

Original Research Article

A PROSPECTIVE STUDY ON AMNIOTIC FLUID INDEX AND ITS EFFECT ON PERINATAL OUTCOME

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ABSTRACT

This prospective observational study assessed the amniotic fluid index (AFI) and its effect on perinatal outcome among 200 pregnant women beyond 32 weeks of gestation admitted to the Department of Obstetrics and Gynecology, Government General Hospital, Machilipatnam, over a three-month period. AFI was measured using the four-quadrant ultrasonographic technique and classified into four groups: severe oligohydramnios (<5 cm, 12%), moderate oligohydramnios (5-8 cm, 17.5%), normal (9-24 cm, 60%), and polyhydramnios (>25 cm, 10.5%). Abnormal AFI was significantly associated with a higher rate of caesarean delivery ($p=0.003369$), low birth weight ($p<0.0000001$), intrauterine growth restriction ($p=0.048$), NICU admission ($p=0.00007832$), and neonatal death ($p=0.00014$), as well as a lower 1-minute APGAR score ($p=0.0181$), although no significant association was found with the 5-minute APGAR score ($p=0.285$). These findings indicate that both oligohydramnios and polyhydramnios are associated with a substantially higher risk of adverse perinatal outcomes compared to a normal AFI. Antenatal AFI assessment therefore serves as a useful, non-invasive predictor of perinatal risk, allowing timely obstetric intervention. Routine AFI monitoring in the third trimester is recommended to identify high-risk pregnancies and optimize delivery planning.

Keywords: AFI, Obstetrics and Gynecology.

INTRODUCTION

Modern obstetrics is concerned with the health and wellbeing of both mother and fetus. Amniotic fluid index acts as one of the indicator for fetal maturity and well being. Identification and quantification of fetal risk based on AFI and determining the optimal time of intervention, so that providing good perinatal outcome.^[1] The present study is conducted to know the effect of amniotic fluid index and its clinical significance in perinatal outcome.

Introduction: Amniotic fluid index is a quantitative estimate of amniotic fluid volume and indicator of fetal wellbeing. Amniotic fluid is produced from both maternal and fetal origin. The quantity of amniotic fluid at any time in gestation is the product of water exchange between the mother, fetus and placenta.^[2,3] Disorders of this regulatory process can lead to either polyhydramnios or oligohydramnios. The normal range for amniotic fluid index (AFI) is 5 to 25 cm.^[4]

Aim: To study the Amniotic fluid index and its effect on perinatal outcome

Objectives

1. To know the prevalence of abnormal AFI (Amniotic fluid index) among study subjects in the study area.
2. To find the association between AFI and perinatal outcome

MATERIALS AND METHODS

Study design: Prospective observational study

Study place: The study was conducted in the Department of Obstetrics and Gynecology at Government General Hospital, Machilipatnam.

Study period: The study was conducted over a period of 3 months

Study subjects: All pregnant women with more than 32 weeks period of gestation, admitted in the inpatient department, Department of Obstetrics and Gynecology, Government General Hospital, Machilipatnam.

Sampling technique: Simple Random sampling.

Sample size: 200 pregnant women with more than 32 weeks period of gestation

Inclusion Criteria

1. Pregnant women who gave informed consent.
2. Pregnant women with Singleton pregnancy
3. Pregnant women with Cephalic presentation
4. Pregnant women with Intact membranes
5. Pregnant women completed 32 weeks of gestation.

Exclusion Criteria

1. Pregnant women who have not given consent.
2. Pregnant women with malpresentation.
3. Pregnant women with Placental abnormalities
4. Pregnant women with Rh-ve pregnancy
5. Pregnant women with Premature rupture of membranes.

Methodology

Taking detailed obstetrical history and performing clinical examination.

AFI is measured by ultrasonogram using the four-quadrant technique as described by Phelan et al.^[7]

Women were divided into 4 groups as per her AFI(5,6):

1. 1.Group 1: AFI <5cms (Severe oligohydramnios)
2. 2.Group 2: AFI 5-8 cms (Moderate oligohydramnios)
3. 3.Group 3: AFI 9-24 cms (Normal)
4. 4.Group 4: AFI >25 cms (Polyhydramnios)
5. We will follow them in antenatal period during and after delivery.

