Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Abbreviated Key Title: Sch. J. App. Med. Sci. **ISSN 2347-954X (Print)**

A Unit of Scholars Academic and Scientific Society, India
www.saspublisher.com

Obstetrics & Gynecology

A Study of Effect of Oligohydramnios on the Obstetric and Perinatal Outcome

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Original Research Article

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Article History
Received: 11.11.2018
Accepted: 25.11.2018
Published: 30.11.2018

DOI:
10.21276/sjams.2018.6.11.72

Abstract: The purpose of our study was to evaluate the effect of Oligohydramnios on the obstetric and perinatal outcome. Hospital based prospective observational study. The study was conducted at S.M.B.T. IMS & RC from August 2016 to July 2018. Antenatal patients between 20-42 weeks gestational age diagnosed to have oligohydramnios on ultrasonography, were enrolled for the study. Obstetric, Perinatal outcome & associated antenatal co-morbid maternal and fetal conditions influencing the outcome were studied. All patients were followed till term/termination of pregnancy to study the outcome. 74 patients (prevalence: 3.39%) were diagnosed to have oligohydramnios. Oligohydramnios was associated with antenatal complications like PIH (20.27%), IUGR (24.32%), prolonged pregnancy (10.81%), post term pregnancy (2.70%) and fetal anomalies (6.75%). The rate of LSCS in the oligohydramnios was 55.40%. Oligohydramnios was found to increase the incidence of low birth weight babies, low Apgar score at 1,5 min, admission to NICU & Perinatal mortality. Oligohydramnios increase the risk of operative intervention and adverse perinatal outcomes. Any additional antenatal complication in association with oligohydramnios leads to suboptimal outcome of pregnancy. Severity of oligohydramnios early in pregnancy hampers the pregnancy outcome. Hence, every case with oligohydramnios demands intensive fetal surveillance and proper antepartum and intrapartum care in order to minimize the adverse perinatal outcomes.
Keywords: Oligohydramnios, Amniotic fluid index, perinatal outcome.

INTRODUCTION

Amniotic fluid is the faintly alkaline fluid contained by the amniochorionic membranes that surrounds the fetus after first few weeks of gestation allowing it to float in the fluid until birth. It is primarily of fetal origin with maternal contribution via extraplacental membranes. The fluid helps protect and cushion the fetus and plays an important role in the development of many fetal organs including the lungs, kidney and gastrointestinal tract.

Disruption of fine fetomaternal equilibrium regulating the amniotic fluid balance may result in underproduction (oligohydramnios) or overproduction (polyhydramnios) of fluid. These quantitative alterations of amniotic fluid volume complicate approximately 7% of pregnancies [1]. These changes in the amniotic fluid volume can be a reflection of abnormalities in maternal and fetal status increasing the risk of perinatal mortality and morbidity.

Oligohydramnios occurs in 0.5- 5.5% of pregnancies [2] and has been associated with meconium staining, fetal intolerance to labour resulting in operative intervention, lower Apgar scores and admission to NICU. Various maternal conditions like PIH, PROM and placental insufficiency are also known to add to the problem. Estimation of amniotic fluid volume can be done by ultrasonography (semi-quantitative) using four quadrant amniotic fluid index (AFI) or single deepest pocket (SDP) as the sonographic parameters. The aim of this study is to evaluate the obstetric and perinatal outcome of pregnancies complicated by oligohydramnios.

AIM AND OBJECTIVES

- To determine the prevalence of oligohydramnios at the study site.
- To study the co-morbid maternal and fetal factors associated with oligohydramnios.
- To study the effect of oligohydramnios on the mode of delivery, fetal outcome in terms of Birth weight, APGAR score, NICU admission, perinatal mortality.

MATERIALS AND METHODS

Study type/design: Prospective observational study

Study center: S.M.B.T. IMS & RC, Nashik

Study duration: August 2016 to July 2018

Study population

Pregnant women with gestational age between 20-42 weeks attending the OPD at the study center

Inclusion criteria

- Women with AFI ≤ 8cm. (AFI between 5.1 and 8 cm were having borderline oligohydramnios, AFI ≤ 5cm were having severe oligohydramnios.
- Gestational age between 20- 42 weeks at the time of diagnosis with single fetus; irrespective of age and parity.
- Willingness to continue treatment and deliver at the study center.

