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## RESEARCH ARTICLE

### INTRAPARTUM AFI AND COURSE OF LABOUR: A CORRELATION STUDY

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#### ABSTRACT

**Background and objectives:** Fetal distress in labor is a common occurrence and is of great concern for both patient and the obstetrician. An evaluation to predict early in course of labor, which fetus is at risk of developing distress could aid in management of labor. In current practice volume of amniotic fluid is measured non-invasively by USG. The present study was conducted with the objective of assessing the relation of amniotic fluid index and course of labor.

**Methodology:** The present study was conducted on 200 pregnant women admitted for labor and delivery. All patients were subjected to ultrasound examination and AFI was determined by four quadrant techniques and divided into 3 groups depending on the value of AFI.

**Results:** 20% of women were in oligohydramnios group, 21% in borderline group and 59% in normal group. Thick meconium stained liquor was seen in 45% of oligohydramnios group, 14.2% in borderline group and 10.16% in normal group. 40 women in group I 30% had normal delivery, 12.5% instrumental and 57.5% cesarean delivery. In the 42 women in group II, 61.9% had normal delivery, 14.2% instrumental and 23.8% cesarean. Among the 118 women in group III 87.2% had normal delivery, 7.6% instrumental and 5.08% cesarean.

**Interpretation and conclusion:** Incidence of cesarean delivery for fetal distress was 52.5% among oligohydramnios group in our study, a finding that is similar to most studies. As there are adverse outcomes in patients with borderline and low AFI values, there should be a close observation and antepartum surveillance for pregnant females. Intrapartum assessment of AFI supplements antepartum fetal assessment. 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.

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## INTRODUCTION

Amniotic fluid is protective to the fetus. During pregnancy acts as a shock absorber, protecting the fetus from possible extraneous injury. It also maintains temperature, helps in growth and free movement of fetus. During labour, it forms a hydrostatic wedge which helps in dilatation of the cervix. During uterine contraction, it prevents marked interference with the placental circulation so long as the membranes remain intact (Malavalli Kempasiddaiah Girija and Maheshwari Marisiddaiah, 2014). Fetal distress in labor is a common occurrence and is of great concern for both patient and the obstetrician. An evaluation to predict early in the course of labor, which fetus is at risk of developing distress could aid in the management of labor.

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The dye dilution test is considered the gold standard for assessment of amniotic fluid volume (John Studd, ?). However this is an invasive technique requiring amniocentesis and therefore suitable for research purpose and not for routine clinical practice, which often needs repeated evaluation. So in current practice volume of amniotic fluid is measured non-invasively by ultrasonography (American College of Obstetricians and Gynecologists, 2007). 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 labor into high risk and low risk groups. Cardiotocography for 20 minutes (NST) and response to vibroacoustic stimulation have been used as admission tests (Phelan et al., 1990). USG examination including measurement of AFI as an "admission test" for women presenting at labor ward, after an uneventful pregnancy, could identify patients at risk of fetal distress and thus can detect cases needing "SPECIAL SURVEILLANCE". This is superior to the

antepartum risk assessment because an immediate evaluation of the current fetal condition could be obtained (Phelan *et al.*, 1990). Hence the present study was conducted with the objective of assessing the course of labour in relation to AFI.

## MATERIALS AND METHODS

The present study was conducted in Department of Obstetrics and Gynecology, at Shadan Institute of Medical Sciences, Hyderabad from January 2011 to May 2012. 200 pregnant women admitted for labor and delivery were selected on the basis of simple random sampling technique. All cases underwent thorough history taking and complete examination. They were then subjected to ultrasound examination and amniotic fluid index was determined by four quadrant techniques. All women were divided into 3 different groups depending on the value of AFI, as shown in the Table No 1.

### Inclusion Criteria

Pregnant Women with gestational age more than 37 weeks and less than 42 weeks, Singleton pregnancy, Patients with true labor pains, AFI assessed by Ultrasound, They should have delivered during the same hospitalization when AFI was determined, Cephalic presentation. The parameters that were recorded were gestational age at delivery, parity and nature of amniotic fluid, mode of delivery, incidence of LSCS and instrumental delivery.

**Table 1. Shows distribution of cases among different groups**

Groups	AFI	No. of Patients	Percentage (%)
I	< 5 Oligohydramnios	40	20
II	5.1-8 Borderline	42	21
III	8.1-24 Normal	118	59

### Diagnostic criteria for AFI

Oligohydramnios - AFI  $\leq$  5cm

Low normal – AFI 5.1 – 8cm

Normal – AFI 8.1 – 24cm

Polyhydramnios – AFI >24 cm

Statistical Analysis: Descriptive data are presented as number and percentages. Chi-square test was used for analyzing categorical data. A p-value of 0.05 or less was considered statistically significant.

