Original article:

Pregnancy outcome in amniotic fluid index less than five in term low risk pregnancy at Pravara Rural Hospital, Loni

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ABSTRACT

Background and objectives: In some instances the volume of amniotic fluid may fall far below the normal limits. Amniotic fluid is measured using amniotic fluid index. Oligohydramnios is defined as amniotic fluid index(AFI) of less or equal to five centimeters. Various methods like nonstress test, acoustic stimulation, and fetal doppler velocimetry are helpful in assessment of fetal well being and identifying those pregnancies at risk of adverse perinatal outcome. Various studies have shown increased incidence of adverse pregnancy outcome like non reactive NST, FHR variability in labour, increased rate of LSCS(Lower Segment Caesarean Section) for fetal distress, meconium stained liquor, low Apgar score, low birth weight, neonatal morbidity and mortality. This study is undertaken to know the adverse pregnancy outcome in term low risk pregnancy with oligohydramnios.

Materials and Methods: This is a Cohort study done at PIMS,LONI. It consists of analysis of pregnancy outcome in 50 cases with diagnosis of oligohydramnios by ultrasound after 37 completed weeks of gestation(Cohort 1) compared with 50 controls with no oligohydramnios (Cohort 2) and matched for other variables like age, parity, gestational age. There are some inclusion and exclusion criteria mentioned in brief later. Various outcome results were recorded and tabulated. The results were statistically analysed using parameters like mean, standard deviation and chi square test. In addition, epidemiological parameters like sensitivity, specificity, positive predictive value, negative predictive value were used.

Results: There was significant difference between two groups in delivery by LSCS for fetal distress(0.001) that too among patients with AFI 0-1(0.01). There is increased incidence of labour induction in women with AFI ≤5cm than women with AFI >8cm. (p-0.01)

Conclusion: An amniotic fluid index of ≤ 5cm detected after 37 completed weeks of gestation is an indicator of poor pregnancy outcome. Determination of AFI can be used as an adjunct to other fetal surveillance methods. Determination of AFI is a valuable screening test for predicting fetal distress in labour requiring caesarean section.

Key words: Oligohydramnios; Amniotic Fluid Index; Amniotic Fluid Volume

INTRODUCTION:

Amniotic fluid plays a major role in the fetal growth and development. It provides the fetus with a protective low resistance environment suitable for growth and development. It provides a cushion against the constricting confines of the gravid uterus, allowing the fetus room for the movement and growth and protecting it from external trauma. It helps to maintain the fetal body temperature and plays a part in the homeostasis of fluid and by permitting extension of the limbs it prevents joint contractures. It prevents compression of the umbilical cord and thus protects the fetus from vascular and nutritional compromise.

In present practice, a semi quantitative amniotic fluid volume assessment during routine ultrasound examination and ante partum testing has become the standard of care. Amniotic fluid index of ≤5 cm defines oligohydramnios

as, originally described by Phelan et al. Many studies show that oligohydramnios is associated with variety of ominous pregnancy outcomes, such as fetal distress, low birth weight, perinatal morbidity, perinatal mortality and increased incidence of caesarean section. However, some studies show that amniotic fluid index is a poor predictor of adverse outcome and even the existence of an entity like isolated term oligohydramnios has been questioned by some authors. Thus this study is conducted to determine whether an antepartum amniotic fluid index (AFI) of 5 cm or less as a predictor of adverse pregnancy outcome .

METHODOLOGY

This study consists of an analysis of pregnancy outcome in 50 cases with diagnosis of oligohydramnios (AFI less than 5) by ultrasound after 37 completed weeks of gestation compared with 50 controls with no oligohydramnios (AFI more than 8) and matched for other variables like age, parity, gestational age and any pregnancy complication.

For all the selected cases, thorough history was taken and complete examination was done. Clinical evidence of oligohydramnios was looked for. The previous obstetric records and ultrasound reports were reviewed. Only those women who remembered their date of last menstrual period correctly with previous regular cycles and the gestational age calculated by clinical examination and ultrasound were corresponding were taken for study. So, only the good dates and excellent dates women with thirty seven completed weeks of gestation were studied. For all the women, ultrasound examination was done and amniotic fluid index was calculated by four quadrant amniotic fluid volume measurement techniq Oligohydramnios is defined as amniotic fluid index < 5 cm. The amniotic fluid volume is considered normal if amniotic fluid index is between 5.1 an 20 cm. Those with ruptured membranes and other complications like multiple pregnancy, malpresentation which could alter the results were excluded from the study. For each case a control was taken with similar gravidity, parity, gestational age but the amniotic fluid index of more than 8 cm and less than 20 cm.

