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Original Research Article

Comparative study of maternal and fetal outcome between low and normal amniotic fluid index at term

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ABSTRACT

Background: Amniotic fluid index (AFI) is kind of an estimate of the amount of amniotic fluid. It is an index for the fetal well-being. The aim was to study fetal and maternal out come in cases of low AFI and normal AFI.
Methods: This was a case control prospective comparative study performed on 200 randomly selected low risk pregnant patients at term (37-40 weeks of gestation) admitted in Obstetrics and Gynaecology Department. 100 patients with AFI <5 cm (cases) and 100 patients with AFI 8-20 cm (control).
Results: Increased number of LSCS in cases that is 35 while only 10 in control and almost equal incidences of MSL and FD in both the groups, while in cases 17 women were planned for elective LSCS for various indications in expectation of better fetal outcome. There was significant low APGAR score in babies of cases, but clinically we refute this. In present study almost double the no. of babies in cases was IUGR or FGR. Significant association between low AFI and congenital anomalies in babies. Most of the anomalies were of urinary tract system.
Conclusions: An AFI ≤5 cm detected at term that was at or after 37 completed weeks of gestation in a low risk pregnancy was an indicator of poor perinatal outcome. Oligohydramnios was being detected more frequently now-a-days due to ready availability of ultrasonography these days.

Keywords: AFI <5 cm, Fetal and maternal outcome, Oligohydramnios

INTRODUCTION

Amniotic fluid index (AFI) is kind of an estimate of the amount of amniotic fluid. It is an index for the fetal well-being.[1] When the volume of amniotic fluid is decreased, it is termed as oligohydramnios.[2] Oligohydramnios is a common complication of pregnancy and its incidence is 3.9% of total pregnancy at term.[3] Low amniotic fluid has been associated with increased risk of maternal morbidity in terms of increased rate of induction of labour and operative interventions, and intrauterine growth retardation, meconium aspiration syndrome, birth asphyxia, low APGAR scores, and congenital anomalies.[4,5]

During labour amniotic fluid provides an adequate cushion for the umbilical cord, this mechanical function of cushion prevent the compression of cord between uterine wall and fetus during fetal movement and uterine contraction, and prevent fetal distress. Amniotic fluid index (AFI) is kind of an estimate of the amount of amniotic fluid. It is an index for the fetal well-being. The amniotic fluid index is measured four quadrants technique by transabdominal ultrasonography as described by Phelan et al in 1997.[6] The measurement and its comparison to the index is important in helping to determine fetal and maternal health.

- An AFI between 8-20 cm is considered normal
- An AFI 5.1-8 cm is considered as borderline
- An AFI <5 cm is considered as low AFI

Aim of the present study was to study fetal and maternal out come in cases of low AFI and normal AFI and to

determine whether a low AFI during antenatal period at term confers a significant risk of poor perinatal outcome.

METHODS

The present study entitled Comparative study of maternal and fetal outcome between low and normal amniotic fluid index at term was conducted in the Department of Obstetrics and Gynaecology, M.G.M. Medical College and M. Y. Hospital, Indore, Madhya Pradesh, India during the period from August 2015 to July 2016. Each patient was told about her inclusion and participation in this study and her informed consent was taken. This was a case control prospective comparative study performed on 200 randomly selected low risk pregnant patients at term (37-40 weeks of gestation) admitted in Obstetrics and Gynaecology Department. 100 patients with AFI ≤5 cm (cases) and 100 patients with AFI 8-20 cm (control) were taken for study after satisfying inclusion and exclusion criteria. Period of gestation was calculated by LMP in patients with regular cycles or by first trimester USG.

Inclusion criteria

- All singleton pregnancies
- Cephalic presentation
- At term 37-40 weeks (gestational age will be calculated by LMP or by first trimester USG)
- Intact membranes.
- Women and/or his/her legally acceptable representative willing to provide their voluntary written informed consent for participation in the study.

Exclusion criteria

- Gestational Age <37 Weeks and >40 weeks
- PROM.
- Uterine Anomaly.
- Malpresentation
- Multiple gestation
- High Risk pregnancy

a. Hypertensive disorders of pregnancy
b. Diabetes
c. Chronic renal disease / cardiac disease and other medical ailment
d. Connective Tissue disorder
e. Vaginal Bleeding (Abruption)

- BOH
- Previous lower segment cesarean section/ myomectomy/ hysterotomy.
- Women and/or his/her legally acceptable representative not willing to provide their voluntary written informed consent for participation in the study.

Data was transcribed from the proforma to Microsoft excel and then transferred to statistical package IBM SPSS Version 20.0.0 for analysis. Comparison of means between the groups was done using Unpaired 't' test. Non-parametric data was analysed using Pearson's chi-square / Mann Whitney U test. A P value of <0.05 was taken as statistically significant. The final data was presented in the form of tables and graphs.

