

# Original Research

## Prenatal outcome in low amniotic fluid index at term

Rupinder Kaur<sup>1</sup>, Amritpal Kaur<sup>2</sup>, Surinder Kumar<sup>3</sup>

<sup>1</sup>Senior Resident, Department of gynaecology and obstetrics, GMC, Amritsar, Punjab, India;

<sup>2</sup>Professor, Department of gynaecology and obstetrics, GMC, Amritsar, Punjab, India;

<sup>3</sup>Medical Officer, Civil hospital, Muktsar, Punjab, India

### ABSTRACT:

**Background:** Antenatal test is done to evaluate fetus health and the risk of adverse outcomes during the course of a pregnancy. Amniotic fluid assessment is an essential part of evaluation of fetus health in terms of fetal distress, meconium aspiration, caesarean and fetal mortality. The assessment of amniotic fluid volume is very crucial for the survival of the fetus and the Amniotic Fluid Index (AFI) is the most common way for the estimation of amniotic fluid volume which is performed by ultrasound method. **Aim of the study:** To study prenatal outcome in low amniotic fluid index at term. **Materials and methods:** The present study was conducted at the Government Medical College, Amritsar, Punjab, India from 2016 - 2017. The study was conducted among 120 women recruited from the OPD and Labor ward. The inclusion criteria for the study were pregnancy at 37–40 weeks of gestation with no known obstetric or medical complications. AFI was measured with the four-quadrant technique and those women with AFI < 5th percentile, i.e., AFI of <5 cm at term as described by Phelan as oligohydramnios or an amniotic fluid volume of <500 mL at >37 weeks of gestation, were included in the study group. Follow-up of patients identified with oligohydramnios was done till they presented in our labor room in active labor or were admitted to labor room through the OPD for other indications. On admission NST was done for all the included patients. **Results:** The number of participants were 60 each in study and control group. The percentage of patients at gestational age >40 weeks in control group was 36 % and in study group was 48 %. Mean AFI in control group was 10.36 cm and in study group was 4.36 cm. We observed that a greater number of neonates were shifted with mother in control group. **Conclusion:** Within the limitations of the present study, it can be concluded that an AFI of  $\leq 5$  cm detected after 37 completed weeks of gestation is an indicator of poor perinatal outcome.

**Keywords:** AFI, Antenatal test, Gestation age, NST.

Received: 12 December, 2019

Accepted: 29 December, 2019

**Corresponding author:** Dr. Surinder Kumar, Medical Officer, Civil hospital, Muktsar, Punjab, India

**This article may be cited as:** Kaur R, Kaur A, Kumar S. Prenatal outcome in low amniotic fluid index at term. J Adv Med Dent Scie Res 2020;8(1): 276-280.

### INTRODUCTION:

Antenatal test is done to evaluate fetus health and the risk of adverse outcomes during the course of a pregnancy. <sup>1</sup> Amniotic fluid is an important part of pregnancy which plays a vital role in the normal growth of the fetus and, promotes muscular-skeletal development and allows for easier fetal movement. Amniotic fluid assessment is an essential part of evaluation of fetus health in terms of fetal distress, meconium aspiration, caesarean and fetal mortality. <sup>2</sup> The assessment of amniotic fluid volume is very crucial for the survival of the fetus and the Amniotic Fluid Index (AFI) is the most common way for the estimation

of amniotic fluid volume which is performed by ultrasound method. <sup>3</sup> Studies have revealed that AFI is an accurate criterion for estimating adequate placental function. <sup>4</sup> Amniotic fluid volume varies with gestational age, rising to a plateau between 22-39 weeks of gestation and reaching 700 and 800 ml, which correspond to an AFI of 14-15 cm. <sup>5</sup> Any decrease or increase in the volume of amniotic fluid leads to pregnancy complications. <sup>2</sup> In most studies oligohydramnios has been defined as an AFI of 5 cm or less and its associated maternal and fetal complications are proven. <sup>6</sup> However, there are different views about the range of borderline AFI. In a study done by Phelan

et al borderline AFI is defined between 5 and 8 cm.<sup>6</sup> Hence, the present study was conducted to study prenatal outcome in low amniotic fluid index at term.

