

Association of Adverse Perinatal Outcome with Oligohydramnios in Pregnant Females

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ABSTRACT

Background: Amniotic fluid serves as a cushion for growing fetus along with provision of a feasible environment for growth. Oligohydramnios is a common complication which is frequently encountered in pregnant patients. It may have severe implications and may have a poor outcome of pregnancy.

Aim: To determine the association of adverse perinatal outcome with oligohydramnios in pregnant females.

Methods: This case-control study was conducted at Department of Obstetrics & Gynecology, Fatima Memorial Hospital Lahore. The duration of this study was one year from January, 2018 to December, 2018. A total of 242 females were enrolled. Two groups of participants were made i.e., group I with oligohydramnios (Cases) having low Amniotic Fluid Index (AFI) and group II with normal AFI (Controls). Patients were followed up till delivery of the fetus and then perinatal outcome was noted. All the collected data was entered and analyzed on SPSS version 20.

Results: A total of 242 females were enrolled. The clinical and demographic variables of patients including age, parity, gestational age and BMI were comparable in both groups. The CS rate was significantly higher among cases than controls (RR = 0.693). Poor Apgar score (RR=0.615 [0.436-0.867]) and low birth weight were also significantly higher among Cases than Controls (RR=0.631). All parameters of outcome were stratified by age, gestational age, parity and BMI and outcome was poor among Cases than controls. .

Conclusion: Adverse perinatal outcome including CS, poor Apgar score and LBW were associated with increased risk with oligohydramnios in pregnant females.

Keywords: Perinatal Outcome; Oligohydramnios; Pregnancy; Apgar; Low Birth Weight

INTRODUCTION

Amniotic fluid provides fetus a protective environment suitable for growth and development. Its volume is maintained by dynamic interaction among the fetal, placental and maternal compartments¹. Oligohydramnios is labelled if amniotic fluid index (AFI) <5th centile for the gestational age or AFI is <5cm on ultrasound along with absence of fluid pocket 2-3cm in depth in presence of intact membranes. It's a common complication occurring in 3-5% of pregnancy at term². Oligohydramnios can develop in any trimester but it is more common in third trimester. It accompanies a wide range of reproductive disorders including anomalies of fetus and functional disorders of fetus, mother and placenta³.

Amniotic fluid can be measured by various methods. Older techniques were cumbersome and required amniocentesis. But now amniotic fluid is measured by ultrasound techniques including single deepest pocket (SDP) technique, 2-diameter pocket and AFI as these are non-invasive and easy to perform⁴. Oligohydramnios is significantly associated with abnormal heart rate of the fetus, meconium stained liquor, low Apgar score and Neonatal Intensive Care Unit (NICU) admission after birth⁵.

Oligohydramnios is also associated with increase rate of induction of labour and increased incidence of caesarean section (CS)⁶. A study showed that the incidence of CS was 54% with oligohydramnios and 23% in

normal AFI group. This was statistically significant ($p < 0.001$). Apgar score ≤ 7 at 5 minute was found in 14% and 23% cases in oligohydramnios and normal AFI group ($p < 0.001$). The poor Apgar score rate was high in normal AFI group. LBW <2.5 kg was 42% in oligohydramnios group and 22.5% in normal AFI group ($p < 0.001$)⁷. Another case control study showed that incidence of CS was 64% and 22% in oligohydramnios and normal AFI group, respectively. This was statistically significant ($p < 0.001$). Apgar score ≤ 7 at 5 minute was found in 16% and 6% cases in oligohydramnios and normal AFI group respectively ($p > 0.05$). LBW <2.5kg was 62% in oligohydramnios group and 28% in normal AFI group ($p < 0.001$)⁸.

Fetal medicine is a rapidly advancing field especially fetal surveillance and amniotic fluid is an important aspect of it. Although a lot of work has been done internationally but very little work has been done in our country. Cross sectional studies have been done but not much work has been done to assess the association of oligohydramnios with adverse fetal outcome. So we want to assess the adverse perinatal outcome associated with oligohydramnios in local population. Moreover, regarding the first presentation of neonate i.e., Apgar score has controversial evidence in literature which may also attests that oligohydramnios is not associated with adverse fetal outcome. Objective of this study was to determine the association of adverse perinatal outcome with oligohydramnios in pregnant females presented during third trimester of pregnancy.

