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LOW AMNIOTIC FLUID INDEX AT TERM AS A PREDICTOR OF ADVERSE PERINATAL OUTCOME

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INTRODUCTION: Phelan defined oligohydramnios as AFI less than or equal to 5 cm and borderline oligohydramnios as AFI between 5 and 8 cm between 36-42 weeks. [1] Oligohydramnios occurs in about 1% to 5% of pregnancies at term. [2] In pregnancies more than 40 weeks the incidence may be more than 12% as the amniotic fluid volume declines progressively after 41 weeks of gestation. [3] Women with oligohydramnios are more likely to have abnormal or nonreactive FHR tracings, increased incidence of foetal distress and thus, an increased incidence of caesarian sections. [4] Oligohydramnios is also the leading indication for labor induction. Labor induction increases caesarean delivery, particularly for primiparous women with an unripe cervix. [5] Oligohydramnios is associated with a high rate of pregnancy complications and increased perinatal morbidity and mortality. Thus, AFI assessed antepartum or intrapartum would help to identify women who need increased antepartum surveillance for pregnancy complications. [6] However, some studies show that amniotic fluid index is a poor predictor of adverse perinatal outcome and isolated oligohydramnios should not be the only parameter for predicting perinatal outcome. [7] Keeping in mind the above knowledge the present study was carried out to find whether oligohydramnios can be used as a predictor of adverse perinatal outcome in non – complicated pregnancies at term.

MATERIALS AND METHODS: This was a prospective study conducted in 180 eligible women recruited from OPD and Labour ward. The inclusion criteria for the study were pregnant women at 37-42 wk of gestation with no known obstetric or medical complications. The exclusion criteria were women with obstetric or medical complications and those who were unwilling to be a part of the study. The women were divided into control and study groups based on AFI. AFI was measured with the four quadrant technique and those women with AFI < 5th percentile i.e. AFI of < 5cm at term as described by Phelan as oligohydramnios at term or an amniotic fluid volume of less than 500 mL at >37 weeks of gestation were included in the study group.

Follow up of patients identified with oligohydramnios was done till they presented in our labour room in active labour (cervical dilation > 3 cm and with good uterine contractions at the rate of 3-4/min lasting for at least 45 seconds) or were admitted in labour room through OPD for other indications.

On Admission NST was done for all included patients. Those with non-reactive NST and not in active labour also had BPP done. Documentation of obstetric interventions in the form of Induction or Augmentation of labour with Prostaglandins or Pitocin and mode of delivery was done. Documentation of neonatal outcomes in the form of Birth weight, APGAR score was done. Admission to neonatal unit for perinatal morbidities like APGAR < 7, Seizures, Hypoglycemia, Hypothermia, Hyperbilirubinemia, Hypocalcaemia, Meconium Aspiration, Respiratory Depression and Perinatal Mortality was documented.

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The results were recorded and tabulated. They were statistically analyzed using chi square test. In addition, epidemiological parameters like sensitivity, specificity, positive predictive value, negative predictive value were used at required observations.

RESULTS: Out of the 180 women included in the study, 54% in the control group and 60% in the study group were primipara. So, both the groups were comparable. While only 19% women in the control group were at gestational age > 40 weeks, the study group included 41% women. The mean AFI for study group was 4.14 cm and for control group was 10.14 cm. The Non-Stress Test was non-reactive in 65% of the patients having AFI < 5 while only 24% of patients having AFI > 5 had a non-reactive NST [$\chi^2 = 27.497$ $p < 0.0001$] (Table 1). Only 33% of patients in the control group delivered by LSCS while 66% of patients in the study group delivered by LSCS [$\chi^2 = 21.36$, $p = < 0.001$] (Table 2). 86% of patients in the study group were induced while only 53% patients in the control group were induced. [$\chi^2 = 19.53$, $p = < 0.001$] amongst the inductions in the control group 7(18%) underwent a LSCS while in the study group 38(61%) underwent a LSCS. [$\chi^2 = 17.539$, $p = < 0.001$] in the control group 7(24%) of LSCS were for foetal distress while in the study group 32(53%) of LSCS were for foetal distress (Table 3). The determination of AFI < 5 cm as a screening test in predicting foetal distress during labor requiring LSCS, has a sensitivity of 82 %, specificity of 63.3%, positive predictive value of 51% and negative predictive value of 90%. A better sensitivity (82%) and negative predictive value (90%) makes it a good screening test. The 5 min APGAR < 7 was seen in 34% in study group and 10% in control group [$\chi^2 = 12.857$, $p = 0.0003$] (Table 4). 33% patients in the control group and 47% patients in the study group had babies weighing between 2-2.4 kg while 17% of women in the study had babies weighing less than 2 kg and none in the control group had low birth weight babies. [$\chi^2 = 16.218$, $p = < 0.001$]. 14% of babies in the study group had respiratory distress as compared to 6% in the control group.

94% of the neonates in the group of AFI 2-3 admitted in NICU while 26% of those with AFI 3.1-4 were admitted while in the control group 14% in the group of AFI 5.1-8 and 6% in the group of 8.1-14 required NICU admission (Table 5). The above results show that maximum perinatal morbidity in the form of foetal distress and low APGAR scores was seen in the study group with an AFI of 2-3.