Exclusion criteria

- Premature rupture of membranes.
- Intrauterine fetal death.

All women included in the study underwent a detailed history & clinical examinations for evidence of oligohydramnios. Routine antenatal investigations, Detailed ultrasound examination was done to assess the growth of the fetus, amniotic fluid index, presence of any fetal congenital anomaly, placental abnormality .USG scanning for AFI was done at an interval of 4 weeks between 20-36 weeks, of 2 weeks between 37-39 weeks and twice weekly thereafter. The AFI was calculated by four quadrant method. NST & Doppler studies for fetal compromise were done wherever required. Routine management protocol was followed for all cases. All babies were attended by neonatologists and appropriate care was given. Various outcome measures recorded were mode of delivery, indication for LSCS, NICU admissions, birth weight, APGAR score at 1min and 5min, perinatal morbidity and mortality rate.

The results were recorded and tabulated. Statistical analysis was done using parameters like mean, standard deviation and chi square test.

OBSERVATIONS AND RESULTS

Total number of antenatal patients between gestational ages of 20- 42 weeks, who attended OPD during the study period: 3240

Patients found to have oligohydramnios: 110

Prevalence of oligohydramnios: 3.39%

Out of the 110 cases diagnosed to have oligohydramnios 20 women had PROM, 3 had IUFD, in 4 women the liquor volume was found to be normal on repeat scan and 9 cases were not available for follow up. Hence the study group included 74 cases.

Age-: It was observed that the maximum cases; 40(54.05%) & 27(36.49%) of oligohydramnios were in the age group of 20-25, 26-30 years respectively. The mean age in oligohydramnios group was 26.07 SD±3.48.

Parity-:59.45% (44/74) were Primigravida, 26(35.13 %) were 2nd gravida. No significant association was found between parity and severity of either oligohydramnios

Severity of oligohydramnios-: 59(79.73%) women had borderline, 15(20.27%) women had severe oligohydramnios.

Gestational age at the time of diagnosing oligohydramnios-: Majority of women 57(77.03%) were in the gestational age group of 34-38 weeks at the time of diagnosis. Mean gestational age at the time of diagnosing oligohydramnios was 36.54 SD±2.42.

Antenatal complications (oligohydramnios)-: Out of the 74 cases 44 cases (59.46%) were found to have antenatal complications like PIH, IUGR, fetal congenital anomalies, malpresentation, prolonged and post term pregnancies. In the remaining 30 cases (40.54%) no antenatal complication was detected and these cases were labeled to have idiopathic oligohydramnios.

Table-1: Antenatal complications associated with oligohydramnios

Antenatal complication	Borderline oligohydramnios	Severe oligohydramnios	No. of cases
Fetal congenital anomalies	3	2	5(6.75%)
PIH	10	5	15(20.27%)
IUGR	14	4	18(24.32%)
Prolonged pregnancy(40-42wks)	5	3	8(10.81%)
Post term (>42 wks)	1	1	2(2.70%)
Malpresentation	4	1	5(6.75%)
Isolated (no complication)	27	3	30(40.54%)

Note: Multiple response tables

OUTCOME MEASURES

Distribution of Mode of delivery -: 33/74 women went into spontaneous labour of which 16/33 delivered vaginally and 17/33 required LSCS.Labour was induced in 20/74 cases for indications like Non-reactive NST, IUGR or severe preeclampsia , of these 13/20 delivered vaginally and 7/20 required LSCS for intrapartum fetal distress or non-progress of labour. A total of 41(55.4%) underwent LSCS, 29(39.19%) delivered normally.

Table-2: Mode of delivery

Mode of delivery	Borderline oligo	Severe oligo	Total(n=74)
Vaginal delivery	22	7	29(39.19%)
• Spontaneous	13	3	16(21.62%)
• Induced	9	4	13(17.57%)
LSCS	34	7	41(55.40%)
• elective	9	1	10(13.51%)
• emergency	25	6	31(41.89%)
Instrumental delivery			
• forceps	3	1	04(5.41%)
Total	59	15	74

Table-3: Indication for LSCS

Indication	Oligohydramnios cases
Malpresentation	4(9.76%)
Fetal distress	23(56.10%)
Previous section	4(9.76%)
Severe pre-eclampsia	3(7.32%)
Failed induction/non progress of labour (NPL)	4(9.76%)
Bad obstetric history	1(2.44%)
Infertility	1(2.44%)
Abruption	1(2.44%)

Maximum LSCS in the oligohydramnios group were done for fetal distress (56.10%).