## RESULTS

The study was conducted in 200 term pregnant women who were admitted in Department of Gynaecology and Obstetrics, Shadan Institute of Medical Sciences and research Centre, Hyderabad for a period of one year and five months. Table No. 1 shows the distribution of the number of cases in each group. 20% of women were in oligohydramnios group, 21% in borderline group and 59% in normal group. The oligohydramnios and borderline groups were individually compared with normal group with regard to maternal age, gravidity, parity and gestational age and matched. Table No. 2 shows that thick meconium stained liquor was seen in 45% of women among oligohydramnios group, 14.2% among borderline group and 10.16% among normal group. The incidence of thick meconium stained liquor was high in the oligohydramnios group I. The nature of amniotic fluid in different groups had a chi-square value of 53.74 and a p-value of < 0.05 which was statistically significant. Table No.3 indicates that outlet forceps delivery was conducted in 12.5% of women among oligohydramnios group, 14.2% of women in borderline group and 7.5% of women in normal group. It can be observed that the incidence of instrumental delivery was high among Oligohydramnios and borderline group of women in the present study. No complications of instrumental delivery were noted in our study.

From the table no.4, it can be observed that there was fetal distress in 52.5% of women among oligohydramnios group, 21.4% in borderline group and 2.5% among normal group. This indicated a high incidence of cesarean delivery for fetal distress in Oligohydramnios group. Indications of emergency cesarean delivery done in normal group are CPD in labor and prolonged 2nd stage. No patients required elective LSCS in our study for oligohydramnios. Table No.5 shows that among the 40 women in group I 30% had normal delivery, 12.5% instrumental and 57.5% cesarean delivery. In the 42 women in group II, 61.9% had normal delivery, 14.2% instrumental and 23.8% cesarean.

**Table 2. Table showing nature of Amniotic Fluid among three different groups**

Nature of Amniotic fluid	Group I	%	Group II	%	Group III	%	$\chi^2$	Pvalue
Thin	6	15	10	23.8	2	1.69	53.74	<0.05
Thick	18	45	6	14.2	12	10.16		***
Clear	14	35	26	61.9	104	88.13		
Total	40	100	42	100	118	100		

**Table 3. Table showing number of instrumental deliveries among different groups**

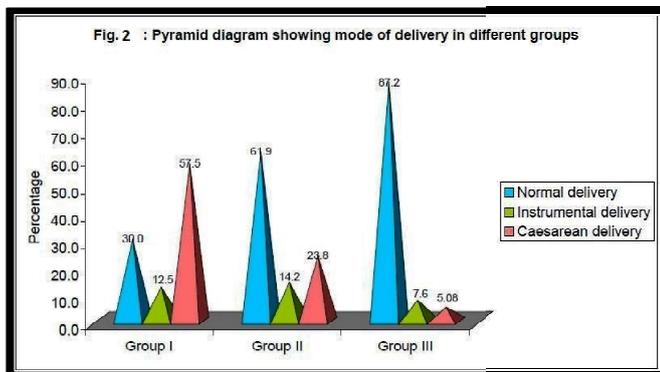
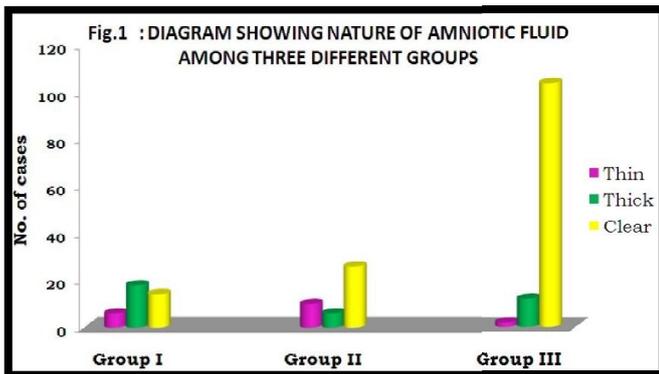
Groups	N	Outlet Forceps	%
I	40	5	12.5
II	42	6	14.2
III	118	9	7.5

