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Original Research Article

Fetal outcome in women with borderline amniotic fluid index at pregnancy 36 weeks and beyond

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ABSTRACT

Background: Aim of the study were to evaluate the fetal outcome associated with borderline amniotic fluid index (AFI) at pregnancy 36 weeks and beyond and to study the mode of delivery among these patients.
Methods: A 60 pregnant subjects who were at 36-42 weeks period of gestation and ultrasonically diagnosed to have AFI less than or equal to 8 cm were included in the study and were compared to 50 pregnant patients with normal amniotic fluid. They were monitored throughout labour and fetal outcome was studied.
Results: Fetal distress was observed in 60.4% cases leading to immediate termination of pregnancy. Incidence of meconium stained liquor was found significantly high (75%). Neonatal morbidity was found to be significantly high. Low birth weight (31.6%), Apgar score less than 7 at 5 minutes (20%), NICU admission (71.6%), meconium stained liquor (23.3%) were observed.
Conclusions: That there is a high risk of adverse perinatal outcome in cases of Borderline AFI at pregnancy 36 weeks and beyond. Providing intensive intrapartum monitoring and good NICU facilities for such cases is necessary to optimise the fetal outcome.

Keywords: Border line AFI, Oligohydramnios, Meconium, Perinatal, Caesarean

INTRODUCTION

Amniotic fluid is vital to the well-being of the fetus as it helps in foetal development. Amniotic Fluid has a number of prominent functions like it cushions the foetus from external forces, maintains body temperature of fetus, provides essential nutrients, facilitates development of fetal musculoskeletal system by permitting movements of the developing baby and allows growth and development of fetal intestinal tract as baby swallows amniotic fluid and plays an important role in development of respiratory system.[1] The reported incidence of oligohydramnios (AFI <5), accounts for 0.5% and that of borderline liquor (AFI 5.1-8), accounts for 5%. The amniotic fluid volume is measured by ultrasonography, AFI is the commonly used semi quantitative measurement of amniotic fluid.[2]

An AFI of 5 cm or less has been used to define oligohydramnios and its association with adverse pregnancy outcome.[2] Borderline or marginal oligohydramnios has been defined by different cut-offs by various authors. Phelan et al and others defined borderline AFI between 5.1 to 8 cm.[3] Banks and Miller defined as an AFI of 5.1 to 10 cm.[4] Kreiser defined it as AFI >5 cm but below the 2.5th percentile which would be AFI between 6 to 9 cm.[5]

Since oligohydramnios has been associated with a variety of poor pregnancy outcomes, it has become an indication for induction of labor in pregnancies complicated by decreased amniotic fluid volume. Whether a borderline AFI is also linked to an adverse pregnancy outcome and should be combined with the group with an AFI of 5 cm or less and managed similarly is uncertain.

Objective of study to evaluate the fetal outcome associated with Borderline AFI at pregnancy 36 weeks and beyond. To study the mode of delivery among these patients.

METHOD

This was a one year (September 2020-August 2021) prospective study which was conducted on antenatal patients presenting at 36 weeks and beyond in the department of obstetrics and gynaecology OPD and IPD, Hindu Rao hospital, Delhi, after obtaining ethical clearance from institutional committee.

Statistical tool (software) used to analyse the data (SPSS version 21).

Inclusion criteria

A total of 60 women were taken as case who presented to hospital at gestational age of 36 weeks and beyond calculated by LMP and gestational age confirmed by 1st trimester USG with single live fetus with intact membrane with no additional high risk factors found to have isolated AFI≤8 cm.

