

# A Comparative Study of Perinatal Outcomes in Patients with Oligohydramnios (Low Amniotic Fluid Index).

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## ABSTRACT

**Background:** This study was aimed to evaluate the predictive value of low amniotic fluid index (AFI) ( $\leq 5$ ) for abnormal perinatal outcomes. Abnormal perinatal outcomes included cesarean section for fetal distress, low birth weight, meconium staining, low Apgar scores and admission to NICU. **Methods:** This was a prospective study of 200 antenatal subjects at Sheri Kashmir Institute of Medical Sciences, Bemina during the years 2014–2015 with gestational age between 34 and 41 weeks. The history, clinical examination of the subjects was recorded and AFI was measured and the perinatal outcome compared between AFI  $\leq 5$  and  $\geq 5$  groups. **Result:** We observed that the low birth weight babies  $< 2.5$  kg and cesarean section rate for fetal distress was greater in subjects with oligohydramnios ( $p < 0.5$ ). Insignificant differences were observed in perinatal outcomes of meconium staining, Apgar score of  $< 7$  at birth between the two groups. **Conclusion:** Thus it can be concluded that oligohydramnios significantly correlates with the cesarean section for fetal distress, low birth weight babies and admission to NICU.

**Keywords:** Amniotic fluid index, oligohydramnios, Cesarean section, Apgar scores.

## INTRODUCTION

Obstetrics is concerned with the wellbeing of both the mother and the fetus that recognizes and quantifies the risks of neonatal complications that arise from immaturity and determines the optimal time and mode of intervention as the major platform of modern perinatal medicine.<sup>[1]</sup> The assessment of amniotic fluid volume has become an important part of antenatal fetal surveillance.<sup>[2]</sup> An abnormality in amniotic fluid volume is one of the earliest sonographic signs of an obstetric problem. Approximately 3-8% of the pregnant women show low amniotic fluid at some point of time and is usually taken as a sign of placental insufficiency. Clinical quantification of amniotic fluid volume (AFV) is a critical part of fetal assessment as a variation in its quantity has been related to pregnancy complications. The amniotic fluid is the platform for a protective environment for the fetus acting as a cushion against any kind of mechanical and biological injury.<sup>[3,4]</sup> Amniotic fluid volume measurement is the basis for antenatal testing for

Chronic utero stress. Ultrasound, is ideal for this application on a large scale due to its non-invasive nature and can be frequently repeated.<sup>[4]</sup> Relationship between low amniotic fluid volume and fetal anomaly, increase in cesarean section for fetal distress have been observed.<sup>[3]</sup> In the present study, amniotic fluid quantification was carried out using four-quadrant technique as described earlier by Phelan et al.<sup>[5]</sup> and analyzed if an antepartum AFI of 5 cm or less is a determinant of abnormal perinatal outcome in terms of meconium staining, cesarean section for fetal distress, low birth weight, low Apgar scores admission to NICU.<sup>[3]</sup>

## MATERIALS AND METHODS

The current study was carried out at the Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Medical College, hospital, Srinagar. 200 participants were participated in the study with a gestational age between 34 and 41 weeks, over a time period of 2014 to 2015. Inclusion criteria were women with a singleton with intact membranes. Women with premature rupture of membranes, with known fetal or chromosomal anomalies, gestational diabetes, Rh incompatibility, placental anomalies and multiple pregnancies were excluded from the study. Detailed history of the patients was taken and clinical examination was carried out after the gestational age assessment on admission. Amniotic fluid index was

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determined by the Phelan's technique [5] at the time of admission. Women were divided into two groups based on their AFI: Group 1—AFI  $\leq$  5 and Group 2 with AFI  $\geq$  5. A note was made of meconium staining of amniotic fluid, the ultimate mode of delivery, birth weight and Apgar score at 1 and 5 min. Statistical analysis was carried out with  $p \leq 0.05$  as level of significance.