**MATERIALS AND METHODS:**

The present study was conducted at the Government Medical College, Amritsar, Punjab, India from 2016 - 2017. The ethical clearance for the study was approved from the ethical committee of the institute prior to commencement of the study. The study was conducted among women recruited from the OPD and Labor ward. The inclusion criteria for the study were pregnancy at 37–40 weeks of gestation with no known obstetric or medical complications. The exclusion criteria were the presence of obstetric or medical complications and an unwillingness to be a part of the study. A total of 120 women were selected. The women were divided into control and study groups based on AFI. AFI was measured with the four-quadrant technique and those women with AFI < 5th percentile, i.e., AFI of <5 cm at term as described by Phelan as oligohydramnios or an amniotic fluid volume of <500 mL at >37 weeks of gestation, were included in the study group. Follow-up of patients identified with oligohydramnios was done till they presented in our labor room in active labor or were admitted to labor room through the OPD for other indications. On admission NST was done for all the included patients. Those with non-reactive NST and not in active labor also had BPP done. Documentation of obstetric interventions in the form of

induction or augmentation of labor with prostaglandins or pitocin and mode of delivery was done. Documentation of neonatal outcomes in the form of birth weight and APGAR score was also done. Admission to the neonatal unit for perinatal morbidities like APGAR <7, seizures, hypoglycemia, hypothermia, hyperbilirubinemia, hypocalcemia, meconium aspiration, respiratory depression, and perinatal mortality was documented.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student’s t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistically significant.

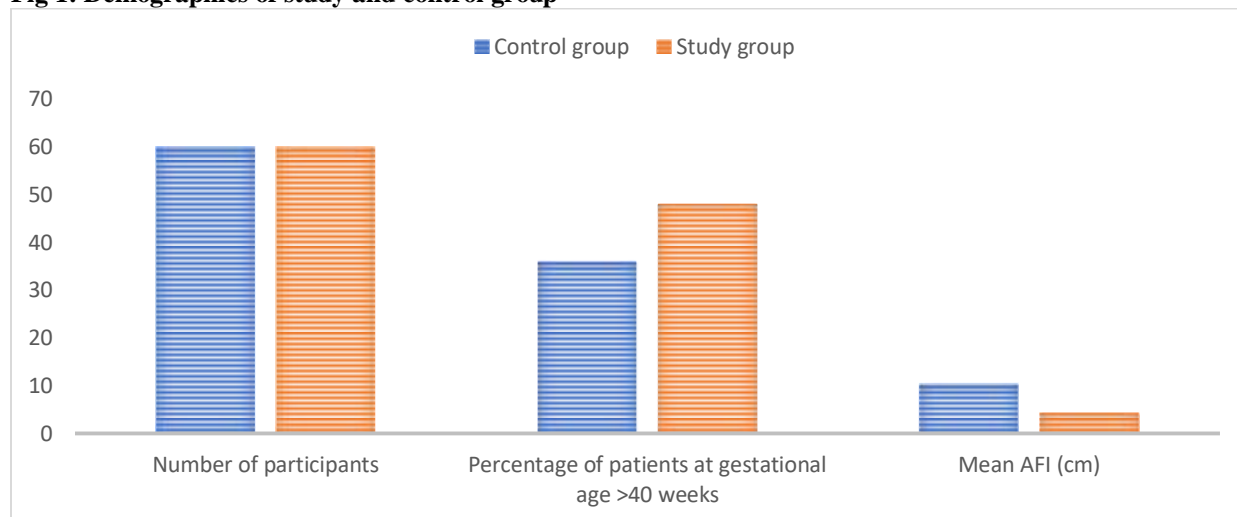
**RESULTS:**

**Table 1** shows demographics of study and control group. The number of participants were 60 each in study and control group. The percentage of patients at gestational age >40 weeks in control group was 36 % and in study group was 48 %. Mean AFI in control group was 10.36 cm and in study group was 4.36 cm. **[Fig 1]** **Table 2** shows neonatal complications in control group and study group. We observed that a greater number of neonates were shifted with mother in control group. Similarly, other complications were more common in study group as compared to control group. In study group, NICU admission was most commonly seen followed by low birth weight, respiratory distress. **[Fig 2]**

