



REVIEW ARTICLE

OUTCOME OF PREGNANCY WITH OLIGOHYDRAMNIOS AT TERTIARY CARE TEACHING
HOSPITAL: AN OBSERVATIONAL STUDY

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ABSTRACT

Introduction: Oligohydramnios occurs in about 1% to 5% of pregnancies. It has been associated with variety of fetal and maternal morbidity and mortality. The objective of this study was to compare the pregnancy outcome in cases with oligohydramnios in comparison to normal pregnancy.

Materials and methods: This prospective observational study was carried out in Department of Obstetrics and Gynecology. Women attending antenatal clinical or labor room with or without oligohydramnios were included in the study in cases (oligohydramnios) and controls (without oligohydramnios). The data was recorded and analyzed in predefined manner in both the groups. Statistical analysis like frequency, chi-square test and relative risk was found to compare both the groups.

Results: During the period of one year, 205 cases and 205 controls were enrolled in the study. At 37-39 weeks and 40-42 weeks of gestational age, significant higher numbers of patients were seen in case group. The most common co-morbidity is PIH (20.97%) . Relative risk of abnormal Doppler (6.001) and cesarean section (1.477) is higher in case group. Following parameters were statistically significant like weight of baby (<2 kg), and NICU admission (p value <0.05). Women with oligohydramnios are associated with abnormal Doppler, more incidence induced labor, NICU admission and APGAR score >7 Higher incidence of operative delivery is seen in patients having associated PIH, IUGR and MSL. most common cause of LSCS in cases and controls was PIH (38(18.6%)).

Conclusion: Women with oligohydramnios are associated with abnormal Doppler, more incidence induced labor, NICU admission and APGAR score <7.

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INTRODUCTION

Amniotic fluid is a liquid which gives a protective environment for the growing fetus against various external and internal injuries. It also provides nutrition responsible for growth and movement of the fetus (acts like a cushion). At term, usual amount of amniotic fluid is around 1000 ml. As gestational age increases, volume of amniotic fluid decreases. Amniotic fluid estimation is a common obstetric investigation by ultrasonography. The amount of amniotic fluid is described using the amniotic fluid index (AFI), which is calculated by adding the depth in centimeters of the largest vertical pocket in each four quadrants (Callen, 2008). At term, oligohydramnios occurs in about 1% to 5% of pregnancies (Moore, 1997). The use AFI is an indicator to diagnose oligohydramnios, if less

than or equal to 5 cm to define oligohydramnios. It was first defined by Phelan *et al* in 1987 as a cutoff value (Phelan, 1987). In third trimester during pregnancy, reduced amount of amniotic fluid has been associated with variety of fetal risks like intrauterine growth restriction, Oligohydramnios and pulmonary hypoplasia which can cause umbilical cord compression leading to fetal distress. Increased risk of operative delivery (cesarean section) is seen along with oligohydramnios which may cause low APGAR score and higher perinatal and neonatal mortality (Dutta, 2004). Hence, induction of labor and cesarean section are routinely practiced by obstetricians to prevent fetal and maternal morbidity and mortality. It is very essential to detect oligohydramnios as early as possible to prevent complications. The objective of this study was to compare the pregnancy outcome in cases with oligohydramnios in comparison to normal pregnancy. Various outcomes of pregnancy were studied like meconium stained amniotic fluid, Doppler abnormalities, APGAR score at 5

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minutes, neonatal resuscitation, cesarean section rate and birth weight of neonates.

MATERIALS AND METHODS

This prospective observational case control study was carried out in Department of Obstetrics and Gynecology at tertiary care teaching Hospital, February 2016 to February 2017 after obtaining approval from the Interstitial review board (IRB). Women attending antenatal clinic or labor room with or without having oligohydramnios were included in the study. Ultrasound examination was done after clinical examination to confirm diagnosis of oligohydramnios. If AFI (Amniotic Fluid Index) was less than five confirms oligohydramnios. Women enrolled in the study divided into two groups. In one group (case): women diagnosed to have oligohydramnios (AFI <5) and in other group (control): women without having oligohydramnios (AFI >5). The sample size was calculated by taking study subjects: control subjects =1:1 at power 80 and 95% confidence intervals. Women attending antenatal clinical or labor room with or without oligohydramnios were included in the study in cases and controls. Exclusion criteria are cases with congenital anomalies, gestational diabetes mellitus, premature rupture of membrane, growth restriction and multi fetal gestation. Color Doppler examination was also done in women with oligohydramnios. Written informed consent was taken from all women enrolled in the study. The data was recorded in predesigned case record form contains patient initial, age, obstetric history, general and physical examination, gestational age, mode of delivery, weight of baby, APGAR score at 5 minute and indication of LSCS. The data was analyzed by Microsoft excel and computer software SPSS (version 24.0). To find statistical difference between two groups, chi-square test was done and p-value was calculated. P value of <0.05 was considered as statistically significant. Relative risk was also calculated wherever possible.

