

Effect of Amniotic Fluid Outcome on Perinatal Outcome in Low Risk Pregnancies

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1. Introduction

The aim of modern obstetrics is wellbeing of both the mother and the child. Various methods of antenatal fetal monitoring have been devised to detect fetal distress at its earliest and to prevent an outcome such as birth asphyxia. The occurrence of birth asphyxia is 2 per 1000 births in developed countries and upto 10 times higher in developed countries.¹ According to a WHO estimate in 2014, about 4 million neonatal deaths occur yearly due to birth asphyxia, representing 35% of deaths of children under 5yrs of age.²

The AFI as measured by the four- quadrant ultrasonic technique was added to antepartum testing to better identify fetuses at higher risk of poor perinatal outcome. Amniotic fluid is an important part of pregnancy sac and helps fetal development. In 1987, Phelan et al discovered a four-quadrant method of assessing AFI. Using that technique an AFI of 5cm or less is defined as oligohydramnios. Sequelae of chronic oligohydramnios can be fetal demise, pulmonary hypoplasia, facial and skeletal deformities. In multiple studies correlation has been found of decreased amniotic fluid with intrauterine growth retardation, postdated pregnancy, abnormal fetal heart rate patterns, low APGAR scores and increased rates of caesarean section for fetal distress.³

According to the four-quadrant ultrasonic-technique, the amniotic fluid index is measured by dividing the uterus into four imaginary quadrants by linea nigra serving as dividing point for right and left halves and umbilicus serving as dividing point for upper and lower halves. Then by keeping the transducer parallel to the patient's longitudinal axis and perpendicular to the floor, the deepest, unobstructed, vertical pocket of fluid is measured in each quadrant in centimeters and the four quadrant measurements are then added to calculate the AFI. Normal AFI values range from 5 cms to 25 cms . In this study, the amniotic fluid index (AFI) will be interpreted in three categories ; AFI <5 cms, AFI 5-15 cms, AFI>15cms.⁴

2. Materials and Methods

This prospective observational study was conducted in the postgraduate department of Gynecology and Obstetrics of GMC Srinagar associated Lalla ded Hospital over a period of one and a half year. In our study AFI was noted in 251 patients with low risk pregnancies near term (37 weeks to 40 weeks). These women were admitted either in early labour or induction of labour was done and these women were

followed during the course of labour and were assessed for mode of delivery and perinatal outcome.

Inclusion Criteria

This included the following patients

- Term or near term Patients (37 weeks to 40 weeks)
- Singleton pregnancy
- Non-anomalous baby
- Primigravidae
- Intact membranes
- Women in early labour or where induction of labour was done.

Exclusion Criteria

Following patients were excluded from the study

- Multiple Pregnancy
- Pre term (Less than 37 weeks)
- Recurrent missed abortions
- PROM (Premature Rupture of Membranes)
- Congenital Anomalies
- Previous bad Obstetric history
- Maternal age above 40 or less than 19
- Previous LSCS
- Intra Uterine Death (IUD)
- Non cephalic presentation/ Malpresentation

Parameters that were studied are:

- 1) Age of the patients and gestational age at the time of admission.
- 2) Amniotic Fluid Index (By 4-quad technique).
- 3) Presence of Meconium, cord around neck at the time of delivery.
- 4) Mode of delivery (Normal vaginal delivery , caesarean section)
- 5) APGAR Score at 0, 1 and 5 Minutes
- 6) Need for admission in NICU

Data was analysed using STATA version 15. A p-value of less than 0.05 was considered statistically significant.

3. Results and Discussion

In our study, most of the patients (64.14%) were in the age group of 25-30 years which is similar to the mean maternal age of 27.04 yrs in the study of **Pradhan et al**⁵ done in 2015 to evaluate the relationship between AFI and perinatal outcome. Our results show that majority of the cases at the time of admission had gestational age of 40 weeks followed by 39 weeks which are in agreement with the study done by

