

# Relationship Of Low Amniotic Fluid Index, Mode Of Delivery, Perinatal Outcome: A Comparative Study

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**Abstract:** AFI is a quantitative estimate of amniotic fluid(1) and indicator of foetal well being. An AFI<5-6cm is considered as oligo hydramnios(3). there is increased incidence of low birth weight babies and Caeserean Section for foetal distress in pregnancies with low AFI. Our study compares mode of delivery and perinatal outcome in pregnant patients with low AFI to those with normal AFI.

**Methods:** In our study 50 cases and equal controls were taken which fulfilled the inclusion criteria. A written and informed consent was taken from all subjects entering into study. Ultrasound examination was performed on all subjects. Phelan(1) was used for measurement of AFI. Measurement of deepest pocket in each quadrant was summated and AFI was recorded in centimeters.

**Results:** Incidence of Caeserean Section was higher in pregnant patients with low AFI and also birth weight of babies was low.

**Conclusions:** Low amniotic index was associated with more number of Caeserean Sections and low birth weight babies. The incidence of PIH is high in pregnancies with low amniotic fluid index.

**Keywords:** Amniotic fluid index, Oligohydramnios, Liquor, Foetal Distress, Neonatal Intensive Care Unit

## I. INTRODUCTION

Amniotic fluid is a complex and dynamic milieu that changes as pregnancy progresses. Phelan(1) proposed amniotic fluid index as more objective and reproducible method as it estimates the amniotic fluid in four quadrants and defined oligohydramnios as AFI less than 5cm, with the normal range of AFI being 12.9-14.6. Amniotic fluid surrounds and protects the foetus in amniotic cavity. It provides cushion against constricting gravid uterus allowing foetal room for movement, growth and protecting it from external trauma. The amount increases rapidly with growth of foetal products 25 ml at 10 weeks to 400 ml at 20 weeks, 800ml at 28 weeks of gestation then it plateaus near term gestation and thereafter declines to about 400ml at 42 weeks of pregnancy, decreases at rate of 8% per week. It reduces further to a mean of 250 ml and 160 ml at 43-44 weeks of pregnancy. Due to its association with chronic placental insufficiency and inherent risk of cord compression in all labours, link has been found between

decreased amniotic fluid volume, still birth, fetal anomaly, abnormal heart tracings, increase in Caeserean Section for foetal distress as described by Chamberlain et al as cited in Bhagat and Chawla(13). In the present study we quantified AFI as described by Phelan et al(1) and we sought to correlate whether AFI<5cm is associated with adverse perinatal outcome in terms of Caeserean Section for foetal distress, meconium staining of liquor, low birth weight and neonatal admission to NICU. The severity of oligohydramnios is associated with degree of IUGR and it reflects placental dysfunction(11).

## AIMS AND OBJECTIVES

To compare maternal and perinatal outcome in pregnant women at  $\geq 37$  weeks having amniotic fluid index  $\leq 5$ cm to those having AFI  $> 5$ cm

## II. METHODS

This is a prospective study conducted in Department of Obstetrics & Gynaecology of Jaipuriya hospital on pregnant women admitted at or after 37 weeks of gestation.

### STUDY DURATION AND SAMPLE SIZE

The patients meeting the eligibility criteria during the study period (December 2017 to April 2018) were enrolled. About 50 women with singleton pregnancies at  $\geq 37$  weeks with  $AFI \leq 5$ cm were enrolled. Same number of controls i.e. women with singleton pregnancies at  $\geq 37$  weeks with  $AFI > 5$ cm were also taken.

Group A-50 pregnant women with amniotic fluid index  $\leq 5$ cm

Group B-50 pregnant women with  $AFI > 5$ cm

### INCLUSION CRITERIA

All women were included with singleton pregnancy and gestation  $\geq 37$  weeks

- ✓ with cephalic presentation
- ✓ intact membranes
- ✓ sure about dates
- ✓ having AFI measurement within one week delivery

### EXCLUSION CRITERIA

- Women with the following were excluded from study
- ✓ any congenital malformation in foetus
  - ✓ APH
  - ✓ medical disorder like thyroid dysfunction and cardiac disease
  - ✓ BOH
  - ✓ diabetes mellitus/GDM
  - ✓ severe anemia
  - ✓ multiple pregnancy
  - ✓ previous Caesarean Section

### STUDY PROTOCOL

A written and informed consent was taken from all subjects entering into study. All patients were examined during the antenatal period. They were subjected to detailed history and clinical examination. AFI was determined by Phelan's technique using transabdominal sonography. AFI was measured by dividing the uterus into four quadrants. Parameters noted were meconium stained liquor, mode of delivery, birth weight. The ethical committee has approved the study. Results were analysed with special emphasis on perinatal outcome.

## III. RESULTS

Demographics of present study shows that mean age in study group was 24.62 and in control group it was 23.44yr ( $p=0.103$ ) as shown in table no. 1. Out of 100 women included in the group, 50% in the control group and 66% in study group

were nulliparas. Among the control group, 48% of patients were induced while in the study group 32% of patients were induced. Incidence of PIH was higher in study group as compared to control group i.e. (54% vs 32%,  $p=0.026$ ) statistically significant.