INCLUSION CRITERIA :

1) AFI less than or equal to 5 2) Single live intrauterine gestation with cephalic presentation 3) 37 completed weeks of gestation 4) Intact membrane

EXCLUSION CRITERIA :

1) AFI more than 5 2) Gestational age less than 37 completed weeks. 3) Post term 4) Associated fetal malformations. 5) Ruptured membranes 6) Malpresentation and multiple gestations. 7) High risk pregnancy eg:

1) Placental insufficiency

a. Hypertension

b. Preeclampsia

c. Diabetes

d. Hypovolemia

e. chronic renal disease

f. connective tissue disorders

2) Abruption

3) Prostaglandin synthetase inhibitors therapy

4) Angiotensinogen converting enzyme inhibitors therapy

8) Uterine scar due to Previous LSCS , myomectomy , hysterotomy

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RESULTS:

Table 1 : **Distribution of study subjects based on Gestational age**

Gestational age	Study group (n=50)	Controls (n=50)	Total
37	13 (26.0%)	04 (08.0%)	17 (17%)
38	13 (26.0%)	07 (14.0%)	20 (20%)
39	10 (20.0%)	11 (22.0%)	21 (21%)
40	11 (22.0%)	23 (46.0%)	34 (34%)
41	03 (06.0%)	05 (10.0%)	08 (08%)
Total	50 (100%)	50 (100%)	100 (100%)

Chi-square – 11.35 df -4 p value – 0.02 (significant)

The mean gestational age was 38.56 weeks for study group and 39.36 weeks for control group which was similar.

In study group 37 and 38 weeks of gestation groups constitute about 26% each. In control group many were 40 weeks of gestation(46%) .

There is statistical significance between the groups.(p-0.02)

Graph 1 :**Bar graph showing Distribution of study subjects based on gestational age**

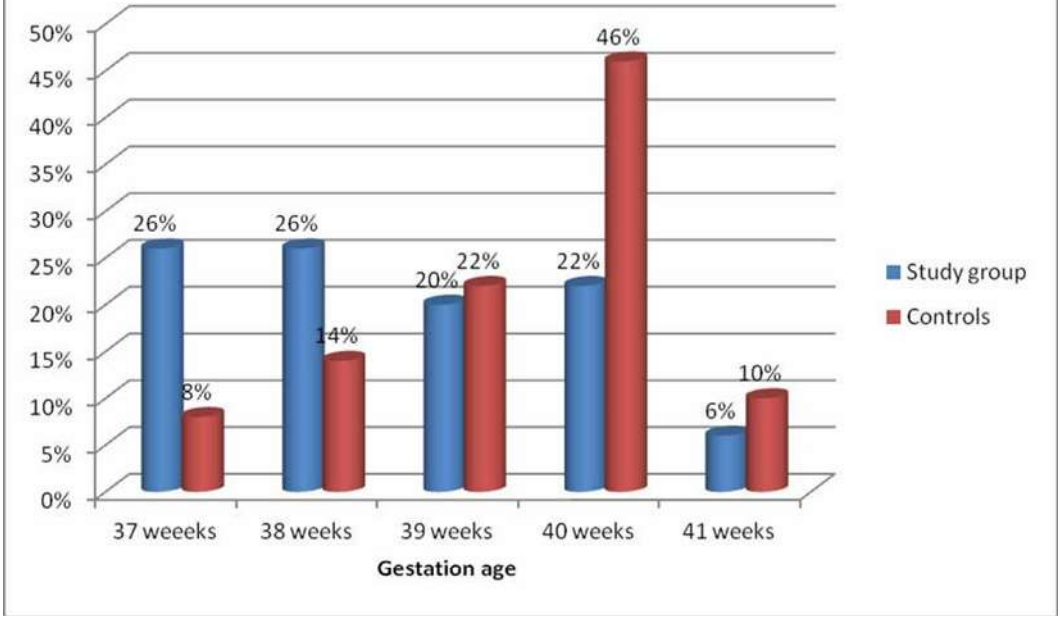

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Table 2:Distribution of Study group based on Amniotic Fluid Index