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MATERIAL AND METHODS

After taking ethical permission from Institutional Review Board, this Case-control was done at Obstetrics & Gynecology Department, Fatima Memorial Hospital Lahore. The study Duration was 2 years from January, 2016 to December, 2017. Sample size of 242 cases (121 in each group) were calculated with 80% power of test, 5% level of significance and taking expected percentage of poor Apgar score i.e. 16% in females with oligohydramnios and 6% in females with normal AFI during last trimester.⁽⁶⁾ Sampling technique used was non-probability, consecutive sampling. We included females of age 18-40 years with parity <5 having singleton pregnancy presenting at 28-40 weeks of gestation (on LMP). They were divided into two groups: Group I (Cases): AFI ≤ 6cm on transabdominal ultrasound, Group II (Controls): AFI ≥ 7cm on transabdominal ultrasound.

We excluded patients with fetal anomaly, patient with PROM or PPRM, patients with hypertensive pregnancy, and patients with cephalopelvic disproportion. A total of 242 pregnant females fulfilling the inclusion criteria were registered through Labour room of Department. An informed consent was obtained for using their data for research purpose. Oligohydramnios was defined if amniotic fluid ≤ 6cm and deep vertical pocket less than 2-3 cm for a gestational age assessed on transabdominal ultrasound. Adverse perinatal outcomes were measured as follows: 1) Caesarean section (CS), poor Apgar score (if Apgar <7 at 5 minute after birth) and low birth weight (if baby weight <2500 grams). Demographic data (name, age, gestational age, parity, BMI) was recorded. Two groups of participants were made i.e. group I with oligohydramnios and group II with normal AFI. All patients in both groups were given

antenatal care as per Departmental protocols. Adverse outcome was assessed at the time of delivery. The data was entered and analyzed through SPSS version 24. Mean and standard deviation was calculated for quantitative variables including age, gestational age, BMI. Frequency and percentage was calculated for qualitative variables including parity and adverse perinatal outcome (cesarean section, poor Apgar, LBW). Relative Risk (RR) was calculated to measure the association between adverse perinatal outcome and oligohydramnios. RR > 1 was considered as significant. Data was stratified for age, gestational age, BMI and parity. Post-stratification, chi-square was applied to check the effect of effect modifiers on different perinatal outcomes. P-value ≤ 0.05 was considered as significant.

RESULTS

A total of 242 females were enrolled. The mean age of the Cases and Controls was comparable. The clinical and demographic variables of patients including age, parity, gestational age and BMI are given in table 1. In this study, the CS was done in 60.3% of patients from Cases. The relative risk showed 0.693 times greater risk of CS in Cases than to Controls. Poor APGAR score was noted in 38.8% of patients among Cases while 20.7% among Controls (RR=0.615 [0.436-0.867]). Also LBW was found significantly higher among Cases than Controls (RR=0.631). All details are given in table 2. All parameters of outcome were stratified by age, gestational age, parity and BMI and outcome was poor among Cases than controls. All details are given in table 3, 4 and 5.

Table 1: Comparison of demographic variables with study groups

		Study Groups	
		Cases	Controls
Age			
	≤30 years	74 (61.15%)	76 (62.8%)
	>30 years	47 (38.84%)	45 (37.19%)
	Mean ± SD	27.79 ± 6.72	28.25 ± 6.77
Gestational age			
	≤37 weeks	66 (54.54%)	79 (65.28%)
	>37 weeks	55 (45.45%)	42 (34.71%)
	Mean ± SD	37.26 ± 1.89	36.82 ± 2.00
Parity			
	Primigravida	72 (59.5%)	60 (49.58%)
	Multigravida	49 (40.49%)	61 (50.41%)
BMI			
	≤30 Kg/m ²	71 (58.67%)	75 (61.98%)
	>30 Kg/m ²	50 (41.32%)	46 (38.01%)
	Mean ± SD	25.103 ± 5.31	25.116 ± 5.63

