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A Comparative Study of Perinatal Outcome in Pregnancies Complicated with Isolated Oligohydramnios and Oligohydramnios with Intrauterine Growth Retardation

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Abstract

Objective: To study the perinatal outcome in pregnancies complicated with isolated oligohydramnios and oligohydramnios with intrauterine growth restriction (IUGR). **Materials and Methods:** A prospective comparative study of perinatal outcome in pregnancies complicated with isolated oligohydramnios (Amniotic fluid index (AFI) <8) and oligohydramnios with IUGR (fetal weight < 10th percentile) was carried out in women between 28-40 weeks of gestation in KMC, Warangal in a period of March 2016-Jan 2019 with a sample of 50 cases with isolated oligohydramnios (AFI <8) and 50 cases with oligohydramnios with IUGR with statistical analysis based on chi-square test. **Results:** In our study, perinatal outcome in isolated oligohydramnios 90% of babies with APGAR scores >8 and 28% of babies requiring NICU admission, perinatal mortality is 2%. Perinatal outcome in oligohydramnios with IUGR showing 26% of babies APGAR<7 and NICU admission seen in 48%. Perinatal mortality was 14%. **Conclusion:** Isolated decreased AFI after 37 weeks of gestation was having better prognosis when compared to oligohydramnios complicating with IUGR. Intense fetal surveillance and proper antepartum and intrapartum care in oligohydramnios can reduce the complications.

Keywords

oligohydramnios, intrauterine growth restriction (IUGR), Amniotic fluid index (AFI), meconium-stained liquor

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INTRODUCTION

Liquor amnii, a fluid elaborated by amnion a two layered extra embryonic membrane formed by inner ectoderm and outer somatic mesoderm provides fluid medium for the early development of the embryo protecting it from concussion, pressure, desiccation, reminiscent of the aquatic origin of life. Adequate amount of amniotic fluid is essential for normal growth of the foetus as it cushions against all sorts of trauma and agitations. It has bacteriostatic properties and prevents infection, and it functions as primary source of fetal nutrients. After 40 weeks, there is a progressive decrease of amniotic fluid volume (AFV) at a rate of 8% per week and AFV

averaging about 400 ml at 42 weeks [1]. Clinical picture of reduced amniotic fluid is oligohydramnios. Isolated oligohydramnios occurs in late pregnancy without any other risk factors and diagnosed incidentally in ultrasound. Oligohydramnios is termed when amniotic fluid is diminished less than 3rd or 5th percentile for gestational age [2]. The prevalence depends largely upon the definition and criteria used for oligohydramnios and population studies [3]. The present study is to compare the perinatal outcome in 28-40 weeks pregnancies complicated with isolated oligohydramnios (AFI <8) and oligohydramnios with IUGR.IUGR is a condition where foetus fails to achieve its genetic potential, leading to perinatal morbidity and mortality. It is commonly associated with oligohydramnios as uteroplacental insufficiency common in both. Increased perinatal morbidity and mortality could be because of the umbilical cord compression, potential uteroplacental insufficiency and increased incidence of meconium-stained amniotic fluid and oligohydramnios [4, 5]. However, some of the recent studies have shown no effect of isolated oligohydramnios in perinatal outcome [6]. Decrease of amniotic fluid volume and IUGR is associated with increase labour induction, stillbirth, non- reassuring fatal heart pattern, meconium aspiration syndrome and neonatal death [7].

MATERIALS AND METHODS

A prospective comparative study of perinatal outcome in pregnancies complicated with isolated oligohydramnios (AFI<8) and oligohydramnios with IUGR was carried out in women between 28-40 weeks of gestation admitted in Katuri Medical College & Hospital (KMCH) from March 2018-Jan 2020 in Guntur. An informed consent was taken from study group, detailed history, examination, and investigation done, per speculum and per vaginal examination done to see any rupture of membranes, necessary investigation done, non-stress test done, USG done for fetal well-being and AFI measured by the four-quadrant technique. Fetal biometry and Doppler velocimetry is done to access IUGR and abnormal uterine blood flow. Accordingly, the patients are grouped; 50 cases of isolated oligohydramnios and 50 cases of oligohydramnios with IUGR. Patients were followed by observing NST at term; any induction of labor, mode of delivery, if delivered by cesarean section, the indication was recorded. Baby's condition assessed by birth weight, APGAR score, color of liquor and need for neonatal admission. Babies are followed till 28 days after birth.

Inclusion criteria: AFI < 8. Singleton pregnancy. Cephalic, breech and transverse presentations. 28-40 weeks of gestation period.

