



Original Article

Amniotic Fluid Index and Its Relationship with Poor Apgar Score in Term Pregnancy

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ABSTRACT

Amniotic fluid bathes the fetus and works as cushion, permits fetal lung growth and prevents fetus from infection. It peaks with gestational age and peaks at 32 -34 weeks of pregnancy. Amniotic fluid index is important and shares important relationship with APGAR (appearance, pulse, grimace, activity and respiration) for fetal wellbeing. **Objectives:** To determine the amniotic fluid index and its relationship with poor APGAR score in term pregnancy. **Methods:** This Descriptive study was done in department of Obstetrics and Gynecology, Holy family hospital, Rawalpindi from 2nd October 2017 to 1st April 2018. We enrolled 222 patients meeting the criteria. Informed consent was taken. **Results:** Mean age was 30.53 ± 4.66 years. Mean gestational age was 38.95 ± 1.38 weeks. Mean parity was 2.28 ± 0.70 . Mean gravidity was 2.43 ± 0.89 . Amniotic fluid index was found ≤ 50 mm in 76 (34.23%) and >50 mm in 146 (65.77%). The babies with Apgar score <6 at 1 minute were 43 (56.58%) having mothers with AFI <50 mm and 05 (3.42%) with AFI >50 mm. **Conclusion:** This study concluded that frequency of Amniotic fluid index <50 mm in term pregnancy is quite high with higher frequency of poor APGAR score in term pregnancy with AFI <50 mm.

INTRODUCTION

Amniotic fluid is an essential and vital role in fetal growth, and it varies throughout pregnancy. At 34 week, amniotic fluid concentrations peak at around 800 mL. An increase or decrease in the volume of amniotic fluid causes abnormalities. increase in polyhydramnios, which account for 1% of all pregnancies and usually result in congenital anomalies in one fifth of neonates. Underlying causes of polyhydramnios may be fetal anomalies like esophageal atresia, tracheal agenesis, and duodenal atresia; poorly controlled maternal diabetes mellitus; and chromosomal

abnormalities [1]. A decrease in volume results in oligohydramnios, which account for up to 15% of all pregnancies. Oligohydramnios may occur due to renal agenesis and polycystic kidneys. placental insufficiency as seen in pregnancy-induced hypertension, maternal diabetes mellitus, or maternal use of drugs like angiotensin-converting enzyme inhibitors [2]. A definition of isolated oligohydramnios is that it has an amniotic fluid index of <5 cm. Oligohydramnios denotes a weakened state of the fetus. Even a moderate reduction in amniotic fluid

volume is associated with abnormal FHR and meconium-stained liquor, which frequently necessitate caesarean sections and cause perinatal morbidity and mortality. Oligohydramnios is frequently linked to abnormal fetal outcomes such as IUGR, fetal anomaly, malpresentation, prematurity syndrome, and fetal distress in labor [3, 4]. According to a study of the literature, assessing the amniotic fluid index on USG is not a reliable way for fetal monitoring [5, 6]. Future improvements to our practice and actions in such circumstances will be made possible, thanks to this study. As there is very little local data available so this study's goal was to assess the impact of low AFI on fetal health at birth in order to make local guidelines to provide early management and rapid therapy.

