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Clinical study of oligohydramnios in term pregnancy in relation with fetal and maternal outcome

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Abstract

Background: Morbidity is seen in pregnancies with oligohydramnios due to various complications like, cord compression and subsequent distress, deformity due to intra-amniotic adhesions, decreased fetal weight, fetal hypoxia,Fetal pulmonary hypoplasia. Present study was conducted to find out the value of oligohydramnios in perinatal outcome and maternal outcome in pregnancies beyond 37 completed weeks. **Material and Methods:** Present study was cross-sectional study, conducted in pregnant women with Gestational Age Between 37 to 40 weeks, amniotic fluid index of ≤5 cm, Intact membranes., Singleton pregnancy with cephalic presentation. **Results:** Our study was performed in tertiary care center with AFI ≤5 cm and gestational age between 37 to 40 weeks. Majority of pregnant women were from 21 to 25 years of age group i.e. 59%, followed by 21% from 26 to 30 years age group. Mean age was 23.8±3.29 years. Majority (86%) were booked cases. 41% of cases were primigravida and remaining 59% were multi. Majority belongs to 38 weeks of gestation followed by 33% were from 39 weeks of gestation. Mean gestational age of cases was 38.38±0.90 weeks. Trial of labour given to 31% subjects and 69% cases were directly undertaken for LSCS. Majority underwent LSCS (86%) and only 14% were normally delivered. Out of 86 LSCS carried out, majority 63(73.3%) having fetal distress followed by history of previous LSCS in 21 (24.4%) NICU admission was indicated in only 22% of newborn of women. Out of 100 delivered babies, newborn death incidence was 6%. All 6 neonates admitted in NICU were died (100%) incidence. Out 94 who survived, NICU admission was required in only 17% (16) newborns. This difference was highly significant. NICU admission required in 59.1% cases with AFI 0-2 as against 36.4% in AFI 2-4 and 4.5% with AFI >4. The difference was statistically significant. Neonatal death occurred in 83.3% cases with AFI 0-2 as against 16.7% in AFI 2-4. The difference in proportion was significant (<0.05) and there is association between NICU admission and AFI grades LSCS took place in 39.5% cases with AFI 0-2 as against 47.7% in AFI 2-4 and 12.8% with AFI > 4 & difference was statistically significant. **Conclusion:** In oligohydramnios, the occurrence of non-reactive NST, meconium stained liquor, development of fetal distress, the rate of LSCS, low 1 and 5 minute Apgar score, low birth weight, NICU admission, perinatal morbidity and mortality are more.

Keywords: oligohydramnios, non-reactive NST, meconium stained liquor, fetal distress, NICU admission, perinatal morbidity/mortality.

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Introduction

Amniotic fluid is a very integral part of antenatal fetal monitoring especially in third trimester. Amniotic fluid which surrounds developing fetus in amniotic sac provides several benefits to the fetus. It creates a physical space for the fetal skeleton to shape normally, promotes normal fetal lung development, and helps to avert compression of the umbilical cord.[1] Amniotic fluid provides a protective milieu for the growing fetus, cushioning it against mechanical and biological injury,[3]. Quantification of amniotic fluid is an important component of biophysical profile in ultrasound evaluation of fetal wellbeing especially in third trimester.[4]

Oligohydramnios defined as AFI ≤ 5 cm.[3] The incidence varies from 0.5 to >5% of all pregnancies9. The common causes are intrauterine growth restriction (poor fetal growth), post-term pregnancy, birth defects (especially kidney and urinary tract malformations), premature rupture of membranes & twin-to-twin transfusion syndrome.[4]

Morbidity is seen in pregnancies with oligohydramnios due to various complications like Fetal pulmonary hypoplasia, cord compression and subsequent distress, deformity due to intra-amniotic adhesions, decreased fetal weight, fetal hypoxia. It is a significant health problem as its rate has increased despite advances in perinatal care. Present study was conducted to find out the value of oligohydramnios in perinatal outcome and maternal outcome in pregnancies beyond 37 completed weeks.

Material And Methods

Present study was cross-sectional study, conducted in Department of Obstetrics & Gynaecology at XXX medical college & hospital, XXX, India. Study duration was of 2 years (July 2018 to June 2020). Study was approved by institutional ethical committee. Pregnant women with diagnosis of oligohydramnios (with AFI ≤ 5 cm) by ultrasound after 37 completed weeks of gestation were considered for study.

