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Maternal and Perinatal Outcomes in Pregnancies with Borderline Oligohydramnios versus Uncomplicated Normal Amniotic Fluid Index

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Abstract
Background and Objectives: *Borderline Oligohydramnios is defined as AFI of 5-8 to centimeters. Various methods like nonstress test (NST), acoustic stimulation, Doppler velocimetry are helpful in the assessment of fetal well being and identifying those pregnancies at risk of adverse perinatal outcome. This study is taken up to know the adverse perinatal outcome in pregnant women with borderline oligohydramnios and to evaluate the value of amniotic fluid in predicting the subsequent fetal distress and cesarean delivery.*
Methods: *Analysis of outcome in pregnancy of 60 cases with borderline oligohydramnios in the 3rd trimester compared with 60 controls with no oligohydramnios who are matched for variables like age, parity, gestational age, and any pregnancy complication.*
Results: *There was a significant difference between the two groups in the occurrence of non-reactive and reactive NST pattern. There is an increased incidence of labor induction in women with AFI 5-8cm and then women with AFI >8cm. There is an increased rate of cesarean section in pregnant women with borderline oligohydramnios. There is an increased occurrence of low birth weight (≤2.5kg) in women with oligohydramnios.*
Conclusion: *An AFI of 5-8cm detected in the third trimester is an indicator of poor perinatal outcome. In the presence of borderline oligohydramnios, the occurrence of non-reactive NST, abnormal FHR tracings during labor, meconium-stained liquor, development of fetal distress, the rate of LSCS, low birth weight are high. The determination of AFI can be used as an adjunct to other fetal surveillance methods.*
Keywords: *Oligohydramnios; Amniotic Fluid Index; Amniotic Fluid Volume; Foetal Acoustic Stimulation Test; Lower Segment Caesarean Section, Ultrasonogram; Foetal Heart Rate; Non-Stress Test.*

Introduction

The main purpose of taking a group of women with borderline oligohydramnios at third-trimester pregnancies is because the etiology, management, and the outcome are different in late-onset oligohydramnios compared to early-onset oligohydramnios. The importance of amniotic fluid volume as an indicator of fetal status and oligohydramnios as an indicator of chronic hypoxia is a relatively recent development.[1]

The technique of the four-quadrant method of calculating the amniotic fluid index (AFI) described by Phelan et al. in 1987 is the accepted method.[2]

Various methods have been described for antepartum and intrapartum fetal surveillance. They are NST, CST, FAST, BPP, VAST, Doppler velocimetry, FHR 2 tracing, fetal stimulation test, and fetal scalp blood pH estimation.[3] All methods have their own advantages and disadvantages. Amniotic fluid is an important part of pregnancy and serves as an indicator of placental function on fetaldevelopment.[4]

Its assessment is an essential part of the evaluation of fetal health in terms of distress, meconium-stained liquor, higher rates of cesarean delivery for a non-reassuring fetal heart rate pattern, and fetal growth restriction.[5] Amniotic fluid is very crucial for the survival of the fetus, and Amniotic Fluid Index (AFI) is the most common way for the estimation of amniotic fluid volume, which is performed by the ultrasound method.[1]

Studies have revealed that AFI is an accurate criterion for estimating adequate placental function. Amniotic fluid volume varies with gestational age.[6] Any decrease or increase in the volume of amniotic fluid leads to pregnancy complications.

In most reported studies, the pregnancies with borderline AFI have shown outcomes such as nonreactive non-stress tests, fetal heart rate deceleration, meconium aspiration, immediate cesarean delivery, low Apgar score, LBW, NICU admission and SGA.

Aims and Objectives

1) To study pregnancy outcome in borderline oligohydramnios.
2) To evaluate the value of AFI in predicting birth weight, fetal distress, meconium aspiration, fetal growth restriction, NICU admission.

Materials and Methods

The study was conducted in the department of Obstetrics and Gynaecology, GEMS hospital, Srikakulam, Ragolu, AP for a period of twelve months.