Statistical Analysis

Statistical Analysis epiinfo version 7 software was used. Chi-square test was performed to assess the association among various categorical variables.

Ethical consideration:

This study was approved by Institutional Ethics Committee of Sri Pingali Venkayyah Government Medical College, Machilipatnam, Andhra Pradesh. Informed consent was taken from all participants.

RESULTS

Table 1: Distribution of cases based on AFI

AFI value	Group	Number of cases
< 5cms	Severe oligohydramnios	24 (12%)
5 -8 cms	Moderate oligohydramnios	35 (17.5%)
9 -24 cms	Normal	120 (60%)
>25 cms	Polyhydramnios	21 (10.5%)

Table 2: Distribution of cases based on period of gestation

Period of gestation in weeks	Number of cases
32	2 (1%)
33	2 (1%)
34	4 (2%)
35	1 (0.5%)
36	44 (22%)
37	87 (43.5%)
38	51 (25.5%)
39	8 (4%)
40	1 (0.5%)

Table 3: Distribution of cases based on NST

NST	Number of cases
Reactive	112(56%)
Equivocal	56(28%)
Non-reactive	32(16%)

Table 4: Distribution of cases based on mode of delivery

Mode of delivery	AFI< 5cms	AFI- 5-8cms	AFI- 9-24cms	AFI >25cms	Total
LSCS	18 (75%)	19 (54.3%)	52 (43.3%)	16 (76.2%)	105
NVD	6 (25%)	16 (45.7%)	68 (56.7%)	5 (23.8%)	95

According to the present study AFI has a influence on mode of delivery. Majority of the deliveries were caesarean sections in cases with abnormal AFI, with significant association i.e p=0.003369 and Chi square=13.69, degree of freedom=3.

Table 5: Distribution of cases based on APGAR at 1minute

APGAR at 1minute	AFI< 5cms	AFI- 5-8cms	AFI- 9-24cms	AFI >25cms	Total
<7	3 (12.5%)	10 (28.6%)	14 (11.7%)	7 (33.3%)	34
>=7	21 (87.5%)	25 (71.4%)	106 (88.3%)	14 (66.7%)	166

According to the present study children born to mothers with low AFI has poor APGAR score compared to children born to mothers with normal AFI with significant association i.e P= 0.01810 ,chi square=10.06, Degree of freedom =3.

Table 6: Distribution of cases based on APGAR at 5minutes

APGAR at 5minutes	AFI< 5cms	AFI- 5-8cms	AFI- 9-24cms	AFI >25cms	Total
<7	12 (50%)	21 (60%)	54 (45%)	13 (61.9%)	100
>=7	12 (50%)	14 (40%)	66 (55%)	8 (38.1%)	100

According to the present study children born to mothers with low AFI has no association with APGAR score at 5minutes of time of birth i.e P= 0.285, chi square=3.79, Degree of freedom=3.

Table 7: Distribution of cases based on NICU admission

NICU admission	AFI< 5cms	AFI- 5-8cms	AFI- 9-24cms	AFI >25cms	Total
Yes	7	12	16	13	48
No	17	23	104	8	152

According to the present study AFI has influence on NICU admission of new born babies, babies with oligohydramnios were admitted more compared to other babies, with significant association i.e p=0.00007832. chi square=26.41, Degree of freedom=3.

Table 8: Distribution of cases based on birth weight

Birth weight	AFI< 5cms	AFI- 5-8cms	AFI- 9-24cms	AFI >25cms	Total
<2.5kg	10	6	9	11	36
>2.5kg	16	25	113	10	164

According to the present study new born children with low AFI level has low birth weight compare to babies born with normal AFI level with a significant association P=<0.0000001, Chi Square=37.76, Degree of Freedom=3.