AFI	Numbers	Percentage
0 – 1 cms	09	18%
1.1 – 2.0 cms	10	20%
2.1 – 3 cms	06	12%
3.1 – 4.0 cms	09	18%
4.1 – 5.0 cms	16	32%
Total	50	100%

Table 3: Distribution of controls based on Amniotic Fluid Index

AFI	Number	Percentage
8.0 – 10.0 cms	27	54%
10.1 – 12.0 cms	13	26%
12.1 – 14.0 cms	07	14%
> 14.0 - <20 cms	03	06%
Total	50	100%

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Table.4: Distribution of study subjects based on Non stress test

Non stress test	Study group (n=50)	Controls (n=50)	Total
Reactive	45 (90.0%)	49 (98.0%)	94 (94%)
Non reactive	05 (10.0%)	01 (02.0%)	06 (06%)
Total	50 (100%)	50 (100%)	100 (100%)

Chi-square – 2.83 df-1 p value – 0.09 (not significant)

The NST was non reactive in 5 (10%) women with AFI $\leq$ 5 cm compared to only 1(2%) in control group. There was no significant difference between two groups in occurrence of non reactive and reactive NST pattern. (P -0.09)

Table.5: Distribution of study subjects based on fetal heart rate pattern:

FHR pattern	Study group (n=50)	Controls (n=50)	Total
Early decelerations	01 (02.0%)	00 (0%)	01 (1%)
Late decelerations	01 (02.0%)	00 (0%)	01 (1%)
Variable decelerations	02 (04.0%)	00 (0%)	02 (2%)
No	46 (92%)	50 (100%)	96 (96%)
Total	50 (100%)	50 (100%)	100 (100%)

Chi-square – 4.17 df-3 p value – 0.24 (not significant)

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Table.6: Distribution of study subjects based on onset of labour

Onset of labour	Study group (n=50)	Controls (n=50)	Total
Spontaneous	22 (44.0%)	32 (64.0%)	44 (44%)
Induced	28 (56.0%)	18 (36.0%)	46 (46%)
Total	50 (100%)	50 (100%)	100 (100%)

Chi-square – 8.48 df-2 p value – 0.01 (significant)

The labour was induced in 28 (56%) women with AFI ≤ 5 cm and 18(36%) women with AFI > 8cm. In control groups 32(64%) delivered spontaneously .The decision for induction of labour was made depending upon gestational age and NST. Depending on CTG recording spontaneous labour was allowed. The difference between two groups in this category was statistically significant (P - 0.01).

Table.7: Distribution of study subjects based on mode of delivery

Mode of delivery	Study group (n=50)	Controls (n=50)	Total
FTND	14 (28.0%)	30 (60.0%)	44 (44%)
FTVD	25 (50.0%)	18 (36.0%)	43 (43%)
LSCS	11 (22.0%)	02 (04.0%)	13 (13%)
Total	50 (100%)	50 (100%)	100 (100%)

Chi-square – 13.18 df- 2 p value – 0.001 (significant)

Number of women delivered by LSCS was 11(22%) among study group compared to 2(4%) in control group. There was statistical significant difference among two groups in this category.(p-0.001)

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Table 8: Indications for LSCS

Indications	Study group (n=50)	Controls (n=50)	Total
Fetal distress	11 (100.0%)	02 (100.0%)	13 (100%)
Total	11 (100.0%)	02 (100.0%)	13 (100%)

Indication for LSCS in both groups was fetal distress.

Table 9: APGAR score at 1 min

APGAR 1 min	Study group (n=50)	Controls (n=50)	Total
4	02 (04.0%)	01 (02.0%)	03 (03%)
5	00 (00.0%)	01 (02.0%)	01 (01%)
6	03 (06.0%)	08 (16.0%)	11 (11%)
7	45 (90.0%)	40 (80.0%)	85 (85%)
Total	50 (100%)	50 (100%)	100 (100%)

Chi-square – 3.90 df-3 p value – 0.27 (not significant)

