

Oligohydramnios and its correlation with maternal and perinatal outcome: A prospective observational study

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Abstract

Objectives: We aimed at evaluating the predictive value of amniotic fluid index <5 on perinatal outcome in terms of effect on N.S.T., mode of delivery, meconium in liquor, birth weight, fetal distress, APGAR score at birth and neonatal admission to ICU. Adverse perinatal outcome in terms of cesarean section for fetal distress, cord pH at birth and maternal weight gain in pregnancy **Methods:** This was a prospective study of 300 antenatal women booked at Krishna Institute of Medical sciences Karad during the years Feb 2013-Jan2014 with gestational ages between 34 and 41 weeks. All women enrolled were subjected to history taking, examination, AFI estimation and compared between those with AFI ≤5 from rest. **Results:** The non-reactive N.S.T., cesarean section rate due to fetal distress, low birth weight, APGAR score <7 and NICU admission were significantly high among those with oligoamnios than the control group. Oligohydramnios has a significant correlation with cesarean section for fetal distress and low birth weight babies and low weight gain of mother during pregnancy. **Conclusion:** Oligoamnios has a significant correlation with adverse perinatal outcome and maternal weight gain in pregnancy.

Key Words: Oligoamnios, AFI, Perinatal outcome, maternal weight.

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INTRODUCTION

Modern obstetrics is concerned with the health and well-being of both the mother and the unborn child. Recognition of a fetus at risk for death or damage in utero, quantifying the risk, balancing the fetal risk against the risk of neonatal complications from immaturity, and determining the optimal time and mode of intervention are the cornerstones of modern perinatal medicine¹. Amniotic fluid represents the structural and functional

integrity of fetus in utero. Low amniotic fluid volume or oligoamnios is defined as amniotic fluid index 5 cm or less and can be associated with different conditions as described by Peipert and Donnenfeld¹. Gagnon *et al.*² found that chronic severe placental insufficiency caused a reduction in amniotic fluid not attributable to reduced fetal urine output. Due to its association with chronic placental insufficiency and the inherent risk of cord compression in all labors, oligoamnios at term would likely have adverse impact on perinatal outcome as described by Grubb and Paul³. Therefore, such cases need a stringent antenatal fetal assessment which includes amniotic fluid volume assessment and intrapartum fetal monitoring. Amniotic fluid volume was measured as described by Phelen *et al.*⁴ by adding largest pockets in all four equal uterine quadrants. Modified biophysical profile as described by Clark *et al.*⁵ and by the American College of Obstetricians and Gynecologists and American Academy of Paediatricians in 2007⁶ remains the predictive tests of fetal well-being. Links have been found 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 as described by Chamberlain *et al.*⁷ as cited in Bhagat and Chawla⁸. In the present study, we quantified AFI as described by Bengal V.B. *et al.*⁹ and we sought to correlate whether AFI ≤ 5 cm is associated with adverse perinatal outcome in terms of NR CTG, cesarean section for fetal distress, meconium staining of liquor, low Apgar score, low birth weight and neonatal admission to NICU¹⁰.

MATERIALS AND METHODS

This was a prospective case control study undertaken at Institute of Medical sciences' Karad. The study participants included 300 booked antenatal mothers over 1 year from Feb 2013 to Jan2014 on the impact of oligoamnios on perinatal outcome.

Inclusion Criteria: Three hundred antenatal ladies with singleton pregnancy between 34 and 41 weeks of gestation admitted to this hospital for confinement were included in the study.

Exclusion Criteria: cases of premature rupture of membrane, anomalous fetus, abnormal lie and presentations, placental abnormalities, Rh incompatibilities, diabetic mothers as well as multifetal gestations. All women were explained about the intention of the study, and a written consent was obtained with reassurance to maintain confidentiality of the outcome and that the study is for research purpose only. After obtaining ethical clearance, enrolled ladies 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 booked cases underwent ultrasonography examination for estimation of amniotic fluid index by Phelen's method within a week prior to delivery; otherwise, AFI estimation was repeated after admission. Seventy women with AFI ≤ 5 were taken as cases in group 1 and 230 as controls in group 2 with A.F.I. > 5 . All have been subjected to cardiotocographic examination, pelvic examination for bishop's scoring and pelvic assessment. Accordingly, decision for mode of delivery was taken and followed through delivery with standard antepartum and intrapartum fetal and maternal monitoring. Data collected on age, parity, mean gestational age at delivery, CTG reading, ultimate mode of delivery, cesarean section due to fetal distress, birth weight, APGAR at 1 min and 5 min, NICU admission if any and duration of stay in NICU were recorded. A pragmatic statistics was used to compare samples to show demographic similarities between two groups; results were analyzed with Student's

t test and Chi-square test to find the level of significance between two groups.

