IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 8 Ver. 2 (August. 2018), PP 37-42
www.iosrjournals.org

"Amniotic Fluid Index as a Predictor of Maternal and Neonatal Outcome in Low Risk Patients "A Non Randomized Comparative Prospective Study

[1] Prof. Dr Sonal Kulshestha [2] Dr Renu Dubey Sharma
[1]*dept Of Obstetrics And Gynecology G.R.Medical College Gwalior*
[2]*post Graduate Dept. Of Obstetrics and Gynecology G.R.Medical College Gwalior*
Corresponding Author: 1 Prof Dr. Sonal Kulshestha

Abstract:
INTRODUCTION
Obstetrics is concerned with human reproduction and as such is always a subject of considerable contemporary relevance. Quantification of amniotic fluid is an important component of the biophysical profile in ultrasound evaluation of the fetal wellbeing, especially in the third trimester.[1] Assessment of amniotic fluid volume at term is often included in antepartum care as a method of evaluating mode of delivery and fetal monitoring.
Alterations in AFI have classically been considered as an indicator of fetal compromise. In the present study we have evaluated the relationship between amniotic fluid volume and maternal and perinatal outcome in low risk pregnancies.
AIMS & OBJECTIVES
To determine predictive value of amniotic fluid index in term pregnancy for
- *maternal outcome-Nature of liquor, Induction of labor, Mode of delivery,*
- *Perinatal outcome- Fetal distress, Infant APGAR Score, Admission in NICU, Perinatal mortality.*

MATERIAL AND METHODS
The present study was a non-randomized comparative study carried out in the Department of Obstetrics & Gynecology at Kamla Raja Hospital, Gajra Raja Medical College, and Gwalior (M.P.) From February 2015 to August 2016.The study participants included 400 antenatal women at Kamla Raja Hospital with gestational age 37 weeks and above, admitted for delivery.
On admission risk factors identified with detailed past, personal, medical and surgical history. Thorough obstetric examination done with clinical evaluation of oligohydramnios, patients were evaluated whether in labor or not, and admission CTG done .Ultra-sonographic evaluation of amniotic fluid index using the phelan's technique[2] done. After assessment of AFI patients were divided into two groups with respect to AFI $\leq$5cm and AFI>5cm.The patient's in-labor were allowed to progress spontaneously with intrapartum intermittent auscultation of FHR, intrapartum CTG recording done according the ACOG guidelines and progress of labor recorded by partogram charting. Outcome assessed in term of maternal and fetal outcome.
CONCLUSION
- *The above study concludes that amniotic fluid index $\leq$5 cm is a helpful tool in determining poor maternal and perinatal outcome in otherwise low risk patients. The study shows high statistical significance between low AFI and occurrence of non-reassuring FHR. Rate of induction of labor and incidence of cesarean section was high in patients with AFI $\leq$5cm. Incidence of meconium stained liquor was higher in patients with low AFI. The study shows higher incidence of low Apgar score, rate of admission to NICU and perinatal mortality in patients with AFI$\leq$5cm. Maternal morbidity is increased in patients with AFI$\leq$ 5cm due to increased incidence of induction their labor and cesarean section and its associated complications. Patients with AFI$\leq$5cm should be intensively monitored with intermittent auscultation and four hourly intra-partum CTG to decrease perinatal morbidity and mortality.*

Date of Submission: 27-07-2018 Date Of Acceptance: 09-08-2018

I. Introduction

Obstetrics is concerned with human reproduction and as such is always a subject of considerable contemporary relevance. The specialty promotes health and well-being of the pregnant woman and her fetus through quality maternal and perinatal care.

Quantification of amniotic fluid is an important component of the biophysical profile in ultrasound evaluation of the fetal well being, especially in the third trimester.[1]

In pregnancy amniotic fluid surrounds the fetus and plays an important role in the development of fetus. Assessment of amniotic fluid volume at term is often included in antepartum care as a method of evaluating mode of delivery and fetal monitoring.

Alterations in AFI have classically been considered as an indicator of fetal compromise. In the present study we have evaluated the relationship between amniotic fluid volume and maternal and perinatal outcome in low risk pregnancies.

AIMS & OBJECTIVES

To determine predictive value of amniotic fluid index in term pregnancy for:-

- maternal outcome-Nature of liquor, Induction of labor, Mode of delivery,
- Perinatal outcome- Fetal distress, Infant APGAR Score, Admission in NICU, Perinatal mortality.

II. Material And Methods

The present study was a non randomized comparative study carried out in the Department of Obstetrics & Gynecology at Kamla Raja Hospital, Gajra Raja Medical College, and Gwalior (M.P.) From February 2015 to August 2016.The study participants included 400 antenatal women at Kamla Raja Hospital with gestational age 37 weeks and above, admitted for delivery.

