

Perinatal Outcome in Patients with Borderline AFI

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ABSTRACT

Background: During pregnancy, amniotic fluid indicates the normal placental function. It is the most essential element for surveillance of fetal growth and health. Amniotic fluid index (AFI) is the most ideal way to determine the level of amniotic fluid during pregnancy. However, the single deepest pocket is applied to determine the changes in AFI level in pregnancies suspected to oligohydramnios. Borderline AFI is defined as AFI levels > 5 to < 10cm; it is a challenging task in obstetrics to associate it with adverse pregnancy outcomes.

Objective: To assess the perinatal outcomes in patients with borderline AFI.

Study Design: Cross-sectional.

Setting: Department of Obstetrics & Gynaecology, Sharif Medical City Hospital, Lahore.

Study Duration: Study was carried out over a period of six months from 10-11-2020 to 11-05-2021.

Subjects And Methods: A total of 160 patients having borderline AFI (more than 5 and less than 10cm) were included in the study. Perinatal outcomes were assessed at the time of delivery in the hospital.

Data Analysis Method: Stratification of data was carried out with regard to age, gestational age, parity and area of residence.

Results: Mean age of the patients was 25.17±4.90 years. Mean gestational age was observed to be 38.44±1.54 weeks. Majority of the patients were between Para 0 to 3. There was no smoker in preset study. Most of the patients belonged to rural area. Perinatal outcomes were as follows: Intrapartum fetal distress was observed in 64 (40%), meconium staining in 56 (35%), Apgar score < 10 at 5 minutes in 37 patients (23.1%) and NICU admission in 38 (23.8%).

Conclusion: In conclusion, borderline AFI during pregnancy can lead to severe hazardous consequences. Therefore, pregnancy complicated with borderline AFI must be observed carefully in order to improve the outcome of pregnancy and avoid adverse perinatal outcomes.

Keywords: Borderline AFI, Apgar Score, NICU Admission, Intrapartum Fetal Distress, Meconium Staining.

INTRODUCTION

Regular antenatal follow-ups and investigations are done to assess outcomes of pregnancy¹⁻³. Amniotic fluid is one of the indicators of adequate placental functioning, fetal movements, growth, musculoskeletal development, and also prevents in-utero or ex-utero stress¹. In 1987, Phelan et al described amniotic fluid volume as AFI by ultrasound³. Normal AFI ranges from 10-24 cm¹. Polyhydramnios is AFI of 25cm or more, whereas Oligohydramnios is AFI of 5cm or less.¹⁻³

AFI of more than 5 & less than 10cm is labeled as borderline AFI^{1,4,5}. Various studies have been done on oligohydramnios versus perinatal outcomes. There is a minor gap in studies available regarding clinical significance and fetomaternal complications of borderline AFI^{1,3,4,6}. About 16% of patients with borderline AFI will develop oligohydramnios as pregnancy advances. Borderline AFI has comparative poor perinatal outcomes (2.86%) compared to normal AFI (2.04%), including fetal distress (4.28%), respiratory distress (13.8%), meconium passage (4.28%), low Apgar score (20.2%) and NICU admissions (14.9%)^{1,2,4,6}.

Though there is contrasting evidence regarding the perinatal outcomes in borderline AFI and its assessment. Magann et al. evaluated borderline AFI and observed the following: meconium staining of amniotic fluid (14%), fetal distress (13%), NICU admissions (9%)^{1,3}. Rutherford et al. reported an inverse relationship between AFI and perinatal outcomes⁷. Luo et al. found no difference in the incidence of fetal distress or neonatal morbidity or mortality⁸. The results are inconclusive largely due to study design variations like inability to calculate likelihood ratios, absence of receiver-operator characteristic curve, sample size variation and lack of randomized controlled trials. Oligohydramnios in literature is described as a hallmark of impending adverse perinatal outcomes but borderline AFI and its associated outcomes are deficient. This topic is least studied locally and only one regional reference is available. Many patients attending SMCH

OPD fall in the category of borderline AFI and majority of them receive induction of labour. The main aim of this study is to screen those pregnancies with borderline AFI and to observe their perinatal outcomes. This study will help in future to do early intervention and prevention of any adverse outcome if associated with borderline amniotic fluid index.^{7,8}

MATERIAL AND METHODS

Study Design: Cross-sectional.

Setting: In the department of Obstetrics and Gynaecology, Sharif Medical City Hospital, Lahore.

Study Duration: Study was carried out over a period of six months from 10-11-2020 to 11-05-2021.

Sample Size & Sampling Technique: In our study, 160 cases were estimated by keeping the confidence level at 95%, margin of error at 4.5%, and percentage of NICU admission i.e., 9% in females with borderline AFI using non-probability, consecutive sampling.

Sample Selection

Inclusion: All the booked pregnant females of age 15-40 years, having borderline AFI (more than 5 and less than 10cm) confirmed on obstetrical scan irrespective of parity with singleton gestation, at gestational age 28 weeks.

Exclusion: Pregnancy with any history of uterine anomaly on ultrasonography, congenitally malformed fetus, antepartum haemorrhage, Preterm Pre-labor rupture of membranes (PPROM), rupture of membranes after 37 weeks (PROM) of gestation were excluded.