Table 2: Comparison of Poor outcome within study groups

		Study Groups		Total	p-value	RR
		Case	Control			
Cesarean Section	Yes	73 60.3%	51 42.1%	124 51.2%	0.005	0.693 [1.25-3.49]
	No	48 39.7%	70 57.9%	118 48.8%		
Poor APGAR score	Yes	47 38.8%	25 20.7%	72 29.8%	0.002	0.615 [0.436-0.867]
	No	74 61.2%	96 79.3%	170 70.2%		
Low Birth Weight	Yes	41 33.9%	22 18.2%	63 26.0%	0.005	0.631 [0.440-0.907]
	No	80 66.1%	99 81.8%	179 74.0%		

Table 3: Comparison of CS with study groups stratified by age, parity, GA and BMI

		CS	Study Groups		p-value	RR
			Case	Control		
Age (years)	≤30	Yes	43(58.1%)	30 (39.5%)	0.022	0.688 [0.49-0.96]
		No	31 (41.9%)	46(60.5%)		
	>30	Yes	30 (63.8%)	21(46.7%)	0.098	0.703 [0.46-1.07]
		No	17(36.2%)	24(53.3%)		
Parity	Primigravida	Yes	46(63.9%)	29(48.3%)	0.072	0.711 [0.49-1.03]
		No	26(36.1%)	31(51.7%)		
	Multigravida	Yes	27(55.1%)	22(36.1%)	0.046	0.702 [0.49-1.01]
		No	22(44.9%)	39(63.9%)		
Gestational age (weeks)	≤37	Yes	42(63.6%)	28(35.4%)	0.001	0.588 [0.42-0.81]
		No	24(36.4%)	51(64.6%)		
	>37	Yes	31(56.4%)	23(54.8%)	0.875	0.96 [0.61-1.52]
		No	24(43.6%)	19(45.2%)		
BMI (Kg/m ²)	≤30	Yes	42(59.2%)	30(40.0%)	0.021	0.68 [0.49-0.95]
		No	29(40.8%)	45(60.0%)		
	>30	Yes	31(62.0%)	21(45.7%)	0.11	0.711 [0.47-1.08]
		No	19(38%)	25(54.3%)		

Table 4: Comparison of poor APGAR score with study groups stratified by age, parity, GA and BMI

		poor APGAR score	Study Groups		p-value	RR
			Case	Control		
Age (years)	≤30	Yes	27(36.5%)	14(18.4%)	0.013	0.600 [0.38-0.95]
		No	47(63.5%)	62(81.6%)		
	>30	Yes	20(42.6%)	11(24.4%)	0.066	0.637 [0.37-1.08]
		No	27(57.4%)	34(75.6%)		
Parity	Primigravida	Yes	27(37.5%)	9(15.0%)	0.004	0.47 [0.26-0.85]
		No	45(62.5%)	51(85.0%)		
	Multigravida	Yes	20(40.8%)	16(26.2%)	0.105	0.73 [0.49-1.10]
		No	29(59.2%)	45(73.8%)		
Gestational age (weeks)	≤37	Yes	26(39.4%)	14(17.7%)	0.004	0.56 [0.36-0.88]
		No	40(60.6%)	65(82.3%)		
	>37	Yes	21(38.2%)	11(26.2%)	0.213	0.72 [0.42-1.24]
		No	34(61.8%)	31(73.8%)		
BMI (Kg/m ²)	≤30	Yes	22(31.0%)	15(20.0%)	0.127	0.74 [0.48-1.13]
		No	49(69.0%)	60(80.0%)		
	>30	Yes	25(50.0%)	10(21.7%)	0.004	0.48 [0.27-0.85]
		No	25(50.0%)	36(78.3%)		

Table 5: Comparison of LBW with study groups stratified by age, parity, GA and BMI