They were divided into two groups based on their AFI

Group A : AFI $\leq$5cm
Group B : AFI >5cm

Methods of collection of data:

Inclusion Criteria:

- All low risk pregnant women with gestational age of 37 weeks or more, willing to participate in the study are included.

Exclusion criteria:

- Pregnant women with gestational age of less than 37 weeks
- Polyhydramnios
- Multiple pregnancy
- Placenta previa
- Fetal congenital anomalies
- Patients with rupture membranes
- Abnormal presentation and position
- Pregnancy with medical disorders

III. Methods

On admission a detailed history was taken with particulars of the patient (i.e. name, age, address, educational status, occupation, referral status) with detailed obstetric history was taken. Risk factors identified with detailed past, personal, medical and surgical history. General examination done. Thorough obstetric examination done with clinical evaluation of oligohydramnios, patients were evaluated whether in labor or not, and admission CTG done.

Ultra-sonographic evaluation of amniotic fluid index using the phelan's technique[2] placing the pregnant women in supine position; the uterus divided into 4 quadrants using maternal sagittal midline vertically and an arbitrary transverse line approximately midway between the pubic symphysis and upper edge of the uterine fundus.

Deepest, unobstructed, clear pocket of amniotic fluid visualized in each quadrant and all the 4 pocket of measurement summed together to determine the AFI with transducer held vertically to the floor and parallel to the long axis of the pregnant woman. After assessment of AFI patients were divided into two groups with respect to AFI $\leq$5cm and AFI>5cm.

The patient's in-labor were allowed to progress spontaneously with intrapartum intermittent auscultation of FHR, intrapartum CTG recording done according the ACOG guidelines and progress of labor recorded by partogram charting. While not in-labor patients were induced in both the groups according to the maternal and fetal indications. Cesarean section done at the earliest indications in the cases with failed induction, intrapartum Maternal and/or fetal distress.

The end points to judge maternal outcome are:
Nature of liquor (clear/meconium stained),
Frequency of uterine contractions frequency
Non satisfactory progress of labor, signs of maternal distress.

The end points used to judge perinatal outcome are:

- Fetal distress
- Non-reassuring FHR
- 1 minute and 5 minute APGAR score judged by independent observer - pediatrician. APGAR score less than 7 will be considered as abnormal.
- Frequency of admission to NICU
- Perinatal death - death of baby in the first 7 days.
  Collected data is analyzed with appropriate statistical test for final outcome.

IV. Observations And Result

This study was conducted on 2 groups of 200 pregnant women in each, of gestational age 37 weeks and above.

Group A (Study group) - AFI $\leq$ 5 cm - 200 cases
Group B (Control group) - AFI $\geq$ 5 cm - 200 cases

These groups were similar with regard to antepartum variables like maternal age, gravidity, gestational age.

TABLE NO. 1 DISTRIBUTION OF CASES ACCORDING TO AGE

Age (yrs)	Study group A		Study group B	
	No.	%	No.	%
18-20 Year	29	14.5	49	24.5
21-25 Year	119	50.6	97	48.5
26-30 Year	52	26	54	27
Total	**200**	**100**	**200**	**100**

TABLE NO. 2 DISTRIBUTION OF CASES ACCORDING TO GRAVIDITY

Gravidity	Study group A		Study group B	
	No.	%	No.	%
Gravida 1	93	46.5	98	49
Gravida 2	61	3.5	46	23
Gravida 3	25	12.5	32	16
Gravida 4	21	10.5	24	12
Total	**200**	**100**	**200**	**100**

TABLE NO. 3 DISTRIBUTIONS OF CASES ACCORDING TO EDUCATION STATUS

Education status	Study group A		Study group B	
	No.	%	No.	%
Uneducated	50	25	52	26
Primary	56	18	53	26.5
Secondary	64	32	58	29
Graduate	30	15	37	18.5
Total	**200**	**100**	**200**	**100**

TABLE NO. 4:- NO. OF LABOUR INDUCTIONS

Labor	Study group A N=200		Study group B N=200	
	No.	%	No.	%
Induced	84	21	36	18
Spontaneous	57	28.5	97	48.5
Total	**133**	**100**	**141**	**100**

TABLE NO. 5 FHR PATTERN

FHR	Study group A N=200		Study group B N=200	
	No.	%	No.	%
Non reassuring FHR	96	48	78	39

(Non-reassuring fetal heart rate - variable, late and early decelerations with decreased variability and no acceleration)

TABLE NO. 6 NATURE OF AMNIOTIC FLUID

Liquor	Study group A		Study group B	
	No.	%	No.	%
Clear	198	99	200	100
Meconium Stained	02	1	-	-
Total	**200**	**100**	**200**	**100**

TABLE NO. 7 MODE OF DELIVERY

	Group A			Group B		
	Induced	Spontaneous	Total	Induced	Spontaneous	Total
FTND	18	39	57	7	123	130
LSCS	78	65	143	32	38	70
TOTAL	96	104	200	39	161	200