Study Design: Prospective study

Study Population: Antenatal mothers admitted to GEMS hospital with borderline oligohydramnios in third trimester and controls are normal antenatal mothers with corresponding for other variables like age, parity, and gestational age.

Selection Criteria

Inclusion Criteria

1) Singleton pregnancy
2) AFI between 5.1 to 8 cm
3) Antenatal mothers in the third trimester

Exclusion Criteria

1) Medical comorbidities like diabetes, hypertension, hypothyroidism.
2) Preeclampsia
3) Multiple pregnancies
4) Premature rupture of membranes

All parturients were monitored by continuous electronic fetal monitoring in labor. The nature of amniotic fluid noted by the artificial rupture of the membrane, which was done in all women and was classified as clear and meconium-stained liquor. Those who developed variable decelerations and repetitive late decelerations or other ominous FHR patterns with or without meconium-stained liquor which persisted in spite of corrective actions like change in maternal position,

O2 inhalation, hydration, and stopping oxytocin were delivered by LSCS or by forceps or vacuum delivery. All births were attended by neonatologists, and endotracheal intubation was done in the presence of thick meconium-stained liquor.

Various outcome measures recorded were, Induced Vs. Spontaneous labor, gestational age at delivery, FHR tracings, nature of the amniotic fluid, mode of delivery, indication for LSCS or instrumental delivery, Apgar score, birth weight, admission to neonatal ward, perinatal morbidity and perinatal mortality. The results were recorded and tabulated.

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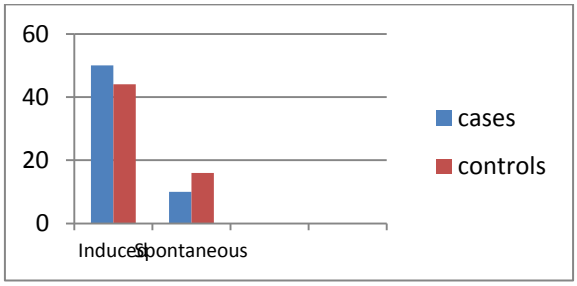
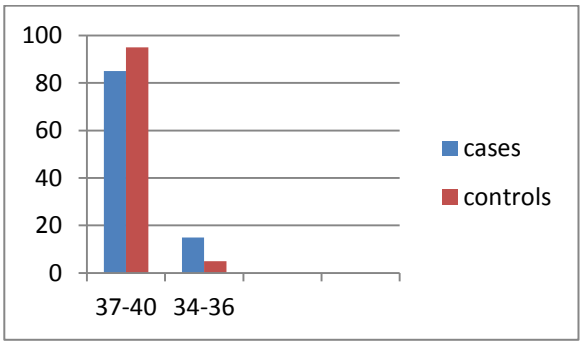


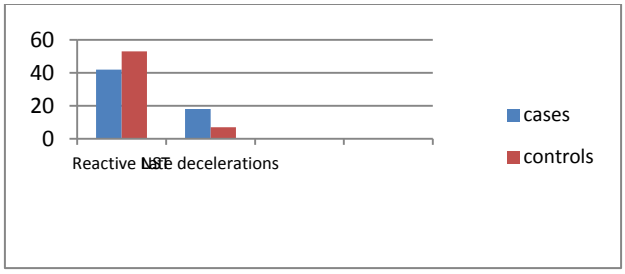
Graph-1 Induced vs. Spontaneous labor

The labor was induced in 50 (83.3%) women with borderline AFI and 44 (73.3%) women with normal AFI. The decision for induction or allowing for spontaneous labor was made depending upon AFI, gestational age, presence of complications like IUGR, and increased S/D ratio. The difference between the two groups in this category was not statistically significant.



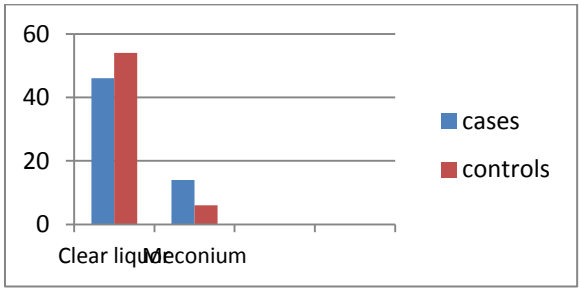
Graph-2 Gestational age distribution

Gestational age distribution between controls and groups was not statistically significant.



