European Journal of Molecular & Clinical Medicine

ISSN 2515-8260 Volume 09, Issue 01, 2022

STUDY OF PERINATAL OUTCOME IN OLIGOHYDRAMNIOS IN PREGNANCY

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Abstract

Introduction - Oligohydramnios or a reduced volume of amniotic fluid poses a challenge in obstetric management, particularly when it is diagnosed before term. It is one of the major causes for antenatal fetal surveillance and induction of labor. The incidence of oligohydramnios in the literature varies from less than 0.5%1 to above 5%, depending on the study population and definition of oligohydramnios. Oligohydramnios, often due to impaired placental function, has been associated with an increased risk of caesarean delivery for fetal distress, as well as low Apgar score, postmaturity, meconium aspiration syndrome and perinatal mortality and morbidity.

Objective - This study was aimed to assess this association in low-risk pregnancies in a rural tertiary health care set up.

Materials and Methods - Present study was conducted at MVJ Medical College in the Department of Obstetrics and Gynecology over a period from 2019 to 2021. 200 patients in their third trimester attending our hospital with evidence of Oligohydramnios were selected after satisfying inclusion and exclusion criteria and studied prospectively.

Results - In this study, we had 100 cases in the study group with AFI < 5cm. And the control group had 100 cases with AFI > 5cm. In our study 25 babies were born below the birth weight of 2 kg. APGAR score <7 at 5 mins was 17 % in study group as against 1 % in control group. The difference was found to be significant. Babies weighing less than 2 kg were 25% in study group and 1% in control group. This difference was found to be significant. (p- <0.05). In study group, 67 % had reactive NST and 34 % had non-reactive NST. In control group, 85 % had reactive NST and 16 % had nonreactive NST. (p- <0.05).

Keywords – Oligohydramnios, low-risk pregnancies, Obstetrics and Gynecology

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Introduction

Amniotic fluid (AF) is a marvelously complex and dynamic milieu that changes as pregnancy progresses. Nature created a floating bed in the foam of amniotic fluid cavity filled with amniotic fluid to meet the fetus's requirements for survival and growth in a sterile environment, temperature regulation, protection from external harm, and mitigation of the influence of uterine contractions [1].

Pregnancy is an once-in-a-lifetime experience for every woman. The image of a developing baby with an acceptable amniotic fluid volume (in proportion to gestational age) in the mother's womb is truly nature's method of portraying the traits of motherhood, and hence an adequate amniotic fluid volume is necessary for the fetus's normal growth and well-being.

Amniotic fluid (AF) is an astonishingly intricate and dynamic environment that changes during pregnancy. AF includes nutrients and growth factors that promote fetal growth, mechanical cushioning and antibacterial effectors that protect the fetus, and enables for the evaluation of foetal maturity and illness. Amniotic fluid is critical in predicting fetal survival [2].

Early in gestational age, a decrease in amniotic fluid can impair symmetrical fetal development, resulting in anatomical abnormalities. There are several types of abnormalities, including cranial, facial, and skeletal malformations, as well as pulmonary hypoplasia. Dolicocephaly, Potter's I, II, III, arthrogryposis, talipesequinovarus, and pulmonary hypoplasia are all deformities related with oligohydramnios [3].

Oligohydramnios with a late start is associated with a poor perinatal outcome. There is a higher risk of meconium-stained fluid, aberrant FHR tracing, low Apgar score, low birth weight, admission to the neonatal intensive care unit, birth asphyxia, and caesarean delivery for foetal distress. However, the majority of complications develop during the intrapartum period, necessitating rigorous intrapartumfoetal monitoring. Amniotic fluid is an ultra-filtrate of maternal plasma in the 1st trimester [4].

By the beginning of the second trimester, the amniotic fluid volume becomes an extension of the fetal extracellular space which diffuses through the fetal skin and is similar to fetal plasma. Water transport across the fetal skin continues until about 22 to 25 weeks, till fetal skin keratinization takes place, because it makes impermeable to further most diffusion.

Fetal urine is one of the main sources of amniotic fluid in the fetal life. Fetal urine production starts between 8 to 11 weeks but it is only by the 20th week that it becomes the major component [5]. Another important source is fetal lungs which produce fluid that exits the respiratory tract and enters the amniotic compartment.