Table-4: Intrapartum and post-partum maternal complications observed in Study population

Complication	No of oligohydramnios cases
Malpresentation	5(6.75%)
Preterm labour/delivery	6(8.10%)
Prolonged labour	8(10.81%)
Meconium stained liquor	29(39.18%)
Abruption	1(1.35%)
Fetal heart rate(FHR) deceleration	30(40.54%)
Postpartum hemorrhage(PPH)	-

Table-5: FHR pattern on NST

FHR deceleration	Borderline oligo	Severe oligo	Total
Variable	13	4	17(22.97%)
Late	11	2	13(17.57%)
Total	24	6	30(40.54%)

(χ^2=0.305, P=0.672 Not Significant)

Meconium stained liquor

44(59.46%) cases had clear liquor. 18(23.32%) were thin meconium stained and 11(14.86%) had thick meconium one patient had blood stained liquor due to abruption. Statistically not significant.

Perinatal outcome measures

Table-6: Perinatal outcome measures

Outcome measure	Oligohydramnios cases
Prematurity (<37 weeks)	6(8.10%)
Birth weight 1.5-2.4kg 2.5-3.4kg 3.5-4.4kg	 13(17.57%) 56(75.68%) 5(6.75%)
Meconium aspiration	3(4.05%)
APGAR ≤ 7 at 1 min	19(25.67%)
APGAR ≤ 7 at 5 min	13(17.57%)
Cord looped around neck	9(12.16%)
Admission to NICU	26(35.14%)
Perinatal death Neonatal death	2(2.70%) 1(1.35%)

Table-7: Distribution of newborn based on the Apgar score

APGAR score	Borderline oligo	Severe oligo	Total(n=74)
≤ 7 at 1min	12	7	19(25.67%)
≤ 7 at 5 min	8	5	13(17.57%)
Total	20	12	32(43.24%)

(□2=0.614P=0.506 Not Significant)

Table-8: Distribution of birth weight of babies

Birth weight(kg)	Borderline oligo	Severe oligo	Total(n=74)
1.5- 2.4 kg	9	4	13(17.57%)
2.5- 3.4 kg	45	11	56(75.68%)
3.5- 4.4 kg	5	-	5(6.75%)
Total	59	15	74

(□2=1.07P=0.446 Not Significant)

Table-9: Indication for NICU admission in oligohydramnios group

Indication for NICU admission	Borderline oligohydramnios	Severe oligohydramnios	Total
Pre term care	3	3	6(23.08%)
Meconium aspiration	2	1	3(11.54%)
Low APGAR score	5	3	8(30.77%)
Low birth weight (LBW)	3	1	4(15.38%)
Respiratory distress	1	-	1(3.85%)
Tachypnea	3	1	4(15.38%)
Total	17	9	26

Out of the 26 newborns requiring NICU admission 2 babies with congenital anomalies died in the perinatal period. There was 1 neonatal death the baby developed respiratory failure. The other 23 newborns did not develop any long term complications.

DISCUSSION

It is a well-established fact that early recognition and management of oligohydramnios reduces the risk of adverse fetomaternal outcome. In the present study the prevalence of oligohydramnios was found to be 3.39% Oligohydramnios complicates 0.5-5.5% [2] of term. In the present study maximum cases (54.04%) of oligohydramnios were in the age group of 20-25 years followed by 26-30 years (36.49%).The results are consistent with similar studies done by Guin G *et al*. [3] and Nazlima N. *et al*. [4]. The mean maternal age was found to be 26.07 SD±3.84. The mean maternal age in the various similar studies was as follows Guin G [3] 24.71 SD±4.58; Nazlima N [4] significant association was noted between maternal age and severity of oligohydramnios in the present study. In the present study majority of women (59.45%) were nulliparous. This is similar to the study done by Bengal BV [5] where 54% women were nulliparous. Gramel *et al.* [6] supported that 67% women with oligohydramnios were nulliparous. In the present study the mean gestational age at the time of diagnosis in the oligohydramnios cases was found to be 36.54 wk SD± 2.42. Which is similar to study by Bengal BV [5] 36.7 SD± 4.1weeks, suggesting that the problem of oligohydramnios is more common in the later part of pregnancy. This is possibly due to physiological or pathological causes of uteroplacental insufficiency near term. In the present study 79.73% cases had borderline oligohydramnios and 20.27% cases had severe oligohydramnios. The findings can be compared to those of Nazlima *et al*. [4] where 74.36% women had borderline oligohydramnios and 25.64% had severe oligohydramnios. In the present study of the 59 cases of borderline oligohydramnios 32(54.23%) cases had associated antenatal complication and 12(80%) cases of severe oligohydramnios had associated antenatal complication. Thus in the present study there was an increased incidence of antenatal complications in the women with severe oligohydramnios which is comparable to study by which is similar to study by Bengal BV [5].

