

INFLUENCE OF AMNIOTIC FLUID INDEX ON FOETAL OUTCOME

G. Raja Lakshmi¹, D. Jyothsna²

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ABSTRACT: BACKGROUND AND OBJECTIVE: In these days of smaller families and the obstetrician having to share the onus of giving a healthy child capable of independent existence as well as to ensure that the population is limited for further progress of this developing country, the estimation of foetal maturity assumes greatest practical importance. As means to achieving the end, estimates of foetal maturity have been done by various clinical and laboratory methods of which assessment of amniotic fluid index assumes importance. The objective is to study the correlation of amniotic fluid index on foetal outcome at term gestation. **MATERIALS AND METHODS:** The study was carried out on two hundred antenatal women who attended the institute of obstetrics and gynaecology at a Government Hospital for Women and Children in Visakhapatnam from Jan 2014 to Jan 2015. It is a 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. **RESULTS:** Perinatal outcome was inferred by noting the various parameters and Statistical Analysis was done by applying the chisquare (x2) test and the value of probability was taken. **CONCLUSION:** The goal of antepartum fetal surveillance is to identify the fetus at increased risk. Amniotic fluid volume has been proved as an indirect measure of fetoplacental function and hence the estimation of amniotic fluid volume assists the obstetrician in risk assessment.

KEYWORDS: Amniotic fluid index, Oligohydramnios, Perinatal outcome.

INTRODUCTION: In these days of smaller families and the obstetrician having to share the onus of giving a healthy child capable of independent existence as well as to ensure that the population is limited for further progress of this developing country, the estimation of foetal maturity assumes greatest practical importance. The obstetrician also is faced with the dilemma of elective termination of pregnancy by caesarean section or induction of labour for the sake of both the fetus as well as the mother in cases of severe deficiency of liquor. In such cases, the probability of delivering a fetus with excellent chances of survival would be added advantage. As means to achieving the end, estimates of foetal maturity have been done by various clinical and laboratory methods:

1. Menstrual date.
2. Obstetric examination.
3. Date of quickening.
4. Date when foetal heart sounds are heard by auscultation.
5. Abdominal girth measurements.
6. Fundal height measurements.
7. Fetal head measurements.
8. Clinical impression of liquor.

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9. Imaging techniques-X-ray for ossification centres, ultrasound amniotic fluid index.
10. Biochemical studies of liquor.

Ultrasound assessment of amniotic fluid index has superceded all other laboratory techniques as it is safe, non-invasive, cheap and easily available procedure. It should form an integral part of routine obstetric examination.

MATERIALS AND METHODS: The study was carried out on two hundred antenatal women who attended the institute of obstetrics and gynaecology at a Government Hospital for Women and Children in Visakhapatnam from Jan 2014 to Jan 2015. It is a 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. Patients were included in the study after fulfilling the inclusion and exclusion criteria.

INCLUSION CRITERIA:

1. Singleton pregnancy.
2. Gestational age between 37-42 weeks.
3. Gestational age confirmed from history of regular menstrual cycles or ultrasonography done in early trimester.
4. No fetal anomalies detected on initial ultrasound screening.

EXCLUSION CRITERIA:

1. History of irregular menstrual cycle.
2. Patients with uncertain and unreliable dates.
3. History of oral contraceptive use before the last menstrual period.
4. Multiple pregnancy
5. Hydramnios.
6. All high risk pregnancies.

A careful clinical history was taken from all patients particularly about age, previous obstetric history, obstetric complications, last menstrual period, history of previous menstrual cycles and history of oral contraceptive use before the last menstrual period. A thorough clinical examination including blood pressure, presence of pedal oedema was examined. By obstetric palpation gestational age, presentation and amount of liquor was noted. The fetal heart was monitored with auscultation and cardiotocography. All preliminary and baseline investigations like hemoglobin estimation, blood grouping and typing and complete urine examination were done. A non-stress test with cardiotocography was done in all these patients at the time of admission.

With all these criteria satisfied amniotic fluid index was performed in these patients using curvilinear array real time B scan with the patient in supine position. Landmarks for the four quadrants of maternal abdomen are used to divide the uterine cavity into four sections. Umbilicus divides the abdomen transversely into upper and lower halves and the linea alba divides it into right and left halves. The curvilinear transducer head is placed along the mother's longitudinal

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axis 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. The measurements obtained from each quadrant are summed to form amniotic fluid index done by Phelan et al method. Perinatal outcome was inferred by noting the incidence of meconium stained liquor, mode of delivery and indication for caesarean section, both one minute and five minute APGAR score, birth weight and admission to Neonatal intensive care unit.