There were 50 control women who matched with their sociodemographic (age and parity) pattern who had normal amniotic fluid volumes

Exclusion criteria

Pregnant women who did not give consent for participation in the study. Pregnant patients with PIH, evidence of IUGR, and ruptured membrane and fetal demises and prediagnosed congenital anomalous babies. Pregnant women with previous LSCS, multiple pregnancies, perinatal loss or recurrent pregnancy loss etc. or on medication for any medical disease. Pregnant women with associated medical condition like pre-existing diabetes mellitus, hypertension, heart disease, thyroid disorder, epilepsy, bronchial asthma, or any other medical or surgical co morbidity were excluded. A detailed history was taken and a general physical and obstetrics examination were done. The patient was then subjected to ultrasonographic examination. Routine scan for fetal well-being was done and AFI was measured by the 4-quadrant technique. The vertical diameter of the maximum pocket was measured in centimetres in each of the four quadrants and measurement obtained from each quadrant were summed to form the AFI in centimetres. Follow-up of these patients was done till delivery and their neonatal outcome was noted in terms of fetal distress in labor, birth weight, Apgar at five minutes, congenital anomalies, and perinatal mortality. The results were compiled and analyzed.

RESULTS

This is a prospective observational study in which total of 60 women were included in the study group with 50 controls with mean AFI 5.35±1.84 and 12.54±2.98 respectively. The age and parity were similar in both study and control group. The majority of cases were in age group 21-25 years (45.45%), followed by in the age group 26-30 years (30%) and the least were in age group>30 years. The mean age for cases and control study population was 23.89±3.14 and 24.5±3.86 years. Range of the age was 18-32 years. Most of the cases were nulliparous i.e., 65%.

A 31% of cases delivered at ≥40 weeks compared to 44% in control group. P>0.05, which was not statistically significant. The mean gestational age at delivery in cases and control are 38.97±1.85 and 39.3±1.73 weeks respectively (Table 1).

Table 1: Distribution of subjects by age, gravidity and gestational age.

Parameters	Cases (Group I), (n=60) (%)	Control (Group II), (n=50) (%)	P value
Age (In years)			
≤20	11 (18.33)	10 (20)	0.476
21-25	29 (48.33)	21 (42)	
26-30	19 (31.67)	14 (28)	
>30	1 (1.67)	5 (10)	
Mean ± SD	23.89±3.14	24.5±3.86	
Gravidity			
Primigravida	39 (65)	28 (56)	0.161
Multigravida	21 (35)	22 (44)	
Gestational age at delivery (Weeks)			
<40	41 (68.33)	28 (56)	0.183
≥40	19 (31.67)	22 (44)	

Among cases 22 (36.67%) had normal vaginal delivery, 5 (8.33%) patients had instrumental delivery and 33 (55%) had caeseran section as compared to control group in which 30 (60%) had normal vaginal delivery, 5 (10%) patients had instrumental delivery and 15 (30%) had caeseran section. This shows that more patients had to undergo caeserian section in case group. The p for this study came statistically significant (0.028) (Table 2).

Table 2: Comparison of study group based on mode of delivery.

Mode of delivery	Cases (Group I), (n=60) (%)	Control (Group II), (n=50) (%)	Total, n (%)
NVD	22 (36.67)	30 (60)	52 (47.27)
Caeserian	33 (55)	15 (30)	48 (43.64)
Instrumental (forceps/ ventouse)	5 (8.33)	5 (10)	10 (9.09)
Total	60	50	110

P=0.028 (chi square test), NVD=Normal vaginal delivery.

The commonest indication for caeserian section in both cases and control group was non-reactive FHR (63% vs 53%) followed by CPD (15% vs 26%) and failed induction (15% vs 20%). P value was >0.05, which was not statistically

significant. Maternal indications for the caeserian section (CPD, failed induction) were seen more in control group and fetal indications for the caeserian section (fetal distress, anhydromnios) was seen more in case group, though not significant statistically (Table 3).

Table 3: Indication of LSCS in different groups.

Indication of LSCS	Cases (Group I), (n=33) (%)	Control (Group II), (n=15) (%)	Total, n (%)
Non-reactive FHR/ fetal distress	21 (63.64)	8 (53.33)	29 (60.42)
CPD	5 (15.15)	4 (26.67)	9 (18.75)
Failed induction	5 (15.15)	3 (20)	8 (16.67)
An-hydramnios	2 (6.06)	-	2 (4.17)
Total	33 (100)	15 (100)	48 (100)

P=0.579 (chi square test), CPD-Cephalopelvic disproportion.