Exclusion criteria: Multiple pregnancy Pregnancies complicated with medical illness like gestational diabetes, preeclampsia, severe anemia, liver disorders and heart diseases.

The management protocol was similar in both groups. In term patients, if AFI ≤ 8 advised admission. On admission NST is done for all women in both groups. If NST found reactive, then further management is done according to protocol, that is induction of labour and proceed as per the maternal and fetal response and if non-reactive emergency LSCS done. If patient is in labor (i.e. less than 3 cm in primigravida and less than 4 cm in multigravida), oxytocin drip started. All cases will be monitored by continuous electronic fetal monitoring in labour. Any signs of fetal distress emergency LSCS done. After 3-centimeter dilatation of the cervical os in primigravida and 4 ems dilatation in multigravida ARM done and will be classified as clear and meconium-stained liquor. All new burns were attended by pediatrician. Various outcome measures recorded are induced vs spontaneous labour, nature of amniotic fluid, FHR tracings, mode of delivery, indication for caesarean section or instrumental delivery, APGAR score at 1 minute and 5 minutes, birth weight, admission to neonatal ward, perinatal morbidity, and mortality.

RESULTS

Present study is the outcome of pregnancies with AFI < 8 and compared to that of complicated with IUGR.

Statistical technique: Chi-square test of significance is used.

Table 1: Indication of caesarean section

Indications of caesarean	Group				Total Frequency	Total Percentage
	Isolated Oligohydramnios		Oligohydramnios with IUGR			
	Frequency	Percentage	Frequency	Percentage		
AFI:0	0	0	1	3.3	1	1.7
AFI:1	1	3.3	0	0	1	1.7
Breech	2	6.7	0	0	2	3.3
CPD	3	10	0	0	3	5
Failed Induction	0	0	6	20	6	10
Fetal Distress	13	43.3	19	63.3	32	53.3
PROM in Labour	1	3.3	0	0	1	1.7
Relative CPD	1	3.3	0	0	1	1.7
Scar Tenderness	8	26.7	4	13.3	12	20
Severe Oligo AFI:2	1	3.3	0		1	1.7
Total	30	100	30	100%	60	100

Chi-square: 18.458; P value: 0.030* statistically significant.

The indications for cesarean section were shown in the Table No. 1.

Main indication for cesarean section was fetal distress in both groups, 63.3% in IUGR and 43.3% in isolated oligohydramnios group.

Birth weight: About 38% babies with oligohydramnios with IUGR group were below 2 kgs and only 4% of babies in that of isolated oligohydramnios. Birth weight of the babies in both groups are depicted in the Table No. 2.

Table 2: Birth weight

Birth weight category	Group				Total Frequency	Total %
	Isolated Oligohydramnios		Oligohydramnios with IUGR			
	Frequency	%	Frequency	%		
> 3KGS	19	38.0	2	4.0	21	21.0
2.5-2.99 KGS	19	38.0	12	29.0	31	31
2.0-2.49 KGS	10	20.0	17	34.0	27	27.0
< 1.99 KGS	2	4.0	19	38.0	21	21.0
Total	50	100	50	100	100	100

Chi-square: 30.919; P value: 0.001* statistically significant

Apgar score: In isolated oligohydramnios, 10% of babies had APGAR < 7at 5 minutes and while in oligohydramnios with IUGR 26% of babies. APGAR score of the babies in both groups depicted in the Table No. 3.

Table 3: Apgar score

Apgar Score	Group				Total Frequency	Total %
	Isolated Oligohydramnios		Oligohydramnios with IUGR			
	Frequency	%	Frequency	%		
< 7	5	10%	13	28%	18	18%
>8	45	90%	37	74%	82	82%
Total	50	100%	50	100%	100	100%

Chi-square: 4.336; P value: 0.033* statistically significant.

Non stress test: NST was found to be non-reactive in 28% of babies with only oligohydramnios, while that of 58% of babies with boh oligohydramnios and IUGR.Details of NST in both groups depicted in Table no.4

Table 4: Non stress test

NST	Group				Total Frequency	Total %
	Isolated Oligohydramnios		Oligohydramnios with IUGR			
	Frequency	%	Frequency	%		
Non-Reactive	14	28.0	29	58.0	43	43.0
Reactive	36	72.0	21	42.0	57	57.0
Total	50	100	50	100	100	100

Chi-square: 9.180; P value: 0.002* statistically significant.