DISCUSSION: In our study, 41% of patients in the study group who presented with isolated oligohydramnios were admitted at >40 weeks. In the study by Gumus et al (2007) [8], gestational age at delivery was 37.7 weeks for study group and 38.3 weeks for control group ($p = 0.004$). This result while being statistically significant correlates with our study. 65% patients in the study group and 24% in the control group had a non reactive Non-Stress Test. ($\chi^2 = 27.497$ $p < 0.0001$). The above result is statistically significant. In the study by Kumar P et al. (1991) [9], 40% of patients had non reactive NSTs, while in the study by Chandra P. et al. (2000) [10] it was 69.23% and in the study by Sriya R. et al (2001) [11], it was 41.55%. These studies show that more than half of the patients with AFI < 5 have non-reactive NSTs. While comparing the incidence of delivery by LSCS in study and control groups (66% vs. 33%), in the study by Charu Jandial et al (2007) [6], 56% patients underwent LSCS while 44% patients delivered vaginally in the study group although Gumus et al [8] for the same had a $p = 0.096$ (non-significant). While inductions were significantly higher in the study group ($p < 0.001$) Rainford et al (2001, ($p < 0.01$) [12], Charu Jandial et al [6] and Gumus et al [8] had a

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similar finding. These studies shows that oligohydramnios is an independent indication for induction of labour in most institutes. Comparing the incidence of LSCS for the inductions in control and the study groups($p < 0.001$), the study by Charu Jandial et al[6] correlates with our study while the study by Achalabi et al [13] based on induction of labour in oligohydramnios and its perinatal outcome had similar outcomes.

The 5 minute APGAR score 7 was seen in 34% in study group and 10% in control group.[$\chi^2 = 12.857, p = 0.0003$] In the study by Charu Jandial et al(2007)[6], 25% of patients with AFI 2-3 , 11.11% of patients with AFI >3-4 and 9.09% of patients with AFI >4-5 had Apgar scores <7 at 5 min which is similar to our study while in the studies by Achalabi et al[13] and Conway et al[14] the results though comparable were non-significant.

In terms of neonatal morbidity in the form of low birth weight <2 kg(17%) and NICU admissions for various indications in our study(30% vs 9%) the studies by Voxman et al[4], Achalabi et al[13], Gumus et al[8], Charu Jandial et al[6] the findings correlated with our findings.

CONCLUSION: An amniotic fluid index of ≤ 5 cm detected after 37 completed weeks of gestation is an indicator of poor perinatal outcome. In presence of oligohydramnios, the occurrence of non reactive NST, abnormal FHR tracings during labour, thick meconium stained, liquor, development of foetal distress, the rate of LSCS, low 5 minute APGAR score, low birth weight and perinatal mortality are high. Determination of AFI can be used as an adjunct to other foetal surveillance methods. It helps to identify those infants at risk of poor perinatal outcome.

Determination of AFI is a valuable screening test for predicting foetal distress in labor requiring caesarean section. It has a sensitivity of 71% and negative predictive value of 82% specificity of 58% and positive predictive value of 43%.

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NST	Control group		Study group	
	Number	%	Number	%
Reactive	67	76	32	35
Non-reactive	23	24	58	65
Total	90	100	90	100

Table 1: Distribution of NST pattern

*Using chi-square test

$$\chi^2 = 27.497$$

$$p < 0.0001$$

Result: Significant

Total No. of Deliveries(n=180)				
	Control group(n=90)		Study group(n=90)	
Type of delivery	Number	%	Number	%
Vaginal	60	66	30	34
LSCS	29	33	60	66
Forceps	1	1	--	--

Table 2 : Mode of delivery

*Using chi-square test

$$\chi^2 = 21.36$$

$$p = < 0.001$$

Result: Significant

Total No. of Deliveries(n=89)				
	Control Group(n=29)		Study Group(n=60)	
Indication	Number	%	Number	%
Fetal distress	7	24	32	53
IUGR with oligohydramnios	4	11	18	30
PROM with non progress of labour	4	14	3	5

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Incoordinate uterine action	2	7	--	--
CPD	3	10	--	--
Failure of Induction	4	14	3	5
Elective LSCS	5	20	4	7

Table 3: Distribution of indications for LSCS

*Using chi-square test

$$\chi^2 = 6.769$$

$$p = < 0.05$$

Result: Significant

APGAR < 7	Study Group(n=90)		Control Group(n=90)	
	Number	%	Number	%
1 min.	45	50	22	24
5 min.	30	34	9	10

Table 4: Distribution of APGAR < 7

*Using the chi-square test

$$\chi^2 = 12.857$$

$$p = 0.0003$$

Result: Significant

No. of deliveries (n=180)				
	Control group (n=90)		Study group (n= 90)	
Neonatal Complications	Number	%	Number	%
Shifted with mother	80	89	58	64
Low Birth weight	--	--	15	16
Respiratory distress	5	6	13	14
Meconium Aspiration	4	1	17	18
NICU admission	9	10	30	33
Stillbirths	1	1	2	3
Neonatal deaths	--	--	1	1

Table 5: Neonatal Complications

*For NICU admissions, applying the chi-square test

$$\chi^2 = 13.475$$

$$p = 0.0002$$

Result: Significant

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