Fetal swallowing is known to be the main mechanism by which amniotic fluid is removed. It is also postulated that amniotic fluid is also removed by continuous flow via oncotic and hydrostatic forces. At the chorionic plate, fluid exchange takes place and leads to reabsorption of water up to 80ml/day by the fetus. However, this does not remove the entire amniotic fluid

there must be some other unidentified mechanisms. With an amniotic fluid index of <5cm, incidence of Oligohydramnios after 34 weeks was 2.3%. Umbilical cord compression during labor is common with Oligohydramnios which increases the risk for caesarean delivery for fetal distress and 5-minute APGAR score <7 [6]. The decrease of amniotic fluid volume is associated with stillbirth, increased labor induction, meconium aspiration syndrome, non-reassuring fetal heart pattern and neonatal death. This present study is undertaken to assess the perinatal outcome in Oligohydramnios (AFI<5) in pregnancy.

Materials and Methods

Present study was conducted at MVJ Medical College in the Department of Obstetrics and Gynecology over a period from 2019 to 2021. 200 patients in their third trimester attending our hospital with evidence of Oligohydramnios were selected after satisfying inclusion and exclusion criteria and studied prospectively.

Sample size

Study group: 100 cases with AFI< 5cms. Controls group: 100 cases with >5cms. Women who had 4 or more visits at our hospital were considered as booked cases. Women with 3 or less visits and referred cases were considered as unbooked cases.

For all the selected cases, thorough history was taken and complete examination was done. Any Clinical evidence of oligohydramnios was looked for. The previous obstetric records and ultrasound reports were reviewed. History about the patient's age, obstetric code, gestational age, menstrual history, obstetric history, associated complications in present pregnancy were noted. Symphysio-fundal height was measured in centimeters. Fetal movements and fetal heart rates were recorded serially.

Blood investigations

Hemoglobin, blood grouping and typing, cell counts, blood sugar, urine analysis, HIV, VDRL, USG, Doppler, NST were done. Speculum and per vaginal examination were done to rule out leaking per vagina and confirmed intact membranes. After taking informed consent patients were treated. Iron, calcium, and multi vitamin supplements were continued orally as before. AFI measurements was done. These women were followed till discharge. Decision of delivery by vaginal route or elective/ emergency LSCS was done as required. Some patients were already in labour and others allowed to go into spontaneous labour. If delivery is made by caesarean section, the indication was recorded. A predesigned study proforma was filled for each case.

Methods

An ultrasound examination was done to monitor fetal wellbeing and assess amniotic fluid index and it was measured by Phelan's technique. A curvilinear transducer was used. The uterus was divided into four equal quadrants – the right and left upper and lower quadrants respectively through the maternal midline vertically and an arbitrary transverse line between symphysis pubis and upper edge of uterine fundus. Transducer placement was parallel to the

maternal sagittal plane and perpendicular to the maternal coronal plane. Image frozen at the clear deepest pocket of amniotic fluid. This pocket was measured using ultrasound calipers in a vertical direction. It is repeated in each of the four quadrants and summation of the four values gives AFI. Patients are grouped according to their AFI, study group with AFI < 5cm, and control group with AFI > 5cms.

Results and Discussion

Oligohydramnios with AFI 5cm can lead to an increase in perinatal mortality and morbidity. Under these situations, there is increased frequency of meconium-stained fluid, fetal discomfort, poor Apgar scores, and irregular fetal heart rhythms. Compared to control group, there was a twofold increase in neonatal and fetal acidosis [7]. There was a threefold increase in caesarean section for fetal distress compared to control. In this study, we had 100 instances in the study group with AFI < 5cm. And the control group comprised 100 instances with AFI > 5cm. Casey & coworkers (2001) conducted a study on pregnancy outcome after diagnosis of oligohydramnios and found that there was an increase in induction of labor (42 percent over 18 percent), no reassuring fetal heart rate patterns (48 percent vs 39 percent), NICU admission (7 percent over 2 percent), MSAF (1 percent over 0.1 percent), neonatal death rate (5 percent over 0.3 percent) associated with oligohydramnios [8].

