

STUDY OF AMNIOTIC FLUID INDEX AT THE ONSET OF LABOUR ON PERINATAL OUTCOMEP. Supriya¹, K. Indira Surya Kumari²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Aim of the present study is to determine amniotic fluid index in labour and to assess the course of labour, mode of delivery and perinatal outcome in relation to AFI. Objective of the study is the early detection of fetal distress and prevention of neonatal morbidity and mortality. This study was conducted in Department of Obstetrics and Gynecology, Rangaraya Medical College, Kakinada from October, 2011 to October 2013, to evaluate perinatal outcome in relation to AFI with a gestational age between 37-42 weeks. AFI was measured and the perinatal outcome compared between three groups. The cesarean section rate for fetal distress and low birth weight babies, <2.5 kgs was higher in patients with oligohydroamnios. There was a significant difference in meconium staining, APGAR at 1 & 5 mins <7 at the time of birth between three groups. Oligohydroamnios has a significant correlation with cesarean section for fetal distress and low birth weight babies.

KEYWORDS: Amniotic fluid index, meconium staining, cesarean delivery, APGAR score, birth weight.

INTRODUCTION: Fetal distress in labour is a common occurrence and is of great concern for both patient and the physician. An evaluation early in the course of labour for predicting fetus at risk of developing distress could aid in the management of labour. The concept of "admission test" was introduced to identify the patients whose antepartum risk factors have been missed, and to triage the patients in early labour into high risk and low risk groups. Cardiotocography for 20 minutes (NST) and response to vibroacoustic stimulation have been used as admission tests.¹ Another variable that has got great impact on the fetal well – being in the labour is amniotic fluid volume. Previously the amount of amniotic fluid was relegated to an "after thought" during amniorrhexis. Now evaluation of amniotic fluid has become an integral part of sonographic evaluation of the gravid patient.² Oligohydramnios in the antepartum period has been associated with intrauterine growth restriction,^{3,4} postdated pregnancy, congenital anomalies,^{3,4} increased fetal morbidity, abnormal antepartum fetal heart rate patterns. "Amniotic fluid index" was described by Phelan in 1987 is the most accurate method for assessing amniotic fluid volume, and helps categorize the patients into normal, low normal and oligohydramnios groups.⁵ Modified biophysical profile is an excellent means of fetal surveillance and identifies a group of patients at increased risk for adverse perinatal outcome and small for gestational age.⁶

The incidence of cesarean delivery for intrapartum fetal distress progressively increased coincidentally with severity of variable decelerations and diminished amniotic fluid volume.⁷ Inclusion of assessment of AFI as an adjunct in admissions test along with NST for women presenting at labour ward, after an uneventful pregnancy, could identify patients at risk of fetal distress and thus detect cases needing "SPECIAL SURVEILLANCE". Ultrasound examination for measurement of AFI in labour is superior to antepartum AFI in risk assessment because an immediate evaluation of the current fetal condition could be obtained.

ORIGINAL ARTICLE

MATERIALS AND METHODS: This study was conducted in Department of Obstetrics and Gynecology, Rangaraya Medical College, Kakinada from October, 2011 to October 2013, to evaluate perinatal outcome in relation to AFI. The study participants included 150 booked antenatal women registered at Government General Hospital, Kakinada with gestational age between 37-42 weeks, admitted for delivery during 2011-2013.

Inclusion criteria were women with a singleton, non-anomalous fetus with intact membranes at the time of intrapartum testing. Women with premature rupture of membranes, with known fetal or chromosomal anomalies, multiple pregnancy, medical complications like PIH, cardiac disease, gestational diabetes, Rh incompatibility, post-cesarean pregnancy, placental anomalies were excluded from the study.

On admission, a detailed history was taken, and a clinical examination was performed and gestational age assessed. Amniotic fluid index was determined using the Phelan's technique⁵, at the onset of labour after informed written consent.

Women were divided into three groups based on their AFI Group1-AFI<5; Group2-AFI 5.1-8 and Group3-AFI 8.1-24. A note was made of meconium staining of amniotic fluid, the ultimate mode of delivery, birth weight, APGAR score at 1 and 5 min recorded at the time of birth. Chi square test was used for analyzing categorical data. A p-value of 0.05 or less was considered as statistically significant.