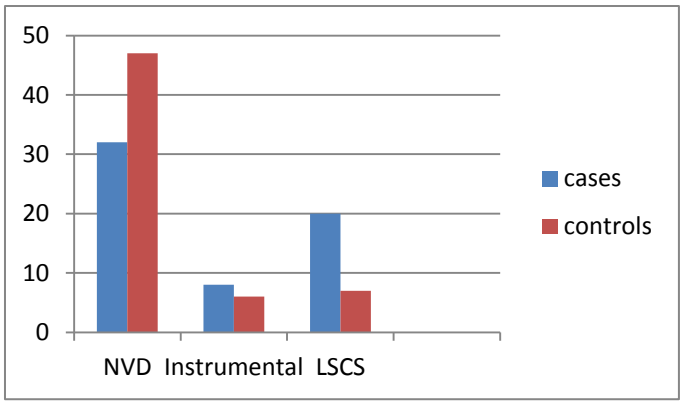
Graph-3 Foetal status assessment in NST

There was a significant difference between the two groups in the occurrence of fetal distress **(P<0.05).**



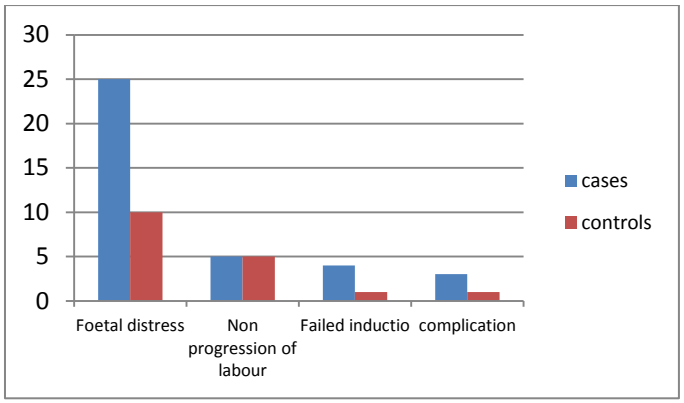
Graph-4 Colour of amniotic fluid

The difference in the occurrence of meconium-stained amniotic fluid between the two groups was statistically significant. **(p<0.05)**



Graph-5 Bar diagram depicting mode of delivery

The difference was statistically significant **(P=0.009).** This study shows that borderline oligohydramnios cases are going for LSCS quite high.

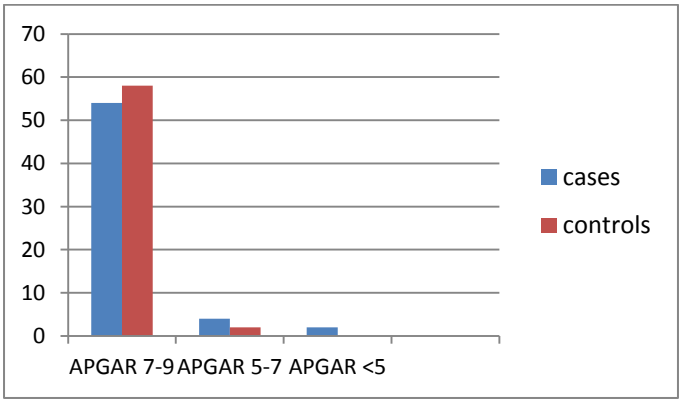


Graph-6 Indication of LSCS

In our study, cases went for L.S.C.S. due to fetal distress was 25%, in the control group, LSCS is 10% due to fetal distress. Whereas the LSCS rate due to no progression of labor was the same in both groups (5%).

