

## AFI and its Relation with MSL, CS and Perinatal Outcome

J. Lalitha\*, B.S. Krishnamma\*\*

### Abstract

*Introduction:* Amniotic fluid volume helps in assessing perinatal outcome. It's appearance and composition can be a beacon in forecasting fetal well-being. This article substantiate the above claim, the discussed study and it's discussions speaks for itself. *Method:* The study was carried out on two hundred women who attended the Institute of Obstetrics and Gynaecology, Government Victoria Hospital, Visakhapatnam from March 2002 to March 2004. It is comparative prospective study comparing 100 cases of oligohydramnios (Amniotic Fluid Index <5 cm) as study group with 100 cases of Normal (Amniotic Fluid Index >5 cm) as control group. *Result:* In the oligohydramnios group, The risk of meconium staining of liquor resulting intrapartum fetal distress and consequent increase in cesarean section rate is higher.

Increased rate of still births and low apgar scores and consequent increase in the rate of admission into neonatal intensive care unit. *Discussion:* Incidence of meconium aspiration syndrome, meconium stained liquor is statistically higher in the study group. Incidence of emergency caesarean section, incidence of caesarean section for fetal distress is statistically higher in the study group.

Incidence of still births, low apgar score, low birth weight babies, new

borns requiring admission into neonatal intensive care unit is statistically higher in the study group. *Conclusion:* Antenatal amniotic fluid index estimation is a reliable indicator for predicting adverse perinatal outcome.

**Keywords:** Amniotic Fluid Index; Perinatal Outcome; Meconium Stained Liquor (MSL); Meconium Aspiration Syndrome (MAS); Caesarean Section; Oligohydramnios.

### Introduction

During the normal course of pregnancy the colour of amniotic fluid changes. Prior to 20 weeks it usually ranges from a pale straw colour to deep yellow depending upon the amount of bilirubin present. At this stage of pregnancy, bilirubin is a normal constituent of amniotic fluid and does not necessarily indicate rhesus hemolysis in the fetus. After the mid pregnancy, the concentration of bilirubin decrease and by 6 weeks the normal amniotic fluid is virtually colourless white floccules may sometimes appear in the fluid during the last four to five weeks. These are clumps of desquamated fetal skin cell and free liquid material [vernix caseosa] and may be found on the skin at birth. Abnormal colouration usually results from contamination with blood or meconium but it may also be due to bilirubin. High bilirubin levels after 30 weeks must be regarded as abnormal.

### Aims & Objectives

1. To study the correlation between amniotic fluid index and meconium staining of liquor

\*Assistant Professor,  
Department of Obstetrics &  
Gynecology, Navodaya  
Medical College, Raichur -  
584103 Karnataka, India.  
\*\*Rtd. Professor & HOD  
Department of Obstetrics &  
Gynecology, Andhra  
Medical College,  
Vishakapathnam Andra  
Pradesh, India.

J. Lalitha, Assistant  
Professor, Department of  
Obstetrics & Gynecology  
Navodaya Medical College  
Raichur - 584103  
Karnataka, India.  
E-mail:  
lalitha.jujare@gmail.com

2. To study the correlation between amniotic fluid index and incidence of caesarean section (for fetal distress)
3. To study the correlation between amniotic fluid index and perinatal outcome.
2. Gestational age between 37-42 weeks
3. History of regular menstrual cycles or Ultrasonography done in the early trimester
4. No fetal anomalies detected on initial ultrasound screening.
5. Reactive Non stress test within 7 days.

### Materials and Methods

The study was carried out on two hundred women who attended the tertiary care hospital in Visakhapatnam from March 2002 to March 2004. It is comparative prospective study comparing 100 cases of oligohydramnios (Amniotic Fluid Index <5 cm) as study group with 100 cases of Normal (Amniotic Fluid Index >5 cm) as control group.

#### Inclusion Criteria

1. Singleton pregnancy

#### Exclusion Criteria

- History of irregular menstrual cycles.
- Patients conceived during the period of lactation
- History of oral contraceptive use before the last menstrual period
- Premature rupture of membranes
- Hydramnios
- Multiple pregnancy
- Cord complications

**Table 1:** Distribution of cases according to colour of liquor

	Control group	Study group
Clear	84 (84 %)	65 (65%)
Meconium stained	16 (16%)	35 (35%)
Total	100	100

p< 0.005 Statistically very significant

**Table 2:** Distribution of cases according to mode of delivery

	Control group	Study group
Spontaneous vaginal delivery	71 (71%)	54 (54%)
Forceps	9 (9%)	10 (10%)
Lower uterine segment caesarean section	20 (20%)	36 (36%)
Total	100	100

Chi- square = 10.92, P< 0.01 statistically very significant

**Table 3:** Distribution of cases according to emergency or elective lower uterine segment caesarean section

	Control group	Study group
Emergency Lower uterine segment caesarean section	9 (45%)	26(72.22%)
Elective Lower uterine segment caesarean section	11 (55%)	10(27.78%)
Total	20	36

**Table 4:** Distribution of women according to indications for lower uterine segment caesarian section

	Control Group	Study Group
Fetal distress	7 (35%)	20 (55.55 %)
Other Indications	13(65%)	16(44.45%)
Total	20	36

Chi- square = 4.0, P<0.05 statistically significant out of 20 women.