Table 10: APGAR score at 5 min

APGAR 1 min	Study group (n=50)	Controls (n=50)	Total
6	02 (04.0%)	01 (02.0%)	03 (03%)
7	00 (00.0%)	01 (02.0%)	01 (01%)
8	03 (06.0%)	07 (14.0%)	10 (10%)
9	45 (90.0%)	41 (82.0%)	86 (86%)
Total	50 (100%)	50 (100%)	100 (100%)

Chi-square – 3.11 df-3 p value – 0.37 (not significant)

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Table 11: Distribution of study subjects based on neonatal death

Neonatal death	Study group (n=50)	Controls (n=50)	Total	
Yes	00 (00.0%)	00 (00.0%)	00	(00%)
No	50 (100.0%)	50 (100.0%)	100	(100%)
Total	50 (100%)	50 (100%)	100	(100%)

No neonatal deaths occurred in both study and control groups.

Strict following of management protocol as mentioned before ie NST before induction, CTG monitoring in labour, timely interventions lead to zero mortality in study as well as control groups.

Table 12:Distribution of study subjects based on Induction– Delivery interval

I – D interval	Study group (n=50)	Controls (n=50)	Total
Less than 6 hrs	14 (50.0%)	08 (44.4%)	22 (47.8%)
6 – 12 hrs	12 (43.0%)	07 (38.8%)	19 (41.4%)
> 12 hrs	02 (08.0%)	03 (16.8%)	05 (10.8%)
Total	28 (100%)	18 (100%)	46 (100%)

Chi- square – 1.03 df-2 p value – 0.59 (not significant)

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Induction delivery interval was less than 6 hrs in 14 (50%) in study group and 8(44.4%) in control group. In control group 3(16.8%) patient delivered after 12 hrs compared to study groups 2(8%).. It was not statistically significant.

Table 13: Relation between Amniotic Fluid index and mode of delivery among Study group*

AFI	Mode of delivery			Total
	FTND	FTVD	LSCS	
0 – 1 cms	02 (22.2%)	02 (22.2%)	05 (55.6%)	09(100%)
1.1 – 2.0 cms	05 (50.0%)	04 (40.0%)	01 (10.0%)	10(100%)
2.1 – 3 cms	01(16.6%)	03(50.0%)	02 (33.4%)	06(100%)
3.1 – 4.0 cms	03 (33.3%)	06 (66.7%)	00	09(100%)
4.1 – 5.0 cms	03 (18.7%)	10 (62.6%)	03 (18.7%)	16(100%)
Total	14 (28.0%)	25 (50.0%)	11 (22.0%)	50 (100%)

Row percentage* Chi-square – 10.34 df-8 p value – 0.01 (significant)

Maximum number of LSCS occurred in study group with AFI less than 1 ie 5(55.6%). This observation is statistically significant (p-0.01). FTND in 5(50%) cases with AFI 1.1-2 and FTVD in 10(62%) cases with AFI 4.1-5.

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Table 14: Validity of AFI </= 5 as a screening tool for LSCS

AFI	LSCS	VAGINAL	Total
Less/equal to 5 cms	11(a)	39 (b)	50
More than 5 cms	02 (c)	47 (d)	50
Total	13	87	100

It helps to maintain the fetal body temperature and plays a part in the homeostasis of fluid and by permitting extension of the limbs it prevents joint contractures. It prevents compression of the umbilical cord and thus protects the fetus from vascular and nutritional compromise.

In present practice, a semi quantitative amniotic fluid volume assessment during routine ultrasound examination and ante partum testing has become the standard of care. Amniotic fluid index of ≤5 cm defines oligohydramnios as, originally described by Phelan et al. Many studies show that oligohydramnios is associated with variety of ominous pregnancy outcomes, such as fetal distress, low birth weight, perinatal morbidity, perinatal mortality and increased incidence of caesarean section. However, some studies show that amniotic fluid index is a poor predictor of adverse outcome and even the existence of an entity like isolated term oligohydramnios has been questioned by some authors. Thus this study is conducted to determine whether an antepartum amniotic fluid index (AFI) of 5 cm or less as a predictor of adverse pregnancy outcome .

CONCLUSION;

From this study, we may conclude, Determination of AFI is a valuable screening test for predicting fetal distress in labor requiring cesarean section. It has a sensitivity of 84.6% and negative predictive value of 94% specificity of 54% and positive predictive value of 22%.

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