

# Maternal and Perinatal Outcome in Pregnancies with Oligohydramnios in Third Trimester

MANISHA SHARMA, D K BHAGWANI, MALA CHAURASIA, P K JAIN

## ABSTRACT

**Introduction:** Oligohydramnios presents a threat to the fetus due to increased risk of the umbilical cord getting compressed and resulting in impaired blood flow to the fetus.

**Aim:** The objective of the study was to find out the significance of oligohydramnios during third trimester of pregnancy.

**Materials and Methods:** A hospital based prospective study was conducted in the Department of Obstetrics and Gynaecology at Hindu Rao Hospital, Delhi. Amniotic fluid index (AFI) estimation was done on 150 pregnant women in third trimester, who were selected after screening for inclusion and exclusion criteria. Women with AFI < 5 cm were taken as cases while women with AFI > 5 cm as controls.

**Results:** The mean maternal age was 23.58±3.43 years and maximum women were primigravida. Mean AFI among the cases was 2.97±1.95 cm. Antenatal complications like pre eclampsia, IUGR, PROM were associated with 71 % of the cases. Labour was induced

in 65% of the cases compared to 21% among controls. LSCS was performed in 44% of cases compared to 10% in controls with fetal distress the most common indication (85%). 73% babies born to the cases had birth weight < 2.5 kg, 55% had APGAR score < 7 and 44% had NICU admission compared to 16%, 13% and 13% respectively among controls. There were 5 intrauterine deaths and 2 stillbirths among the cases and none among the controls.

**Conclusion:** Identification of oligohydramnios can be done by a good clinical examination and confirmed by measuring AFI on ultrasonography. Poor fetal outcome in the form of preterm, IUD, LBW, low APGAR score at 5 minute and increased chances of still birth, NICU admission and neonatal death are seen with oligohydramnios in third trimester and more so if it is detected in early third trimester. Chances of induction of labour and risk of LSCS also increase. Thus, detection of oligohydramnios helps in proper management of the cases so that maternal and perinatal outcome can be improved.

**Keywords:** Amniotic fluid index, Obstetric complication, Poor fetal outcome

## INTRODUCTION

Amniotic fluid provides a protected environment for the growing foetus. It cushions the foetus against mechanical and biological injury and supplies nutrients for its growth. The normal average volume of amniotic fluid at 16 weeks of gestation is 250ml, it increases to 800ml at 28 weeks and further to 1000ml at 38 weeks and decreases slightly to 800 ml at 40 weeks [1].

Oligohydramnios is described as a condition with decreased amniotic fluid volume relative to gestational age. It presents a threat to the foetus due to increased risk of the umbilical cord getting compressed which results in impaired blood flow to the foetus. Manning et al., defined oligohydramnios as the condition when the largest pocket on ultrasound in its broadest diameter measured less than 1cm [2]. Subsequently they revised the criteria to a single pocket measuring 2cm in both vertical and horizontal planes [3]. Later Phelan

et al., described Amniotic Fluid Index by an ultrasound approach and defined oligohydramnios as a condition when amniotic fluid index (AFI) was  $\leq 5$  cm [4].

Pre-eclampsia, Intrauterine Growth Restriction (IUGR) and post dated pregnancies are the commonest causes of reduced amniotic fluid during third trimester of pregnancy due to chronic placental insufficiency and reduced renal circulation. Oligohydramnios is associated with increased maternal morbidity in terms of increase rate of induction of labour and caesarean section. It is also associated with adverse perinatal outcomes such as preterm delivery, low birth weight, fetal distress in labour, meconium passage, low APGAR score, neonatal resuscitation and NICU admission [5].

Thus, this study was conducted to find out the significance of oligohydramnios in determining the maternal and perinatal outcome in pregnant women with oligohydramnios during third trimester of pregnancy and

to find out maternal high risk factors associated with it.

