Perinatal outcome at or beyond 28 weeks of gestation in severe oligohydramanios (AFI ≤ 5) – Comparative non randomized study.

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ABSTRACT

Objectives: To study the perinatal outcome of ultrasonographically detected normal and AFI ≤ 5 at or beyond 28 weeks of gestation.

Method: During this study 200 patients with singleton pregnancy were selected at or beyond 28 weeks of pregnancy and AFI was evaluated in group 1 with AFI ≤ 5 and group 2 with normal AFI (8-24).Perinatal outcome was compared in both.

Result: Incidence of induction of labour, meconium stained liquor & C-section, were more in study group. Apgar score was ≤ 7 at one minute resulting in more NICU admissions. Low birth weight was more in study group either due to preterm or IUGR. Perinatal deaths were more in study group.

Conclusion: AFI ≤ 5 at or beyond 28 weeks of gestational age is an indicator of poor perinatal outcome. AFI measurement in antepartum period can help to identify women who need increased antepartum surveillance for pregnancy complications.

Introduction

Amniotic fluid plays a major role in the development of fetus. It provides a medium in which fetus can readily move, cushions the fetus against injuries, helps to maintain even temperature. It also plays a role in dilatation of cervix during labour. Adequate amniotic fluid helps in permitting extension of limbs and prevents joint contractures. It prevents the compression of the umbilical cord, placenta and protects the fetus from vascular and nutritional compromises.

Amniotic fluid volume reflects both maternal and fetal status. The maintenance of the amniotic fluid volume within normal limits is important for fetal well-being. Oligohydramnios can be associated with fetal congenital anomalies and Intrauterine Growth Retardation (IUGR). It is usually directly proportional to the degree of IUGR and it indicates placental dysfunction. Oligohydramnios can also cause asymmetrical fetal growth, contracture of the joints and hypoplasia of fetal lungs by decreasing the lung expansion due to compression of the fetal abdomen which limits the movements of the fetal diaphragm and decreases the flow of the amniotic fluid into and out of the fetal lungs. Amniotic fluid is approximately 7ml by at 8 weeks, 190ml by 16 weeks and mean of 780ml by 32-35 weeks then decreasing to about 400-450ml by 42weeks. Phelan et al[1] in 1987 described quantification of amniotic fluid using the amniotic fluid index (AFI). The four-quadrant technique termed AFI is in which a vertical pocket of amniotic fluid, free of umbilical cord, in each of four equal uterine quadrant was summated. It assesses the total amount of fluid within the cavity and not just a single pocket. The curve of AFI against gestational age is remarkably similar to that generated from dye-dilution technique or direct measurement studies. The technique has been standardized to reduce the inter observer variation between examiners and institutions. It provides a measurement of amniotic fluid that can be followed on subsequent examinations. It is more sensitive than a single vertical pocket measurement in detection of oligohydramnios.

Amniotic fluid indices as described by phelan et al[1] are:

AFV	AFI(cm)
Oligohydramnios	<5
Borderline	5.1-8
Normal	8.1-24.0
Polyhydramnios	>24

An amniotic fluid volume more than standard deviation below the mean for specific gestational age or volume reduced below the 5th percentile for particular gestational age would define Oligohydramnios. Based on this definition, volume <300ml at term would constitute Oligohydramnios. According to Phelan et al[1] Oligohydraminos is defined by AFI <5cm. Chromosomal abnormalities, congenital anomalies, ruptured membranes, fetal demise, following amniocentesis or chorionic villous sampling, twin to twin transfusion, women on prostaglandin synthetase inhibitors and on Angiotensinogen converting enzyme inhibitors. are causes of early onset oligohydramnios Reduction in amniotic fluid early in the gestational age can interfere with symmetrical fetal development leading to structural malformations. These include cranial, facial and skeletal deformities and pulmonary hypoplasia. Deformities associated with oligohydramniuos include dolicocephaly, Potter's facies, arthrogryposis, talipes equino varus, pulmonary hypoplasia.

Placental insufficiency caused by, hypertension, preeclampsia, hypovolemia leading to late onset oligohydramnios. . Late onset oligohydramnios is a risk factor for poor perinatal outcome. There is increased incidence of IUGR, meconium stained liquor, abnormal FHR tracing, low Apgar score, low birth, weight(2-3), admission to NICU, birth asphyxia caesarean section for fetal distress. However, most of the problems occur during intrapartum period and hence careful intra partum fetal monitoring is necessary.

