(n=29) as compared to controls 19% (n=19) in our study. It shows there is no statistically no significant difference (p value>0.05). In study by Bansal et al<sup>2</sup> PIH was found in 21% of cases, Bangal et al<sup>3</sup> 16% and Krishna Jagathia et al<sup>4</sup> PIH was found to be 21%.

Among cases, there was higher percentage of LSCS as compared to the controls. 56% babies required to be delivered by LSCS. This relation is statistically significant for Mode of delivery distribution between 2 groups (P <0.01 and chi-square value is 5.718).

Similar studies were done showing variable percentage of LSCS, byGolan et al<sup>5</sup> (35.2%), Bower Chatoor et al<sup>6</sup> (44%), Bansal et al<sup>2</sup>.,(47%).

Thus different studies have shown different results in incidence of LSCS amongstoligohydramnios, and may depend on the policies adopted by the different hospitals.

**Table 2:** Comparison of anthropometric profile of the two groups

Variable	Sub Group	Case	Control	P-value
Weight (gm)		2251.26 (±609.42)	2440.61 (±550.76)	0.0134
Length (cm)		45.94 (±3.38)	46.53 (±3.26)	0.1883
HC (cm)		31.15 (±2.37)	31.28 (±1.97)	0.6573
Mean Gestational Age (weeks)		37.39 (±2.76)	36.97 (±2.78)	0.2519
Weight for gestation	SGA AGA	34 (25%) 102 (75%)	4 (4%) 96 (96%)	< 0.0001

Mean weight of Cases was significantly lower than Controls. (P = 0.0134). Among cases, there was higher percentage of VLBW and LBW as compared to the controls. This relation is statistically significant for weight distribution between 2 groups (P = 0.0134). Mean weight in our study is 2251 grams, as compared to 2140 grams in study by Bangal et al,<sup>7</sup> 2748 grams by Jun Zhang et al<sup>8</sup> and 56% of newborns born to oligohydramnios were found to be in between 2-2.5 kg by Kondepagu et al.<sup>9</sup>

As per Table 2 in our study we have compared the various parameters like need for LSCS, stillbirth, death, preterm, SGA, congenital malformations, renal dysfunctions – both morphological and functional, & death on follow up with the values of AFI. We found that morphological renal dysfunction to be significantly higher (p value <0.001) for AFI 0 – 1 as compared to higher AFI. Chance of preterm birth was higher among anhydramnios cases as compared to oligohydramnios cases and this difference was statistically significant at 95% CI.

Still-births were seen in 5.88% of cases, as compared to none in control. In view of 0% in control, statistical analysis

was not possible. Still-births in Bangal<sup>7</sup> et al study was 8%, and Bansal<sup>2</sup> et al study was 5% which were comparable to our study.

Discharge rate was significantly higher in cases as compared to controls (P>0.05).

Death were higher in cases but this is not statistically significant (P>0.05). Death in our study was 2.21%, while perinatal mortality was 7.35%. Similar studies have shown following mortality rates – Casey<sup>10</sup> et al 6.4%, Wolff F<sup>11</sup> et al 7.2%, Apel-Sarid et al<sup>12</sup> 9.9%, Chamberlin<sup>13</sup> et al 10.9%, Ja Younget<sup>14</sup> al 12%, Bangal<sup>7</sup> et al 16%, some of which were comparable to our study.

#### 4. Conclusion

From this study we concluded that

1. Among cases, there was higher percentage of female birth as compared to the controls. But the relation is statistically not significant for gender distribution between 2 groups.
2. Maternal morbidities were comparable in both cases and controls, PIH was slightly higher in cases (21%) as compared to controls (19%).
3. Among cases, there was higher percentage of LSCS as compared to the controls. 56 % babies required to be delivered by LSCS. This relation is statistically significant for Mode of delivery distribution between 2 groups.
4. In our study we have compared various parameters like need for LSCS, Stillbirth, Death, Preterm, SGA, Congenital Malformations, and Renal dysfunctions – both Morphological and Functional, & Death on follow up with the values of AFI. We found Morphological renal dysfunction to be significantly higher for AFI 0 – 1 as compared to higher AFI, rest others were comparable.
5. Both the cases and controls were divided according to the birth weight and most of them fall between 2000- 3000 gms. In our study, weight in cases were significantly lower than those of controls.
6. Mean weight of Cases was significantly lower than in Controls, among cases, there was higher percentage of VLBW and LBW as compared to the controls. This relation was statistically significant for weight distribution between 2 groups.
7. We have compared the various parameters like need for LSCS, Stillbirth, Death, Preterm, SGA, Congenital Malformations, and Renal dysfunctions – both Morphological and Functional, & Death on follow up with the values of AFI. We found that Morphological renal dysfunction to be significantly higher for AFI 0 – 1 as compared to higher AFI.
8. Stillbirths were seen in 5.88% of cases, as compared to none in control. In view of 0% in contact, statistical

