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Original Research Article

Oligohydramnios and its perinatal outcome

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ABSTRACT

Background: Oligohydramnios is one of the major causes of perinatal morbidity and mortality. The sonographic diagnosis of oligohydramnios is usually based on an AFI ≤ 5 cm or on a single deepest pocket of amniotic fluid ≤ 2 cm³. Our study was aimed to study the perinatal outcome in oligohydramnios. Aim and objective were to study obstetric risk factors associated with oligohydramnios and maternal outcome in the form of mode of delivery, and to assess neonatal complications in terms of APGAR score at birth, NICU admission rates, meconium stained liquor and still birth rates.

Methods: It was an Observational, Prospective, clinical study of 100 pregnant patients diagnosed with oligohydramnios by ultrasound, carried out in Geetanjali medical college and hospital, Udaipur for period of from January 2020-August 2020. The study was conducted after ethical clearance and with informed consent. Detailed history on demographic profile, medical illness, obstetric history and antenatal complication if any in the present pregnancy; general examination, obstetric examination and bimanual examination were performed meticulously.

Results: In our study 53% cases of oligohydramnios were associated with some of the risk factors like PIH (29%), IUGR (22%), fetal anomaly (1%), systemic maternal disease (1%) and 47% of the cases were Idiopathic. LSCS was done in 85.71% cases with AFI < 5 cm. Low birth weight was found in 51.43% cases with AFI < 5 cm. NICU admission was required for 28.57% cases with AFI < 5 cm.

Conclusions: AFI is an important and convenient screening test for prediction of perinatal outcome. In presence of oligohydramnios, the risk of fetal distress, operative delivery, low Apgar score, low birth weight, perinatal morbidity and mortality are more. Hence early detection of oligohydramnios, associated antenatal risk factors and timely management can improve the maternal and fetal outcome.

Keywords: Oligohydramnios, Pregnancy-induced hypertension, Intrauterine growth restriction, Amniotic fluid index

INTRODUCTION

Amniotic fluid has an important role in protecting fetus, providing nutrients and in the development of lungs and gastrointestinal tract. It has bacteriostatic properties also.¹ Amniotic fluid protects the growing fetus by cushioning effect against mechanical and biological injuries and facilitating growth.

Amniotic volume levels peaks to 800-1000ml at 28-32 weeks then slowly decreases and plateaus near term with further reduction to only 400 ml at 42 weeks.² Amniotic fluid can easily be monitored by ultrasound by amniotic fluid index (AFI) or single largest pocket (SLP). Amniotic fluid volume is calculated by adding largest pockets in all four equal uterine quadrants. The sonographic diagnosis of oligohydramnios is usually based on an AFI ≤ 5 cm or on a single deepest pocket of amniotic fluid ≤ 2 cm³ (American college of obstetricians

and gynecologists, 2012).³ Phelan defined oligohydramnios as AFI less than or equal to 5 cm and 5.1 to 20 as normal.⁴

In chronic placental insufficiency, there is brain sparing effect and reshuffling of blood flow at cost of renal and hepatic supply. This leads to reduced fetal urine output leading to oligohydramnios. So, oligohydramnios is an indirect marker of placental insufficiency.

Long standing effects of decrease amniotic fluid includes pulmonary hypoplasia, potter's syndrome, club foot, club hand and dislocation of hip. High incidence of maternal and perinatal morbidity and mortality are associated with oligohydramnios.⁵

Many studies showed association between decreased amniotic fluid volume and still birth, fetal anomaly, abnormal FHR tracings in labor, increase in cesarean section for fetal distress, fetal hypoxia and acidosis.⁶

Antenatal fetal assessment includes fetal movement count, AFI or SLP, biophysical profile, non-stress test (NST) and fetal Doppler. AFI is one of the components of biophysical profile so important marker of fetal well-being.