Material & Methods

The study was conducted in department of obstetrics and gynaecology, P.B.M. Hospital, Sardar Patel Medical College,Bikaner. During this study 200 patients with singleton pregnancy were selected at or beyond 28 weeks of pregnancy and AFI was evaluated in those patients with technique of phelan et al[1] . On the basis of AFI measurement patients were divided in two groups. Group 1those who had AFI ≤5cm and group 2 with normal AFI (8-24cms). Perinatal outcome in pregnancies with AFI of <5cm. were compared with those with normal AFI. Finally AFI was evaluated as predictor of neonatal outcome by calculated % positive and negative predictive value of AFI for the selected outcomes.

Pregnant women with gestation age of 28 weeks or beyond attending ANC clinic, labour room, booked and unbooked patients

were included in the study. It is a Comparative non randomized study. Sample size in Group 1 Oligohydramnios – 100, Group 2 Normal AFI – 100. All pregnant women with gestation age of 28 weeks or more, willing to participate in the study were include with written and informed consent. Pregnant women with gestational age of less than 28 weeks, polyhydramnios, multiple pregnancy, placenta previa, fetal congenital anomalies, patient with ruptured membranes, abnormal presentation and position, were excluded from study. In supine position. A linear, curvilinear or sector transducer was used. Uterus was divided into 4 quadrants using the maternal sagittal midline vertically and an arbitrary transverse line approximatelay halfway between symphysis pubis and upper edge of uterine fundus. Transducer was kept parallel to the maternal sagittal plane and perpendicular to the maternal coronal plane throughout. The deepest unobstructed (free of umbilical cord or fetal parts) and clear pocket of amniotic fluid is visualized and the image frozen. Ultrasound calipers were manipulated to measure the pocket in a strictly vertical direction. The process was repeated in each four quadrants and pocket measurement summed, which gave AFI. If AFI less than 8, perform the four quadrant evaluation 3 times and average the values. The end points used to judge perinatal outcome are, fetal distress predicted by abnormal FHR, meconium stained liquor. One minute and 5 minute Apgar score judged by paediatrician apgar score less than 7 will be considered as abnormal. Frequency of admission to NICU. IUGR- baby weight of less than 10th percentile for gestation age, The result were recorded, tabulated and statistically analyzed using parameters like mean, standard devitation and chi square test. Chi square (x^2) test was carried out at 5 % (α = 0.05) level of significance to test the homogeneity of the group with respect to the distribution of patients over different classes of a characteristic of interest (Table 1, 2).

Results

The mean age for study and control group were 22.87 years and 23.58 years respectively. Most of patient were primigravida in both the groups. Mean gravidity was 1.81 for study group and 1.74 for control group. Mean gestational age was 38.18 weeks in study group and 38.7 weeks in control group. Induction of labour was done in 52% of cases in study group and 27% in control group. This indicates that there are higher incidence of induction of labour in patients with oligohydramnios. Incidence of meconium stained liquor was 46% in study group and 20% in control group. Occurrence of MSL in patient with oligohydramnios was more. Incidence of LSCS was 54% and 23% in study and control group respectively. This was statistically significant (p<0.001). Indication of LSCS was fetal distress in 55.6% cases in study group. LSCS for fetal distress was significantly higher in study group (Table-3). Fetal outcome in study group was poor as compared to control group. 5% babies were still born in study group while 1 % in control group. Mean Apgar score was less in oligohydramnios group. Apgar score ≤7 was considered as abnormal. Apgar score ≤7 at 1 minute was found in 33% cases of study group as compared to 18% cases of control group. Apgar score ≤7 at 5 minute was found in 14% and 4% cases in study and control group respectively. It indicates that low Apgar score which shows fetal asphyxia, was more in oligohydramnios group. Babies with birth weight less than 2.5 kg was 42% in study group and 22% in control group. This is statistically significant (p<0.001). It implies that incidence of low birth weight babies are more in oligohydramnios cases. NICU admissions were more in study group (38%) compared to control group (12%). This is statistically significant (p<0.001). Perinatal death was more in study group (10%) as compared to control group (2%). It indicates that in patient with oligohydramnios perinatal mortality was significantly higher.