## RESULTS

Out of a total of 200 women, the mean maternal age was observed to be  $27.31 \pm 5.06$  in Group 1 and  $26.49 \pm 4.46$  in Group 2, out of which 16 (64 %) women in Group 1 and 106 (60.5 %) in Group 2 were nulliparous. The gestational age was recorded as 37 weeks in 60 % (15) women in Group 1 as compared to 63 (36 %) in Group 2. The maternal weight gain was observed to be  $< 10$  kg in 11 (44 %) women in Group 1 in comparison to 16 (9 %) women in Group 2. A total of 16 (64 %) women were induced in Group 1 as compared to 85 (48.57 %) in Group 2 [Table 1]. Analysis of associated ante-natal risk factors was carried out and it was observed that 34.6% patients with pregnancy induced hypertension (PIH) and 44.8% patients with intrauterine growth retardation (IUGR) were significantly associated with oligohydramnios [Table 2]. Obstetric and perinatal outcomes were studied in both the groups. An observation was made that 6 (24 %) subjects in Group 1 and 24 (13.7 %) subjects in Group 2 had meconium-stained liquor. The differences was not statistically significant ( $p = 0.144$ ). The cesarean section was carried out in 16 (64 %) women in Group 1 as compared to 63 (36 %) in Group 2 ( $p = 0.0004$ ). The cesarean section for fetal distress was observed to be higher in women with oligohydramnios (67 %) as compared to women with AFI  $\geq$  5 (40 %) ( $p = 0.003$ ). In Group 1, the Apgar score at 1 min was less than 7 in 40 % women (10) when compared to 25 (14.28 %) in Group 2 ( $p = 0.414$ ). An Apgar score  $< 7$  at 5 min was noted in 2 (8 %) woman in Group 1 and 7 (0.04 %) women in Group 2 ( $p = 0.632$ ). Birth weight of less than 2.5 kg was found in 13 (52 %) neonates in Group 1 as compared to 42 (24 %) in Group 2 ( $p = 0.518$ ). The values for perinatal outcomes are outlined in table 3. In Group 1, out of 25 women, 17 (68 %) showed normal cardiotocography (CTG) and 5 (20 %) were presented with pathological CTG. In Group 2, out of a total of 175 patients, 146 (83.4 %) had a normal CTG and 9 (5.1 %) with a pathological CTG. The rate of Pathological CTG in Group 1 was statistically significant [Table 4]. Non-reactive NST was present in a significant number of patients in Group 1 (32 %) as compared to Group 2 (9.7 %). Majority of the neonates in Group 1, i.e. 22 (88 %), were admitted to the neonatal intensive care unit (NICU). However, in Group 2, 100 (57.14 %) babies were admitted to the NICU. Thus, it can be conferred that in Group 1,

there was a significant correlation to NICU admission ( $p = 0.006$ ) [Table 4].

**Table 1: Demographic and obstetric characteristics.**

Maternal demographic and obstetric characteristics	AFI $\leq$ 5 (n=25)		AFI $\geq$ 5 (n=175)		p-value
	Maternal age (mean)	27.31 $\pm$ 5.06		26.49 $\pm$ 4.46	
Parity	16 Nulliparous	9 Multiparous	106 Nulliparous	69 Multiparous	0.148
Gestational age $<$ 37 weeks at delivery	15		63		0.801
Weight gain $<$ 10 kg	11		16		0.068

**Table 2: Ante-natal risk factors.**

Associated risk factors	AFI $\leq$ 5 (n=25)	AFI $\geq$ 5 (n=175)	p-value
PIH	9	48	0.400
IUGR	11	24	0.148
Abruptio placentae	2	7	0.999
Severe anemia	1	3	0.518
Prolonged pregnancy	3	21	0.286

**Table 3: Perinatal outcomes**

Perinatal Outcome	AFI $\leq$ 5 (n=25)	AFI $\geq$ 5 (n=175)	p-value
Induction of labour	16 (64%)	85 (48.5%)	0.374
Meconium-stained liquor	6 (24%)	24 (13%)	0.144
Cesarean section	16 (64%)	63 (36%)	0.0004
Cesarean for Fetal distress	67%	40%	0.003
Birth weight $<$ 2.5 kg	13 (52%)	42 (24%)	0.001
Apgar score			
1 min $<$ 7	10 (40%)	25 (14.2%)	0.414
5 min $<$ 7	1 (8%)	7 (0.04%)	0.632

