

International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622
© Gynaecology Journal
www.gynaecologyjournal.com
2018; 2(3): 99-101
Received: 28-03-2018
Accepted: 29-04-2018

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Amniotic fluid index for prediction of fetal outcome

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Abstract

Introduction: Quantification of amniotic fluid is an important component in biophysical profile, especially in third trimester. Ultrasound being a noninvasive test is ideal for application on a large scale and can be used frequently for repeat AFV determination. Fluid provides a protective cushion effect for growing fetus. It maintains the temperature and provide a thermally stable environment. It acts as shock absorber, protecting fetus from possible external injury.

Method and Materials: The study was done for 1 year from feb.2015 to July 2016. We took 100 singleton booked antenatal women with period of gestation between 34 to 41 weeks admitted in labor room for delivery at National institute of medical sciences and research hospital. Amniotic fluid index was determined by using Phelan's technique within 7 days of delivery or at the onset of labor. The patients were divided into 2 groups with AFI >5 and <5cm. equipment used was real time imaging ultrasound machine.

Results & Conclusion: out of total 100 patients, 4 (28.6%) women in group I and 18 (20.9%) women in group II had meconium stained liquor. Induction of labor was done in 10 (71.4%) in group I and 28 (32.6%) in group II, Total 9 (64.3%) patients in group I and 22 (25.6%) in group II, had cesarean section out of which 5 (35.5%) women in group I and 8 (9.3%) women in group II has fetal distress as indication of LSCS. Present study concluded that low AFI index is excellent predictor of adverse fetal effects which can be prevented if low AFI is detected timely and enhanced antepartum and intra partum surveillance is provided.

Keywords: Induction of labor, AFI index, partum surveillance

Introduction

Modern obstetrics is concern with the health and well-being of both mother and unborn child. Recognition of a fetus at risk for death or damage in utero, quantifying the risk, balancing the fetal risk against the risk of neonatal complication from immaturity, and determining the optimal time and the mode of intervention are cornerstones of modern perinatal medicine. [1], fluid provides a protective cushion effect for growing fetus. It maintains the temperature and provide a thermally stable environment, [2, 3]. It acts as shock absorber, protecting fetus from possible external injury.

Quantification of amniotic fluid is an important component in biophysical profile, especially in third trimester. Ultrasound being a noninvasive test is ideal for application on a large scale and can be used frequently for repeat AFV determination. Now a days ultrasound has become crucial investigation during pregnancy because it is harmless, easily available, and inexpensive. Various reported ultrasonographic methods to assess the AFV are:

1. Single deepest pocket.
2. 2-diameter pocket.
3. Amniotic fluid index by four quadrant method.

We sought to determine if an antepartum AFI is less than 5 cm is a predictor of adverse perinatal outcome in terms of meconium stained liquor, cesarean section for fetal distress. Birth weight, low Apgar score.

Aims & Objective

1. To study the correlation between amniotic fluid index with perinatal outcome.
2. To compare perinatal out come in normal versus low AFI patients in terms of meconium staining, mode of delivery, non reassuring fetal heart rate, cesarean section rate, NICU admission and neonatal mortality.

Method & Materials

The present study was prospective study carried out at the NIMS &R hospital, Jaipur, Rajasthan.

The study was done for 1 year from feb.2015 to July 2016. We took 100 singleton booked antenatal women with period of gestation between 34 to 41 weeks admitted in labor room for delivery at National institute of medical sciences and research hospital. Patient inclusion criteria:

Period of gestation between 34 weeks and 41 weeks.

Patients who give consent for study conduct.

Singleton pregnancy.

Intact membrans.

Exclusion criteria

Patients withdrawal from study design and defaulters.

Patients with medical illness or disease superadded to pregnancy for example Thyroid disorders, diabetes, preeclampsia, eclampsia, diagnosed case of IUGR, post datism, heart disease ect.

Premature rupture of membranes.

Twin and multiple pregnancy.

Associated fetal anomalies.

On admission detailed history was taken and a clinical exam was performed and gestational age assessed. Amniotic fluid index was determined by using Phelan's technique within 7 days of delivery or at the onset of labor. The patients were divided into 2 groups with AFI >5 and <5cm. equipment used was real time imaging ultrasound machine (Model GE Volusion 730 PRO). data was coded and entered in to Microsoft excel spreadsheet. Analysis was done using SPSS version 20 (IBM SPSS statistics inc. Chicago, Illinois, USA.) window software programme. Level of significance was set at p value <0.05.