Inclusion criteria

Pregnant women with Gestational Age Between 37 to 40 weeks, amniotic fluid index of ≤5 cm, Intact membranes., Singleton pregnancy with cephalic presentation

Exclusion criteria

- Gestational age less than 37 weeks and more than 40 weeks
- Associated fetal malformations.
- Ruptured membranes
- Malpresentation and multiple gestation.
- Intrauterine Death
- Polyhydramnios

Study was explained & a written informed consent was taken. After selection of cases, detailed history including (Obstetric History, Menstrual History, Past History, Family History, Personal History) was taken and complete examination(General Examination, Systemic Examination,Abdominal Examination and Pelvic Examination) was done. Clinical evidence of oligohydramnios was looked for and confirmed by ultrasound examination. All the cases were subjected to investigations like Complete hemogram, Blood Group & Rh Typing, Blood Sugar, VDRL,HIV, HBsAg,Thyroid Profile,Urine Analysis, USG, Colour Doppler (if possible at the time) & NST.

Various outcome measures recorded were gestational age at delivery, colour of amniotic fluid, FHR tracings, mode of delivery, indication for cesarean section or instrumental delivery, Apgar score at one minute and five minutes, birth weight, admission to Neonatal

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Intensive Care Unit (NICU), perinatal morbidity and perinatal mortality.
Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi-square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

Results

Our study was performed in tertiary care center with AFI ≤5 cm and gestational age between 37 to 40 weeks. Majority of pregnant women were from 21 to 25 years of age group i.e. 59%, followed by 21% from 26 to 30 years age group. Mean age was 23.8±3.29 years. Majority (86%) were booked cases. 41% of cases were primigravida and remaining 59% were multi. Majority belongs to 38 weeks of gestation followed by 33% were from 39 weeks of gestation. Mean gestational age of cases was 38.38±0.90 weeks. Out of 100, majority (44%) were having AFI grade 2-4 followed by 35% having 0-2. Mean AFI of cases was 2.96±1.61. 60% were reactive to NST whereas only 40 % were nonreactive to NST.

Table 1: Maternal characteristics

Maternal characteristics	**Frequency**	**Percent**
Age group (in years)		
Less than 20	16	16.0
21 to 25	59	59.0
26 to 30	21	21.0
More than 30	4	4.0
Mean Age(yrs)	23.80 ± 3.29	
Booking status		
Booked	86	86.0
Unbooked	14	14.0
Parity		
Primi	41	41
Multi	59	59
Gestational age (in weeks)		
37	17	17.0
38	39	39.0
39	33	33.0
40	11	11.0
Mean GA(wks)	38.38 ± .90	
AFI grading		
0 to 2	35	35.0
2 to 4	44	44.0
More than 4	21	21.0
Mean AFI (cms)	2.96 ± 1.61	
NST		
Reactive	60	60.0
Non-reactive	40	40.0

Trial of labour given to 31% subjects and 69% cases were directly undertaken for LSCS. Majority underwent LSCS (86%) and only 14% were normally delivered. Out of 86 LSCS

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carried out, majority 63(73.3%) having fetal distress followed by history of previous LSCS in 21 (24.4%). Amniotic fluid was clear in 86% cases whereas in 11% it was TNM. APGAR was less than 7 in 54% cases at the end of one minute. APGAR was less than 7 in 3% cases at the end of five minute. NICU admission was indicated in only 22% of newborn of women. Out of 100 delivered babies, newborn death incidence was 6%.

Table 2: Maternal & fetal outcome

Mode of labour		
Induced	11	11.0
Spontaneous	20	20.0
LSCS	69	69.0
Mode of delivery		
FTND	14	14.0
LSCS	86	86.0
Mean Birth Wt.(kg)	2.19 ± .38	
Amniotic fluid		
Clear	86	86.0
TKM	3	3.0
TNM	11	11.0
APGAR at 1 minute < 7	54	54.0
APGAR at 5 minute < 7	3	3.0
NICU	22	22.0
Neonatal death	6	6.0
No	78	78.0
Indication of LSCS		
CPD	2	2.3
Fetal distress	63	73.3
Previous LSCS	21	24.4

Out of 6 neonatal deaths, 66.7% (4) were non-reactive to NST as against 38.3% (36) survived neonates. There is no association between NST and neonatal death (p>0.05)