RESULTS

The grouping was based on the AFI. AFI ≤5 cm was taken as Cases and AFI between 8-20 cm was taken as Controls. 88%women were unbooked cases, while 68% of women of the controls were unbooked. The mean age of women in cases was 24.40±3.81 years, while it was 23.83±3.77 years in controls. Majority of the women were in the age group 21-25 years in both the groups. Maximum number of women (37% of Cases and 48% of Controls) were Gravida 1. Pearson Chi-square value was 11.655. The P value was 0.001 (significant) (Table 1).

Table 1: Distribution according to booked and emergency cases, age, gravida and parity.

	Cases		Controls	
	No. of patients	**%**	**No. of patients**	**%**
Booked	12	12	32	32
Unbooked /Emergency	88	88	68	68
21-25 years age	52	52	51	51
Gravida 1	37	37%	48	48%
Gravida 2	26	26%	22	22%
Gravida 3	20	20%	20	20%
≥ Gravida 4	17	17%	10	10%
Para 0	44	44	52	52
Para 1	36	36	31	31
Para 2	16	16	15	15
Para 3	03	03	2	2
Para 4	01	01	0	0

Table 2: Distribution according to mode of delivery.

Mode of Delivery	Cases		Control	
	No.	**%**	**No.**	**%**
LSCS	35	35	10	10
Vaginal Delivery	65	65	90	90
Total	100	100%	100	100%

In cases, more number of women (35%) in comparison to 10% of controls had undergone LSCS, while in Controls 90% of the women were delivered normally. Pearson Chi-square value was 17.921. The P value was 0.000 (significant) (Table 2). Elective cesarean section 17 (48.5%) was the most common indication for LSCS in cases, while other indications were foetal distress, MSL, non-progress of labour and failed induction were the next most common indications in both the groups (Table 3).

Table 3: Indication for LSCS.

Indication for LSCS	Cases		Control	
	No.	%	No.	%
Total LSCS	35	35	10	10
Foetal distress	5	14.2	4	40
MSL	3	8.5	4	40
Elective section	17	48.5	0	0
a. Loop of cord around neck	1	2.8	0	0
b. Uteroplacental insufficiency	7	2	0	0
c. Absent diastolic flow	4	11.4	0	0
d. Reversed diastolic flow	5	14.2	0	0
Non progressive Labour	3	8.5	1	10
Failed induction	6	17	0	0
Obstructed labour	0	0	1	10

Table 4: Distribution of APGAR score, nursery admissions and IUGR.

Observations		Cases	Control
APGAR score at 5 min.	8-10	68	80
	≤7	32	20
Nursery admission		28	17
IUGR	Alive	17	09
	IUD	01	00

Table 5: Congenital anomalies.

Name of Congenital anomaly	Cases		Control	
	No.	%	No.	%
Urinary tract system	4	4	0	0
Hydronephrosis /hydroureter	2	2	0	0
Renal agenesis	1	1	0	0
Renal ectasia	0	0	0	0
Polycystic kidney disease	1	1	0	0
Posterior urethral valve	0	0	0	0
Potter syndrome	0	0	0	0
CTEV	1	1	0	0
Amniotic band syndrome	0	0	0	0
Pulmonary hypoplasia	0	0	0	0
Hydrocephalus	1	1	1	1
Gastrointestinal system	0	0	0	0
Cardiac anomaly	0	0	0	0

Large numbers of babies (32) in cases were having low APGAR score at 5 min in comparison to 20 of the controls. The mean weight of babies born in cases (2.45±0.42 kg) was nearly comparable to the weight of babies born in controls (2.55±0.50 kg). Unpaired t-test was applied. The P value was 0.109 (insignificant). IUGR was more in cases (17) in comparison to the controls (9), but this difference was statistically not significant. Mann Whitney U value for AFI and APGAR score at 5 min was 4350.000 and P value was 0.000 (significant) (Table 4). Congenital anomalies were mostly seen in cases, while only 1 case of hydrocephalus was seen in the controls. Statistically significant association was seen between congenital anomalies and groups (Pearson Chi-square value was 3.701, the P value was 0.054, the value was borderline and can be considered as significant in the study (Table 5).

DISCUSSION

There were evidences that show significant increase in perinatal morbidity and mortality in patients with oligohydramnios at term.

Most of the cases and controls were belonging to age group 21-25 years i.e. cases 52% and controls 51%. The mean age of cases was 24.4±3.81 years in cases and 23.83±3.77 years for controls. Present study results corroborate with the results of the studies done by Zhang et al found mean age of 28.4±3.4 years, Jagatia et al found mean age of 23.9 years, Hindumati et al found mean age of 22.5 years and Sangeeta et al found mean age of 23.1 years in cases and 22.6 years in controls.[7-10]

In present study it was observed that in cases only 12% were booked and 88% were unbooked. In control 32% were booked and 68% were unbooked. More number of unbooked cases was significantly associated with low AFI.