In the present study, patients have been grouped into two categories. Study group comprising patients with amniotic fluid index <5cm and control group comprising patients with amniotic fluid index > 5 cm. Perinatal outcome in these group has been studied separately.

STATISTICAL ANALYSIS: The chisquare test (χ^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 AND DISCUSSION: In the study group the mean amniotic fluid index was 4 cm with a range of 3-5 cm whereas in the control group mean amniotic fluid index was 12cm with a range of 6-19 cm. In the present study there was no statistically significant difference between maternal age and parity. The women were between 20-25 years in both study and control group. The present study coincides with the study of Colleen Baron et al and Elloit et al.^[1,2] As the gestational age increases beyond 40 weeks, amniotic fluid index decreased in the study group (44%). When compared to control group (11%) and this difference is statistically highly significant as P<0.001. This study coincides with study by Leveno et al (1984),^[3] Feischer et al (1996),^[4] and Hsieh et al (1998).^[5] The incidence of meconium stained liquor, (28%) rate of caesarean section (37%) especially emergency caesarean section (72.97%) for foetal distress (76%) was higher in the study group with Oligohydramnios than in control group where the incidence of meconium stained liquor (13%), rate of caesarean section (19%), emergency caesarean section (36%) especially for foetal distress (68%). Similar incidences were found in studies by Heish et al,^[5] Shmoys et al^[6] and Redzko et al.^[7]

In this study it was found that there was a rise of induction of labour in the study group (40%). When compared to the control group (18%). which coincides with a study by Varma et al. There is an increased incidence of stillbirth (2%) in the study group when compared to (1%) in control group. The incidence of low APGAR score was higher in the study group (31%) compared to control group (11%). This study coincides with the study of Hsieh et al,^[5] Shmoys et al,^[6] Jeng et al,^[8] Redzko et al^[7] who showed significant effect of amniotic fluid on APGAR score. In this study the incidence of low birth weight babies is higher in study group (28%) when compared to control group (2%) and also rate of admission into neonatal intensive care unit in the study group was (31%) when compared to control group (11%) and these findings coincide with the study by Hsieh et al^[5] and Roberts et al.^[9] The incidence of Birth asphyxia (29%), intrauterine growth restriction (12%), meconium aspiration syndrome (38.7%). When compared to control group and these findings are similar to studies by Hsieh et al and Varma et al. Incidence of respiratory

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distress syndrome was nil in both study and control group and this correlates well with studies by Petrucha et al, Kazzi et al, Gross et al, Shah et al.

CONCLUSION: The goal of antepartum fetal surveillance is to identify the fetus at increased risk. Amniotic fluid volume has been proved as an indirect measure of feto-placental function and hence the estimation of amniotic fluid volume assists the obstetrician in risk assessment. By application of dynamic ultrasonographic methods it is now possible to measure the amount of amniotic fluid. Of the various semi-quantitative methods described, the four quadrant technique of amniotic fluid index provides a most convenient and reproducible method of evaluating amniotic fluid.

As pregnancy advances the amount of liquor amnii starts decreasing and meconium stained amniotic fluid or absent amniotic fluid is seen more commonly, thus increasing the risk of intrapartum fetal distress and consequent increase in caesarean section rate, increased rate of still birth, low APGAR score and consequent increase in rate of admission into neonatal intensive care unit. Hence all these findings lead to the conclusion that the use of estimation of amniotic fluid index can be considered as a reliable indicator and having important prognostic value for predicting adverse perinatal outcome.

Amniotic Fluid Index	No. of Cases
> 5cm	100
< 5cm	100
Total	200

Table 1: Distribution of cases according to Amniotic Fluid Index

Amniotic Fluid Index	Control Group	Study Group
Range	6 – 18 cm	3 – 5 cm
Mean Amniotic Fluid Index	12 cm	4 cm

Table 2: Distribution of cases according to Amniotic Fluid Index

	Control Group	Study Group
16 – 20 years	46 (46%)	49 (49%)
21 – 25 years	43 (43%)	40 (40%)
26 – 30 years	11(11%)	1(11%)
Total	100 (100%)	100 (100%)

Table 3: Distribution of cases according to age

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	Control Group n (%)	Study Group n (%)
Primi Gravida	66 (66%)	61 (61%)
2 nd Gravida	29 (29%)	39 (39%)
3 rd Gravida	5 (5 %)	--
Total	100	100

Table 4: Distribution of cases according to parity

Chi Square = 0. 52 P > 0. 05 not statistically significant.