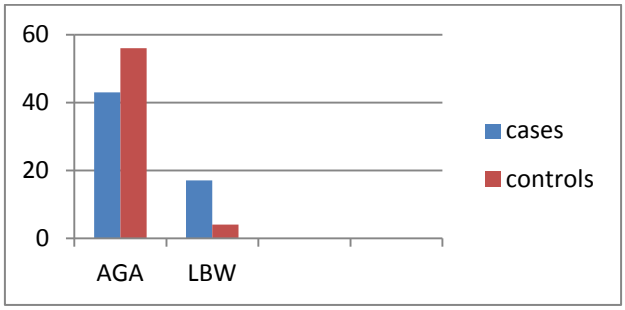
Table-1 Comparison of Apgar score between cases and controls

	cases	Controls
APGAR 7-9	54(90%)	58 (96.7%)
APGAR 5-7	4(6.7%)	2(3.3%)
APGAR<5	2(3.3%)	0(0%)



Graph-7 Comparison of Apgar score between cases and controls

The Apgar score was not statistically significant in the study and control groups.
(P=0.24).

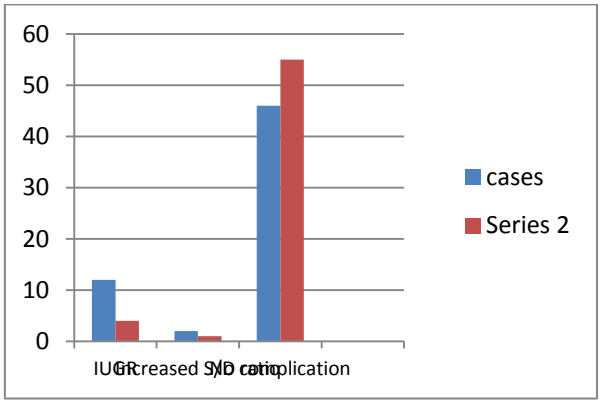


Graph-8 Association of birth weight in borderline oligohydramnios

The occurrence of birth weight < 2.5 Kg was seen in 17 (28.3%) and 4 (6.7%) in the study group and control group, respectively. The difference was significant **(P<0.05).**

Table-2 Complications in Antenatal Period

	Cases (out of 60)	Controls (out of 60)
IUGR	12	4
Increases S/D ratio	2	1

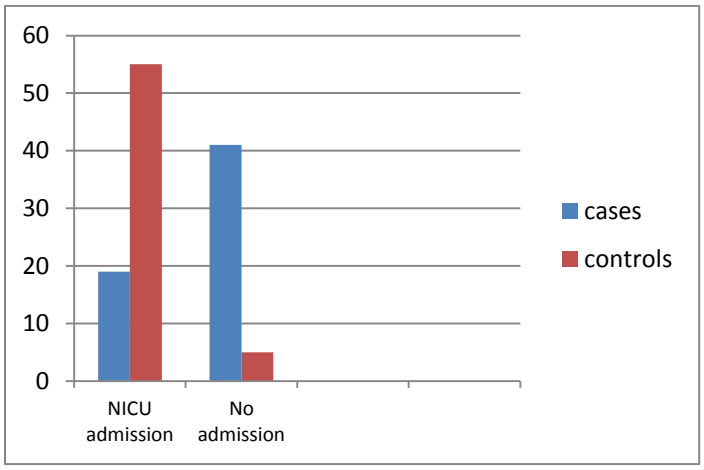


Graph-9 Bar diagram showing antenatal complications

The occurrence of IUGR and increased systolic/diastolic ratio were 20 % and 3.3 % respectively in the study group and 6.7 % and 1.7% in the control group, respectively, which is statically significant **(p<0.05)**

Table 3: NICU admission

	cases	Controls
NICU admission	19	55
No admission	41	5



Graph-10 Bar diagram showing babies who needed NICU admission.

Nineteen neonates of the study group were admitted to the neonatal ward for various morbidities like birth asphyxia and meconium aspiration. Only 5 (8.3%) of the control group were admitted to the neonatal ward. The difference between the two groups was statistically significant **(P < 0.05).**

Discussion

Many studies have been done to correlate association of borderline oligohydramnios with adverse perinatal outcomes, and the occurrence of maternal and fetal complications was reported high in pregnancies with borderline oligohydramnios than those with normal AFI.

Both groups were similar with respect to maternal age, parity, and gravidity, similar

to a study conducted by Gumus et al. and Voxman et al.