## MATERIALS AND METHODS

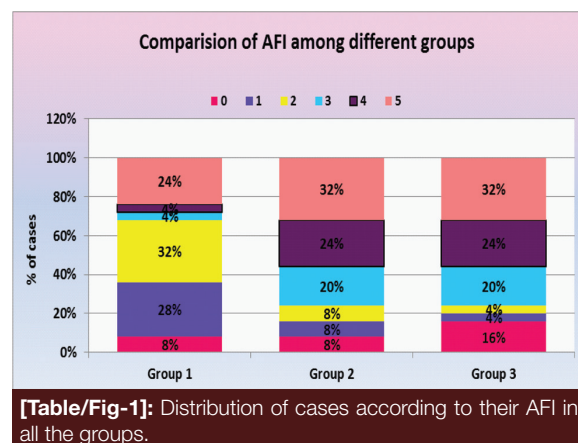
A hospital based prospective study was done from June 2013 to May 2014 in the Department of Obstetrics and Gynaecology, NDMC Medical College and Hindu Rao Hospital, Delhi after taking ethical clearance. This study included 150 pregnant women, out of which 75 pregnant women with 28 completed weeks of gestation who had singleton pregnancy with cephalic presentation and Amniotic Fluid Index (AFI) < 5 cm were enrolled as study cases while 75 pregnant women with AFI > 5 cm who fulfilled the inclusion criteria were taken as controls. Patients who had pre mature rupture of membrane (PROM) were also included in the study. Pregnant women with gestation age < 28 weeks, unsure gestational age, multiple pregnancy, fetal malpresentation, congenital anomaly and Intra uterine death (IUD) were excluded. The patients were included in the study in such a manner that they could equally be divided into 3 groups according to their gestational age: Group I = 28 - 31 weeks, 6 days; Group II = 32 – 36 weeks, 6 days; Group III = 37 – 40 weeks.

After obtaining an informed written consent, a detailed history including name, age, education, occupation and socioeconomic status, menstrual and obstetric history, any significant personal or past medical / surgical history was taken. A thorough general physical examination and systemic examination followed by obstetric examination was done. Basic investigations: haemogram, blood group, Rh typing, blood sugar (random), urine (routine and microscopy), HBsAg, HIV, VDRL were performed along with special investigation wherever indicated. A transabdominal ultrasound obstetric scan was performed with the help of Toshiba-just vision USG machine. AFI was measured by using Phellan's technique. The uterus was divided into four quadrants using the maternal sagittal midline vertically and an arbitrary transverse line approximately halfway between the symphysis pubis and the upper edge of the uterine fundus [4]. The transducer was kept parallel to the maternal sagittal plane and perpendicular to maternal coronal plane in order to avoid inadvertent measurement of adjacent quadrant. The vertical depth of unobstructed and clear pocket of amniotic fluid was measured in all the four quadrants which were summed up to obtain AFI.

All the patients were followed up to delivery. Any antenatal complication in the patients and the fetomaternal outcome at the time of delivery was recorded. Maternal and perinatal outcome in patients with AFI ≤ 5cm (cases) was compared with those with AFI > 5cm (controls) during 3<sup>rd</sup> trimester as a whole and also among the three groups. Appropriate statistical test was applied to the results and computer based analysis was done using appropriate software like SPSS (Ver.16).

## RESULTS

In our study maximum patients were primi gravida and in the age group of 21-25 years. Out of 75 cases, 40% had AFI between 0 and 2cm while 60% had AFI between 3 and 5cm [Table/Fig-1] 71% cases of oligohydramnios had associated antenatal complications compared to 36% of controls (84% cases each in group I and II and 44% in group III had associated antenatal complications) [Table/Fig-2]. Various obstetrical complications-. Pre eclampsia, IUGR, PROM and abruption placentae were seen in 39%, 29%, 15% and 5% of the cases compared to 12%, 1.3%, 7% and 0% of the controls respectively.



[Table/Fig-1]: Distribution of cases according to their AFI in all the groups.

Abnormal Biophysical scoring (4/8 or below) was seen in 27% of the cases, equivocal in 41% and normal in 27% cases while 13% controls had equivocal and one control had abnormal BPS. There were 4 (5%) intrauterine deaths among cases and none among controls.