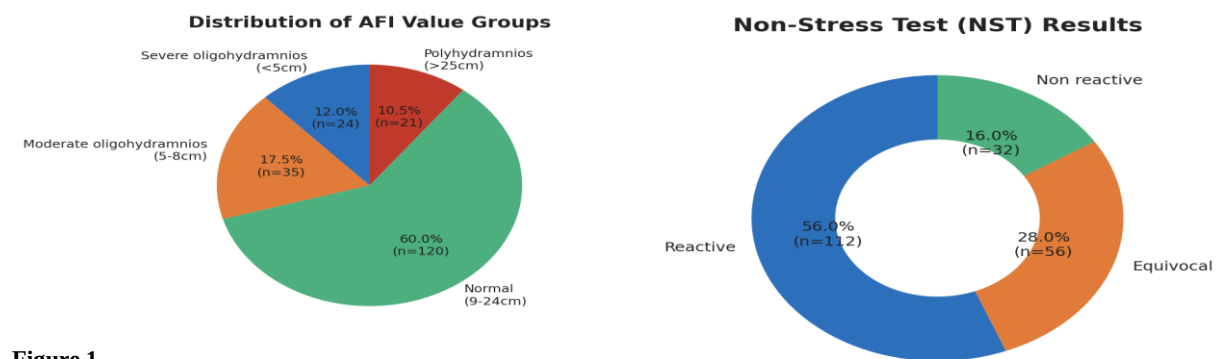
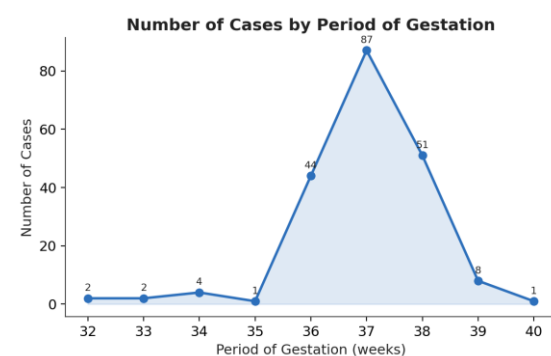
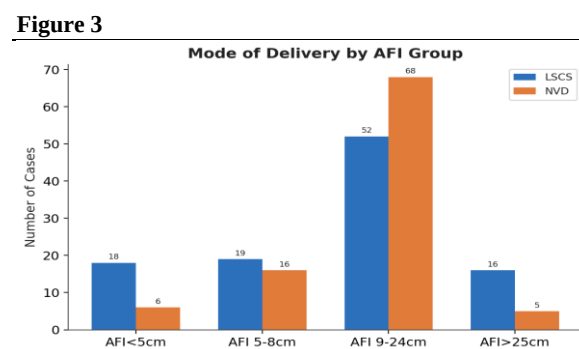
Table 9: Distribution of cases based on IUGR

AFI	IUGR	NON IUGR	Total
Abnormal	15	65	80
Normal	11	109	120

The above table infers that study population with abnormal AFI are more prone to IUGR compared to population with normal AFI i.e, P= 0.048, chi square=3.898.

Table 10: Distribution of cases based on neonatal outcome

AFI	Neonatal deaths	Live babies
AFI<5cms	3	21
AFI 5-24cms	2	153
AFI>25cms	4	17

**Figure 1****Figure 2****Figure 3**

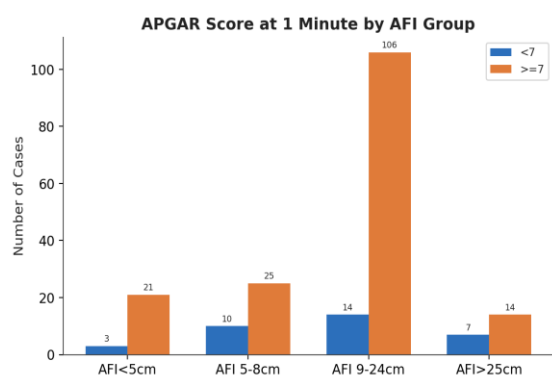


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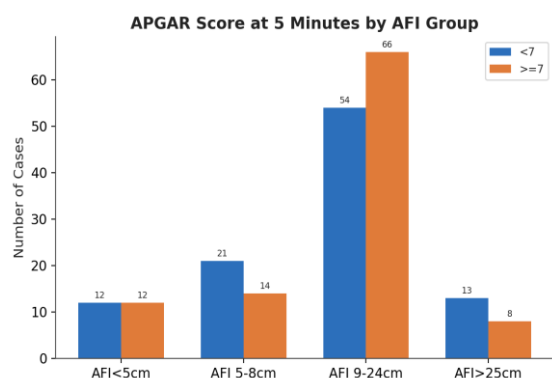