	Group A n=50	Group B n=50	P value
Maternal age(mean)	24.62	23.44	0.103
Nulliparity	33(66%)	25(50%)	0.105
Gestation age $\geq 40$ wks	7(14%)	3(6%)	0.318
Induction of labour	16(32%)	24(48%)	0.102
Incidence of PIH	27(54%)	16(32%)	0.026

Table 1: Maternal demographic and obstetric characteristics

In the control 16% has LSCS, while 84% delivered vaginally and in the study group, 40% delivered vaginally and 60% has LSCS (table no. 2).

Total no. of deliveries (n=100)

Type of delivery	Grp A(n=50)	Grp B(n=50)	P value
Vaginal	20(40%)	42(84%)	<0.001
LSCS	30(60%)	8(16%)	

Table 2: Mode of delivery

24% neonates in control group and 48 % in study group had birth weight  $< 2.5$  kg. (table no. 3)

Parameters	Grp A(n=50)	Grp B(n=50)	P value
Birth weight $< 2.5$ kg	24(48%)	12(24%)	0.012
NICU admissions	3(6%)	3(6%)	1

Table 3: Neonatal Outcome among Study Group Cases and Controls

Meconium stained liquor was present in slightly higher no. of cases in Grp A as compared to Grp B (table no.4)

Amniotic fluid	Grp A(n=50)	Grp B(n=50)	P value
Meconium	10(20%)	8(16%)	0.603
Clear	40(80%)	42(84%)	

Table 4

In the control group 87.5% underwent LSCS for foetal distress, while in study group 33.3% underwent LSCS for foetal distress (table no.5).

(n=38)

Indication	Grp A(n=30)	Grp B(n=8)	P value
Foetal distress	10(33.3%)	7(87.5%)	0.013
Others	20(66.7%)	1(12.5%)	

Table 5: Total no. of Caesarean deliveries

## IV. DISCUSSION

In the present study, meconium stained liquor was present in 20% of patients in Group A and 16% in Group B and the difference was not significant ( $p=0.603$ ). The Caesarean Section rate was higher in Group A with  $AFI \leq 5$  i.e. 60 % as

compared to 16% for Grp B and the difference was statistically significant ( $p < 0.001$ ) which is statistically significant. However, Caesarean Section rate for foetal distress was higher in patients with normal AFI as compared to the group with low AFI (87.5% vs 33.3 %,  $p = .013$ ). A study conducted by Baron et al. (5) showed that meconium stained amniotic fluid occurred significantly less often in oligohydramnios group as compared to normal AFI group. A study conducted by Voxman et al. (7) concluded that there was no difference between the groups with regards to meconium stained liquor which was comparable to our study. Chauhan et al. (3) in their metaanalysis (1999) found that intrapartum  $AFI \leq 5$  was associated with increased risk of CS for foetal distress which was similar to our study. Rutherford et al. (2) found an inverse relationship between amniotic fluid index and Caesarean section for foetal distress.

In our study birth weight  $< 2.5$  kg was found in 48 % of patients in Group A versus 24% in Group B and difference was statistically significant ( $p = 0.012$ ). Locatelli et al. (4) reported that in uncomplicated term pregnancies with oligohydramnios, the presence of  $AFI < 5$  independently increased risk for SGA infant. Morris et al. (9), found 60% of babies were of LBW in the group with  $AFI < 5$ , indicating that oligohydramnios had an association with growth restriction. A study by Rutherford et al. (2) showed that when  $AFI < 5$  (36%) pregnancies result in infants with intrauterine growth restriction.

In the study by Bhagat et al. (13), there was no significant difference in meconium staining of liquor while Caesarean Section rate was higher in patients with oligohydramnios as compared to group with normal AFI (57.4 vs 38.7,  $p = 0.048$ ). Birthweight  $< 2.5$  kg found in 56% of patients with oligohydramnios and 21.7% with adequate liquor.

In study by Singhal et al. (15), an  $AFI < 5$  cm was associated with significant high rate of induction of labour ( $p < 0.001$ ), Caesarean section ( $p = 0.04$ ) and foetal distress ( $p < 0.05$ ), meconium stained liquor ( $p = 0.76$ ), low birth weight ( $p = 0.130$ ) or NICU admissions ( $p = 1$ ) were comparable in two groups. In our study also meconium and NICU admissions were comparable in both groups.

Rate of induction is similar to Casey et al. (6), who also found high rate of induction of labour with low AFI (42%) as compared with normal AFI (22%). In our study also, induction of labour was found to be significantly high, 63% in women with oligohydramnios as compared to 14% in the control as compared to control group.

Bangal et al., who studied perinatal outcome in women with low AFI ( $< 5$  cm) but did not compare it with normal AFI found very high rate (44%) of Caesarean section in women with low AFI.

Nicolades K.H et al., stated that oligohydramnios associated with IUGR and maternal diseases including maternal hypertension, the foetus is hypoxic, impaired placental function in addition to hypoxia contributes to oligohydramnios.

## V. CONCLUSION

In present study, we concluded that a low amniotic fluid index was associated with low birth weight babies and increased number of Caesarean Section deliveries. The incidence of PIH is also high among those with low AFI. So, regular antenatal care and antepartum, intrapartum foetal monitoring is must to reduce the incidence of oligohydramnios and consequent LSCS deliveries and low birth weight babies.

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