METHODS

This Descriptive study was done in department of Obstetrics and Gynecology, Holy family hospital, Rawalpindi from 2nd October 2017 to 1st April 2018. The sample size was determined using WHO calculator with 6% error margin having 95% confidence interval and the Anticipated Population is 29.4%, calculated as 222. We included 222 patients meeting criteria of age 20-40 years, Parity < 5 and Gestational age from 37 to 42 weeks by using non-probability, consecutive Sampling and we excluded congenital abnormalities or IUGR (assessed though USG), CPD (clinical evaluation) and macrocosmic fetus (>4000grams weight), Females with multiple gestations (on USG), females with PROM and high risk pregnancies like PIH (BP>140/90mmHg), pre-eclampsia or eclampsia (convulsions with or without pre-eclampsia) or gestational diabetes. Consent was taken and data were recorded. 222 females were added through the gynecology ward of the department of obstetrics and gynecology at the Holy Family Hospital after receiving approval from the hospital ethical council. There was informed consent received. We also acquired demographic information (name, age, and parity). Then, a single senior radiologist from the hospital underwent ultrasonography on female patients to evaluate the AFI (sum of amniotic fluid in each quadrant with largest anteroposterior diameter). Women were divided into low AFI<50mm and typical AFI>50mm categories based on their AFI values. Then, until birth, the ladies were monitored in the ward. Deliveries were performed on all females. Following delivery, the APGAR SCORE was determined and classified as either poor (will be <6 after 1 minute of birth.). All the data were analyzed using SPSS version 22.0. For the data like Poor or normal APGAR score and AFI, frequencies along with percentages were calculated. For continuous variable like age of mother, parity, gravida, means along with standard deviations were calculated. Effect modifiers were controlled through stratification and chi-square test was applied, P value ≤ 0.05 was significant.

RESULTS

Age ranges from 20 to 40 years with mean age of 30.53 ± 4.66 years. Majority of the patients 119 (53.60%) were between 31 to 40 years of age. Gestational age range in this study was from 37 to 42 weeks with mean gestational age of 38.95 ± 1.38 weeks. Mean parity was 2.28 ± 0.70 as shown in table 1.

Parameters	Range	Mean ± SD
Age (years)	20 to 40	30.53 ± 4.66
Gestational age weeks	37 to 42	38.95 ± 1.38
Parity	0-2	2.28 ± 0.70

Table 1: Distribution of demographic and clinical characteristics

Mean gravidity was 2.43 ± 0.89. Amniotic fluid index was found ≤ 50 mm in 76 (34.23%) and > 50 mm in 146 (65.77%) as shown in figure 1.

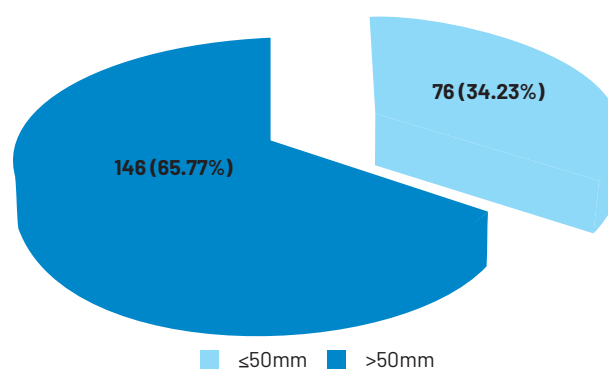


Figure 1: Distribution of patients according to amniotic fluid index (n=222)

The babies with Apgar score < 6 at 1 minute were 43 (56.58%) having mothers with AFI < 50 mm and 05 (3.42%) with AFI > 50 mm as shown in table 2.

AFI	APGAR score		p-value
	Poor	Good	
≤ 50 mm	43 (19.3%)	33 (14.8%)	0.0001
> 50 mm	05 (2.2%)	14 (6.3.5%)	

Table 2: Stratification of poor APGAR score with AFI < 50 mm and > 50 mm (n=222)

DISCUSSION

A few questions have lately been raised regarding the significance of amniotic fluid volume changes to fetal health and their close relationship to rising perinatal death and morbidity rates. Fetal well-being is a vital question that can, however, go unanswered in many circumstances [7, 8]. The sonographic parameters that are frequently used to calculate the volume of amniotic fluid are AFI and SDP. Both error in that they estimate a three-dimensional parameter from a two-dimensional measurement. Phelan et al, first observed the amniotic fluid index (AFI), a semi quantitative ultrasound assessment used to indicate the volume of amniotic fluid [8]. The fetal position might have a different impact on AFI and SDP since AFI measures the four