Labour was induced in 65% cases of oligohydramnios compared to 21% of controls. 44% cases had undergone LSCS compared to 10% of controls [Table/Fig-2]. Most common indication for LSCS was fetal distress among the cases (85%) followed by non progress of labour (12%) and abruption placenta (3%) while among controls non progress of labour was the most common indication (75%) followed by fetal distress (25%).

73% of the babies born to the patients of oligohydramnios had birth weight < 2.5 kg while 16% babies born to controls had birth weight < 2.5 kg (Fig. 3). At the same time 55% babies born to the cases had APGAR score < 7 while 13% babies born to controls had APGAR score < 7. Maximum number of patients (72%) had APGAR score < 7 among cases of group 1 [Table/Fig-3].

23% of all the cases delivered term babies compared to 87% of the controls. Almost all the cases who delivered at term were in group III. There were 5 intrauterine deaths and 2 stillbirths among the cases (all in group I) and none among the controls. 57% of all the cases had preterm birth compared to 5% of controls. Almost all the preterm births were either in group I or II. 44% babies born to the cases were admitted in NICU as compared to 13%

Distribution of patients with	Group I		Group II		Group III		Total in 3 <sup>rd</sup> trimester	
	Cases N=25	Control N=25	Cases N=25	Control N=25	Cases N=25	Control N=25	Cases N=75	Control N=75
Antenatal Complication	21 (84%)	14 (56%)	21 (84%)	11 (44%)	11 (44%)	7 (28%)	53 (71%)	28 (36%)
No Antenatal Complication	4 (16%)	15 (44%)	4 (16%)	14 (56%)	14 (56%)	18 (72%)	22 (29%)	47 (64%)
p-value	0.007		0.05		0.232		0.002	
Spontaneous labour	8(32%)	19(76%)	8(32%)	19(76%)	10(40%)	21(84%)	26(35%)	59(79%)
Induced labour	17(68%)	6 (24%)	17(68%)	6 (24%)	15(60%)	4(16%)	49(65%)	16(21%)
p-value	0.002		0.002		0.003		0.002	
NVD	20(80%)	24(96%)	10(40%)	22(88%)	9(36%)	19(68%)	39(52%)	65(87%)
Instrument	0(0%)	1(4%)	0(0%)	0(0%)	3(12%)	1(4%)	3(4%)	2(3%)
CS	5(20%)	0(0%)	15(60%)	3(12%)	13(52%)	5(20%)	33(44%)	8(10%)
p-value	0.042		0.001		0.017		0.002	

**[Table/Fig-2]:** Distribution of cases and controls according to antenatal complications, induction of labour and mode of delivery.

Fetal APGAR score and Weight	Group 1		Group 2		Group 3		Total	
	Cases N=25	Control N=25	Cases N=25	Control N=25	Cases N=25	Control N=25	Cases N=75	Control N=75
>7	7(28%)	20(80%)	15(60%)	24(96%)	12(48%)	21(84%)	34(45%)	65(87%)
>7	18(72%)	5(20%)	10(40%)	1(4%)	13(52%)	4(16%)	41(55%)	10(13%)
p-value	0.001		0.005		0.016		0.014	
>2.5 Kg	1(4%)	21(84%)	4(16%)	21(84%)	15(60%)	21(84%)	20(27%)	63(84%)
2.5 - 1.5	5(20%)	4(16%)	15(60%)	4(16%)	10(40%)	4(16%)	30(40%)	12(16%)
< 1.5 Kg	19(76%)	0(0%)	6(24%)	0(0%)	0(0%)	0(0%)	25(33%)	0(0%)
p-value	<0.001		<0.001		0.114		<0.001	

**[Table/Fig-3]:** Distribution according to fetal APGAR score and fetal weight.

among the controls. There were 16% neonatal deaths among the cases and none among the controls.

## DISCUSSION

Amniotic fluid volume serves as an indicator of fetal well being. Decreased amniotic fluid volume in pregnancies without premature rupture of membranes reflects a fetus in chronic stress with shunting of blood to its brain, adrenal glands and heart and away from other organs including the kidney [2]. Decreased renal perfusion results in decrease urinary output and oligohydramnios. Thus, the evaluation of Amniotic Fluid Volume has become an integral component of fetoplacental assessment in pregnancies which are at risk for an adverse outcome of pregnancy.