RESULTS

Total 300 cases were enrolled for the study: 70 in group 1 (AFI ≤ 5) and 230 in group 2 (AFI > 5). Mean maternal age in group 1 is 20.45 ± 3.4 , and in group 2, it is 23.30 ± 3.4 ; mean gestational age in group 1 was 38.80 ± 1.57 , and in group 2, it was 38.80 ± 0.49 ; 45 (64%) women were nulliparous in group 1 and 102 (44.34%) in group 2; 45 (64.28%) women in group 1 had < 10 kg weight gain during pregnancy as compared to 20 (8.1%) in group 2 Which is statistically significant $t < 0.0001$ (Table 1). Obstetric and perinatal outcomes were studied in both the groups. N.S.T. was non-reactive among 20 (28.57%) in group 1 and 24 (10.43%) in group 2, which was statistically significant ($p = 0.0015$). Cesarean section was performed in 46 (65.71%) women in group 1 versus 145 women (63.04%) in group 2, having no statistical significance, whereas CS due to fetal distress 16 (22.85%) in group 1 as compared to 24 (10.43%) in group 2 is statistically significant ($p = 0.0228$). Nineteen women (27.14%) in group 1 and 40 (17.39%) in group 2 had meconium-stained liquor. The difference was not significant statistically ($p = 0.1506$). Low birth weight was found in 25 (35.71 %) in group 1 versus 35 (15.21 %) in group 2 women; this is found to be statistically significant ($p = 0.0008$). NICU admission was required for 18 (25.71%) versus 25 (10.86%) babies in groups 1 and 2, respectively; this is found to be statistically significant ($p = 0.016$). One-minute APGAR score of < 7 was found in 18 (25%) in group 1 neonates versus 20 (8.6%) in group 2 ($p = 0.0050$), whereas 5-min APGAR score < 7 was observed in 8 neonates in group 1 and 9 neonates in 2 group (3.91%) ($p = 0.005$). Therefore, both 1-min and 5-min APGAR scores of < 7 were noted among statistically significant number of neonates in group 1 (Table 2).

Table 1: Maternal demography

	Group 1 (AFI < 5) (n = 70)	Group 2 (AFI > 5) (n = 230)	P value ($< 0.05 =$ significant)
Maternal age (mean \pm SD)	20.45 \pm 3.4	23.30 \pm 3.4	0.0861
Mean gestational age	38.80 \pm 1.57	38.80 \pm 0.49	0.8850
Nulliparity	45 (64%)	102(44.34%)	< 0.0001
Maternal wt gain (< 10 kg)	45 (64.28%)	20 (8.10%)	< 0.0001

Table 2: Obstetric and perinatal outcome

	Group 1 (AFI<5) (n = 70)	Group 2 (AFI>5) (n = 230)	P value (<0.05)
Non-reactive NST	20 (28.57%)	24(10.43%)	0.0015
Meconium-stained liquor	19 (27.14%)	410(17.39%)	0.1506
Total cesarean delivery	46 (65.71%)	145 (63.04%)	1.0008
Cesarean due to fetal distress	16 (22.85%)	24 (10.43%)	0.0228
APGAR score			
1 min <7	18 (25.7%)	20 (8.6%)	0.0050
5 min <7	8 (11%)	9 (3.91%)	0.0057
Birth weight <2.5 kg	25 (35.71%)	35 (15.21%)	0.0008
NICU admission	18 (25.71%)	25 (10.86%)	0.0160

In the present study, incidence of oligoamnios is 23.33%. The association of PIH, IUGR and prolonged pregnancies is statistically high among group 1 (52%) compared to group 2 (17%) (Fig. 1).

Group 1 cases of oligohydramnios, associated risk factors

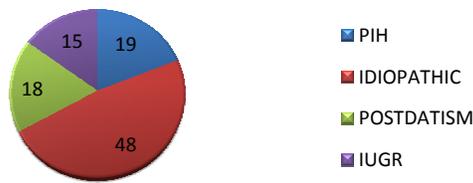


Figure 1

We found associated PIH among 19% of group 1 versus 4% of group 2 women. Similarly, postdatism was seen among 18% in group 1 versus 5.8% in group 2, and IUGR was associated in 15% versus 3.3% between group 1 and group 2 women. In the present study, 52% oligoamnios cases are associated with some risk factor and 48% cases are idiopathic (Fig. 2)

Association of risk factors for multiple variables

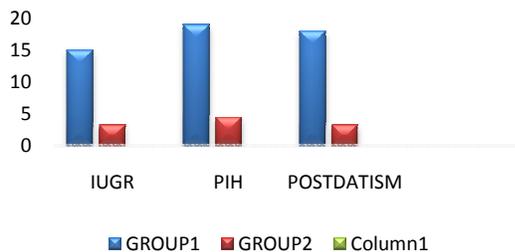


Figure 2

DISCUSSION

Mean maternal age was 20.45± 3.4 in our study group, which is similar to the mean (± SD) maternal age of 21.8 ± 4.2 years in a study by Bangal *et al.*⁹. Mean gestational