Observation & Results

Table 1: Distribution of patients on the basis of amniotic fluid index

Amniotic fluid index	Number of patients	%
<5 cm	14	14
>5 cm	86	86

Table 2: Obstetric and perinatal outcome

	AFI<5 N=14	AFI>5 N=86	P value
Meconium stained Liquor	4 (28.6%)	18 (20.9%)	0.52
Induction of labour	10 (71.4%)	28 (32.6%)	0.005 (s)
Total LSCS	9 (64.3%)	22 (25.6%)	0.004 (s)
APGAR Score At 5 min <7	7 (50%)	24 (27.9%)	0.57
Birth weight <2.5	11 (78.5%)	26 (30.2%)	0.001 (s)

Table 3: Secondary outcome measures

	AFI<5	AFI>5	P value
Non-reactive NST	5 (35.7%)	8 (9.3%)	0.006 (s)
Admission to NICU	6 (42.9%)	8 (9.3%)	0.001 (s)

Out of 100 women the mean maternal age was 24.92 years in group I and 25.29 in group II, out of which 8 (57.1%) women was nulliparous in group I and 53 (61.6%) In group II. Gestational age was <37 weeks in 8 (57.1%) patients in group I and 17 (19.8%) in group II. Obstetric and perinatal outcome were studied in both groups.

4 (28.6%) women in group I and 18 (20.9%) women in group II had meconium stained liquor. The difference was not statistically significant (p value-0.52). Induction of labor was done in 10 (71.4%) in group I and 28 (32.6%) in group II, which was statistically significant (p value-0.005). Total 9 (64.3%) patients in group I and 22 (25.6%) in group II, had cesarean section out of which 5 (35.5%) women in group I and 8(9.3%) women in group II has fetal distress as indication of LSCS. Cesarean section for fetal distress was higher in women with oligo hydramnios. Birth weight <2.5 kg was found in 11 (78.5%) women in group I and 26(30.2%) women in group II. An Apgar score <7 at 5 min was noted in 7 (50%) women in group I and 24 (27.6%) women in group II. The difference was not statistically significant (p value 0.57)

Nonreactive NST was present in a significant number of patients in group I (35.7%) as compared to group II (9.3%). (P value-0.006). most of the babies in group I were admitted to NICU in group I (42.9%).

Discussion

During the demographic study of population in present study no significant association was found between maternal age and amniotic fluid index as the mean age was comparable in both

groups. Similar observations were made in the studies conducted by casey *et al*, sowmya K *et al*, Chauhan *et al*.^[4, 5, 6]

In present study antepartum oligo hydramnios (AFI<5) was associated with increased cesarean delivery, particularly for fetal distress. Similar findings were observed by Chate *et al*, showing higher rate of cesarean section in patients with low AFI, 46% vs 16%.^[7] a study done by Bhagat *et al*. also showed cesarean section in significant number of patients with low AFI.^[8]

On the contrary Voxman *et al*. reported through his study that there was no difference in rate of cesarean section between two groups (16.7% and 22.9% for oligohydramnios and AFI >5 respectively.)

Loctaelli A *et al*. and bhagat M *et al*. in their studies showed that the occurrence of meconium stained liquor was higher in women with low AFI <5 but not significantly higher which was comparable to our study in which 28.57% women with low AFI had MSL as compared to 20.93

% women with AFI >5.^[9] The reason being oligohydramnios induced fetal distress which may be due to cord compression or compression over fetal head against maternal pelvis leading more cases of meconium passage^[7, 8]

Owing to more number of preterm deliveries and babies born with IUGR, the mean fetal weight in oligohydramnos group was lower 2.33 kg versus 2.7 kg in normal AFI group. The result of study strongly correlate with the study of Chate P *et al*.^[7]

Krishna et al reported through their study that there is direct relationship between oligohydramnios and growth retardation^[10].

Neonates of mother who were diagnosed with oligohydramnios, who needed to be admitted in NICU were significantly more as compared to those who were born with normal AFI. Results were coincide with Chate P *et al*.^[7]

Throgh the above discussion it can be seen that the low AFI group was associated with more number of cases of fetal

distress, more cesarean section, preterm deliveries, meconium stained liquor, more NICU admissions, but due to early intervention good intra partum surveillance and better neonatal resuscitation facilities no neonatal deaths or still births were encountered and the final outcome in both group was similar showing that if we are able to deliver good antepartum and intra partum fetal surveillance facilities we can negate the adverse effect of decreased amniotic fluid volume over perinatal outcome.

Conclusion

Present study concluded that low AFI index is excellent predictor of adverse fetal effects which can be prevented if low AFI is detected timely and enhanced antepartum and intra partum surveillance is provided.

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