RESULTS

During the period of one year, 205 cases and 205 controls were enrolled in the study. Various demographic patterns like age, gravida (primi) and para were same in both the groups. Table-1 depicts age distribution pattern in both the groups which were not statically significant. (p-value>0.05). In case group, number of patients was higher with gestational age 34-36 weeks which was highly statistically significantly (p<0.0001). At 37-39 weeks and 40-42 weeks of gestational age, significant higher numbers of patients were seen in case group. Various co-morbid conditions were seen in both the groups. As shown in table-2, the most common was pregnancy induced hypertension (PIH) (20.97%) followed by fever (14.14%), post dates (11.7%), meconium stained liquor (MSL) (8.53%) and intrauterine Growth Retardation (IUGR) (3.89%). Color Doppler study of umbilical artery was done with both the groups. In case group, incidence of abnormal doppler was statistically higher. Relative risk of abnormal doppler was more (6.001) in case group. In case group, out of 205 patients, 65 (31.70%) were delivered by LSCS and 140 (68.29%) were delivered vaginally. In control group out of 205, 44 (21.46%) were delivered by lower segment caesarian section (LSCS) and 161 (78.53%) were delivered vaginally. The difference was highly significant statistically. The relative risk for cesarean section was found to be 1.477. Other parameters like spontaneous onset of labor, induced labor, normal delivery

were as shown in Table-3. Table-4 shows that the following parameters were statistically significant like weight of baby (<2 kg), and NICU admission (p value <0.05). APGAR score at 5 minute was significantly low in case group. Other parameter were not statistically significant (p value >0.05). In the present study, 15 (7.1%) patients were less than 20 years of age among which 4 (27%) patients were delivered by caesarian section. While 22 (11%) patients were more than 30 years of age. Out of which, 10 (46%) patients were delivered by caesarian section (Table 5). Out of 81 (39.5%) patients of primigravida, 24 (30%) patients had operative delivery. Out of 26 NICU admission, 22 neonates has APGAR score <7. All patients having abnormal Doppler test were delivered by caesarian section. Higher incidence of operative delivery is seen in patients having associated PIH, IUGR and MSL.

Table 1. Distribution of study participants based on age, parity and gestational age

	Cases (%) N=205	Control (%) N=205	Chi-square value***	p-value
Age (years)*				
<20	15 (7.3)	10 (4.9)	1.0649	0.3020
20-25	76 (37.1)	68 (33.2)	0.685	0.4078
26-30	92 (44.9)	104 (50.7)	1.4076	0.2354
>30	22 (10.7)	23 (11.2)	0.025	0.8744
Primi gravida	81 (39.5)	75 (36.6)	0.3725	0.5416
Parity				
First	28 (13.7)	38 (18.5)	1.8058	0.1790
Second	54 (26.3)	56 (27.3)	0.0497	0.8235
Third	40 (19.5)	35 (17.1)	0.408	0.5230
Fourth	2 (0.9)	1 (0.5)	0.3358	0.5622
Gestational age (weeks)**				
34-36	26 (12.7)	1 (0.5)	24.78	<0.0001
37-39	133 (64.9)	180 (87.8)	29.830	<0.0001
40-42	46 (22.4)	24 (11.7)	8.3378	0.0038

* Mean age of the patient in case group is 26.9 ± 3.4 years *** At significance level 0.05

**Mean gestational age in our study was 38.7 ± 3.2 weeks

Table 2. Various co-morbid conditions

Associated conditions	Cases (N=205)	Percentage (%)	Control (N=205)	Percentage (%)	Average (%)
Fever	31	15.1	27	13.17	14.14
PIH	46	22.43	40	19.51	20.97
Post dated	38	18.53	10	4.87	11.7
IUGR	14	6.82	2	0.97	3.89
MSL	24	11.70	11	5.36	8.53

PIH – Pregnancy induced hypertension CPD – Cranio-pelvic disproportion
MSL – Meconium stained liquor IUGR – Intrauterine growth retardation