Neonatal outcome: Perinatal mortality found to be more in IUGR group i.e., 14%. NICU admissions were 28% in isolated oligohydramnios and 48% in oligohydramnios with IUGR. Neonatal outcome of both groups are shown in the Table No.5

Table 5: Neonatal outcome

NICU Admission	Group				Total Frequency	Total %
	Isolated Oligohydramnios		Oligohydramnios with IUGR			
	Frequency	%	Frequency	%		
Dead	1	2.0	7	14	8	8
No	35	70	19	38	54	54
Yes	14	28	24	48	38	38
Total	50	100	50	100	100	100

Chi-square: 11.872; P value: 0.003* statistically significant.

Concised table (table no. 6) of perinatal outcome in isolated oligohydramnios showing 90% of babies with APGAR score > 8 and 28% of babies requiring NICU admission. Perinatal mortality is 2%.

Table 6: Isolated Oligohydramnios

		NST		
		Non-reactive	Reactive	Total
Mode of Delivery	Caesarean Delivery	13	17	30
		92.9%	47.2%	60%
	NVD	1	19	20
		7.1%	52.8%	40%
	Total	14	36	50
		100%	100%	100%
Apgar Score	<7	3	2	5
		21.4%	5.6%	10%
	>8	11	34	45
		78.6%	94.4%	90%
	Total	14	36	50
		100%	100%	100%
NICU Admission	Dead	1	0	1
		7.1%	0%	2%
	No	6	29	35
		42.9%	80.6%	70%
	Yes	7	7	14
		50%	19.4%	28%
	Total	14	36	50
		100%	100%	100%
Deaths	0	14	35	49
		100%	97.2%	98%
	1	0	1	1
		0%	2.8%	2%
Total		14	36	50

		100%	100%	100%

***P* value for mode of delivery is 0.03* APGAR score 0.126, NICU admission is 0.019* and deaths is 1.00.**

Concised table (table no. 7) of perinatal outcome in Oligohydramnios with IUGR showing 26% of babies with APGAR <7. Perinatal mortality was 14%. NICU were seen in 48%.

Table 7: Oligohydramnios with IUGR

		NST		Total
		Non-Reactive	Reactive	
Mode of Delivery	Cesarean Delivery	18	12	30
		62.1%	57.1%	60%
	NVD	11	9	20
		37.9%	42.9%	40%
Total		29	21	50
		100%	100%	100%
Apgar Score	<7	10	3	13
		34.5%	14.3%	26%
	>8	19	18	37
		65.5%	85.7%	74%
Total		29	21	50
		100%	100%	100%
	Dead	7	0	7
		24.1%	0%	14%
NICU Admission	NO	10	9	19
		34.5%	42.9%	38%
	Yes	12	12	24
		41.4%	57.1%	48%
Total		29	21	50
		100%	100%	100%
Deaths	0	29	21	50
		100%	100%	100%
	1	0	0	0
		0	0	0
Total		29	21	50
		100%	100%	100%

***P* value for mode of delivery is 0.776, APGAR score is 0.191, NICU 0.052*.**

Table-8: Distribution of Cases with Parity

Parity	Group				Total Frequency	Total Percent
	Isolated Oligohydramnios		Oligohydramnios with IUGR			
	Frequency	Percent	Frequency	Percent		
0	25	50.0	33	66.0	58	58.0
1	22	44.0	14	28.0	36	36.0
2	1	2.0	3	6.0	4	4.0
3	1	2.0	0	0.0	1	1.0
4	1	2.0	0	0.0	1	1.0
Total	50	100	50	100	100	100

Chi-Square: 5.881, Df: 4, P Value: 0.208, Statistically Not Significant.

In Isolated Oligohydramnios 50% are primi and 50% are multi. In Oligohydramnios with IUGR 66% are primi and 34% are multi. The difference was found to be non-significant.

Table-09: Mode of Delivery

Mode of Delivery	Group				Total Frequency	Total Percent
	Isolated Oligohydramni OS		Oligohydramnios with IUGR			
	Frequency	Percent	Frequency	Percent		
Caesarean Delivery	30	60.0	30	60.0	60	60.0
Normal Vaginal Delivery	20	40.0	20	40.0	40	40.0
Total	50	100	50	100	100	100

Chi-Square: 0.001, Df: 1, P Value: 0.581, Statistically Not Significant
In both groups number of cesarean and vaginal deliveries were found to be equal.

Table-10: Colour of Liquor

Liquor Colour	Group				Total Frequency	Total Percent
	Isolated Oligohydramnios		Oligohydramnios with IUGR			
	Frequency	Percent	Frequency	Percent		
Brown	0	0.0	2	4.0	2	2.0
Clear	41	82.0	34	68.0	75	75.0
Meconium	9	18.0	14	28.0	23	23.0
Total	50	100	50	100	100	100

Chi-Square: 3.740, Df: 2, P Value: 0.154, Statistically Not Significant

In Isolated Oligohydramnios 18% had meconium-stained liquor while in Oligohydramnios with IUGR group 28% had meconium-stained liquor.