Table 3: Distribution according to neonatal outcome and non-stress test results

NST results	**Neonatal death**				**Total**	**Fischer's exact test**	**P**
	Yes		**No**				
	Number	**Percent**	**Number**	**Percent**			
Reactive	2	33.3	58	61.7	60	1.89	0.21 Not significant
Not reactive	4	66.7	36	38.3	40		
Total	6	100.0	94	100.0	100		

All 6 neonatal deaths were in women who had undergone LSCS (100%) as against 80 women who underwent LSCS and babies were alive. This difference in incidence of death of newborn was not significant (p>0.05)

Table 4: Distribution according to neonatal outcome and mode of delivery

Mode of delivery	**Neonatal death**		**Total**	**Fischer's exact**	**P**
	Yes	**No**			

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						test	
	Number	**Percent**	**Number**	**Percent**			
Normal	0	0.0	14	14.9	60	1.03	0.59 Not significant
LSCS	6	100.0	80	85.1	40		
Total	6	100.0	94	100.0	100		

All 6 neonates admitted in NICU were died (100%) incidence. Out 94 who survived, NICU admission was required in only 17% (16) newborns. This difference was highly significant.

Table 5: Distribution according to neonatal outcome and NICU admission required

NICU admission	**Neonatal death**				**Total**	**Fischer's exact test**	**P**
	Yes		**No**				
	Number	**Percent**	**Number**	**Percent**			
Yes	6	100.0	16	17.0	22	22.63	0.0001 (Highly significant)
No	0	0.0	78	83.0	78		
Total	6	100.0	94	100.0	100		

NICU admission required in 59.1% cases with AFI 0-2 as against 36.4% in AFI 2-4 and 4.5% with AFI >4. The difference in proportion was significant(<0.05) and there is association between NICU admission and AFI grades

Table 6: Distribution according to AFI grades and NICU admissions

NICU admission	**AFI grading**						**Total**	**Fischer's exact test**	**p**
	0 to 2		**2 to 4**		**More than 4**				
	No.	**%**	**No.**	**%**	**No.**	**%**			
Yes	13	59.1	8	36.4	1	4.5	22	8.46	0.015 Significant
No	22	28.2	36	46.2	20	25.6	78		
Total	35	35.0	44	44.0	21	21.0	100		

Neonatal death occurred in 83.3% cases with AFI 0-2 as against 16.7% in AFI 2-4. The difference in proportion was significant (<0.05) and there is association between NICU admission and AFI grades

Table 7: Distribution according to AFI grades and neonatal deaths

Neonatal deaths	**AFI grading**						**Total**	**Fischer's exact test**	**p**
	0 to 2		**2 to 4**		**More than 4**				
	No.	**%**	**No.**	**%**	**No.**	**%**			
Yes	5	83.3	1	16.7	0	0.0	6	5.14	0.048 Significant
No	30	31.9	43	45.7	21	22.3	94		
Total	35	35.0	44	44.0	21	21.0	100		

LSCS took place in 39.5% cases with AFI 0-2 as against 47.7% in AFI 2-4 and 12.8% with AFI > 4.The difference in proportion was significant (<0.05) and there is association between NICU admission and AFI grades

Table 8: Distribution according to AFI grades and mode of delivery

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Mode of delivery	AFI grading						Total	Fischer's exact test	P
	0 to 2		2 to 4		More than 4				
	No.	%	No.	%	No.	%			
Normal	1	7.1	3	21.4	10	71.4	14	19.79	0.0001 Highly significant
LSCS	34	39.5	41	47.7	11	12.8	86		
Total	35	35.0	44	44.0	21	21.0	100		

Discussion

Oligohydramnios is an important sign of placental insufficiency which affects perinatal outcome. An amniotic fluid index of ≤ 5 cm detected after 37 completed weeks of gestation is an indicator of poor perinatal outcome. Morbidity is seen in pregnancies with oligohydramnios due to various complications like Fetal pulmonary hypoplasia, cord compression and subsequent distress, deformity due to intra-amniotic adhesions, decreased fetal weight, fetal hypoxia. It is a significant health problem as its rate has increased despite advances in perinatal care.

For prevention of development of oligohydramnios proper care regarding maternal nutrition and hydration and regular sonographic study of amount of liquor is necessary along with tests for fetal well-being.[5]

Mean maternal age (in years) of study group in present study was 23.80 compared to 27.04, 22.88 and 23.9 in study by Bhagat M[6], Bangal VB et al.[7] and Casey BM et al[8] respectively. In a study by Jandial C et al.,[9] 48% women belonged to 21-25 years of age group. Mean maternal age (in years) in a study by Melamed Net et al[10]. was 28.2 in active delivery group and 28.1 in expectant management group. In our study group primigravida accounted for 41% compared to 60% in the study by Jandial C et al[9].