Perinatal outcome in the form of meconium staining, IUGR, cesarean section for abnormal FHR tracing, low Apgar score and neonatal intensive care unit admission have been associated with reduced amniotic fluid volume.⁷ It has been observed that antepartum or intra partum AFI $\leq$ 5 cm is associated with a significant increase in lower segment caesarean section for fetal distress and low APGAR score at 5 minutes (APGAR score $<$ 5).⁸

Aim and objectives

To study obstetric risk factors associated with oligohydramnios and maternal outcome in the form of mode of delivery. And to assess neonatal complications in terms of APGAR score at birth, NICU admission rates, meconium stained liquor and still birth rates.

The objective of the study was to evaluate mode of delivery in oligohydramnios, perinatal outcome in the form of meconium stained liquor, APGAR score, NICU admission and still birth and maternal risk factors associated with oligohydramnios.

METHODS

It was an Observational, Prospective and clinical study of 100 patients diagnosed with oligohydramnios by ultrasound, carried out in Geetanjali medical college and hospital, Udaipur from January 2020 to August 2020. The study was conducted after ethical clearance and with informed consent in local language. Enrolled patients were subjected for a detailed history on demographic profile, medical illness, obstetric history and antenatal

complication if any in the present pregnancy; general examination, obstetric examination and bimanual examination were performed. All cases underwent ultrasonography examination for estimation of amniotic fluid index by Phelan's method.

Inclusion criteria

Pregnant women aged $\geq$ 18 years of age, all pregnant women between 24-40 weeks gestation with amniotic fluid index less than 8cm in ultrasonography

Exclusion criteria

Patients with history of PPROM (preterm premature rupture of membrane).

Maternal outcomes

Different antenatal complications were studied like pregnancy induced hypertension (PIH), Intrauterine growth retardation (IUGR), antepartum hemorrhage (APH).

Mode of delivery

Spontaneous/induced vaginal delivery, caesarean section, instrumental delivery- forceps and ventouse

Neonatal outcomes

Birth weight, sex, APGAR score, Gestational age, meconium stained liquor, birth asphyxia, any other neonatal complication was studied.

Statistical analysis

Sample size of 100 mothers was considered by using statistical formula. The difference was considered significant at $P<0.05$ and highly significant at $P<0.01$. The data was entered in MS excel sheet windows 10. Student t test and z test of proportion was used for analysis with help of SPSS IBM version 20.

RESULTS

A total of 100 cases were observed for the study: 35 in group 1 (AFI $\leq$ 5) and 65 in group 2 (AFI $>$ 5).

Mean maternal age in group 1 was 25.43 ± 3.41 and in Group 2 it was 27.62 ± 4.15 years and the difference in age was found to be statistically significant ($P=0.009$) (Table 1).

Mean gestational age in Group 1 was 38.07 ± 2.20 and in group 2 was 37.85 ± 2.22 weeks and difference were found to be statistically insignificant ($P=0.636$) (Table 1). Also, a mean ANC visit in Group 1 was 9.71 ± 2.09 and in group

2 was 9.81 ± 2.09 times and difference were also found to be statistically insignificant ($P=0.820$) (Table 1).

Table 1: Maternal demography.

Maternal demography	Group 1 AFI $\leq$ 5 N=35	Group 2 AFI $>$ 5 N=65	P value
Mean maternal age	25.43 $\pm$ 3.41	27.62 $\pm$ 4.15	0.009
Mean gestational age	38.07 $\pm$ 2.20	37.85 $\pm$ 2.22	0.636
Mean ANC visits	9.71 $\pm$ 2.09	9.81 $\pm$ 2.09	0.820

Total 19 (54.29%) women in group 1 PIH and 10 (15.00%) had PIH in group 2 and difference was found to be statistically significant ($P<0.001$).

IUGR was found in 15 (42.86%) and 7 (10.76%) among women of group 1 and group 2 respectively and difference was found to be statistically significant ($P<0.001$).

LSCS delivery was done in 30 (85.71%) women of group 1 and 40 (61.54%) women of group 2 and difference was also found to be statistically significant ($P=0.022$) (Table 2).

Table 2: Antepartum complication.

Antepartum complication	Group 1 AFI $\leq$ 5 N=35	Group 2 AFI $>$ 5 N=65	P value
PIH	19 (54.29%)	10 (15.00%)	<0.001
IUGR	15 (42.86%)	7 (10.76%)	<0.001
Fetal anomaly	1 (2.86%)	0	-
Maternal disease	1 (2.86%)	0	-
LSCS	30 (85.71%)	40 (61.54%)	0.022

Table 3: Indications of LSCS.

