Amniotic fluid index for prediction of fetal outcome

Dr. Omvati Gupta, Dr. Deepa Masand and Dr. Swati Gill

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 two groups with AFI >5 and <5 cm. 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, parturum surveillance

Introduction
Modern obstetrics is concerned 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. 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.

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 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.

Method and 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.

Exclusion criteria

- Patients withdrawal from study design and defaulters.
- Patients with medical illness or disease suupperadded 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 into 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>
<thead>
<tr>
<th>Amniotic fluid index</th>
<th>Number of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5 cm</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>&gt;5 cm</td>
<td>86</td>
<td>86</td>
</tr>
</tbody>
</table>

Table 2: Obstetric and perinatal outcome

<table>
<thead>
<tr>
<th>Non-reactive NST</th>
<th>AFI&lt;5</th>
<th>AFI&gt;5</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission to NICU</td>
<td>6 (42.9%)</td>
<td>8 (9.3%)</td>
<td>0.001 (s)</td>
</tr>
</tbody>
</table>

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 were 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 had fetal distress as indication of LSCS. Cesarean section for fetal distress was higher in women with oligohydramnios. 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 no 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.

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 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 oligohydramnios 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].

Through the above discussion it can be seen that the low AFI group was associated with more number of cases of 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 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 oligohydramnios 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].

Through the above discussion it can be seen that the low AFI group was associated with more number of cases of 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 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 oligohydramnios 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].
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.

References