Discussion

In our study induction of labour was more in oligohydramnious group that is 52% compared to 27% in control group. This dif-ference was found to be statistically highly significant (p<0.001). Casey et al[4], in their study also found higher rate of induction in patients with oligohydraminos i.e. 42%. In the other studies like Rainford et al[5], Jandial et al[6], Gumus et al[7], also found higher incidence of induction of labour in patient with oligohydraminos. The incidence of meconium stained liquor was high in study group. In our study MSL was present in 46% of case in study group as compared to 20% cases in control group. This difference was found to be statistically highly significant (p<0.001). Similar results were found in study by Jandial et al[6] who found MSL in 48% of women with oligohydramnios. Our study is also supported by Crowley et al[8], who found statistically significant increase in MSL in patients with reduced amniotic fluid volume. In our study, 54% cases in study group delivered by LSCS while on control group 23% cases had LSCS. This difference was found to be statistically highly significant (p<0.001). In our study fetal distress was the most common reason for LSCS. 52.6% cases in study group and 21.7% cases in control group underwent LSCS for fetal distress. Our result is supported by study done by jandial et al[6] found that LSCS was done in 56% cases. Indication for LSCS was fetal distress in 42% cases in their study, similar to our study. So the rate of LSCS for fetal distress was significantly higher in study than in control group. studies conducted by Sarno et al(9), Conway et al[10] and sriya[11], the rate of LSCS for fetal distress was higher in cases when compared to controls which is similar to our observation. In our study 5% babies in study group were still born as compared to 1% in control group. In the study conducted by jandial et al[6] who found 4% still born babies in patients with AFI <5cm which is similar to our study. Apger score ≤7 at 1 minute was found in 33% cases in study group and 18% cases in control group. Apgar score ≤7 at 5min was found in 14% and 4% cases in study and control groups respectively. The difference was found to be significant (p<0.05). Our results are supported by study done by jandial et al[6], in which Apgar score <7 at 5 minute was in 12% of cases of oligohydramnios group. Similar results were also found by Rutherford et al[2] and Shmoys et al[12]. Incidence of low birth weight (birth weight <2.5kg) observed by us was 42% in study group while 22% in control group. This difference was found to be statistically highly significant (p<0.001). In study by Ghike et al[13] birth weight <2.5kg was in 51.35% in study group and 30.16% in control group which supports the results of our study. In study by Jandial et al[6,] low birth weight was found in 58% of cases which is almost similar to our study. In study done by Bachhav et al[14] NICU admission was 30% vs 9% in study and control group which is similar to our study. Other studies done by voxman et al15, Gumus et al[7], Jandial et al[6] were also found significant higher rate of NICU admission in patients with oligohydraminos. Perinatal death in our study was 10% in study group and 2% in control group. Among 10% perinatal deaths in study group, 1% was IUD, 5% were still birth and 4 % were early neonatal deaths. Perinatal death were significantly higher among study group (p<0.05). In the study by jandial et al[6] noted that perinatal death was 10% in patients with oligohydramnios and their results are similar to our study. Similar results were found in study by Casey et al[4] reported 6.4% perinatal death in their study, which was significantly high in patients with oligohdraminos.

Conclusion

AFI ≤5cm at or beyond 28 weeks of gestational age in an indicator of poor perinatal outcome. Oligohydramnios is associated with a high rate of pregnancy complications and increased morbidity and mortality. In presence of oligohydramnios, chance of induction, meconium stained liquor, development of fetal distress, LSCS, low 1 and 5 minute Apgar score, low birth weight and perinatal mortality are high. AFI measurement in antepartum or intrapartum period can help to identify women who need increased antepartum surveillance for pregnancy complication and such women should be managed in a special unit to combat the complication effectively. These patients may require

induction of labour and color doppler sonography to improve the perinatal outcome.

Table-1

Maternal demographic & obstetric characteristics.

	AFI <5 n=100	AFI >5 n=100	P values
Maternal age	22.87	23.58	0.129
Antenatal booking	60[60%]	71[71%]	0.102
Induction of labour	52{52%]	27[27%]	<0.001
Mean gestational age [weeks]	38.18+2.35	38.70+1.35	0.055

Table-2

Perinatal outcome

	AFI<5 n=100	AFI<5 n=100	P values
Perinatal mortality	10[10%]	2[2%]	0.05
NICU admission	38[38%]	12[12%]	<0.001
Birth weight<2.5kg	42[42%]	22[225]	<0.001
Apgar score at 1 min ≤7	33[33%]	18[18%]	<0.05
Apgar score at 5 min ≤7	14[14%]	23[23%]	<0.001
Total cesearean delivry	54[54%]	23[23%]	<0.001
Meconium stained liquor	46[46%]	20[20%]	<0.001

Table-3

Indication	Study Group		Control Group	
	No. of Cases (54)	%	No. of Cases (23)	%
Fetal distress	30	55.6	5	21.7
IUGR	16	29.6	2	8.7
PROM with non progress Of labour	2	3.7	4	17.4
CPD	0	0	3	13.1
Failure of induction	2	3.7	4	17.4
Previous LSCS in Labour	4	7.4	5	21.7

Various indications of LSCS between study and control group.

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