RESULTS: The important results are summarized in the tables below:

| | AFI<5 | AFI 5.1-8 | AFI8.1-24 |
|---------------------------|-------|-----------|-----------|
| No of cases | 33 | 39 | 78 |
| Maternal age 20-25 yrs | 19 | 21 | 39 |
| Nulliparity | 20 | 15 | 40 |
| Gestational age 37-40 wks | 14 | 22 | 66 |

Table 1: Maternal demographic and obstetric characteristics

| | AFI<5 | AFI 5.1-8 | AFI 8.1-24 |
|------------------|-------|-----------|------------|
| COLOR OF LIQUOR | | | |
| Clear | 10 | 20 | 70 |
| Thin meconium | 6 | 11 | 5 |
| Thick meconium | 17 | 8 | 3 |
| MODE OF DELIVERY | | | |
| Normal delivery | 7 | 21 | 68 |
| Instrumental | 4 | 2 | 1 |
| Cesarean section | 22 | 16 | 9 |

Table 2: Obstetric outcome

ORIGINAL ARTICLE

| | AFI <5 | AFI 5.1-8 | AFI 8.1-24 |
|-----------------|--------|-----------|------------|
| Birth wt <2.5kg | 17 | 10 | 4 |
| APGAR <7 | | | |
| 1 min | 16 | 11 | 6 |
| 5min | 12 | 6 | 2 |
| NICU admission | 17 | 6 | 3 |
| NICU stay>2days | 17 | 6 | 3 |

Table 3: perinatal outcome

| GROUPS | Mean (kg) | Standard deviation |
|--------|-----------|--------------------|
| 1 | 2.38 | 0.452 |
| 2 | 2.73 | 0.420 |
| 3 | 2.87 | 0.0373 |

Table 4: showing the mean and standard deviation (SD) of birth weight in different groups

| Groups | T | P |
|--------|------|----------------|
| 1-2 | 1.52 | 0.13(p>0.05)NS |
| 1-3 | 4.06 | <0.05S |
| 2-3 | 2.46 | <0.05S |

Table 5: showing “p” values among different groups

T=student t test; NS –not significant, S –significant.

The p value among groups 1&2 was 0.13 which was statistically not significant, the p value among 1 & 3 was <0.05 which was significant, p value among 2 & 3 was < 0.05 which was significant finding a correlation between low birth weight and oligohydroamnios.

DISCUSSION: In present study, most of the women are primigravida (50 %) while the least number belong to gravida 4. No much difference is noted with reference to gravida in these 3 groups. Women between 40 – 42 weeks of gestational age⁸ are more in oligohydroamnios (57.6 %) and borderline group (43.6 %), while the normal group had more women in between 37 – 40 weeks of gestational age (84.6 %). Gestational age distribution in 3 groups had a chi-square value of 31.33 with a p-value of < 0.05, which is statistically significant. The incidence of thick meconium stained liquor was highest among oligohydramnios group (51.5 %), which was comparable with the study conducted by Rutherford et al., (1987)⁹ and Chandana et al.,(2006). The nature of amniotic fluid in different groups had a chi-square value of 71.94 and a p-value of < 0.05 which was statistically significant. The incidence of instrumental delivery was high among oligohydramnios (12.1). There is high incidence of cesarean delivery for fetal distress in oligohydramnios group (63.6 %).^{9,10} Results of the present study correlated with studies of the Indian study group.

ORIGINAL ARTICLE

The difference in the mode of delivery was found to be statistically significant between three groups ($p < 0.05$). APGAR score < 7 at 1 min and 5 min was high among oligohydramnios group (48.5 % and 36.3 % respectively). The difference in the value of APGAR scores between three groups at both 1 and 5 minutes was statistically significant.¹¹ The incidence of low birth weight was high among oligohydramnios group (51.5 %) which is comparable with the study conducted by Chandana et al., and Raj Sriya et al.^{12,13} The association can be explained by placental insufficiency as a causative factor. The difference in the birth weights among different groups had a chi-square value of 33.08 and a p value of < 0.05 which was statistically significant.

The incidence of NICU admissions (51.5%), prolonged NICU hospital stay of > 2 days, and neonatal complications are highest among oligohydramnios group which were comparable with other studies.¹⁴ The NICU admissions in different groups had a chi-square of 47.52 and p value < 0.05 which was statistically significant. All end points of perinatal and mortality was significantly increased in patients with oligohydroamnios when compared to normal AFI.¹⁵ Hence determination of AFI can be used as an adjuvant to other fetal surveillance methods. It helps to identify those infants at risk of poor perinatal outcome.¹⁶

CONCLUSION: Amniotic fluid index measurement can be used as a useful adjunct to other fetal surveillance methods, to identify those fetuses at risk of poor perinatal outcome. $AFI \leq 5$ cm is associated with high incidence of thick meconium stained liquor, fetal distress, operative delivery and cesarean section for fetal distress, poor APGAR score, low birth weight, meconium aspiration and perinatal mortality and morbidity. Assessment of amniotic fluid index at the onset of labour is a useful method for immediate evaluation of current fetal condition. AFI when used as an “admission test” in intrapartum period can categorize the fetuses into “high risk” and “low risk” depending on their susceptibility to fetal distress. Hence, AFI is a useful screening test in predicting fetal distress in labor, requiring intensive intrapartum fetal surveillance, to determine time and mode of delivery, and prevention of neonatal morbidity and mortality.

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ORIGINAL ARTICLE

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