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Original Research Article

Perinatal outcome in pregnancy complicated with oligohydramnios at term

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ABSTRACT

Background: Oligohydramnios is defined as AFI of less or equal to five cm. Various methods like NST, acoustic stimulation, and fetal Doppler velocimetry are helpful in assessment of fetal wellbeing and identifying those pregnancies at risk of adverse perinatal outcome. This study was undertaken to know the adverse perinatal outcome in pregnant women with oligohydramnios at term and to evaluate the value of AFI in predicting the subsequent fetal distress and caesarean delivery.
Methods: Analysis of pregnancy outcome in 50 cases with diagnosis of oligohydramnios by USG after 37 completed weeks of gestation compared with 50 controls with no oligohydramnios and matched for other variables. There were some inclusion and exclusion criteria used. The results were statistically analysed using parameters like mean, standard deviation and chi square test sensitivity, specificity, PPV, NPV were used.
Results: There was significant difference between two groups in occurrence of non-reactive and re-active NST pattern. There is increased incidence of labour induction in women with AFI ≤5cm as compared with women with AFI >5cm. Increased occurrence of LBW (≤2.5kg) in women with oligohydraminos and increased LSCS rates in pregnancy complicated by oligohydramnios were observed.
Conclusions: An AFI of ≤ 5cm detected after 37 weeks of gestation is an indicator of adverse perinatal outcome. AFI can be used as an adjunct to other fetal surveillance methods. AFI is a valuable screening test for predicting fetal distress in labour requiring caesarean section.

Keywords: Amniotic fluid index, Amniotic fluid volume, Fetal acoustic stimulation test, FHR, NST, Oligohydramnios, VAST

INTRODUCTION

Amniotic fluid which surrounds developing fetus in amniotic sac provides several benefits to the fetus. Despite decades of investigations, the regulation of amniotic fluid volume and composition remains incompletely understood. This results in part from the complexities inherent in the amniotic fluid dynamics, an enigmatic interaction of several sites of amniotic fluid secretion and excretion.[1,2] The purpose of taking group of women with oligohydramnios at term pregnancies are because the etiology, management and the outcome is different in late onset oligohydramnios compared to early on-set oligohydramnios.[3-5] Appreciation of importance of

amniotic fluid volume as an indicator of fetal status and oligohydramnios as an indicator of chronic fetal hypoxia is a relatively recent development. Progressive improvements in ultrasonographic techniques have made it possible to assess the amniotic fluid volume relatively accurately.[6,7] Although subjective and semiquantitative methods of estimating amniotic fluid volume ultrasonographically are in use, the best technique remains controversial. However, the technique of four quadrant method of calculating amniotic fluid index (AFI) described by Phelan et al in 1987 is accepted by most of the author.[7,8]

Numerous factors have been evaluated with respected to the effect on amniotic fluid index including interobserver and intra-observer variation, transducer pressure, maternal hydration, fetal movements, transducer type, fetal presentation and number of gestation. Various methods have been described for antepartum and intrapartum fetal surveillance like NST, CST, FAST, BPP, VAST, doppler velocimetry, FHR tracing, fetal stimulation test and fetal scalp blood pH estimation.[9,10] All methods have their own merits and demerits. Amniotic fluid index of ≤5 cm defines oligohydramnios as, originally described by Phelan et al.

Many studies show that oligohydramnios is associated with variety of ominous pregnancy outcomes, such as fetal distress, low birth weight, perinatal morbidity, perinatal mortality and increased incidence of cesarean section.[10,11] However, some studies show that amniotic fluid index is a poor predic-tor of adverse outcome and even the existence of an entity like isolated term oligohydramnios has been questioned by some authors.[12] Thus this study is con-ducted to find out the value of oligohydramnios in determining perinatal outcome and cesarean section rates in pregnancies beyond 37 completed weeks.

The objectives are to analyse and study the perinatal outcome in oligohydramnios (AFI ≤5) at term and to analyse the value of AFI in predicting the subsequent fetal distress and caesarean delivery.

METHODS

This study consisted of an analysis of pregnancy outcome in 50 cases with diagnosis of oligohydramnios by ultrasound after 37 completed weeks of gestation compared with 50 controls with no oligohydramnios and matched for other variables like age, parity, gestational age and any pregnancy complication. For all the selected cases, thorough history was taken, and complete examination was done.

Clinical evidence of oligohydramnios was looked for. The previous obstetric records and ultrasound reports were re-viewed. For all the women, ultrasound examination was done and amniotic fluid index was calculated by four quadrant amniotic fluid volume measurement technique. For all women baseline investigations like Hb%, blood group and Rh typing, urine examination were done. NST was done for all and BPP for few patients.

Inclusion criteria

This included thirty-seven completed weeks of gestation, amniotic fluid index of < 5 cm, intact membranes and singleton pregnancy with cephalic presentation.