**Table 4. Table showing indications for emergency cesarean delivery in three different groups**

Indications	Group I	%	Group II	%	Group III	%
Fetal distress n-33	21	52.5	9	21.4	3	2.5
CPD in labor n-4	1	2.5	1	2.3	2	1.6
Prolonged second stage n-1	-	-	-	-	1	0.8
Failure to progress n-1	1	2.5	-	-	-	-

**Table 5. Table showing the mode of delivery in three different groups**

Groups	Normal Delivery	%	Instrumental Delivery	%	Cesarean Delivery	%	$\chi^2$	P Value
I (n-40)	12	30	5	12.5	23	57.5	58.7	<0.05
II (n-42)	26	61.9	6	14.2	10	23.8		***
III (n-118)	103	87.2	9	7.6	6	5.08		



Among the 118 women in group III 87.2% had a normal delivery, 7.6% instrumental and 5.08% cesarean. The difference in the mode of delivery was found to be statistically significant between three groups ( $p < 0.05$ ).

## DISCUSSION

The measurement of amniotic fluid is one among the 2 component of modified biophysical profile (other being VAST) (Rutherford and Smith, 1987). Assessment of amniotic fluid volume is one of the important component of obstetric sonogram, particularly in the second and third trimester. In 1987 a semiquantitative sonographic assessment of Amniotic fluid volume was developed known as AFI (Phelan *et al.*, 1986).

This involves the summing of maximum vertical pockets in each of the four quadrants of the uterus. The amniotic fluid index cut offs provided a useful working definition of "normal" (AFI = 8.1-18cm) amniotic fluid volume. Patients with amniotic fluid index values less than 5cm had significantly higher risk of fetal heart rate abnormalities, meconium staining and cesarean delivery. Thus it seems logical to evaluate amniotic fluid volume in the early intrapartum period as a predictor of fetal morbidity.

Increasing AFI correlates linearly with increasing birth weight and macrosomia is associated with an increased incidence of cesarean delivery. AFI > 15 carries over double risk of birth of a macrosomic infant, while AFI > 18 has a risk of over six times (Myles and Nguyen, 2001). The incidence of oligohydramnios AFI ( $\leq 5$ cms) between 36-40 weeks of gestation was 2.4% in a study by Rutherford and Smith, 1987. It was noted that pregnancies with an AFI  $\leq 8$ cm had higher incidence of meconium staining, cesarean section for fetal distress, abnormal fetal heart rate tracings (Jeng *et al.*, 1992). Guin Gita and Punekar Shweta, 2011, found in their study that when oligohydramnios was associated with an additional risk factor, the incidence of induction was high (56.5%). The incidence of Cesarean section was high (42.8%). Fetal distress (48/60) was the commonest indication of CS (Guin Gita and Punekar Shweta, 2011). The maternal and fetal complications in women with borderline AFI were compared with complications in those with normal AFI among 235 pregnant women in a study by Maryam Asgharnia *et al.* (2013). The study confirmed the increased adverse perinatal outcomes in women with borderline AFI. Findings indicated that maternal outcomes such as preterm delivery and labor induction in women with borderline AFI were considerably higher than those in normal group and that was consistent with the findings in some other studies (Maryam Asgharnia *et al.*, 2013). In present study the incidence of thick meconium stained liquor was high among oligohydramnios group accounting for 45% of women and is comparable with the study conducted by Phelan and Sarno, (1990) (41.9%). The studies by Raj Sriya *et al.*, (2001) showed 38.88%, Kaushik *et al.* (2006) and CharuJandial *et al.* (2007) 48%, and Rutherford and Smith, (1987) 54% incidence of thick meconium stained amniotic fluid in the oligohydramnios group. The incidence of cesarean delivery for fetal distress was 52.5% among oligohydramnios group in our study. This is comparable with the study

conducted by Brian *et al.* (2000) (48%) (Brian *et al.* (2000), Charu Jandial *et al.* (2007) (58%) Charu Jandial *et al.* (2007) and Nazlima and Fatima, (2012) (58%). In our study 2.5% of women in normal group had fetal distress which is comparable with the study conducted by Phelan and Sarno, 1990 (2.5%) (Phelan and Sarno, 1990).

### Conclusions

- As there are adverse outcomes in patients with borderline and low AFI values, there should be a close observation and antepartum surveillance for pregnant females.
- AFI  $\leq$  5cm is associated with high incidence of thick meconium stained liquor, fetal distress, operative delivery and cesarean section for fetal distress, thus increasing maternal and fetal morbidity.
- Intrapartum assessment of amniotic fluid index supplements antepartum fetal assessment. 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.
- Conflict of interest:
- The authors declare that there are no conflict of interest.

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