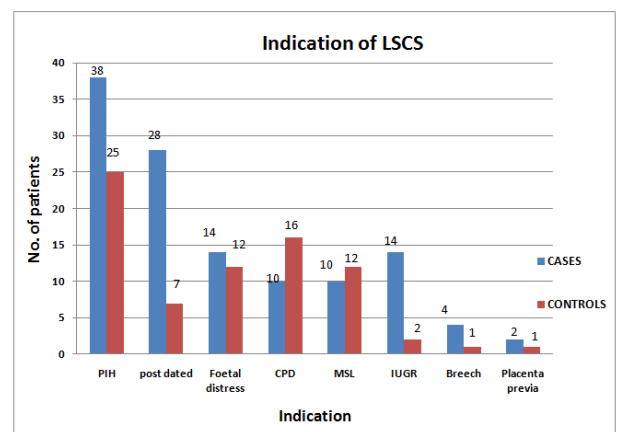


Figure 1. Indication of LSCS in both the groups

Table 3. Various parameters in both the groups

	Cases (%) N=205	Control (%) N=205	Chi-square value*	p-value	Relative risk** Significance level z statistics
Abnormal Doppler	12 (5.9)	2 (0.9)	7.3954	0.04539	6.001 P=0.018 2.366
Spontaneous onset of labor	70 (34.1)	100 (48.8)	9.0441	0.0026	0.7000 P=0.0031 2.959
Induced labor	90 (43.9)	53 (25.9)	14.7008	0.0001	1.6981 P=0.0002 3.724
Normal delivery	140 (68.3)	161 (78.6)	4.5113	0.0336	0.8813 P=0.034 2.111
LSCS	65 (31.7)	44 (21.5)	5.511	0.0188	1.4773 P=0.0205 2.317

*At significance level 0.05. **With 95% confidence interval.

Table 4. Neonatal outcome in both the groups

	Cases (%) N=205	Control (%) N=205	Chi-square value*	p-value	Relative risk** Significance level z statistics
Weight of baby (kg)					
<2	6 (2.9)	1 (0.5)	3.6335	0.04989	6.001 P=0.0957 1.666
2-2.5	40 (19.5)	33 (16.1)	0.8166	0.36616	1.2121 P=0.3674 0.901
2.6-3	154 (75.1)	170 (82.9)	3.7669	0.05227	0.9059 P=0.0535 1.931
>3	5 (2.4)	1 (0.5)	2.7063	0.09995	5.0001 P=0.1402 1.475
APGAR score at 5 minute					
0-3	4 (1.9)	1 (0.5)	1.8222	0.17704	4.000 P=0.2132 1.245
4-6	22 (10.7)	12 (5.8)	2.5303	0.1116	1.8333 P=0.0789 1.757
7-9	123 (60)	185(90.2)	50.1668	<0.0001	0.6649 P<0.0001 6.639
>9	56 (27.3)	7 (3.4)	45.0304	<0.0001	8.0000 P<0.0001 5.352
NICU Admission	26 (12.9)	11 (5.4)	6.6843	0.0097	2.3636 P=0.0129 2.487
Neonatal death	3 (1.4)	1 (0.5)	1.8222	0.17704	3.0000 P=0.3396 0.955

*At significance level 0.05. **With 95% confidence interval.

Table 5. Distribution of various factors in vaginal delivery and caesarian section

Age (years)	Vaginal delivery (%)	Caesarian section (%)	Total (N=205)
<20	11 (5.4)	4 (1.9)	15
20-30	117 (57.1)	51 (24.9)	168
>30	12 (5.9)	10 (4.9)	22
Primipara	57 (27.8)	24 (11.7)	81
Multigravida	104 (50.7)	20 (9.7)	124
Doppler			
Normal	161 (78.6)	32 (15.6)	193
Abnormal	0 (0)	12 (5.8)	12
Associated conditions			
Fever	29 (14.1)	2 (0.9)	31
PIH	22 (10.7)	24 (11.7)	46
Post dated	26 (12.7)	12(5.9)	38
IUGR	6 (2.9)	8 (3.9)	14
MSL	10 (0.5)	14 (6.8)	24

Out of 26 NICU admission, 22 neonates has APGAR score <7. As shown in figure-1, the most common cause of LSCS in cases and controls was PIH (38(18.6%)) and post dates (28(12.9%)). Other common causes were post dated, foetal distress, CPD, MSL, IUGR, and breech presentation. The least common cause was placenta previa (2 in case and 1 in control).