In this study, most often complications encountered were IUGR and increased S/D ratio in pregnancies with borderline oligohydramnios, which is consistent with the study by Banks who considered the likelihood of IUGR up to 4 times greater and

Gumus et al. found a greater rate of IUGR, LBW.

Induction of labor does not make a difference when compared to the study and control group.

The nonreactive non-stress test rates are high in women with AFI 5.1 to 8 cm.

The rate of non-reactive NST is 30% in the present study and is comparable to that similar study conducted by Kumar P et al[7] 1991 which was 40%.

The occurrence of meconium-stained amniotic fluid is high in women with borderline AFI. Meconium stained liquor was noted in 23.3% in the study group

In the present study is similar to other studies.

In the study conducted by Grubb et al.,[8] 99% of women with low AFI and prolonged deceleration had meconium-stained amniotic fluid.

Various studies show different rates of LSCS for fetal distress in pregnant women with an amniotic fluid index of 5.1 - 8 cm. The LSCS for fetal distress was done by 25% in the present study.

Apgar score <7 is only about 10% in the present study, which is not statistically significant when compared to the control group.

The mean birth weight is less in the borderline oligohydramnios group. The occurrence of low birth weight is 28.3%, which is comparable with other Indian studies. (Chandra P et al. 61.53 and Sriya R et al. 58.38%).[9] The high incidence of low birth weight may be because of chronic placental insufficiency causing fetal growth restriction.

31.7 percent of newborns were admitted to the neonatal ward for various morbidities like birth asphyxia, meconium aspiration, etc. This is not consistent with studies by Magann et al. (1995)[10] and Casey et al. (1999).[11] However, both authors refer to admission to neonatal intensive care units. A study by Sriya R et al. (2001)[12] showed an even higher incidence of (88.88%) admission to the neonatal ward. In a study by Maryam Asgharnia, infants with Apgar <7 were routinely observed in NICU after delivery, and that might contribute to higher rates of NICU admission.[6]

There were no fetal malformations in the present study. Though Borderline oligohydramnios can cause CTEV due to compression, to know the significance of association, it needs a large number of cases.

In our study, there was no perinatal mortality. In Chandra P et al.[9] study, neonatal death occurred in one case. In a study by Baron et al.[13] and Casey et al.,[11] there was no mortality, probably because of good neonatal intensive care facilities.

In the current research, the incidence of respiratory distress between the two groups (borderline AFI and normal AFI) was not significant, whereas there was a significant difference among patients between 28 to 32 weeks of gestational age, which might be because of premature births in this group. Also, in other studies, there was an increased incidence of respiratory distress in the borderline AFI group, and it was mostly because borderline AFI was evaluated in a lower gestational age.

The limitations of the study include the following:

1) Only 60 cases were analyzed in the study, which exactly satisfied the inclusion and exclusion criteria.
2) The diagnosis of fetal distress was made depending on FHR tracings.
   However, fetal acidosis was not proved by fetal scalp blood sampling because of no – availability.

3) The use of backup surveillance methods like amnioinfusion would have altered the outcome.
4) The availability of better neonatal intensive care unit facilities probably would have minimized the neonatal death rates.
5) Lack of neonatal follow up after seven days

Conclusion

In the presence of borderline oligohydramnios, the occurrence of non-reactive NST, abnormal FHR tracings during labor, meconium-stained liquor, development of fetal distress, the rate of LSCS, low birth weight are high.

(In our study, low 5 min Apgar score and perinatal mortality number are not statistically significant in study and control groups.)

The determination of AFI can be used as an adjunct to other fetal surveillance methods.

It helps to identify those infants at risk of poor perinatal outcome.

Determination of AFI is a valuable screening test for predicting fetal distress in labor requiring a cesarean section. It has a sensitivity of 71% and a negative predictive value of 82% specificity of 58% and a positive predictive value of 43%.

Due to adverse outcomes in patients with borderline AFI, and there was no sufficient evidence and specific decision regarding delivery based on borderline AFI, there should be close observation, and they will need antepartum surveillance.

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