It was found in this study that there was no statistical difference between gravidity and parity in the two study groups. Most of the women 37% of cases and 48% of controls were primigravida. 44% of the cases and 52% of the controls were para 1. Study done by Hindumati et al found a 59% of incidence of oligohydramnios in primipara. Our study results are also comparable to the studies done by Asgharnia et al, Gumus et al and Voxman et al.[9,11-13]

In present study, 55% of the women of cases and 67% of controls were from urban area. 71% of the cases and 83% of the controls were in the upper lower class (Kuppuswamy Classification).

Twenty nine women were induced and 6 were failed induction in the cases, while only 1 woman was induced in the controls. The decision for induction or allowing for spontaneous labour was taken depending upon the stage of labour, favourability of the cervix and AFI. Study done by Sangeeta et al reported 56% induction in cases and 36% induction in controls; they have shown a higher incidence of induction in comparison to our study.[10]

65% of the cases and only 10% of controls underwent LSCS in this study, while 90% of the controls were delivered vaginally. Higher incidence of LSCS was seen in cases in comparison to the controls. In a study done by

Sangeeta et al 22% of the cases and 4% of the controls underwent LSCS.[10] In Hindumati et al study, 47% of the women underwent LSCS and Umber et al reported 32% incidence. Studies done by Casey et al, Golan et al and Rainford et al reported 32%, 35.2% and 33.3% of LSCS respectively in oligohydramnios groups.[9,14-17]

Elective cesarean section (48.5%) was the most common indication of LSCS in our study, while it was 2.8% due to color doppler changes and loop of cord around neck. The decision for elective cesarean section was taken for improving the fetal outcome. Other indications included fetal distress (14.2%), MSL (8.5%), non-progress of labour (8.5%) and failed induction (17%). However, in controls 40% of women had undergone LSCS for fetal distress, 40% due to MSL, 10% for non-progress of labour and 10% for obstructed labour. MSL and fetal distress incidence was nearly equal in both the groups. Studies done by Hindumati et al, Casey et al found fetal distress in 17% and 48% respectively as the most common indication for LSCS, while Umber et al found thick MSL in 6% to be the indication for LSCS. [9,14-15]

Congenital anomalies were mostly seen in cases, while only 1 case of hydrocephalus was seen in controls. Statistically significant association was seen between low AFI and babies having congenital anomalies (Pearson chi-square value= 3.701, P value= 0.054, though borderline, can be considered as significant). In 6% of the babies in cases, congenital anomalies were related to urinary tract system. Incidence of congenital anomalies reported by Shetty et al was 8%, 5.8% by Guin et al, 8.5% by Golan et al and 11% by Shenker et al.[16,18-20]

APGAR score of babies at 1 min and 5 min was 8-10 for 61% and 68 % cases and ≤7 for 39 % and 32 % of cases respectively while 77% and 80 % in 8-10 and 23 % and 20% in ≤7 for control. It is comparable to the study of Chate P score <7 in study group was 30% at 1 min. and 16% at 5 min.[21] In this study, P value at 1 min. was 0.016 and at 5 min P value was 0.000. Statistically it was significant but clinically we refute this. The variation was very likely in different sample sizes. In a similar study by Syria et al APGAR score <7 was found to be in 38.8%, less than 3 in 6% in study by Casey et al and.[15,22] There was no significant difference for APGAR score in study and control group in the study by Locatelli A et al. [23]

In the present study IUGR babies were 18 % in cases and 9% in control. P value was 0.109. The mean value of weight of baby born to case group was 2.449±0.4190 and in control group was 2.554±0.5036 years. So statistically it showed no significant association between low AFI and IUGR/FGR babies, which was comparable to study of Raju Sriya et al, which has 16.6% IUGR in oligohydramnios.[24]

In this study most of the babies were alive and healthy i.e. 71% in cases and 82% in controls while 28% of babies among cases and 17% of babies among controls went to NICU. The P value was 0.176. A study by Sriya showed a higher incidence of 88.88% admission to NICU while 4% in study of Sangeetha et al.[10,24]

1% of babies were stillbirth in each category. Out of the babies going to nursery or NICU, 17.8% i.e. 5 out of 28 babies died and 82% were alive and healthy in cases category. Long term management of alive babies with congenital anomalies were not studied in the study. None of the babies died in Control category.

CONCLUSION

Oligohydramnios is being detected more frequently now-a-days due to ready availability of ultrasonography these days. An AFI ≤5 cm detected at term that is at or after 37 completed weeks of gestation in a low risk pregnancy is an indicator of poor perinatal outcome.

Intensive fetal monitoring is essential for patients in labour. Due to increased risk of neonatal complications in oligohydramnios the rate of LSCS is also increasing but decision between vaginal delivery and ceasarean section should be well balanced so that unnecessary maternal morbidity prevented. Timely intervention is also required to reduce perinatal morbidity and mortality

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