**Table 1: Demographics of study and control group**

Variables	Control group	Study group
Number of participants	60	60
Percentage of patients at gestational age >40 weeks	36	48
Mean AFI (cm)	10.36	4.36

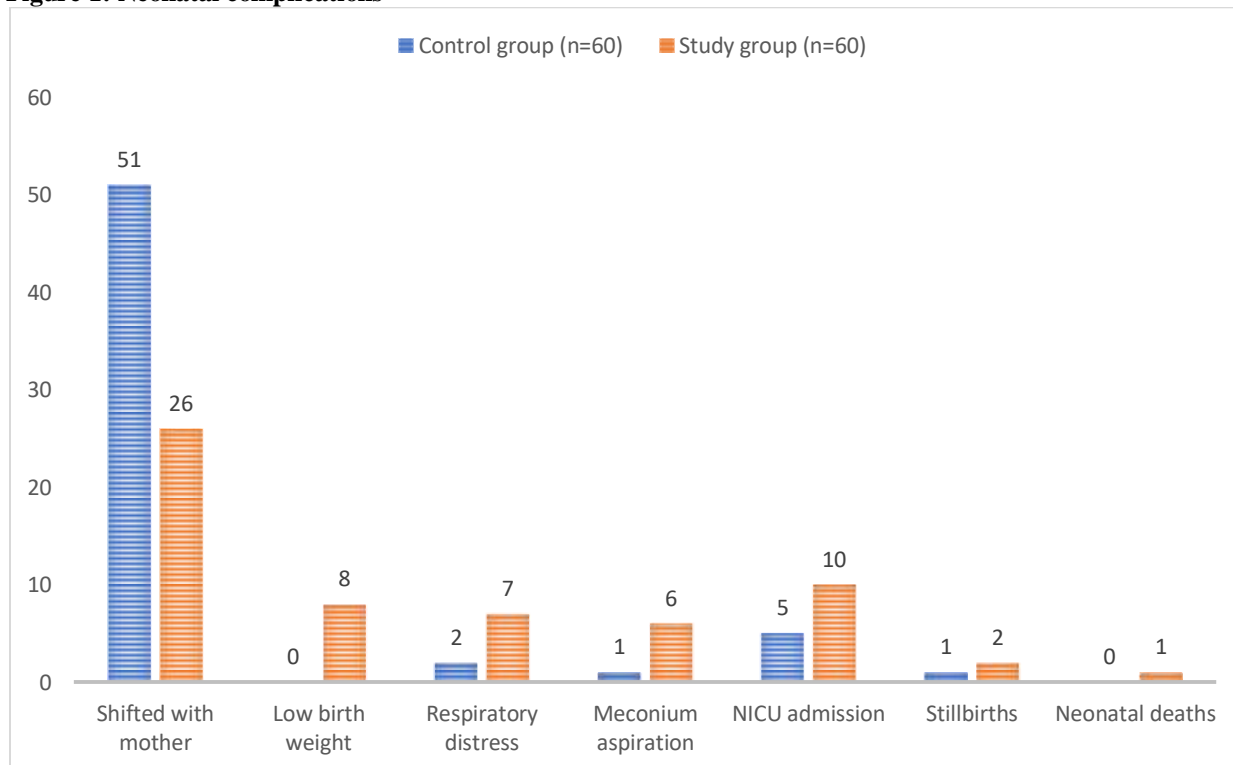
**Fig 1: Demographics of study and control group**



**Table 2: Neonatal complications in control group and study group**

Neonatal complications	Control group (n=60)	Study group (n=60)	p-value
Shifted with mother	51	26	0.004
Low birth weight	0	8	
Respiratory distress	2	7	
Meconium aspiration	1	6	
NICU admission	5	10	
Stillbirths	1	2	
Neonatal deaths	0	1	