Exclusion criteria

This included gestational age less than 37 completed weeks, associated fetal malformations, ruptured membranes, malpresentation and multiple gestation.

The management protocol was similar in both study group and control group. Those women who had high risk factors like preeclampsia, post-term pregnancy and non-reactive NST, were induced using dinoprostone gel (PGE2) or oxytocin. Women with no other risk fac-tors were allowed for spontaneous onset of labour and daily NST and weekly BPP was done. All were monitored by continuous electronic fetal monitoring in labour. The nature of amniotic fluid noted at artificial rupture of membrane which was done in all women and was classified as clear, thin meconium stained liquor and thick meconium stained liquor. Those who developed significant variable decelerations and repetitive late decelerations or other ominous FHR pattern with or without meconium stained liquor which persisted inspite of corrective measures like change in maternal position, hydration, 02 inhalation and stopping oxytocin were delivered by LSCS or forceps delivery. All new borns were attended by neonatologists and endotracheal intubation was done in presence of thick meconium stained amniotic fluid.

RESULTS

This was a prospective case control study of 50 pregnant women of more than 37 weeks of gestation with AFI < 5 cm compared with women having AFI between 5 and 20 cm. Other variables like age, parity, gestational age were matched in both the groups.

The mean age for study group and control group were 24.1 years and 23.1 years respectively. Most of them were primigravidas and the mean gravidity was 1.8 in study group and 1.7 in control group. Only those with good rates were taken for study and all had completed thirty-seven weeks of gestation and mean gestational age was 39.4 weeks for study and 39.5 for control group. More than half had some antenatal complications, commonly preeclampsia and post-term pregnancy. The amniotic fluid index was measured by four quadrant semiquantitative technique in ultrasound and those with AFI <5 cm were considered as oligohydramnios and those with AFI between 5 cm and 20 cm were considered

normal. The mean AFI in oligohydramnios group was 3.55 cm and mean AFI for control group was 9.75 cm. The occurrence of non-reactive NST was more common in oligohydramnios group compared to control group (P<0.05). The FHR decelerations in CTG were recorded more often in oligohydramnios group and variable decelerations were the commonest type. The study showing p=0.66 which is non-significant statistically. The occurrence of thick me-conium stained amniotic fluid was more than twice in oligohydramnios group compared to control group. The induction of labor was also more common in oligohydramnios group compared to control group. The difference was statistically significant (P<0.002, χ^2=9.46). Fifty percent of women with AFI <5 cm developed fetal distress. Forty-four patients of them were delivered by cesarean section and 5% by forceps. The difference in occurrence of fetal distress and cesarean section for fetal distress in study group and control group was statistically non-significant (P=0.98, χ^2=0.03).

Table 1: Summary of perinatal outcome.

Outcome parameters	Study group (n=50)		Control group (n=50)	
	No.	%	No.	%
Non-reactive NST	19	38	10	20
FHR decelerations	30	60	15	30
Thick meconium stained liquor	24	48	8	20
Induction of labor	27	54	12	24
LSCS for fetal distress	22	44	9	18
Forceps delivery for fetal distress	3	6	1	2
Apgar score <7				
1 min	16	32	9	18
5 min	8	16	3	6
Birth weight ≤2.5 kg	32	64	14	28
Admission to neonatal ward	20	40	6	12
Neonatal death	4	8	1	2

The determination of AFI can be used as screening test to predict fetal distress requiring LSCS. The efficacy was sensitivity of 71%, specificity of 58% positive predictive value of 43% and negative predictive value of 82%. Occurrence of cesarean section was high if oligohydramnios was associated with non-reactive NST. The mean Apgar score were less in oligohydramnios group. The low 5-minute Apgar score was maximum in oligohydramnios group compared to normal volume group but statistically non-significant (P=0.90, χ^2=0.02). The mean birth weight was 2.31 kg and 2.64 kg for oligohydramnios group and those with normal AFI respectively. The birth weight < 2.5 kg was seen in 64% of women with AFI <5 cm and in 28% of women with AFI >5 cm. Forty percent of babies born to women with AFI <5 cm were admitted to neonatal ward for various neonatal complications. Only 12% of control group were admit-ted to neonatal ward. The difference in two group was statistically significant (P <0.01). Bilateral CTEV was present in one infant of study group. There were 4 early neonatal deaths in oligohydramnios group and one early neonatal death in control group. In control group also, occurrence of various adverse perinatal outcome parameters were high, though it is significantly less than that in the study group. This is because even the study group included high risk population with preeclampsia and post-term pregnancies. These results are consistent with most of the similar studies.