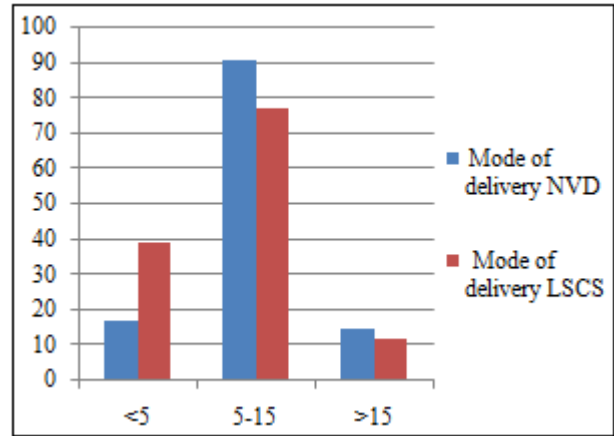
Miura Y et al⁶ (2011) who in their study found that the mean gestational age was 39 weeks.

Out of the total 251 patients, 168 (66.93%) patients had adequate liquor with AFI between 5-15 cms, 56 (22.31%) patients had oligohydramnios with AFI <5cms while 27(10.76%) patients had polyhydramnios with AFI>15cms .Our results are in agreement with the study done by Anand RS et al (2016)¹ to assess the role of AFI as perinatal outcome predictors, in which 18% of the patients had AFI< 5cms and 82% had AFI >5cms.

Comparison of AFI with Mode of Delivery (MOD)

AFI (cms)	Mode of delivery		Total
	NVD	LSCS	
<5	17 (30.36%)	39 (69.64%)	56 (100%)
5-15	91 (54.17%)	77 (45.83%)	168 (100%)
>15	15 (55.56%)	12 (44.44%)	27 (100%)
Total	123 (49%)	128 (51%)	251 (100%)

Pearson chi square (2) =10.0472 ; p=0.007

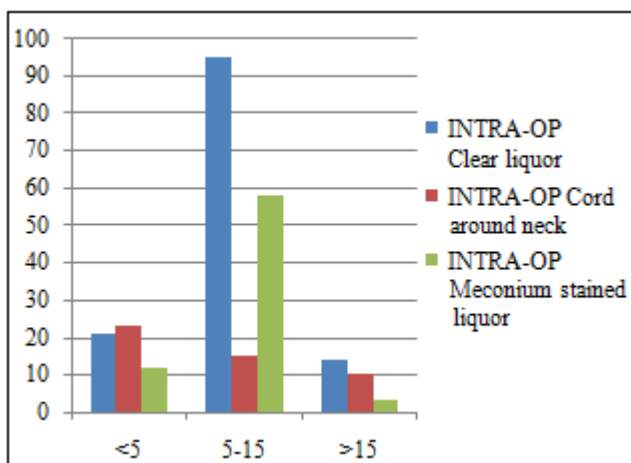


The results of our study showed that in patients with AFI< 5cms, 69.64% required LSCS whereas this percentage was 45.83% & 44.44% respectively in patients with adequate liquor (AFI 5-15cms) and polyhydramnios (AFI> 15cms) respectively. Results similar to our study were also obtained in the study conducted by Anand RS et al in 2016¹ to evaluate AFI, NST & color of liquor as a predictor of perinatal outcome. In patients with AFI <5cms, 83% needed intervention during labour (77% LSCS, 6% instrumental vaginal delivery) while in AFI> 5cms group only 29% needed intervention (24% LSCS, 3% instrumental vaginal delivery). Our results are also in agreement with the study by Sangeetha et al (2015)⁷ done to assess pregnancy outcome in term low risk pregnancies with oligohydramnios in which LSCS rate (22%) was significantly high in low AFI (<5cms) group compared to control group(4%) with AFI>5 cms.

Comparison of AFI with intra-operative findings (INTRA-OP)

AFI (cms)	INTRA-OP			Total
	Clear liquor	Cord around neck	Meconium stained liquor	
<5	21 (37.50%)	23 (41.07%)	12 (21.43%)	56 (100%)
5-15	95 (56.55%)	15 (8.93%)	58 (34.52%)	168 (100%)
>15	14 (51.83%)	10 (37.04%)	3 (11.11%)	27 (100%)
Total	130 (51.79%)	48 (19.12%)	73 (29.08%)	251 (100%)