**Table 5:** Distribution of cases according to indications for lower uterine segment caesarean section

	Control group	Study group
Fetal distress	7 (35%)	20(55.55%)
Previous Lower uterine segment caesarean section	8 (40%)	7(19.44%)
Cephalopelvic disproportion	3(15%)	4 (11.11%)
Failure to progress	1 (5%)	2(5.56%)
Failed induction	1(5%)	3 (8.33%)
Total number of Lower uterine segment caesarean section	20	36

**Table 6:** Effect of amniotic fluid index on apgar score

	Control group	Study group
Still births	1 (1%)	4 (4%)
Apgar < 5	3 (3%)	12 (12%)
Apgar 5-8	10 (10%)	24 (24%)
Apgar >8	86 (86%)	60 (60%)
Total	100	100

Chi-square = 17.58, P< 0.001 Statistically Very Significant

**Table 7:** Amniotic index and birth weight

	Control group	Study group
Range	1.44-4.25 kgs	1.42- 4.25 kgs
Mean birth weight	3.00 kgs	2.64 kgs
Standard deviation	0.48	0.53
Total number of babies	100	100

Standard error of difference between two means is 0.071 P< 0.05 statistically significant.

**Table 8:** Distribution of babies according to birth weight

	Control group	Study group
Normal birth weight (> 2.5 kgs)	76 (76%)	60 (60%)
Low birth weight (< 2.5 kgs)	24 (24%)	40 (40%)
Total number of babies	100	100

Chi-square = 5.88, P< 0.05 statistically significant

**Table 9:** Distribution of babies according to admissions into neonatal intensive care unit

	Control study	Study group
Number of babies admitted in Neonatal Intensive Care Unit	13 (13%)	36(36%)
Number of babies not admitted in to Neonatal Intensive Care Unit	87 (87%)	64 (64%)
Total	100	100

**Table 10:** Distribution of babies according to neonatal complications

	Control group	Study group
Birth asphyxia	4 (30.77%)	16 (44.45%)
Intra uterine growth retarded babies	2 (15.38%)	8 (22.23%)
Meconium aspiration syndrome	1 (7.7%)	10 (27.77%)
Hyperbilirubinemia	4 (30.77%)	2 (5.55%)
Convulsions	2 (15.38%)	-
Total	13	36

With all these criteria satisfied Amniotic fluid index was measured in these patients using with curvilinear array real time B scan examination is performed with the patient in the supine position. Landmarks for the four quadrants of maternal abdomen are used to divide a uterine cavity into four sections. Umbilicus divides it transversely into upper and lower halves and the linea alba divides it into right and left halves, the curvilinear transducer head is placed along mother's longitudinal axis and held perpendicular to the floor for all measurements. The maximum vertical diameter of the largest pocket is measured in centimeters in each of the four quadrants. 'Vertical' is defined as perpendicular to the transducer head. Brief appearance of cord or an extremity are ignored but aggregation of either the exclusion of the fluid is not considered as a part of fluid pocket. The measurements obtained from each quadrant are summed to form Amniotic Fluid Index.

### Statistical Analysis

The chisquare test ( $\chi^2$ ) was applied to compare two proportions of the patients. The value of probability (P) < 0.05 was taken as significant, those with P < 0.01, P< 0.005 and P < 0.001 were taken as very significant and those with P >0.05 were taken as not significant.

### Results & Discussion

In the present study out of 36 babies in study group who were admitted in neonatal intensive care unit 16 babies (44.45%) had birth asphyxia in study group where as out of 13 babies who were admitted in neonatal intensive care unit. 4 babies (30.77%) had birth asphyxia in control group. 8 babies (22.23%) had intra uterine growth retardation in study group

when compared to 2 babies (15.38%) in control group. 10 babies (27.77%) had meconium aspiration

	Oligohydramnios group	
	No. of Cases	%
Present study	100	55.5
Casey et al <sup>8</sup>	147	5
Thomas D. Myles et al <sup>7</sup>	-	4.3

syndrome study group when compared to 1 baby (7.7%) in control group. 2 babies (5.5%) had hyperbilirubinemia in study group when compared to 4 babies (30.77%) in control group. 2 babies (15.38%) had convulsions in control group.