Chamberlain & colleagues 1993, reported there was a relevance between occurrences of congenital abnormality, IUGR connected to amniotic fluid volume [9]. Youseef et al., did a study on measurement of AFI and fetal outcome and discovered AFI higher than 5cm had better probability of predicting a good fetal outcome. Golan & collaborators (1994) investigated fetal outcome in 145 newborns with oligohydramnios and reported higher frequency of fetal distress, MSAF (29 percent), IUGR (24.5 percent), breech (17 percent), birth asphyxia (11.5 percent). (11.5 percent). Chauhan S P & colleagues (1999) showed higher risk of caesarean delivery with antepartum and intrapartum AFI neonates with low apgar score at 5 minutes [10].

Baron and associates (2000) compared patients with AFI 5cm with normal AFI patients. Oligohydramnios resulting in caesarean delivery owing to fetal distress was evaluated and shown to have sensitivity of 78 percent, specificity of 74 percent, positive predictive value of 33 percent, and negative predictive value of 95 percent. Locatelli A 2004 revealed that oligohydramnios was related with significant risk of low birth weight in postdated pregnancies [11].

In this study result of 100 patients with AFI 5cm was compared with 100 patients with AFI > 5cm. In study group, 39 women had normal vaginal birth and 46 patients had LSCS. In control group, 62 patients had normal vaginal birth, while 23 patients required caesarean section.

MeghaBhagat et al., examined the prognostic significance of amniotic fluid index (AFI) (<5) for unfavorable perinatal outcome in terms of cesarean section for fetal distress, birth weight, meconium staining, Apgar scores, and cord pH at delivery. The cesarean section rate for fetal distress and low birth weight infants, <2.5 kg, was greater in individuals with oligohydramnios

(p = 0.048, 0.001, respectively) in their research. There was no significant difference in meconium staining, Apgar score at 5 min <7, and cord pH at birth between the two groups was noted by them. They concluded that Oligohydramnios had a substantial link with cesarean surgery for fetal distress and low birth weight neonates [12].

The same sort of observations were reported in our investigation. AFI < 5 was related with increased risk of cesarean delivery for fetal distress, which was comparable to our study. Elizabeth G Voxman MD et al., evaluated if an antepartum amniotic fluid index (AFI) of 5.0 cm or less is a predictor of unfavorable perinatal outcome [13]. In the present study, the 1-min Apgar score was <7 in 17 of 100 newborns in Group 1, but only 1 baby in Group 2 had an Apgar score <7, and this difference was statistically significant (p = 0.001). Chauhan et al. showed in their meta-analysis that antepartum AFI of ≤5 cm was related with a 5-min Apgar score <7 (pooled RR −1.8, 95 percent CI 1.1–2.6). A research by Driggers et al. found a 5-min Apgar score <7 in 3.8 percent patients in an oligohydramnios group against 4.6 percent in a normal AFI group, and concluded that there was no meaningful difference [14].

A research by Grubb et al. reported the 1-min Apgar score <7 in 84 percent patients with AFI ≤ 5 as opposed to 14 percent in the normal AFI group, which was very significant (p = 0.01). In the same research, the 5-min score <7 was found in 13 percent patients with AFI ≤ 5 against 5 percent in the normal AFI group. A decreasing amount of amniotic fluid is closely connected with IUGR. Significant morbidity has been observed to exist in pregnancies with an amniotic fluid index value of less than 5 cm [15]. NitinWadnere et al., reported the connection between fetal weight and amniotic fluid index in mothers of central India. In their study Thirteen hundred and ninety-three pregnant women were prospectively investigated by means of an ultrasound during a 12 month period. The fetal weight (FW) was determined using a combination of fetal data bi-parietal diameter, fetal trunk cross-sectional area, and femur length. AFI was evaluated using the four quadrant approach [16].

They noted that the rise in FW was detected throughout pregnancy, but there was no significant correlation between AFI and EFW when all the AFI and EFW pairings in the gestational group were analyzed (P > 0.05; r = 0.413). This absence of substantial connection between AFI and EFW across all gestational age strata is substantiated by the works.