**Table 4: Secondary outcome**

Secondary outcome measure	AFI $\leq$ 5 (n=25)	AFI $\geq$ 5 (n=175)	p-value
NST	32%	9.7%	0.002
Admission to NICU	88%	57.14 %	0.006

## DISCUSSION

The assessment of Amniotic Fluid Volume is a critical component for Biophysical Profile and for antepartum fetal surveillance to predict the perinatal outcome. A number of studies have been carried out

so far to compare the perinatal outcome of normal AFI with oligohydramnios. An uncertainty remains that whether normal AFI and oligohydramnios groups can be treated similarly. In the current study the demographic factors, associated ante-partum risk factors and perinatal factors were compared in these two groups.

In the present study, meconium-stained liquor was present in 6 (24 %) of the patients in Group 1 and 24 (13 %) in Group 2, and the difference was not significant ( $p > 0.1445$ ). The cesarean section rate was higher in Group 1 (16) as compared to 63 for Group 2, and the difference was statistically significant ( $p = 0.0004$ ) although, some studies have also observed a statistically significant relation however,<sup>[6]</sup> our study was in similarity to the one reported by Voxman et al.<sup>[7]</sup> Cesarean section for fetal distress was also higher in patients with oligohydramnios as compared to the group with normal AFI (67% vs 40%) ( $p = 0.0003$ ). Our study further reproduces the reported literature of Chauhan et al.<sup>[8]</sup> who observed that intrapartum AFI  $\leq 5$  was associated with a higher risk of cesarean section for fetal distress. An inverse relationship between the amniotic fluid index and cesarean section for fetal distress was observed by Rutherford et al.<sup>[9]</sup> In the current study, birth weight  $< 2.5$  kg was found in 13 (52 %) of the patients in Group 1 versus 42 (24 %) in Group 2, and the difference was statistically significant ( $p = 0.001$ ). Similar observations were made by Locatelli et al.<sup>[10]</sup> with oligohydramnios patients where AFI  $\leq 5$  increased the risk for a small for gestational age infant. Morris et al.<sup>[11]</sup> reported that 60 % of babies were of low birth weight in the group with AFI  $\leq 5$ , suggesting that oligohydramnios is associated with growth restriction. A study by Rutherford et al.<sup>[9]</sup> showed that when the AFI  $\leq 5$  (36 %), pregnancies resulted in infants with intra uterine growth restriction (IUGR). In the present study, the 1-min Apgar score of  $< 7$  in 10 out 25 (40 %) babies in Group 1, whereas only 14.2 % babies in Group 2. The 5-min Apgar score was statistically insignificant between the groups (1 vs. 7 %). In similarity to this study, Driggers et al.<sup>[12]</sup> observed that a 5-min Apgar score  $< 7$  in 3.8 % patients in an oligohydramnios group versus 4.6 % in a normal AFI group were not significant to each other. A study by Grubb et al.<sup>[13]</sup> reported that the 1-min Apgar score  $< 7$  in 84 % patients with AFI  $\leq 5$  as compared to 14 % in the normal AFI group, which was statistically highly significant ( $p = 0.4140$ ). The same study concluded that the 5-min score  $< 7$  are seen in 13 % patients with AFI  $\leq 5$  while as only 5 % in the normal AFI group. Our observations with regard to Secondary outcome measures were in proximity to observations of Ghike et al that NICU admission rate was significantly higher in oligohydramnios group than borderline group.

## CONCLUSION

The current study throws some light on antepartum oligohydramnios (AFI  $\leq 5$ ) and was observed to be associated with a higher risk of cesarean delivery, particularly for fetal distress. A significantly high relation was observed between the oligohydramnios and caesarean section, fetal distress, IUGR and PIH. On analysis of secondary outcome, significant correlation was observed in terms admission to the NICU. Therefore, it can be concluded that women with oligohydramnios should undergo antepartum management like induction of labor so that the perinatal outcome improves.

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