In the present study maximum pregnancies were complicated by hypertensive disorders (20.27%) and intrauterine growth restriction (24.32%).Prolonged pregnancy was present in 10.81% cases with oligohydramnios indicating that decreased placental blood flow caused by hypertensive disorders of pregnancy, post term or prolonged pregnancies can be a possible causative factor for oligohydramnios. The occurrence of post term pregnancies and prolonged pregnancies was less in the present study as compared to the various similar studies this could be due to proper surveillance of the booked patients and timely intervention wherever required. In the present study 39.19% women with oligohydramnios delivered vaginally and 55.40% women required cesarean section for various indications and 5.41% women required instrumental delivery (forceps). Grubb *et al*. [7] also reported an increased rate of operative deliveries in cases with decreased amniotic fluid levels. Of the cesarean sections 56.10% were done for fetal distress. Baron *et al*. [8] found that CS rate for fetal distress was significantly more often in oligohydramnios than normal AFI. The induction rate was slightly higher (22.67%) in cases with severe oligohydramnios as compared with 15.25% in borderline oligohydramnios which is similar to study by Casey B *et al*. [9]. In the present study 30(40.54%) fetuses developed decelerations intrapartum. There was no significant association between fetal heart rate decelerations and severity of oligohydramnios. The percentage of occurrence is comparable to that noted by Casey *et al*. [9] (48%). The percentage of meconium staining was 38.17%, it was slightly higher in women with severe oligohydramnios (46.67%) as compared to (37.28%) borderline oligohydramnios; but the occurrence was not statistically significant. In the present study 24.32% cases had non-reactive NST (22.03%: borderline cases, 33.33%: severe oligohydramnios). In our study majority (75.68%) of the babies had birth weight greater than or equal to 2.5 kg. 17.57% newborns were low birth weight. There was statistically no significant association between birth weight and severity of oligohydramnios. This finding is similar to the findings of Baron *et al*. [8]. The present study noted 25.67% newborns to have 1 min Apgar score ≤ 7 and 17.57% to have 5 min Apgar score ≤ 7. Guin G [3] in a similar type of study recorded 1min Apgar score < 7 in 39% cases. Out of the 74 cases of oligohydramnios 26(35.14%) required NICU admission. Of these 17(28.81%) newborns

belonged to mothers with borderline oligohydramnios and 9(60%) cases belonged to mothers with severe oligohydramnios. Thus the rate of NICU admission was more in severe oligohydramnios group. This is in accordance with the study of Casey *et al*. [9]. In the present study there were 2(2.70%) perinatal deaths and 1(1.35%) neonatal death. All the three neonates had congenital anomalies associated with oligohydramnios. (Pleural effusion and ascites, intestinal atresia, hypoplastic left ventricle). In the present study there were no perinatal deaths in isolated oligohydramnios group however the overall perinatal + neonatal mortality was 4.05%.

CONCLUSION

Oligohydramnios when detected in late second trimester or early third trimester of pregnancy is generally associated with other antenatal maternal or fetal co-morbid conditions which affect the outcome of pregnancy Severity of oligohydramnios increases the rate of operative intervention and adverse perinatal outcomes. Oligohydramnios when present with fetal anomalies have poor prognosis. Every case of oligohydramnios needs careful evaluation, parental counseling and individualized decision regarding timing and mode of delivery to improve the perinatal outcome.

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