Figure 6

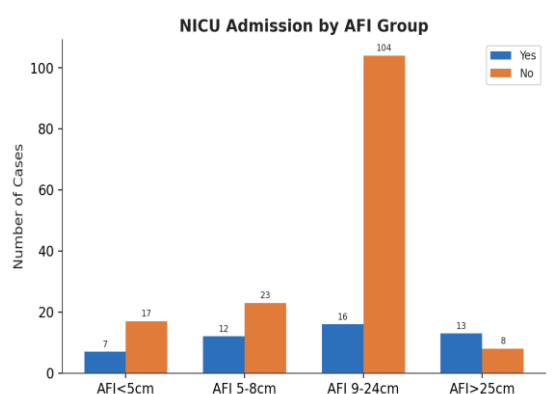


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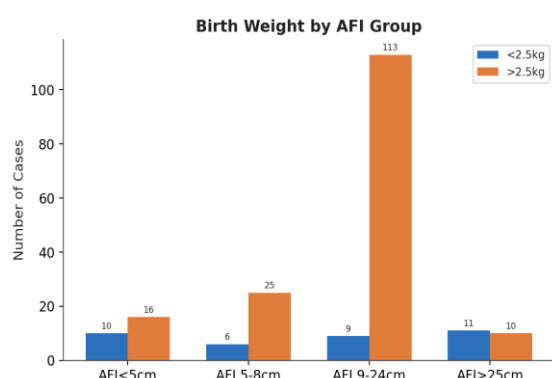


Figure 8

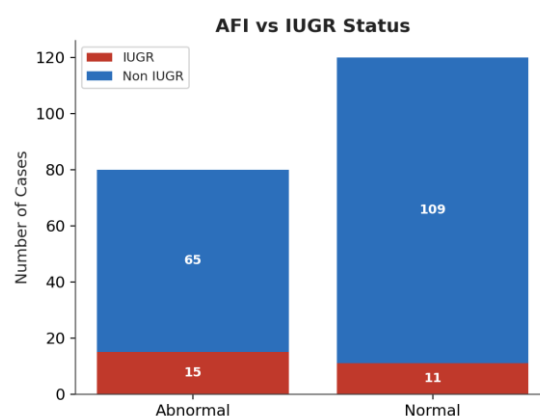


Figure 9

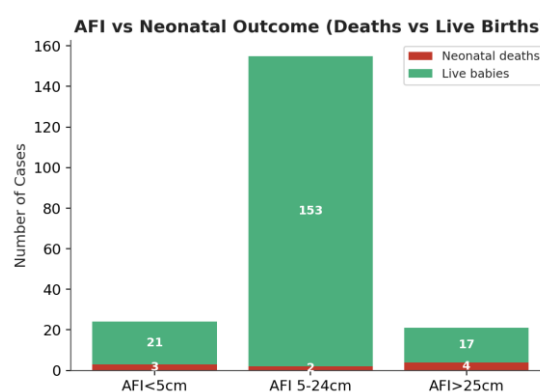


Figure 10

Summary

In the Present study 17% of the study population had severe Oligohydramnios, 12% being moderately oligohydroamniotic and 11 % of them had polyhydramnios respectively. Among study group 56% of them had Reactive NST, 28% of them had equivocal only 16% had non reactive NST. Meconium stained liquor was present among 27.5% of the study population and 71% were with clear liquor and 2% were blood stained liquor respectively. Among total new born babies 24% had NICU admission and 76% had no NICU admission respectively. Among total N=48 NICU admission of the new born babies 64.58% of the admitted new born were discharged after 1 week and 35.41% discharged before 1 week. Among 200 outcomes of 4.5 % of the outcome was perinatal deaths and 95.5% were live born. Majority of the study population 43.5% were constituted by mothers of 37 weeks of gestation followed by 25.5% by 38weeks and 22% by 36weeks. Among the new born babies majority of the them with normal birth weight constituted by 81% followed by low birth weight babies constituting 15% and 4 % constituted by new born babies with very low birth weight.