**Figure 1: Neonatal complications**



**DISCUSSION:**

In the present study, we observed that neonatal complications were more commonly seen in study group patients as compared to control group. NICU admission was most commonly observed in study group patients. The results were statistically significant. The results were compared with previous studies and were found to be consistent. Jamal A et al determined adverse pregnancy outcomes in borderline amniotic fluid index (AFI). Pregnant women (37-40 wks) with diagnosis of borderline AFI between December 2012 and August 2014 were identified. Antepartum, intrapartum and neonatal data were collected and compared with those of pregnant women with normal AFI. An AFI less than 8 and more than 5 cm was defined for borderline AFI. Pregnancy outcomes included Cesarean section for non-reassuring fetal heart rate, meconium stained amniotic fluid, 5-min Apgar

score <7, low birth weight, umbilical cord blood pH at term and NICU admission. Gestational age at delivery in pregnancies with borderline AFI was significantly lower than normal AFI. Cesarean section rate for non-reassuring fetal heart rate in women of borderline AFI was significantly higher and there was an increased incidence of birth weight less than 10th percentile for gestation age in borderline AFI group. Incidence of low Apgar score and low umbilical artery pH in pregnancies with borderline AFI was significantly higher than women with normal AFI. There were no significant difference in the rate of NICU admission and meconium staining in both groups. They concluded that there are significant differences for adverse pregnancy outcomes , such as Cesarean section due to non-reassuring fetal heart rate, birth weight less than 10th percentile for gestation age, low 5 min Apgar score and low umbilical artery pH between pregnancies with borderline and

normal AFI. Bachhav AA et al determined whether an antepartum low amniotic fluid index (AFI) is a predictor of adverse perinatal outcome in normal pregnancy and to determine a threshold level of AFI that could predict an adverse outcome. This was a prospective study conducted among 180 pregnant women at 37–40 weeks of gestation with no known obstetric or medical complications with an AFI  $\leq$  5th percentile. The results were statistically analyzed and compared. In the control group, the mean AFI was 10.14 cm and in the study group, it was 4.14 cm. 65 % patients in the study group and 24 % in the control group had a non-reactive non-stress Test. In the control group, 53 % of patients were induced for reasons other than oligohydramnios, while in the study group, 86 % of patients were induced for oligohydramnios. Among the control group, 33 % had a LSCS, while 67 % delivered vaginally; and in the study group, 34 % delivered vaginally and 66 % had a LSCS. In our study, a 5-min APGAR  $< 7$  was seen in 34 % in the study group and 11 % in the control group. 33 % neonates in the control group and 64 % in the study group had birth weights  $< 2.5$  kg. They concluded that in the presence of oligohydramnios, perinatal morbidity and mortality are high. Determination of AFI is a valuable screening test for predicting fetal distress.<sup>7,8</sup>

Locatelli A et al evaluated the effect of oligohydramnios on perinatal outcome in uncomplicated pregnancies between 40.0 and 41.6 weeks. From January 1997 to December 2000 all uncomplicated pregnancies reaching 40.0 weeks' gestation with a singleton non-malformed fetus and reliable dating underwent monitoring with serial determination of amniotic fluid index (AFI) and biophysical profile. Labor was induced for AFI  $\leq 5$  cm, biophysical profile score of 6 or less, rise in maternal blood pressure  $> 140/90$  mm Hg, or gestational age of 42.0 weeks. Perinatal outcome was compared between cases with AFI  $\leq 5$  cm and those with AFI  $> 5$  cm. Three thousand and forty-nine women met the inclusion criteria, 341 of which (11%) had an AFI  $\leq 5$  cm. Gestational age at delivery, rates of nulliparity and induction of labor were significantly different between cases with oligohydramnios and those with normal AFI. Rates of cesarean delivery for non-reassuring fetal testing and of neonates with birth weight  $< 10$ th percentile were significantly higher in the AFI  $\leq 5$  cm group compared with the AFI  $> 5$  cm. No significant differences were identified between the two groups in rates of meconium-stained amniotic fluid, 5-min Apgar score  $< 7$ , or umbilical artery pH  $< 7$ . They concluded that in uncomplicated pregnancies at 40.0 to 41.6 weeks, oligohydramnios is independently associated with a higher risk of low birth weight centile. Sultana S et al determined the accuracy of antepartum Amniotic Fluid Index (AFI) of  $< \text{or} = 5$  cm as a