In lower birth weight group (≤2500 gram), out of 29 babies, 19 babies belonged to case group in contrast to 10 babies in control group. Though the p=0.166, which was not statistically significant. Meconium-stained liquor was present in 23.3% patient of case group as compared to 8% patients of control group. P for study came out to be 0.039 which was statistically significant

Neonates with 1-minute Apgar score≤7 in cases and control group were 13% and 16% respectively. But 5-minute Apgar score≤7 in cases and control group were 20% and 6%. P=0.049 which is statistically significant. 28% neonate in case group and 4% neonate in control group required admission in NICU. Majority of neonate in normal AFI group required no nursery treatment. This study was statistically significant with p<0.05.

There were no stillborn in any of the group, but 2 neonatal deaths in case group and 0 neonatal deaths in control group. The p=0.500, which was not statistically significant (Table 4).

Table 4: Comparison of fetal outcome in different groups.

Parameters	Group I, (n=60) (%)	Control (Group II), (n=50) (%)	Total, n (%)	P value
Birth weight≤2500 grams	19 (31.67)	10 (20)	29 (26.36)	0.0469
MSL present	14(23.33)	4 (8)	18 (16.36)	0.0753
1 minute Apgar≤7	8 (13.33)	8 (16)	16 (14.55)	0.707
5 minute Apgar≤7	12 (20)	3 (6)	15 (13.64)	0.033
NICU	17 (28.33)	2 (4)	19 (17.27)	0.00331
Neonatal death (NND)	2 (3.33)	0	2	0.066

DISCUSSION

Amniotic fluid volume is a very good indicator of fetal status. Therefore, it has become extremely important to assess amniotic fluid volume during antenatal examination. Decreased amniotic fluid volume without rupture of membrane suggest fetus in chronic stress. Among all the methods of assessment, AFI is used most commonly because of its convenience and reproducibility. The present study undertaken observes the fetal outcome in pregnancy more than 36 weeks of gestation. Total 60 cases (Group I) and 50 control (Group II) were taken.

Table 4 is showing findings of studies by Gaikwad et al, Ghike et al, Pandey et al and our present study comparing mode of delivery and LSCS rates in group I A (oligohydramnios) with AFI ≤5 cm with group I B (borderline oligohydramnios) AFI 5.1 TO 8 cm showed a statistically significant (p<0.05) higher rate of LSCS amongst cases with oligohydramnios with AFI ≤5 cm.[7-9]

In our study, the rate of caesarean section in oligohydramnios group with AFI≤5cm compared to borderline liquor group with AFI 5.1-8 cm was 68% vs 39.4% respectively. P=0.013, which is statistically significant. This may be because of presence of a greater number of cases with associated risk factors like abnormal umbilical artery Doppler velocimetry studies in oligohydramnios group

In our study commonest indication for caeserian section in both cases (Group I) and control group (Group II) was fetal distess (63% vs 53%). the p value was not statistically significant.

Similarly in study done by Mangalpuri, fetal distress was the indication for caesarean section in 60% women in oligohydramnios group and in 66.7 % women in the group with borderline AFI which were comparable to our findings.[10]

Gaikwad et al did a similar study and found that the commonest indication for caesaerean section was fetal distress in 34.6% cases of oligohydramnios and in 11.7% cases in cases of borderline AFI.[7]

In present study, low birth weight (≤2500 gram), low Apgar score at 5 minutes, meconium stained liquor and

admissions to NICU were significantly high in cases as compared to control group (It was even more higher among the oligohydramnios group compared to the borderline and normal liquor group) which was similar to various studies (Table 6).

Table 5: Comparison of mode of delivery in case group in various studies.