Indication of LSCS	Group 1 AFI $\leq$ 5 n=30	Group 2 AFI $>$ 5 n=40	P value
Oligohydramnios	30 (100%)	36 (90.00%)	0.206
Breech	5 (16.67%)	5 (12.5%)	0.882
Fetal Distress	1 (3.33%)	5 (12.5%)	0.355
PIH	13 (43.33%)	5 (12.5%)	0.008
IUGR	11 (36.67%)	5 (12.5%)	0.036
Previous LSCS	3 (10.0%)	12 (30.0%)	0.085

Among group 1, oligohydramnios was found in 100% women and was found to be the main indication of LSCS followed by PIH in 13 (43.33%), IUGR in 11 (36.67%), breech in 5 (16.67%) and previous LSCS in 3 (10.0%) each and fetal distress in 1 (3.33%) women whereas in group 2, oligohydramnios was found in 90% women and was found to be the main indication of LSCS followed by previous LSCS in 12 (30.0%) and breech, fetal distress, PIH and IUGR in 5 (12.5%) women respectively. Thus, overall, statistically significant difference in proportion of women among groups regarding PIH and IUGR was found ($P<0.05$) (Table 3).

Perinatal outcomes were also studied in both the groups and it was observed that 3 (8.57%) women in group 1 and 5 (7.69%) women in group 2 had meconium stained liquor and the difference was found to be statistically insignificant ($P=0.817$).

Table 4: Perinatal outcome.

Perinatal outcome	Group 1 AFI $\leq$ 5 N=35	Group 2 AFI $>$ 5 N=65	P value
Meconium stained liquor	3 (8.57%)	5 (7.69%)	0.817
LBW	18 (51.43%)	12 (18.46%)	0.001
NICU admission	10 (28.57%)	6 (9.23%)	0.026
Mean birth weight	2.57 $\pm$ 0.47	2.76 $\pm$ 0.64	0.002

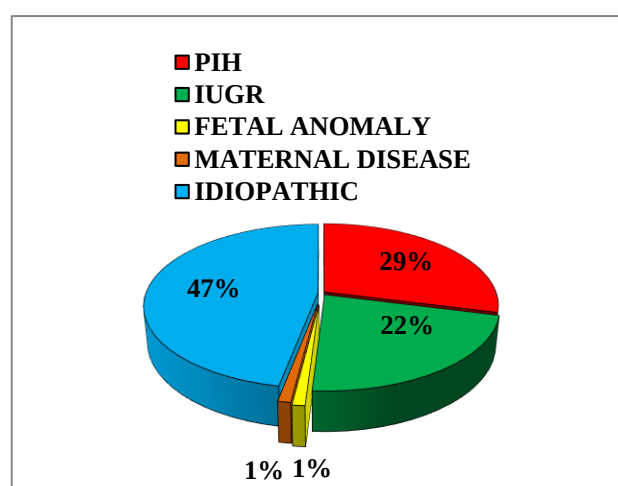


Figure 1: Associated risk factors in cases of oligohydramnios.

Low birth weight was found in 18 (51.43%) cases in group 1 and 12 (18.46%) cases in group 2 and this difference was found to be statistically significant ($P=0.001$).

NICU admission was required for 10 (28.57%) in group 1 and 6 (9.23%) in group 2 and this difference was found to be statistically significant ($P=0.026$).

Mean birth weight was found to be 2.57 ± 0.47 kg in group 1 and 2.76 ± 0.64 kg in group 2 and this difference was found to be statistically significant ($P=0.002$) (Table 4).

In our study, PIH (29%) and IUGR (22%) was found to be the main associated risk factors in cases of oligohydramnios followed by 1% cases due to fetal anomaly and 1% cases due to systemic maternal disease (chronic kidney disease). Thus 53% cases of Oligohydramnios were associated with some of the risk factors and 47% of the cases were idiopathic (Figure 1).