	Study Group		Control Group	
	No. of Cases	%	No. of Cases	%
Present Study	100	4	100	1
Casey et al study <sup>8</sup>	147	1.4	6276	0.3

In the present study, incidence of meconium stained liquor is statistically higher in the study group (35%) when compared to control group (16%) as  $p < 0.005$ . The present study coincides with Hsieh et al [1], Shmoys et al [2], Redzko et al [3], Ergun et al [4] Sarno et al [5] and Jeng et al [6].

In the present study, incidence of meconium stained liquor in the oligohydramnios group was 35% where as 43.7% in Thomas D. Myles et al [7]. In the present study, incidence of caesarean section rate is statistically higher (36%) in the study group when compared to the control group (20%) as  $p < 0.01$ . The present study coincides Hsieh et al [1], Casey et al [8], Shmoys et al [2] and Redzko et al [3].

	Oligohydramnios group	
	No of Cases	%
Present study	100	36
Casey et al <sup>8</sup>	147	1
Thomas D. Myles et al <sup>7</sup>	-	4.3%

In the present study, incidence of emergency caesarean section is statistically higher in study group (72.22%) when compared to control group (27.78%) as  $p < 0.005$ . But in Varma et al [9] study, there is increase in the incidence of elective cesarean section. In the present study, incidence of caesarean section for fetal distress is statistically higher in the study group (55.55%) when compared to control group (35%) as  $p < 0.05$ . The present study coincides with Shmoys et al [2] and Voxman et al [10].

Meconium aspiration syndrome	Study Group		Control Group	
	No of cases	%	No of cases	%
Present study	100	27.7	100	7.6
Casey et al <sup>8</sup>	147	1	6276	0.1

In the present study, incidence of caesarean section for fetal distress is 55.5% and Casey et al [8] found 5% and Thomas Myles et al<sup>7</sup> found 4.3%. In the present study there is statistically increased incidence of still birth in the study group (4%) when compared to control group (1%)

The incidence of still births in oligohydramnios group 4% in the present study. Where as 1.4% in Casey et al study [8]. In the present study, incidence of low apgar score stastically higher in the study group (12%) when compared to control group (3%) as  $p < 0.001$ . The present study coincides with Hsieh et al [1], Shmoys et al [2], Ergun et al, Jeng et al [6] Redzko et al [3] showed no significant effect of amniotic fluid index on apgar score. In the present study, incidence of low birth weight babies is statistically higher in the study group (40%) when compared to control group (24%) as  $p < 0.05$ . The present study coincides with Hsieh et al [1] and Roberts et al [11]. Incidence of rate of admissions into NICU in oligohydramnios group was 36% when compared to control group 13%.

Incidence of rate of admissions into NICU in oligohydramnios group was 36% in present study where as it was 1% in Casey et al [8] and 4.3% in Thomas D. Myles et al [7]. In the present study increased incidence of birth asphyxia (44.4%) IUGR (22%) MAS (27.7%) when compared to control group. The present study coincides with Hsieh et al [1] and Varma et al [9].

### Summary

Incidence of meconium aspiration syndrome in the present study was 27.7% where as 1% in Casey et al study. In the present study, incidence of meconium stained liquor is statistically higher in the study group (35%) when compared to control group (16%) as  $p < 0.005$ . In the present study, incidence of caesarean section rate is statistically higher (36%) in the study group when compared to the control group (20%) as  $p < 0.01$ . In the present study, incidence of emergency caesarean section is statistically higher in study group (72.22%) when compared to control group (27.78%) as  $p < 0.005$ . In the present study, incidence of caesarean section for fetal distress is statistically higher in the study group (55.55%) when compared to control group (35%) as  $p < 0.05$ . In the present study, incidence of still births is statistically higher in the study group (4%) when compared to control group (1%) and incidence of low apgar score statistically higher in the study group (12%) when compared to control group (3%) as  $p < 0.001$ .

In the present study, incidence of low birth weight babies is statistically higher in the study group (40%)

when compared to control group (24%) as  $p < 0.05$ . In the present study, incidence of new borns requiring admission into neonatal intensive care unit is statistically higher in the study group (36%) when compared to control group (13%) as  $p < 0.001$ .

### Conclusion

In the oligohydramnios group, the risk of meconium staining of liquor, intrapartum fetal distress and consequent increase in cesarean section rate, increased rate of still births and low apgar scores and consequent increase in the rate of admission into neonatal intensive care unit. All these findings lead to the conclusion that antenatal amniotic fluid index estimation is a reliable indicator for predicting adverse perinatal outcome.

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