Gestational	Control Group	Study Group
37 – 40 week	89 (89%)	56 (56%)
40 week – 42 weeks	11 (11%)	44 (44%)
Total	100	100

Table 5: Distribution of cases according to Gestational age

Chi Square = 27 – 30 P = < 0. 001 statistically highly significant.

Liquor	Control Group	Study Group
Clear	87 (87%)	72 (72%)
Meconium Stained	13 (13%)	28 (28%)
Total	100	100

Table 6: Distribution of cases according to colour of Liquor

Chi Square = 6. 88 P = < 0. 005 Statistically very significant.

Mode of labour	Control Group	Study Group
Spontaneous	82 (82%)	60 (60%)
Induced	18 (18%)	40 (40%)
Total	100	100

Table 7: Distribution of cases according to mode of labour

Chi square = 11. 6 P < 0. 001 Statistically very significant.

Mode of labour	Control Group	Study Group
Vaginal delivery	68 (68%)	53 (53%)
Forceps	13 (13%)	10 (10%)
Lower uterine segment	19 (19%)	37(37%)
Total	100	100

Table 8: Distribution of cases according to mode of delivery

Chi square = 7. 8 P < 0. 05 Statistically significant.

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	Control Group	Study Group
Elective lower uterine segment caesarean section	12 (63%)	10 (27%)
Emergency lower uterine segment caesarean section	7 (36%)	27 (72.97%)
Total	19	37

Table 9: Distribution of cases according to emergency or elective lower uterine segment caesarean section

Chi square = 15 P < 0.001 Statistically very significant.

	Control Group	Study Group
Foetal distress	13 (68%)	28 (76%)
Other indications	6 (31%)	9 (24%)
Total	19	37

Table 10: Distribution of cases according to indications for lower uterine segment caesarean section

Chi square = 15.93 P < 0.001 Statistically very significant.

Lower uterine segment caesarean section	Control Group	Study Group
Foetal distress	13 (68%)	28 (76%)
Failed induction	4 (21%)	6 (16%)
Failure to progress	1 (5%)	3 (8%)
Cephalopelvic Disproportion	1 (5%)	0 (0%)
Total	19	37

Table 11: Distribution of cases according to indication for lower uterine segment caesarean section

Chi square = 15.93 P < 0.001 Statistically very significant.

	Control Group	Study Group
Still Births	1 (1%)	2 (2%)
APGAR 0-3	2 (2%)	6 (6%)
APGAR 4 – 6	9 (9%)	25 (25%)
APGAR 7 – 10	88 (88%)	67 (67%)
Total	100	100

Table 12: Amniotic fluid index and APGAR score

Chi square = 12.4 P < 0.001 Statistically very significant.

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Birth weight	Control Group	Study Group
Range	2- 4 kg	1. 5 – 5 kg
Mean Birth weight	3. 00 Kg	2. 75 kg
Total Number of Babies	100	100

Table 13: Amniotic fluid index and Birth weight

Birth weight	Control Group	Study Group
Birth weight > 2. 5 kg	98 (98%)	72 (72%)
Birth weight < 2. 5kg	2 (2%)	28 (28%)
Total Number of Babies	100	100

Table 14: Distribution of Babies according to Birth weight

Chi square = 26. 2 P < 0. 05 Statistically very significant.

	Control Group	Study Group
Number of babies admitted in neonatal intensive care unit	11 (11%)	31 (31%)
Number of babies not admitted to neonatal intensive care unit	89(89%)	69 (69%)
Total	100	100

Table 15: Distribution of Babies according to admissions into neonatal intensive are unit

Chi square = 11. 5 P < 0. 001Statistically very significant.

	Control Group	Study Group
Birth Asyphyxia	2 (18. 8%)	9 (29%)
Intrauterine growth retarded babies	2(18. 8%)	4 (12. 9%)
Meconium aspiration syndrome	4 (36%)	12 (38. 7%)
Hyperbilirubinemia	2 (9%)	4 (12. 9%)
Convulsions	1 (9%)	2 (6. 45%)
Total	11	31

Table 16: Distribution of Babies according to neonatal complications

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AUTHORS:

1. G. Raja Lakshmi
2. D. Jyothsna

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Obstetrics & Gynaecology, Andhra Medical College.
2. Post Graduate, Department of Obstetrics & Gynaecology, Andhra Medical College.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. G. Raja Lakshmi,
Plot No. 44, Dasapalla Hills,
Visakhapatnam-530003,
Andhra Pradesh.
E-mail: rlgujju832@gmail.com

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