		LBW	Study Groups		p-value	RR
			Case	Control		
Age (years)	≤30	Yes	20(27.0%)	15(19.7%)	0.291	0.81 [0.53-1.23]
		No	54(73.0%)	61(80.3%)		
	>30	Yes	21(44.7%)	7(15.6%)	0.002	0.42 [0.21-0.82]
		No	26(55.3%)	38(84.4%)		
Parity	Primigravida	Yes	20(27.8%)	16(26.7%)	0.887	0.97 [0.63-1.48]
		No	52(72.2%)	44(73.3%)		
	Multigravida	Yes	21(42.9%)	6(9.8%)	0.001	0.33 [0.16-0.69]
		No	28(57.1%)	55(90.2%)		
Gestational age (weeks)	≤37	Yes	29(43.9%)	10(12.7%)	<0.001	0.39 [0.23-0.68]
		No	37(56.1%)	69(87.3%)		
	>37	Yes	12(21.8%)	12(28.6%)	0.445	1.22 [0.75-1.97]
		No	43(78.2%)	30(71.4%)		
BMI (Kg/m ²)	≤30	Yes	26(36.6%)	13(17.3%)	0.008	0.57 [0.36-0.92]
		No	45(63.4%)	62(82.7%)		
	>30	Yes	15(30.0%)	9(19.6%)	0.238	0.73 [0.41-1.28]
		No	35(70.0%)	37(80.4%)		

DISCUSSION

This present Case-control study was carried out with the objective to determine the association of adverse perinatal outcome with oligohydramnios in pregnant females. Oligohydramnios literally means 'too little amniotic fluid' around the fetus. It is usually labeled if amount of liquor is less than 200 ml at term. About 8-10% of pregnant women may have decreased levels of amniotic fluid; however, approximately 5% are diagnosed as having oligohydramnios. There are many ways to quantify the amount of amniotic fluid in pregnant females including AFI

evaluation or deep pocket measurements (MPD) or maximum pocket depth⁹.

In this study the CS was done in 124(51.2%) females in which 73(60.3%) females were from Cases whereas 51(42.1%) females were from Controls i. e RR=0.693 [1.25-3.49]. Whereas the LBW and APGAR score showed protective effect. The LBW was noted in 63(26%) females in which 41(33.9%) females were from Cases whereas 22(18.2%) females were from Controls i. e RR=0.631 [0.440-0.907]. The poor APGAR score was noted in 72(29.8%) females in which 47(38.8%) females were from

Cases whereas 25(20.7%) females were from Controls i.e., RR=0.615 [0.436-0.867].

A case control study showed that incidence of CS was 64% and 22% in oligohydramnios and normal AFI group, respectively. This was statistically significant ($p < 0.001$). Apgar score ≤ 7 at 5 minute was found in 16% and 6% cases in oligohydramnios and normal AFI group respectively ($p > 0.05$). LBW < 2.5 kg was 62% in oligohydramnios group and 28% in normal AFI group ($p < 0.001$)⁸.

Rabie Net al¹⁰ found that women having oligohydramnios had significantly higher rates of an infant having meconium aspiration syndrome (relative risk (RR), 2.83; 95% CI, 1.38–5.77). Also oligohydramnios and other comorbid among pregnant patients had higher risk of having an infant with LBW (RR, 2.35; 95% CI, 1.27–4.34).

One study showed that the incidence of CS was 54% with oligohydramnios and 23% in normal AFI group. This was statistically significant ($p < 0.001$). Apgar score ≤ 7 at 5 minute was found in 14% and 23% cases in oligohydramnios and normal AFI group ($p < 0.001$). The poor Apgar score rate was high in normal AFI group. LBW < 2.5 kg was 42% in oligohydramnios group and 22.5% in normal AFI group ($p < 0.001$)⁷.

Casey et al. showed that oligohydramnios is associated with neonatal death and still birth, they found that oligohydramnios is not associated with lower birth weight (< 10 th percentile)¹¹.

Babar Shrikant A and Shanbhag S. D¹² demonstrated that patients with oligohydramnios had significantly higher association with an abnormal intrapartum Foetal Heart Rate (FHR), i.e., foetal distress, meconium stained fluid, Apgar score less than 7 or Neonatal Intensive Care Unit admission. Also subjects with AFI ≤ 6 cm had a higher rate of CS for foetal distress.

CONCLUSION

This study concluded that the adverse perinatal outcome caesarean section is associated with increased risk with oligohydramnios in pregnant females whereas LBW and APGAR score showed protective effect in females presented during third trimester of pregnancy.

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