The probable explanations adduced for this include that eating and urinating processes, rather than fetal size, are more engaged in the control of amniotic fluid content. The conclusion of this is that fetal size may not need to be addressed in fluctuations of amniotic fluid volume over the gestational ages. This reports were in contradiction with our study. In our study 25 infants were delivered below the birth weight of 2 kg. It is noteworthy to note that Kofinas and Kofinas, in 2012, observed a substantial connection between AFI and EFW. Although no reason was presented for the former, it was theorized that fetuses of spent more time breathing than swallowing [17]. As swallowing and breathing are mutually incompatible, the fetuses do not ingest as much amniotic fluid as predicted. Thus in diabetes pregnancies, it may be crucial to consider fetal size when evaluating amniotic fluid fluctuations between gestational ages. In

terms of newborn morbidity in the form of low birth weight <2 kg and NICU hospitalizations for various causes (53 vs. 0 percent), our findings coincide.

Table 1 - Correlation between Age and Period of Gestation (POG)

Variable	Group	N	Mean ± SD	Std. Error Mean	T value	P value
Age	**Study**	101	23.93 ± **3.60**	3.60	-0.818	0.414
	Control	101	24.32 ± **3.11**	3.11		
Period of Gestation (**POG)**	**Study**	101	37.84 ± **0.83**	0.08	-6.089	0.0001
	Control	101	38.56 ± **0.85**	0.08		
AFI	**Study**	101	4.05 ± **1.11**	0.11	-32.339	0.0001
	Control	101	8.99 ± **1.06**	0.10		

Table 2 - Correlation between APGAR and Admission in NICU with Final outcome

Variable	Group	Categories	NST		Chi Square Value	P Value
			Non reactive	Reactive		
APGAR	**Study**	**≤7**	8 (8.0%)	9 (9.0%)	1.557	**0.212 (p>0.05)**
		>7	57 (57.0%)	26 (26.0%)		
	Control	**≤7**	1 (1.0%)	0 (0.0%)	5.366	**0.021 (p<0.05)**
		>7	15 (14.9%)	85 (84.2%)		
Admission in NICU	**Study**	**Yes**	21 (20.8%)	32 (31.7%)	1.774	**0.183 (p>0.05)**
		No	13 (12.9%)	35 (34.7%)		
	Control	**Yes**	0 (0.0%)	0 (0.0%)	-	-
		No	16 (15.8%)	85 (84.2%)		
Final Outcome	**Study**	**Discharge**	18 (17.8%)	46 (45.5%)	12.802	**0.046 (p<0.05)**
		LBW	0 (0.0%)	4 (4.0%)		
		IUGR	6 (5.9%)	7 (6.9%)		
		Respiratory	0 (0.0%)	2 (2.0%)		

		distress				
		SGA	0 (0.0%)	2 (2.0%)		
		NICU	6 (5.9%)	5 (5.0%)		
		Dead	4 (4.0%)	1 (1.0%)		
	Control	**Discharge**	16 (15.8%)	85 (84.2%)	-	-
		LBW	0 (0.0%)	0 (0.0%)		
		IUGR	0 (0.0%)	0 (0.0%)		
		Respiratory distress	0 (0.0%)	0 (0.0%)		
		SGA	0 (0.0%)	0 (0.0%)		
		NICU	0 (0.0%)	0 (0.0%)		
		Dead	0 (0.0%)	0 (0.0%)		

Table -3 Correlation of variables

Variable	**Group**	**N**	**Mean ± SD**	**T value**	**P value**
Age	**Study**	101	23.93 ± **3.60**	-0.818	0.414
	Control	101	24.32 ± **3.11**		
Period of Gestation (**POG)**	**Study**	101	37.84 ± **0.83**	-6.089	0.0001
	Control	101	38.56 ± **0.85**		
Parity	**Study**	101	1.42 ± **0.51**	0.142	0.887
	Control	101	1.41 ± **0.49**		
AFI	**Study**	101	4.05 ± **1.11**	-32.339	0.0001
	Control	101	8.99 ± **1.06**		
Birth Weight	**Study**	101	2.41 ± **0.51**	-5.657	0.0001
	Control	101	2.73 ± **0.33**		

No. of days in NICU	**Study**	60	6.53 ± **4.86**	-	-
	Control	0	-		

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