DISCUSSION

Out of 205 patients in each case and control groups, age of the patient, number of primigravida and parity was not statistically significant (Table 1). So baseline data was almost similar in both the groups. Most of the patients in age group were in between 20-30 years (Mean age of the patient was 26.9 ± 3.4 years) which is similar comparable with the study by Casey *et al.* (Casey, 2000). Similar studies by Chauhan *et al.* (Chauhan, 1997). Jun Zhang *et al.* (Jun Zhang, 2004), and Everett *et al.* (Everett, 1992), found that the mean maternal age were 23.6 ± 6.5 years, 28.4 ± 3.4 years and 23.8 ± 5.7 years respectively. Incidence of oligohydramnios in primigravida was 39.5% which is less than a study done by Petrozella in which 60% patients were primigravida (Petrozella, 2011). Most of the cases were of gestational age of 37-39 weeks, but reduction in amniotic fluid starts only after 40-42 weeks which suggests reduction in volume of amniotic fluid with increasing gestational age. Comparison between case and control groups is similar to a study by Pasquini *et al.* (Pasquini, 2003) in parameters like age of patient, gestational age and parity. Mean gestational age in the present study was 38.7 ± 3.2 weeks which is similar to the study by Hoskins (Hoskins, 1991), in which gestational age was 36.3 ± 2 weeks. This suggests that oligohydramnios was more common in the later part of third trimester during pregnancy. At later part of pregnancy, physiological or pathological reduced placental perfusion might lead to oligohydramnios. As depicted in Table-2, most common associated conditions were fever, PIH and post dated. This is comparable to a study by Bhat S. (Bhat, 2015). In the present study, about 22% patients have PIH which is similar with a study by Golan A *et al.* (Golan, 1994). Incidence of MSL was higher in our study (11.7%) than by Casey *et al.* (2.3%). Vidyadhar B. (Vidyadhar, 2012), found that IUGR was diagnosed in 20% cases of oligohydramnios, which is higher than our study (6.8%). Another study by Sowmya *et al.* recorded IUGR in 27% of cases (Sowmya, 2014). Incidence of induced labor (43.9%) in our study was significantly higher among case group ($p < 0.0001$). Incidence of induced labor is less but higher rate of caesarian section was observed (31.7%) than study by Manzanares *et al.* (16%) (Manzanares, 2007). In our study, rate of induced labor is also higher in case group, which is comparable to study published in 2007 (Browen-Chattoor, 1995). Oligohydramnios may cause umbilical cord compression leading to fetal distress in presence or absence of uterine contractions which is one of the main factor for cesarean sections by obstetricians. Even though, there is significant variation is seen in management if oligohydramnios. There is significant divergence regarding the management of isolated oligohydramnios. All the patients having abnormal Doppler undergo cesarean section which is similar to Jagatia K. (Jagatia, 2013).

In the present study, about 23% babies had birth weight <2.5 kg with mean birth weight 2.7 kg which is similar with a study done by William Ott *et al.* (Ott, 2005), in which mean birth weight was 2.3 kg. APGAR score at 5 minute was also recorded, about 13% babies had APGAR score <7 which is

same as Manning *et al.* (Manning, 1981) (14%) but less than Raj Sariya *et al.* (38%) (Sriya, 2001). Out of 26 NICU admissions, 22 neonates had APGAR score >7 indicates higher rate of NICU admission, if less APGAR score (Sriya, 2001). About 13% babies admitted to NICU which is less than studies done by Manning *et al.* (1981) and Raj Sariya *et al.* (Volante, 2004), 43% and 89% respectively. There is statistically significant higher NICU admission observed in cases of oligohydramnios than control. Total three (1.4%) neonatal deaths was recorded which is less than study done by Golan *et al.* (5%) (1994) and Casey *et al.* (2000). Neonatal deaths observed in babies who had low APGAR score. Bowen Chattoor JS *et al.* observed four neonatal deaths similar to our study (Browen-Chattoor, 1995). Common indications of LSCS in our study were PIH and post dated which is different than study by Volante (Volante, 2004), observed fetal distress and IUGR were common indications of LSCS.

The decrease in amniotic fluid volume (oligohydramnios) was associated with increased induction of labor, meconium aspiration syndrome, still birth and neonatal death. The other possible explanation of the increased fetal and maternal morbidity and mortality could be due to potential utero-placental insufficiency and umbilical cord compression in oligohydramnios. These risk factors are associated with more adverse fetal outcome. Oligohydramnios is common and needs proper antepartum and intrapartum care to prevent various complications. Risk of IUGR, PIH, fetal distress and post dated beyond 40 weeks of gestation lead to fetal and maternal morbidity and mortality. Decrease in amniotic fluid is associated with increased risk of abnormal heart rate and meconium stained fluid. Incidence of caesarian section are rising nowadays but decision between vaginal delivery and caesarian section should be well balanced. Timely intervention like caesarian section may prevent fetal and perinatal morbidity and mortality.

Conclusion

Incidence of oligohydramnios is detected early nowadays due to routinely practiced ultrasonography. Post dated pregnancy and pregnancy induced hypertension reduced amniotic fluid in the last trimester. Women with oligohydramnios are associated with abnormal Doppler, more incidence induced labor, NICU admission and APGAR score >7. Oligohydramnios increases risk of caesarian delivery. More gestational age increases incidence of oligohydramnios. Early decision in the form of mode of delivery, antepartum and intrapartum maternal and fetal monitoring reduces maternal and fetal morbidity and mortality.

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