DISCUSSION

In our study the proportion of low birth weight babies was 15.75% (n=30) which was less compared to Verhoeff F, Brabin B, Buuren SV, Chimsuku L,

Kazembe P, et al,^[9] and Berendes HW, Fikree FF et al(10) where the proportion of low birth weight babies was 20.3% and 24.4% respectively. The present study showed a significant association between mode of delivery and AFI level were lower segmental caesarean section much more prevalent among mothers with abnormal AFI level compared to mothers with normal AFI levels with $p=0.003369$ and Chi square=13.69 at degree of freedom=3 which is similar to Bakhsh, H., Alenizy, H., Alenazi, S. et al.^[8] The rate of cesarean deliveries was higher in polyhydramnios cases comparing to normal cases, A statically significant association was found between polyhydramnios and late term deliveries ($P = 0.005$) and cesarean section (CS) rates ($P = 0.008$). Present study had a significant association between abnormal AFI levels and IUGR in perinatal outcome with $P=0.048$, chi square=3.898. In O'Brien, et al.^[11] Which similar factor concluded that there is significant association of fetal growth retardation is with an AFI of 7 cm, or less ($P \leq 0.001$). In the present study there was a statistical significant association between APGAR at 1 minute time of birth among new born with abnormal AFI compared to new born with normal AFI level and there was no difference in APGAR after 5 min of birth among, new born with abnormal and normal AFI level, similar with Bhagat M, Chawla I et al,^[12] to the 1-min Apgar score .

CONCLUSION

Majority of study population had normal AFI and followed by oligohydramnios and polyhydramnios. In the present study there is statistically strong correlation between abnormal AFI and mode of delivery showing LSCS are more with $AFI < 7$. There is also strong correlation between abnormal AFI and

low birth weight babies, IUGR babies, low APGAR babies, NICU admissions and perinatal deaths.

REFERENCES

1. Chamberlain PF, Manning FA, Morrison I, et al. The relationship of marginal and decreased amniotic fluid volume to perinatal outcome. *Am J Obstet Gynecol* 1984;150(3):245-9.
2. Brace RA, Wolf EJ. Normal amniotic fluid volume changes throughout pregnancy. *Am J Obstet Gynecol*. 1989;161(2):382-8.
3. Magann EF, Bass JD, Chauhan SP, Young RA, Whitworth NS, Morrison JC. Amniotic fluid volume in normal singleton pregnancies. *Obstet Gynecol*. 1997;90(4):524-8.
4. Leveno KJ, Spong CY, Dashe JS, Casey B, Hoffman BL, Cunningham FG, et al. *Williams Obstetrics* (25th edition). New York: McGraw-Hill Education, 2018, p. 225-33, 227-31.
5. Ian Donalds. *Text book of practical obstetric problems*: page number 428-430.
6. D C Dutta's. *text book of obstetrics* 9th edition page 200-203
7. Phelan JP, Smith CV, Broussard P, Small M. Amniotic fluid volume assessment with the four-quadrant technique at 36-42 weeks' gestation. *J Reprod Med*. 1987;32(7):540-2.
8. Bakhsh H, Alenizy H, Alenazi S, Alnasser S, Alanazi N, Alsowinea M, et al. Amniotic fluid disorders and the effects on prenatal outcome: A retrospective cohort study. *BMC Pregnancy Childbirth* 2021;21(75). <https://doi.org/10.1186/s12884-021-03549-3>. [Last Accessed 27th Jul, 2022].
9. Verhoeff F, Brabin B, Buuren SV, Chimsuku L, Kazembe P, et al. An analysis of intrauterine growth retardation in rural Malawi. *Eur J Clin Nutr*. 2001;55:682-9.
10. Berendes HW, Fikree FF. Risk factors for term intrauterine growth retardation: a community-based study in Karachi. *Bull World Health Organ*. 1994;72:581-9.
11. O'Brien JM, Mercer BM, Friedman SA, et al. Amniotic fluid index in hospitalized hypertensive patients managed expectantly. *Obstet Gynecol*. 1993;82:247-50.
12. Bhagat M, Chawla I. Correlation of amniotic fluid index with perinatal outcome. *J ObstetGynaecol India*. 2014 Feb;64(1):32-5. doi: 10.1007/s13224-013-0467-2. Epub 2013 Oct 20. PMID: 24587604; PMCID: PMC3931909.