quadrants while SDP just measures the deepest pocket. It is still debatable how accurate SDP and AFI are in comparison. Using invasive techniques, some research have demonstrated the comparability of different measures, while others have demonstrated that one index may be superior to the other [9]. Numerous studies have found that pregnant women with oligohydramnios, which may be detected by ultrasound scanning, are more likely to experience intrapartum fetal discomfort. Although the precise pathophysiology of oligohydramnios is unknown [10, 11]. There are still questions about the typical AFI readings for each gestational age, though. In order to compare the frequency of low APGAR scores in term pregnancy with AFI <50 mm and >50mm, as well as the frequency of amniotic fluid index 50mm in term pregnancy, I did this study. In my study, participants ranged in age from 20 to 40 years. The majority of the 119 patients (53.60%) were between the ages of 31 and 40. The study's range for gestational age was 37 to 42 weeks, with a mean gestational age of 38.951.38 weeks. AFI <50mm was seen in 76 (34.23%) cases and 146 (65.77%) were having AFI of >50mm. Similar observation was seen in study by Horsager R et al, who observed AFI < 50mm (29.4%) and AFI >50mm (70%)[12]. Poor APGAR score was found in 48 (21.62%), out of them 43 (56.58%) having mothers with AFI <50mm and 05 (3.42%) with AFI >50mm while good APGAR score was observed in 174 (78.38%) with p-value = 0.0001. Similar findings were also seen in other study by Chamberlain PF et al, where those 75% having Poor APGAR score with mothers of AFI <50mm and 25% with mothers AFI >50mm [13]. In a study by Chate P et al, observed 50 females at term pregnancy with AFI < 50 mm having more intrapartum complication, fetal distresses with poor APGAR in comparison to patients having AFI >50mm with insignificant p value [14]. In one study 83 women were enrolled 11 women with AFI <5 significantly underwent caesarean sections due to fetal distress [15]. Whereas the observation of Pasquini L et al, is not consistent as they observed in study that in pregnancies with oligohydramnios, the modality of delivery and neonatal outcome did not differ from those with normal AFI [16]. In the study by Mushtaq E et al, 146 patients with similar demographic and clinical characteristics like maternal age, parity and mean gestational age were enrolled in two groups with respect to AFI <50mm and AFI >50mm. patient with AFI <50mm was associated with higher rate of induction of labor (68.49% vs. 21.8%, p<0.001), non-reassuring fetal heart rate (45.20% vs. 13.2%, p<0.001), cesarean section for fetal distress (51.61% vs. 28.47%, p<0.001), meconium stained amniotic fluid (32.2% vs. 21.6%, p=0.008). However, there was no statistically significant difference between the two groups in terms of

APGAR score at 1 min [17]. After 37 full weeks of gestation, an amniotic fluid index of less than 50mm is a sign of a poor perinatal outcome. Oligohydramnios increases the likelihood of thickened meconium, fetal distress, poor APGAR scores and higher rates of perinatal morbidity. AFI assessment can be done in conjunction with other fetal surveillance techniques. It aids in locating infants with increased risk for poor outcomes. An important tool for identifying fetal distress and making decision for mode of fetal delivery is the determination of AFI [18]. Alfirevic et al. conducted a randomized research to compare the two methods. The frequency was greater among individuals who obtained AFI assessment rather single pocket assessment, these authors said, even if the newborn outcomes were identical in both groups [19]. Magann et al, observed that single pocket measurement is least likely to result in a false positive diagnosis for fetal wellbeing [20]. Therefore, an alternative method of evaluating amniotic fluid using ultrasound may be employed in clinical practice rather than the AFI.

CONCLUSIONS

This study concluded that frequency of Amniotic fluid index < 50mm in term pregnancy is quite high with higher frequency of low APGAR score in term pregnancy with AFI < 50 mm. So, we recommend that early screening and management of this high risk group.

Conflicts of Interest

The authors declare no conflict of interest

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