Pearson chi square (4) =36.5463 ; p<0.00



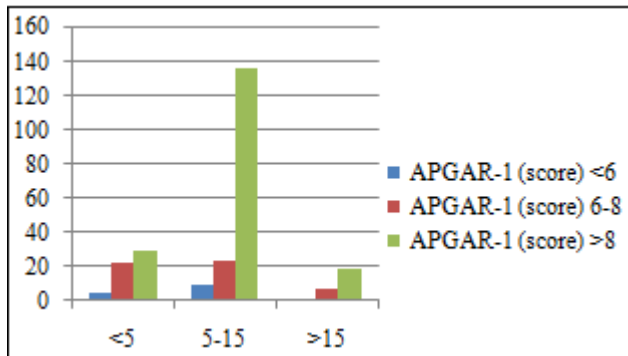
In our study it was also seen that in patients with low AFI (<5cms) ,cord around neck was present in 41.07% of the newborns & meconium stained liquor in 21.43% of the newborns at the time of delivery while in patients with AFI between 5-15 cms, cord around neck was seen in 8.93% and

meconium stained liquor in 34.52% of the newborns at the time of birth . Thus, in our study no significant difference in meconium staining of the liquor was seen between the AFI groups. Similarly there was no significant difference in meconium staining between th two groups of AFI in the study by Bhagat Megha et al (2014)⁸ which was done to see the correlation between AFI & perinatal outcome.

Comparison between AFI and APGAR score at “1-minutes” of BIRTH (APGAR-1)

AFI(cms)	APGAR-1 (score)			Total
	<6	6-8	>8	
<5	4 (7.14%)	22 (39.29%)	30 (53.57%)	56 (100%)
5-15	9 (5.36%)	23 (13.69%)	136 (80.98%)	168 (100%)
>15	1 (3.70%)	7 (25.93%)	19 (70.37%)	27 (100%)
Total	14 (5.58%)	52 (20.72%)	185 (73.71%)	251 (100%)

Pearson chi square (4) = 18.4259 ; P=0.001



At “1-minute” of birth, there were only 7.14% with low APGAR in AFI<5cms group and 5.12% with low APGAR in AFI >5 cms group. There was not a statistically significant difference in the APGAR score at birth between the AFI groups. Similarly there was no statistical difference in APGAR score at birth between the two groups of AFI in the study by **Bhagat Megha et al (2014)**.⁸

Comparison of AFI with NICU Admission

AFI(cms)	NICU		Total
	Absent	Present	
<5	52 (92.86%)	4 (7.14%)	56 (100%)
5-15	159 (96.95%)	9 (5.35%)	168 (100%)
>15	26 (96.30%)	1 (3.7%)	27 (100%)
Total	237 (94.42%)	14 (5.58%)	251 (100%)

Pearson chi square (2)=3.840 ; p=0.041

NICU admission was also more in newborns of patients with AFI<5 cms (7.14% in patients with AFI<5 cms as compared to 5.35% in patients with adequate liquor) as seen in our results, though the results were not statistically significant. Our results are in agreement with the study conducted by **Pradhan S et al in 2015**⁸ to evaluate the relationship between AFI and perinatal outcome in which the caesarean section rate for fetal distress & low birth weight babies (<2.5kgs) was higher in patients with low AFI (p=0.048,0.001 respectively). In this study there was no significant difference in meconium staining, APGAR score at 5-minutes between the two groups (p=0.881,0.884 respectively). Similar to our study, results were seen in the study by **Sangeetha et al (2015)**⁷ in which NICU admission was more in low AFI group than in control group but the results were not statistically significant, abnormal fetal outcome was significantly more in low AFI group compared to control group and also in the study by **Anand RS et al (2016)**¹, 89% of the newborns in patients with AFI< 5cms had an APGAR score <7 whereas in patients with AFI>5 cms, only 20% had APGAR score <7.

4. Conclusions

- 1) In patients with low AFI, rate of caesarean section as mode of delivery was more.
- 2) Intraoperatively, cord around neck of baby and meconium stained liquor was seen more in patients with AFI<5 cms than in those with AFI>5 cms.
- 3) APGAR score at 1 minute of birth and NICU admission was more in babies of those patients with AFI< 5cms as compared to babies of those patients with AFI >5 cms.

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