In present study mean gestational age at delivery was 38.38±0.90 weeks compared to 38 ± 2 weeks in study by Casey BM et al.[8] In study by Bhagat M[6], 56% of women were <37 weeks of gestational age at delivery. In study by Melamed N et al[10], gestational age at delivery was 36.7 + 1 . 1 weeks in active delivery group and 38.9 ± 1.7 weeks in expectant. In our study group 72% women were nullipara compared to 68%, 40% and 60.3 % in study by Bhagat M[6], Casey BM et al[8]. and Melamed N et al[10]. respectively. In our control group 68 % women were nullipara compared to 58.9 %, 37%$_0$ and 57.4 % in study by Bhagat[6], Casey BM et al[8]. and Melamed N et al[10]. respectively.

NST was non-reactive in 40% women of our study group compared to 32% and 38% in a study by Bhagat M[6] and Jandial C et al[9]. respectively. Occurrence of meconium stained liquor was 14% in our study as compared to 16%, 48%, 6% and 6.7% in study by Bhagat M[6], Jandial C et al[9]., Casey BM et al[8]. and Melamed N et al[10]. respectively.

In present study group, 44% of women were induced (induction of labour) compared to 72%o, 58% and 42% in study by Bhagat M[6], Jandial C et al[9]. and Casey BM et al[8]. respectively. Caesarean delivery (LSCS) for fetal distress was done in 73.3% women of our study group compared to 57.1 %, 42% in study by Bhagat M[6], Jandial C et al[9]. respectively. In study by Melamed N et al[10]., 59%> women in active delivery group and 16.7% in expectant management group underwent caesarean delivery for fetal .

Apgar score was <7 at 1 minute in 54% neonates in present study group compared to 36%o and 10% in study by Bhagat M[6] and Bangal VB et al[7] respectively. Apgar score was <7 at 5 minutes in 3% neonates in present study group compared to 4%, 16%o and 12% in study by Bhagat M[6], Bangal VB et al.[7] and Jandial C et al.[9] respectively.

In present study group 84% neonates birth weight was less than 2.5 kg, compared to 56%, 58% and 35% in study by Bhagat M[6]. Jandial C et at[9]. and Casey BM et al[8].respectively as shown in Table 38. Birth weight of neonates in oligohydramnios group was less, due to

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chronic uteroplacental insufficiency.

In present study group 22% of neonates were admitted to NICU compared to 92%, 16% and 7% in study by Bhagat M[6], Jandial C et al[9]. and Casey BM et al[8].respectively. In a study by Melamed N et al[10]. 12.8% neonates in active delivery group and 6.6% in expectant management group were admitted to NICU.

Early neonatal deaths accounted for 6% in present study group compared to 16%, 6% and 5% in study by Bangal VB et al[7]., Jandial C et al[9]. and Casey BM et al.[33] respectively. A study conducted by Baron et al.[11] showed that meconium-stained amniotic fluid occurred significantly less often in the oligohydramnios group as compared to the normal AFI group. A study by Voxman et al.[12] concluded that there was no difference between the groups with regard to meconium-stained liquor. Chauhan et al[13]. In their meta-analysis found that intrapartum AFI ≤ 5 was associated with increased risk of cesarean section for fetal distress (pooled RR = 1.7), which was similar to our study. Rutherford et al[14]. found an inverse relationship between amniotic fluid index and cesarean section for fetal distress.

Thus oligohydramnios causes increased occurrence of non-reactive NST, meconium stained liquor, induction of labour, development of fetal distress, rate of LSCS, low Apgar score, low birth weight neonates, NICU admissions and early neonatal deaths. Identification of oligohydramnios and performing fetal surveillance tests will help us to manage patients in a better way and will definitely improve clinical outcome.

Limitations of present study were, diagnosis of fetal distress was made depending on the NST. However the fetal acidosis was not proved by fetal scalp blood sampling or other methods. Neonatal follow up after 7 days was not done.

Conclusion

In oligohydramnios, the occurrence of non-reactive NST, meconium stained liquor, development of fetal distress, the rate of LSCS, low 1 and 5 minute Apgar score, low birth weight, NICU admission, perinatal morbidity and mortality are more.

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