DISCUSSION

Amniotic fluid is important marker for fetal wellbeing. Oligohydramnios is associated with many maternal and fetal factors, like PIH, IUGR, maternal systemic disease, fetal anomalies, and unexplained. In our study, amniotic fluid volume was assessed by ultrasonography using amniotic fluid index. Majority of study participants were in age group between 20-30 years. Demographic factors like age, parity, religion and gestational age were comparable in both groups.

In our study Mean maternal age in group 1 was 25.43 ± 3.41 and in group 2 was 27.62 ± 4.15 years, which is similar to mean maternal age of 22.48 ± 3.4 in a study by panda et al.¹⁰ Mean gestational age in Group 1 was 38.07 ± 2.20 which is similar to Mean gestational age of 38.85 ± 1.57 in a study by panda et al.⁹ These findings indicates that the problem of oligohydramnios was more common in later part of pregnancy.

In present study, 19 (54.29%) women had associated pregnancy induced hypertension (PIH) in group 1 ($AFI < 5$ cm) and 10 (15.00%) had associated PIH in group 2 ($AFI > 5$ cm) and difference was found to be statistically significant ($p < 0.001$), compared to 38.46% and 31% PIH associated with oligohydramnios in study by Chandra P et al and Sriya R et al.^{10,11} In our study IUGR was found in 15 (42.86%) and 7 (10.76%) among women of group 1 and group 2 respectively and difference was found to be statistically significant ($p < 0.001$); compared to 61% cases of IUGR in study by Dalal N et al.¹² which shows significant correlation between oligohydramnios and IUGR. In our study association of PIH, IUGR was seen more with group 1 compared to group 2.

In our study, LSCS delivery was done in 30 (85.71%) women of group 1 and 40 (61.54%) women of group 2 and difference was also found to be statistically significant ($P = 0.022$); compared to 64% LSCS in study by Chate P et al.¹³ in our study main indications for LSCS were fetal distress, associated antepartum complications like, PIH, IUGR and previous LSCS, breech.

In our study, perinatal outcomes were also studied in terms of meconium stained liquor, low birth weight, NICU admission in both the groups. Meconium stained

liquor was observed in 3 (8.57%) women in group 1 and 5 (7.69%) women in group 2 and the difference was found to be statistically insignificant ($p=0.817$); Similar studies conducted by Baron et al.¹⁴ and Voxman et al.¹⁵ concluded that there is no difference between the groups with regard to meconium-stained liquor.

In present study, low birth weight (LBW) was found in 18 (51.43%) cases in group 1 and 12 (18.46%) cases in group 2 and this difference was found to be statistically significant ($p=0.001$); which is comparable to study by panda et al.⁹ Showing LBW in 32 % in group 1 and 12 % in group 2 women, indicating oligohydramnios had an association with fetal growth restriction.

In our study, NICU admission was required for 10 (28.57%) in group 1 and 6 (9.23%) in group 2 and this difference was found to be statistically significant ($P=0.026$). which is comparable to study by panda et al.¹⁰ where NICU admission among babies in group 1 versus group 2 was 17 (24 %) versus 28 (12 %), and this was found to be statistically significant ($p=0.020$).

In our study, we found oligohydramnios was associated with 29% cases of PIH. IUGR was found to be in 22% cases of oligohydramnios followed by 1% cases were due to fetal anomaly and 1% cases due to maternal disease. Thus 53% cases of oligohydramnios were associated with some of the risk factors and 47% of the cases were Idiopathic. Panda et al.¹⁰ found PIH among 17 %, IUGR among 18%, postdatism in 11% and 54% cases were idiopathic.

CONCLUSION

AFI is an important and convenient screening test for prediction of perinatal outcome. In presence of oligohydramnios, the risk of fetal distress, operative delivery, low Apgar score, low birth weight, perinatal morbidity and mortality are more. Hence early detection of oligohydramnios, associated antenatal risk factors and timely management can improve the maternal and fetal outcome. Isolated oligohydramnios in the absence of any other maternal or fetal complicating factor is found to increase the operative intervention and adversely affect the fetal outcome. Hence, prevention of isolated oligohydramnios without any complicating factor is an area of further research.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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