**Table 3:** Distribution of cases as per AFI (Amniotic fluid index)

Distribution of cases as per AFI		AFI		P value
		Anhydramnios (0)	Oligohydramnios (>0-5)	
Mode of delivery	LSCS	31	46	>0.05
	NVD	23	36	
Type of birth	Still birth	5	3	>0.05
	Live birth	49	79	
Type of foetal outcome	Death	2	1	>0.05
	Living	47	79	
Functional Renal Morbidities	Functional Renal Dysfunction	13	26	>0.05
	Normal Renal function	41	56	
Morphological Renal Morbidities	Morphological Renal Dysfunction	1	5	<0.001
	Normal Renal Morphological	53	77	
Congenital malformations	Yes	4	3	>0.05
	No	50	79	
Foetal maturity	Pre-term	17	13	<0.05
	Term	37	69	
Gestational Age	SGA	13	21	>0.05
	AGA	41	61	
Outcome on follow up	Death	5	6	>0.05
	Alive	49	65	

**Table 4:** OUTCOME Distribution in Case & Control

Outcome	Case		Control		P-value
	Number (n)	Parentage %	Number (n)	Parentage %	
Discharge	121	88.97	99	99.00	<0.05
Stillbirth	8	5.88	0	0.00	-
Referred	2	1.47	0	0.00	-
Death	3	2.21	1	1.00	>0.05
DAMA	2	1.47	0	0.00	-
Total	136	100.00	100	100.00	

**Table 5:** Comparison of various Perinatal morbidity of oligohydramnios in our study and other studies:

Parameters	Our study	Bangal VB et al <sup>7</sup>	Jun Zhang et al <sup>8</sup>	Bansal et al <sup>2</sup>	Jayantinath et al <sup>15</sup>	Shetty et al <sup>16</sup>	Guin et al <sup>17</sup>
Still birth	5.88	8%		5%	1%		
Mode of delivery	Spontaneous	43.4	56%	76%	53%	17%	57.2%
	LSCS	56.6	44%	24%	47%	83%	42.8%
Mean Weight	2251g	2140 g	2748g				
SGA	25%					25%	14.2%
Mortality	2.21%	16%	5.1%	10%	2.4%	3.3%	12.6%
Congenital malformations	5.38%	-	-	9%	-	5.8%	4.2% *(perinatal)

analysis was not possible. Death were higher in cases but this was not statistically significant. Death in our study was 2.21 %, while perinatal mortality 7.35%. There were more discharged newborns in Controls as compared to Cases, which was statistically significant.

9. Among cases, there was higher percentage of SGA as compared to the controls. This relation was statistically significant.
10. All the morbidities-Asphyxia, HIE, HMD, MAS, Sepsis, Meningitis, Jaundice, Hypothermia, Hypoglycemia were observed in both groups and they were not statistically significant.
11. Congenital malformations were more common in the Cases than in the Controls. Major congenital malformations were seen in 5.14% of cases, as compared to none in control. In view of 0% in control, statistical analysis was not possible.
12. Between Oligohydramnios with Maternal comorbidities and with isolated oligohydramnios, we compared incidence of LSCS, Stillbirth, Death, SGA, Preterm, Congenital Malformations, Renal Dysfunctions and Death on follow up. There was no significant difference in perinatal outcomes in pregnancies with Isolated Oligohydramnios and Pregnancies with comorbidities & Oligohydramnios.

## 5. Conflicts of Interest

All contributing authors declare no conflicts of interest.

## 6. Source of Funding

None.

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## Author biography

**Nilesh T Shah**, Paediatrician

**Shivendra Varshney**, Paediatrician

**Umang Patel**, Associate Professor

**Sheila Aiyer**, Professor

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