Mode of delivery	AFI (cm)											
	Gaikwad et al			Ghike et al			Pandey et al			Our study		
	≤5	5.1-8	>8-25	≤5	5.1 -8	>8-25	≤5	5.1-8	>8-25	≤5	5.1-8	>8-25
NVD (%)	18.4	52.9	-	54.06	77.79	-	-	45.4	65.2	22.7	50	60
LSCS (%)	73.4	37.2	-	35.14	14.28	-	-	51.5	34.8	68	39.4	30
Instrumental (%)	8.2	9.9	-	10.8	7.93	-	-	3	0	9	10.6	10

Table 6: Comparison of fetal outcome.

Apgar score	AFI (cm)								
	Gaikwad et al			Pandey et al			Our study		
	≤5	5.1-8	>8-25	≤5	5.1-8	>8-25	≤5	5.1-8	>8-25
1 minute ≤7	26.5	11.7	-	-	16.6	3	18.8	10.5	16
5 minute ≤7	8.1	5.8	-	-	14.2	2.3	27.2	15.7	6
NICU admission	28.5	19.6	-	-	9	3	30	26	4
MSL	36.7	25.4	-	-	35.3	8.6	27.2	21.05	8

Limitations

High risk cases like hypertensive disorders, diabetes, anemia in pregnancy etc. were excluded from the study due to limited period of study of one year

CONCLUSION

Our study thus supports that AFI is good indicator of fetal outcome. In the presence of low AFI, incidence of MSL, abnormal FHR, rate of LSCS, low Apgar score, low birth weight, admission to NICU and perinatal mortality are high. We also observed that in cases of borderline oligohydramnios (AFI 5.1-8 cm) there is higher risk of perinatal complications and operative deliveries. So, we must do a thorough clinical examination and oligohydramnios must be confirmed by ultrasound, so that early antepartum surveillance can be started to avoid various fetal complications.

Adverse perinatal outcome is seen in higher percentage of patients having oligohydramnios than that of borderline AFI. Statistically significant difference for overall caesarean delivery rate as well as LSCS for fetal distress mandates the need for close antepartum and intrapartum monitoring in both the groups oligohydramnios as well as borderline oligohydramnios.

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REFERENCES

1. Nicolini U, Fisk NM, Rodeck CH, Talbert DG, Wigglesworth JS. Low amniotic pressure in oligohydramniosis this the cause of pulmonary hypoplasia? Am J Obstet Gynecol. 1989;161(5):1098-101.
2. American College of Obstetricians and Gynaecologists: Ultrasonography in Pregnancy. Washington DC: American College of Obstetricians and Gynaecologists. 2009.113(2 Pt 1):451-61.
3. Phelan JP, Smith CV, Broussard P, Small M. Amniotic fluid volume assessment with the fourquadrant technique at 36-42 weeks' gestation. J Reproduct Med. 1987;32(7):540-2.
4. Banks EH, Miller DA. Perinatal risks associated with borderline amniotic fluid index. Am J Obstet Gynecol. 1999;180:1461-3.
5. Kreiser D, El-Sayed YY, Sorem KA, Chitkara U, Holbrook RH Jr, Druzin ML. Decreased amniotic fluid index in low-risk pregnancy. J Reprod Med. 2001;46:743-6.
6. Brace RA, Wolf EJ. Normal amniotic fluid volume changes throughout pregnancy. Am J Obstet Gynecol. 1989;161(2):382-8.
7. Gaikwad PR, Oswal MS, Gandhewar MR, Bhatiyani BR. Perinatal outcome in oligohydramnios and borderline amniotic fluid index: a comparative study. Int J Reproduct Contracep Obstet Gynecol. 2016;5(6):1964-8.

8. Ghike S, Reddy G, Ghike NW. Increasing Severity of Oligohydramnios: A risk factor for outcome. J South Asian Feder Obst Gynae. 2013;5(1):8-10.
9. Pandey U, Stephen L. Perinatal outcome in cases of borderline oligohydramnios. Indian J Obstetr Gynecol Res. 2018;5(3):405-8.
10. Puri M, Sharma K. Low amniotic fluid index and intra-natal and perinatal outcome in term pregnancy. Int J Med Heal Res. 2017;3(11):129-13.

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