predictor of adverse outcome at birth in high-risk pregnancies. One hundred pregnant women at term gestation were studied. Each high-risk woman at term with an AFI of  $< \text{or} = 5$  cm admitted for delivery through emergency or outpatient department was labeled as predictor of poor outcome. The next high-risk pregnant woman at term with the same pregnancy complication but an AFI of  $> 5$  cm was labeled as predictor of good outcome at birth. The subjects in both the groups were demographically matched and fulfilled the inclusion and exclusion criteria. The Apgar score was calculated at 5 minutes of birth. The newborns, with Apgar score  $< \text{or} = 6$  at 5 minutes of birth were labeled as diseased and  $> 6$  were labeled as healthy. AFI was compared with Apgar score, using Chi-square and a p-value was calculated to determine the statistical significance. Sensitivity, specificity, efficiency and the predictive values of AFI at a cut off point of  $< \text{or} = 5$  cm as a predictor of adverse outcome at birth (Apgar score of  $< \text{or} = 6$  at 5 minutes of birth) in high-risk pregnancy were calculated. Only 8 neonates of 50 women with low AFI had low Apgar score. Similarly, 6 neonates of 50 women with normal AFI had poor Apgar score. The diagnostic sensitivity, specificity, positive predictive value, negative predictive value and efficiency of AFI as test were 57.1%, 51.3%, 16%, 88% and 52% respectively. They concluded that low AFI is a poor predictor of adverse outcome for high-risk term patients. AFI is not a good screening test for high-risk pregnant women at term for birth of an infant with low Apgar score.<sup>9,10</sup>

#### CONCLUSION:

Within the limitations of the present study, it can be concluded that an AFI of  $\leq 5$  cm detected after 37 completed weeks of gestation is an indicator of poor perinatal outcome.

#### REFERENCES:

1. Magann EF, Chauhan SP, Hitt WC, Dubil EA, Morrison JC. Borderline or marginal amniotic fluid index and peripartum outcomes: a review of the literature. *J Ultrasound Med.* 2011;30:523–528.
2. Ali HS. Assessment of amniotic fluid index in normal pregnancy at a tertiary care hospital setting. *J Ayub Med Coll Abbottabad.* 2009;21:149–151.
3. Karim R, Jabeen S, Pervaiz F, Wahab S, Yasmeen S, Raees M. Decreased amniotic fluid index and adverse pregnancy outcome at term. *JPMI.* 2010;4:307–311.
4. Pankaj D, Purvi P, Anjali G. Decrease of amniotic fluid index in low-risk pregnancy. Any significance? *J Obstet Gynecol Ind.* 2004;54:464–466
5. Magann EF, Chauhan SP, Bofill JA, Martin JN Jr. Comparability of the amniotic fluid index and single deepest pocket measurements in clinical practice. *Aust N Z J Obstet Gynaecol.* 2003;43:75–77.
6. Phelan JP, Smith CV, Broussard P, Small M. Amniotic fluid volume assessment with the four-quadrant technique

- at 36-42 weeks' gestation. *J Reprod Med.* 1987;32:540–542.
7. Jamal A, Kazemi M, Marsoosi V, Eslamian L. Adverse perinatal outcomes in borderline amniotic fluid index. *Int J Reprod Biomed.* 2016;14(11):705-708.
  8. Bachhav AA, Waikar M. Low amniotic fluid index at term as a predictor of adverse perinatal outcome. *J Obstet Gynaecol India.* 2014;64(2):120-123. doi:10.1007/s13224-013-0489-9
  9. Locatelli A, Vergani P, Toso L, Verderio M, Pezzullo JC, Ghidini A. Perinatal outcome associated with oligohydramnios in uncomplicated term pregnancies. *Arch Gynecol Obstet.* 2004 Jan;269(2):130-3. doi: 10.1007/s00404-003-0525-6. Epub 2003 Aug 20. PMID: 12928935.
  10. Sultana S, Akbar Khan MN, Khanum Akhtar KA, Aslam M. Low amniotic fluid index in high-risk pregnancy and poor apgar score at birth. *J Coll Physicians Surg Pak.* 2008 Oct;18(10):630-4. doi: 10.2008/JCPSP.630634. PMID: 18940121.