Data Collection: Patients with borderline AFI and meeting above defined selection criteria were selected from OPD of Sharif Medical City Hospital. An informed consent was taken from the patient and their antenatal cards would be tagged with silver stickers. Patients were observed, called for follow-up and managed according to standard protocols. Perinatal outcomes were assessed at the time of delivery in the hospital and all the information collected using

specially designed proforma. Outcome variables were assessed and recorded as per operational definitions.

Fetal Distress: Any of these; Loss of variability, fetal tachycardia (more than 160 bpm), prolonged deceleration or repetitive variable decelerations for 20 minutes on cardiotocogram.

Meconium Staining of Liquor: Assessed on amniotomy during labour.

APGAR Score: Less than 7 at 5 minutes.

NICU Admission: If fetus is having respiratory distress (respiratory rate > 60/min with chest in-drawing), transient tachypnoea neonatorum (new born having respiratory distress with nasal flaring, grunting and cyanosis) or meconium aspiration syndrome (aspiration of meconium leading to chemical pneumonitis and respiratory distress).

Data Analysis: Data was analyzed by SPSS v. 20. The numerical variables like age, parity and gestational age were calculated as mean±SD. The categorical variables like meconium staining, Apgar score < 7 at 5 min and fetal distress and NICU admission were calculated as frequency and percentages. Data was stratified for age, gestational age, area of residence (rural and urban) and parity. Chi-square test was used post-stratification with P-value < 0.05 considered as statistically significant.

RESULTS

In this study, a total of 160 patients were reviewed. Out of them, the mean age of the patients was 25.17±4.90 years. Mean gestational observed 38.44±1.54 years. Majority of the patients were between para 0-3. There was no smoker in the present study. Most of the patients belonged to rural areas (Table 1).

Table 1: Baseline characteristics of pregnant females.

n = 160	F (%)
Age (Year)	25.17 ± 4.90
15-25	99 (61.9%)
26-40	61 (38.1%)
Gestational age (weeks)	38.44 ± 1.54
34-39 ⁶	123 (76.8%)
40-42	37 (23.2%)
Parity	2.04 ± 1.15
0-3	140 (87.5%)
4-5	20 (12.5%)
Area of residence	
Urban	59 (36.9%)
Rural	101 (63.1%)

Out of 160 patients: Intrapartum fetal distress was seen in 64 (40%), meconium staining in 56 (35%), Apgar score < 10 at 5 minutes in 37 (23.1%), NICU admissions in 38 (23.8%). (Table 2).

Table 2: Perinatal Outcome

Fetal distress	F (%)
Yes	64 (40%)
No	96 (60%)
Meconium staining	
Yes	56 (35%)
No	104 (65%)
Apgar score < 10 at 5 minutes	
Yes	37 (23.1%)
No	123 (76.9%)
NICU admission	
Yes	38 (23.8%)
No	122 (76.2%)

DISCUSSION

Amniotic fluid is sustained in very gentle balance during the whole pregnancy with both; arrangement and volume that may vary at different gestational ages. In the first trimester, amniotic fluid is transudated from the chorionic trophoblast and fetal tissues. The fluid can easily pass the fetal skin before the skin cornifies during 23-25 weeks. Amniotic fluid development progressively shifts from transudation to the renal production when the first trimester ends.

At 10-11 weeks of gestation, fetal kidneys start to excrete the urine, leading to kidneys performing the aggregating role in the amniotic fluid production. Thus, kidneys become the main supplier for amniotic fluid generation during second and third trimesters.⁹

Several studies have already been done which found significant association of borderline AFI with poor perinatal outcomes and, in most of the studies, the adverse fetomaternal outcomes were more common in pregnancies with borderline AFI as compared to pregnancies with normal AFI.¹⁰ But, there were no definite perinatal care suggested in such pregnancies. This may be due to several different causes like difference in study design, the likelihood of borderline AFI varied from 6-44% and 25-35%, and thus, more researches are to be required to determine the effect of borderline AFI on poor perinatal outcomes.¹¹⁻¹³

In our study, a significant association was observed between borderline AFI and adverse perinatal outcomes. Preterm delivery, fetal distress, meconium stained liquor and poor Apgar score in borderline AFI were observed in a higher number of cases. Other studies conducted before also found higher rate of fetal intolerance during labor, meconium stained liquor and fetal distress, which were in-consistence with findings of our study.^{8,14,15}

In a systemic review, conducted by Magann et al. based on the uncertainty of predictive values of borderline AFI for poor perinatal outcomes the ultrasound has been proposed to assess the fetal growth without further testing.³ Gumus observed that the frequency of poor Apgar score and NICU admission was significantly high in females with borderline AFI.¹⁵ These findings were also in concordance to our results. Literature stated that the reduced AFI can increase the chances of meconium-stained liquor and also increase the number of cesarean sections due to fetal distress.^{16,17}

Kwon et al. conducted a study on 271 pregnant females with borderline AFI and compared the findings with the findings of pregnancies with normal AFI. They observed the high risk for poor Apgar score i.e., <7 at 5 minutes, and NICU admissions in pregnancies with borderline AFI. In these pregnancies, abnormal Doppler velocimetry was also noted.¹⁸ These findings were also similar as we found in our study.

CONCLUSION

It has been concluded that borderline AFI during pregnancy can lead to severe hazardous consequences. Therefore, pregnancy complicated with borderline AFI must be observed carefully in order to improve the outcome of pregnancy and adverse perinatal outcome can be avoided. Considering no compromise for fetal testing, appropriate intervention and intrapartum fetal surveillance; further studies must be done.

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