In the present study the mean maternal age was 23.58 ±3.43 years which was similar to studies done by Chauhan SP et al., [6] and Everett F et al., [7] who found the mean maternal age 23.6±6.5 years and 23.8±5.7 years respectively. Maximum patients were primi gravida but there was no statistically significant difference in age, gravidity and parity among the cases and controls. The mean amniotic fluid index among the cases was 2.97±1.95 cm [Table/Fig-1]. It was comparable with the study done by Chauhan SP et al., (3 ± 1.5 cm in patients with AFI <5) [6].

Patients with oligohydramnios had associated antenatal complications frequently (71% Vs 28%) and it was statistically significant (p value 0.002). They were more frequent when oligohydramnios was detected in early third trimester (28`week to 31.9 week) compared to late third trimester (37 to 40 weeks) and it was statistically significant (p value 0.007 Vs 0.232). Earlier the oligohydramnios detected during pregnancy more is its association with antenatal complications [Table/Fig-2]. Preeclampsia was associated with 39% of cases of oligohydramnios which is comparable to 38.46% and 31% of preeclampsia in oligohydramnios group in studies by Chandra P et al., [8] and Sriya R et al., [9] respectively. IUGR was associated with 22% of cases which is comparable to the study by Golan et al., (24.5%) [10]. Association of pre eclampsia alone as well as with IUGR was statistically significant when cases were compared with controls (p value 0.003 and p value 0.001 respectively).

Abnormal BPS was seen more frequently among the cases than controls (27% Vs 1.3%) (p value <0.001). All the intrauterine deaths associated with oligohydramnios were seen when it was detected earlier in 3<sup>rd</sup> trimester. Casey et al., also found non reassuring fetal heart rate among pregnancies complicated by oligohydramnios (p value < 0.03) [11].

Induction of labour among cases was much higher than controls (65% Vs 21%) and was statistically significant (p-value 0.002). It was consistent with other studies by Jandial C et al., [12] and Guin et al., [13] who found that labour was induced in 58% and 56.6% respectively in cases of oligohydramnios. In our study labour was induced among 68% in group I and II both (early 3<sup>rd</sup> trimester) which represents iatrogenic prematurity associated with oligohydramnios [Table/Fig-2].

The caesarean section rate was 44% in oligohydramnios in our study which was comparable to other studies by Casey et al., [11] and Sriya R et al., [9] (51% and 43.05% respectively). But Jun Zhang et al., [14] found no difference in the overall rate of caesarean section between women with oligohydramnios and the controls (24% Vs 19%). The rate was high and statistically significant among cases of group II and III compared to group I (p-value 0.001 and 0.017 respectively) as LSCS was not attempted in very premature and very low birth weight babies [Table/Fig-2]. Chauhan SP et al., [6] found an increased risk for caesarean delivery for fetal distress among cases of oligohydramnios which was comparable to our study. Compression of cord due to oligohydramnios may be responsible for fetal distress. There was no significant difference in the incidence of meconium staining of liquor among cases and controls (17% Vs 12%).

In present study 73% of the babies born to the cases had birth weight < 2.5 kg [Table/Fig-3]. In group III birth weight difference was not statistically significant (p value 0.114) while in group I and II birth weight difference was statistically significant (p value < 0.001) among cases and controls which indicates that oligohydramnios occurring in early third trimester affects birth weight significantly [Table/Fig-3]. Casey et al., [11] found 35% LBW in their study while Chandra P et al., [8] and Sriya R et al., [9] found birth weight less than 2.5 kg in 61.53% and 58.38% cases of oligohydramnios respectively. The high incidence of low birth weight might be because of chronic placental insufficiency causing fetal growth restriction.

APGAR score < 7 at 5 minutes was detected more often in cases (55%) in comparison to controls (13%).