age in group 1 was 38.80 ± 1.57 which is similar to mean gestational age 36.90 ±4.1 weeks in a study by Bangal *et al.*⁹. These findings indicate that the problem of oligoamnios was more common in the later part of pregnancy. We found nulliparity to be 45 (64%) in the study group **versus** 102(44.34%) in the control group, which is statistically significant, saying that oligoamnios is more prevalent among primigravida. This is similar to the finding of Krishna Jagatia *et al.* in 2013 in their study of maternal and fetal outcome in oligoamnios-a study of 100 cases¹⁰; their incidence of oligoamnios among primigravida was 52%; similarly in a study by Locatelli A *et al.* in 2004, their observation was a significantly high incidence of oligoamnios among nulliparous women (0.001)¹¹. Further by Bhagat *et al.*⁸, the incidence of oligoamnios was noted among 68% of nulliparous though the association was not statistically significant (0.22). In the present study, our observation showed that 45 of 70 women versus 20 of 230 women had <10 kg weight gain during pregnancy; there is a statistically significant low maternal weight gain among oligoamnios group (p = 0.0001). Similar observation was made by Bhagat and Chawla⁸ at RML hospital in their study on Amniotic Fluid Index and Perinatal outcome. Our study showed N.S.T. was non-reactive among 20 (28.57%) in group 1 versus 24 (10.43%) in group 2, which was statistically significant (p = 0.0015); similar observation was described by Bhagat *et al.*⁸ in their study on Correlation of Amniotic Fluid Index with Perinatal Outcome. Though the present study did not show any significant difference in cesarean section rate between two groups, the CS due to fetal distress 12 (26%) in oligoamnios group as compared to 18 (11.7%) in control group was statistically significant (p= 0.03), which is similar to that reported by Chauhan *et al.*¹² in their meta analysis that intrapartum AFI<5 was associated with increased risk of cesarean section for fetal distress (pooled RR - 1.7). Similarly, Baron *et al.*¹³ showed cesarean section rate 57.4 versus 38.7% (p=0.048). In the present study, meconium-stained liquor was present in 19 (27,14%) in group 1 and 40 (17.39%) in group 2; the difference was not statistically significant (p = 0.1506). Similar studies conducted by Baron *et al.*¹³ and Voxman *et al.* [14] concluded that there is no difference between the groups with regard to meconium-stained liquor. In our study, both 1-min and 5-min APGAR scores <7 were significantly higher among oligoamnios group (p = 0.0050 and 0.0057, respectively); 5-min APGAR <7 was observed in 8 (11%) neonates in our series, whereas Vaxman *et al.* and manisha laddad *et al.*^{4,19} reported it as 16 (16%), whereas a study by Driggers *et al.*¹⁵ reported the 5-min APGAR score <7 in 3.8% babies in oligoamnios group versus 4.6% in normal AFI group and concluded that there is no statistical

difference. Another study by Grubb *et al.*¹⁶ reported the 1-min APGAR score <7 in 84% in AFI<5 group versus 14% in the normal AFI group, which was highly significant ($p=0.01$); their 5-min score <7 was 13 versus 5% among oligoamnios versus normal AFI group. Our study reported a LBW in 25 (35.71%) in group 1 versus 35 (15.21%) in group 2 women which was statistically significant ($p=0.0008$). Locatelli *et al.*¹¹ reported that uncomplicated term pregnancies with oligoamnios (AFI<5) independently increased the risk of SGA infant. Morris *et al.*¹⁷ recorded 60 % of babies were LBW in the group with AFI<5, indicating that oligohydramnios had an association with growth restriction. In the present study, NICU admission among babies in group 1 versus group 2 was 18 (25.71%) versus 25(10.86%), and this was found to be statistically significant ($p = 0.0160$). In a study by Brain *et al.*¹⁸, their neonatal admission to NICU was (7 vs 2%; $p < 0.001$). In the present study, incidence of oligoamnios is 23.33 % which is high comparing to many studies. But the association of PIH, IUGR and prolonged pregnancies is statistically high among group 1 (52%) compared to group 2 (13%) (Fig.2). We found associated PIH among 19% of group 1 versus 4.1% of group 2 women. Similarly postdatism was seen among 18% in group 1 versus 5.6% in group 2, and IUGR was associated in 20% versus 3.3% between group 1 and group 2 women. manisha *et al.*¹⁹ found PIH association among 16%, postdatism among 16% and IUGR among 20% cases; overall association of risk factors was among 78% of oligoamnios cases. In a study by Jaylaxmi *et al.*²⁰, among 71 cases of oligoamnios, 17% cases associated with PIH and remaining 54% cases are idiopathic. In the present study, 48% oligohydramnios cases are idiopathic.

CONCLUSION

Oligoamnios at term pregnancy is found to be associated with increased non-reactive CTG readings intrapartum. It is a strong predictor of adverse perinatal outcome in terms of increased cesarean sections for fetal distress, low APGAR score at 1 and 5 min, LEW due to IUGR and NICU admissions.

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