DISCUSSION

The various outcome results are comparable to results of similar studies done both in India and abroad.[1-4] Amniotic fluid volume is known to be reduced with advancing gestational age after 40 weeks.[3,4]

Post-term pregnancy was seen in 10% of women with AFI <5 cm in present study compared to 15.38% and 25% women in study by Chandra P and Sriya R respectively.[5-7] Hypertensive disorders which cause chronic placental insufficiency lead to oligohydramnios. In the oligohydramnios group 32.5% had mild or severe preeclampsia compared to 38.46% and 31% of oligohydramnios group in study by Chandra P et al and Sriya R et al.[6,7] Any cause of chronic placental insufficiency including chronic abruptio and diabetes mellitus can cause fetal growth restriction and oligohydramnios in term pregnancies. The non-reactive non-stress test rates are high in women with AFI <5 cm. The rate of non-reactive NST is 38% in present study and is comparable to that in similar study. The FHR decelerations, during intrapartum period suggestive of fetal distress are common in pregnant women with AFI <5 cm. Most common are variable decelerations due to cord compression.

The ominous FHR pattern noted in 40% in present study is comparable to 48% and 36.11% in studies by Casey et al and Sriya R et al respectively.[6,7] The occurrence of meconium stained amniotic fluid is high in women with AFI <5 cm. The thick meconium stained liquor was noted in 48% in study group in present study which is similar to other studies. These are not consistent with study by Baron et al and this could be due to less number of women who had crossed 40 weeks.[8,9] In a study by Grubb et al 99% of women with AFI <5 cm and prolonged deceleration, had meconium stained liquor.[8,9] Various studies show different rates of LSCS for fetal distress in pregnant women with amniotic fluid index of <5 cm. The LSCS for fetal distress was done in44% in present study which is compared with the situations in other studies.

Oligohydramnios (AFI <5 cm) has been used as a screening test for the development of fetal distress, subsequently during intra-partum period. The sensitivity, specificity, positive predictive value and negative

predictive value noted in different studies are almost same. The efficacy of oligohydramnios (AFI <5 cm) in predicting fetal distress and requirement of LSCS had a sensitivity of 71% and negative predictive value of 82.0%. But the specificity and positive predictive value were poor. So, this can be considered as a screening test for occurrence of fetal distress in intrapartum period requiring cesarean delivery. The rate of LSCS was more in those with oligohydramnios and non-reactive NST (52.6%). Even with reactive NST 40% develop fetal distress and LSCS was done and it is comparable to Kumar et al study.[9-11]

In control group women with non- reactive NST had 40% cesarean rate and with reactive NST had only 12.5% of caesarean rate. The mean 1 min and 5 min Apgar score was 6.9 and 8.02 in study group and 7.8 and 9.2 in control group respectively. The 5 min Apgar score <7 is seen in 16% of oligohydramnios group and are comparable with other studies.[6-11] The mean birth weight is less in oligohydramnios group. The occurrence of low birth weight is 64% which is comparable with other Indian studies (Chandra P et al 61.53 and Sriya R et al. 58.38%).[10-12] The high incidence of low birth weight may be because of chronic placental insufficiency causing fetal growth restriction.

Forty percent of newborns were admitted in neonatal ward for various morbidities like neonatal seizures, birth asphyxia, meconium aspiration etc. This is not consistent with studies by Morris et al and Casey et al.[11,12] However, both authors refer to admission to neonatal intensive care units.

Study by Sriya R et al showed even higher incidence of (88.88%) admission to neonatal ward. Bilateral congenital talipes equino varus was present in 1 neonate. Though oligohydramnios can cause CTEV due to compression, to know the significance of association it needs large number of cases. Among cases, there were 4 neonatal deaths while among controls there was only one neonatal death.

In Chandra P et al. study neonatal death occurred in one case. In study by Baron et al and Casey et al there was no mortality probably because of good neonatal intensive care unit facilities. All the 4 deaths in present study group were early neonatal deaths and were unbooked cases. Three of them were deeply asphyxiated at birth and could not be revived. One had meconium aspiration syndrome. In control group also, one neonate died of meconium aspiration.

In the control group (AFI 5-20 cm) 20% had non-reactive NST. 30% had ominous FHR pattern, 20% had thick meconium stained liquor and 20% cesarean section rates. This could be because even in the control group 46% had antenatal com-plications of either preeclampsia or post-term pregnancies which belong to high risk group.[12]

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 labor, thick meconium stained, liquor, development of fetal distress, the rate of LSCS, low 5-minute Apgar score, low birth weight and perinatal mortality are high (In present study the rate of LSCS, low 5 min Apgar score and perinatal mortality number is high but statistically the difference in study and control groups are non-significant).

Determination of AFI can be used as an adjunct to other fetal surveillance methods. It helps to identify infants at risk of poor perinatal outcome. Determination of AFI is a valuable screening test for predicting fetal distress in labor requiring cesarean section. It has a sensitivity of 71% and negative predictive value of 82% specificity of 58% and positive predictive value of43%.

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