APGAR score < 7 at 5 minute was seen more frequently among cases in early 3<sup>rd</sup> trimester when compared to oligohydramnios occurring in late third trimester but it was statistically significant in all the three groups (p value 0.001, 0.005, 0.016) [Table/Fig-3]. In similar studies by Chauhan SP et al., [6], Morris JM et al., [15], Guin G et al., [13] and Chate P et al., [16] low APGAR score was found among cases of oligohydramnios.

Out of 43 cases of preterm delivery 42 were either in group I or II. This indicates that if oligohydramnios develops early in 3<sup>rd</sup> trimester chances of patient going till term are minimum. Early development of oligohydramnios is also associated with increased chances of intrauterine death (7%) and stillbirth as shown in the study [Table/Fig-4]. The difference was statistically significant in cases and controls (p value < 0.001). Golan et al., [10] found 5.5% IUD in their study. 44% of all the babies born to the cases were admitted in NICU as compared to 13% among the controls. Maximum number of the babies who were admitted in NICU belonged to cases in group I or II and was statistically significant (p value 0.001 and 0.032 respectively). If oligohydramnios is detected late in 3<sup>rd</sup> trimester chances of admission to NICU are less (p value 0.417). Chate P et al., [16] and Chandra P et al., [8] found 42% and 46.5% NICU admissions among cases of oligohydramnios respectively while Casey et al., [11] found 7% Vs 2% NICU admission in case of oligohydramnios. Newborns were admitted in NICU for various morbidities like jaundice, septicaemia, IUGR, birth asphyxia etc. Out of 33 babies who were admitted in NICU, 12 could not survive because of prematurity (7 babies were < 32 weeks - group I) and very low birth weight.

Thus, oligohydramnios is associated with a higher rate of pregnancy complications and increased fetal morbidity and mortality and can be used as an adjunct to other fetal surveillance methods to identify those fetuses which are at risk of poor perinatal outcome. Termination of pregnancy should be considered when pulmonary maturity is present or in cases of fetal distress.

## LIMITATIONS

Study time was less and study population may not be

Fetal Outcome	Group 1		Group 2		Group 3		Total	
	Cases N=25	Control N=25	Cases N=25	Control N=25	Cases N=25	Control N=25	Cases N=75	Control N=75
Term	0(0%)	22(88%)	1(4%)	20(80%)	16(64%)	23(92%)	17(23%)	65(87%)
IUD	5(20%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	5(7%)	0(0%)
Still Birth	2(8%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	2(3%)	0(0%)
Preterm	18(72%)	1(4%)	24(96%)	3(12%)	1(4%)	0(0%)	43(57%)	4(5%)
SFD	0(0%)	2(8%)	0(0%)	2(8%)	8(32%)	2(8%)	8(11%)	6(8%)
NICU	16(64%)	4(16%)	12(48%)	4(16%)	5(20%)	2(8%)	33(44%)	10(13%)
NND	7(28%)	0(0%)	3(12%)	0(0%)	2(8%)	0(0%)	12(16%)	0(0%)

[Table/Fig-4]: Comparison of fetal outcomes between controls and cases among different groups.



representative of whole population as we had selected only 150 cases.

## CONCLUSION

Pregnant women with oligohydramnios can be identified by a good clinical examination and further can easily be confirmed by a non-invasive ultrasonography by measuring AFI. Antenatal complications like preeclampsia, IUGR, PROM and abruptio placentae are frequently associated with oligohydramnios. It is also associated with increased risk of induction of labour and caesarean section. Poor fetal outcome in the form of IUD, fetal distress, low APGAR score at 5 minutes, LBW, preterm, still birth, NICU admission and neonatal death are frequently seen in cases of oligohydramnios. Poor fetal outcome increases whenever oligohydramnios is detected in early third trimester. AFI is an important component of biophysical profile scoring and its assessment in early third trimester helps to identify women who need more ante partum surveillance so that proper management can be done for the improvement of maternal and perinatal outcome.

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### FINANCIAL OR OTHER COMPETING INTERESTS:

None.

Date of Publishing: Jul 01, 2016