DISCUSSION

Oligohydramnios, AFI <8 cm with IUGR is associated with increased perinatal morbidity and mortality when compared to isolated oligohydramnios. In multiple studies oligohydramnios has been correlated with increased risk of abnormal fetal heart rate [8, 9, 10, 11]. Pulmonary hypoplasia [12, 13]. Increased risk of cesarean delivery [8], IUGR [10, 14], postdated pregnancy, meconium passage, lower APGAR score [7], NICU and neonatal deaths [11]. Meconium-stained liquor, low birth weight, low APGAR, NICU admissions, perinatal mortality are more frequent in IUGR group when compared to isolated oligohydramnios. Casey and coworkers [15] studied pregnancy outcomes in oligohydramnios at or beyond 34 weeks of gestation in 147 cases and found that oligohydramnios was associated with increase in labour induction (42% vs 18%), non-reassuring heart rate (48% vs 39%), NICU admission (7% vs 2%),meconium stained amniotic fluid (1% vs 0.1%), neonatal death rate (5% vs 0.3%).In this present study perinatal outcome in 50 cases AFI <8cm and 50 cases of AFI <8 with IUGR are studied. In both groups 20 patients had vaginal delivery and 30 patients had LSCS. There was no significant difference between them though induction was done in cases going in postdates and abnormal Doppler studies in IUGR. Induction was done with dinoprostone0.5 mg gel or misoprostol 25 micro grams depending on the bishops score of cervixes. In the group of isolated oligohydramnios, only 38% of cases were induced, indication was mostly postdating, but in IUGR group 46% were induced due to abnormal Doppler i.e. decreased diastolic flow in the umbilical artery, absent flow or reversed flow or increased flow in the middle cerebral artery. All the women admitted at term or in labour subjected to non-stress test to look for fetal heart acceleration and to rule out fetal distress. Patients are subjected to induction of labour or cesarean section based on the indication. Newborns are attended by pediatrician at time of birth, dry stimulation was enough in the babies in IUGR group needed resuscitation and NICU admission. Magnan EF and colleagues [16] done a prospective longitudinal study on peripartum outcome of high risk pregnancies complicated by oligohydramnios and concluded that the fetuses of pregnancies complicated by oligohydramnios had a greater risk of labour induction, IUGR and preterm delivery. Oligohydramnios definition varies with different techniques of measuring AFV and different investigation. In present study AFI is taken as <8 to select antenatal women to categorize as Oligohydramnios. Jeng *et al*. [17] proposed a cut off

value of 8cm demonstrating increased incidence of meconium staining, cesarean delivery for fetal distress, abnormal fetal heart rate pattern and APGAR score of 7 or less at one minute when AFI<8.

Oral and Intravenous hydration therapy

Hydration with water reduces maternal plasma osmolality and increased uteroplacental perfusion and then increases amniotic fluid volume. Treatment of maternal dehydration with oral or intravenous rehydration has been shown to increase amniotic fluid volume by 30%.[18] Long term oral hydration was formed to be more effective when compared to intra venous. L-Arginine sachets are another strategy as it is a potent vasodilation and increase uteroplacental blood flow and increase AFV. Sildenafil citrate is emerging drug for treatment of fetal growth restriction. It relaxes muscles in the wall of blood vessels and increases blood flow. It is used in low dose 25mg thrice daily. It improves perinatal outcome in pregnancies complicated with IUGR and severe oligohydramnios. IUGR is a condition where the fetus fail to achieve its genetic potential and consequently is at risk of increased perinatal morbidity and mortality among the number of causes of IUGR, Uteroplacental insufficiency is one of the most common cause being same reason leading to oligohydramnios, there is a common association of oligohydramnios and IUGR. In a study by Dalal N *et al*. [19] 61% cases of IUGR, which shows significant correlation between oligohydramnios and IUGR.

CONCLUSION

This study concludes that isolated decreased AFI after 37 weeks of gestation was having better prognosis when compared to oligohydramnios with IUGR. Determination of AFI can be used as an adjuvant to other fetal surveillance and proper antepartum and intrapartum care. In presence of oligohydramnios with IUGR non-reactive non stress test, meconium-stained amniotic fluid, fetal distress induction of labour rate, caesarean section rate and perinatal mortality rate are more. Due to intrapartum complications and high rate of perinatal morbidity and mortality, rates of caesarean section are rising. Decision making between vaginal delivery and caesarean section should be balanced so that unnecessary maternal morbidity is prevented. Sometimes intervention can be done to decrease perinatal morbidity and mortality.

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