Table No. 8 Distribution of cases according to Apgar score at 1 min

Apgar Score at 1 min	Study group A		Study group B	
	No.	%	No.	%
< 7	85	43	74	37
> 7	115	57	126	63
Total	**200**	**100**	**200**	**100**

TABLE NO. 9 DISTRIBUTIONS OF CASES ACCORDING TO APGAR SCORE AT 5 MIN

Apgar Score at 5 min	Study group A		Study group B	
	No.	%	No.	%
< 7	56	28	30	15
> 7	144	72	170	85
Total	**200**	**100**	**200**	**100**

TABLE NO. 10 DISTRIBUTIONS OF CASES ACCORDING TO NICU ADMISSION

NICU admission	Study group A N=200	Study group B N=200
Admitted	14	04

TABLE NO. 11 DISTRIBUTIONS OF CASES ACCORDING TO PERINATAL MORTALITY

Perinatal death	Study group A N=200	Study group B N=200
Deaths	10	02

V. Discussion

This study was conducted on pregnant women of the gestational age of 37 wks. and beyond admitted to Kamla Raja Hospital, Gwalior.

Four hundred antenatal singleton low risk pregnancies were identified and divided into two groups

Group A - AFI $\leq$5cm

Group B - AFI >5cm

The various outcomes and results were compared to results of similar studies done in India & abroad. The mean gestational age in the present study is 37.92 weeks in group A and 38.02 weeks in group B which is comparable with mean gestational age of 37.5 weeks in the study conducted by **Cassey ET al[3]**.

For comparison with other studies about oligohydramnios (AFI$\leq$5 cm), our findings in group A and group B are taken together.

Non reassuring FHR

The FHR decelerations, during intrapartum period suggestive of fetal distress were common in pregnant women with AFI $\leq$5cm.

In our study we found that Non reassuring FHR in women with AFI $\leq$5cm was 48% and statistically significant (p=0.003), which was consistent with the study done by **Ashwal E ET. al (2014)[8]** with p< 0.01.

Number of labor inductions

Induction of labor was 48% in group A as compared to 19.5% in group B which is statistically significant (p<0.001) and this is consistent with **Cassey et al (2000)[3]** found induction rate of 42%.

Ashwal E et al (2014)[8] in study of isolated oligohydramnios at term, the induction rate was 27.7%

Incidence of meconium stained liquor

The incidence of meconium stained amniotic fluid was 2% with p-value=0.499, in (women with AFI ≤5cm) in our study which is almost consistent with study of impact of amniotic fluid index on perinatal outcome and induction of labor by **Alchalabi HA et al (2006)**[11] with p-value=0.040.

Kahraman Ulker, Isa Aykut Ozdemia (2011)[5] and **Sunita Ghike et al (2013)**[6] also found higher rates of meconium stained liquor.

Mode of delivery

The cesarean rates were higher in group A (AFI ≤5cm) i.e. 71.5% as compared to 33.5% for group B (AFI > 5 cm) and the difference was statistically significant (p <0.001).

Bachhav AA et al (2014)[7] in their study of low amniotic fluid index at term as a predictor of adverse perinatal outcome found that patients with AFI <_5cm was associated with increased incidence of cesarean section in 66%, which was similar to our study.

Naverio-Fuentes M, et al. (2015)[9] in retrospective analysis of perinatal outcomes with isolated oligohydramnios at term pregnancy was associated with higher risk of cesarean delivery.

APGAR score at 1 minute and 5 minute.

In the present study:-

The 1 minute Apgar score was <7 in 43% in group A, whereas only 37% babies in group 2 had a 1 minute Apgar score <7.with P-value=0.128 which is statistically insignificant.

The 5 minutes Apgar score was <7 in 28% in group A and 15% in group B and this difference was also statistically insignificant (p = 0.116) **Bachhav AA et al (2014)**[7] in study of perinatal outcome in pregnant women with low amniotic fluid index at term found that Apgar <7 at 5 minutes (pooled relative risk, 5.2; 95% confidence interval, 2.4-11.3), was significant.

A study by **Choi et al (2016)**[10] found that the 1 minute and 5 minute Apgar score <7 was higher in patients with AFI ≤5cm as compared to the normal AFI group, which was highly significant (p=0.001).

Admission to NICU

The incidence of admission to NICU was 7% in group A as compared to 2% in group B and this is consistent with studies by **Cassey et al (2000)**[3] 7.6%. Another study by **Choi SR et. al (2016)** [10] of perinatal outcomes in the uncomplicated term pregnancy found admission to the NICU was significant with p-value=0.368.

Perinatal mortality

Occurrence of perinatal death was 5% in oligohydramnios group comparable to 5% in a study by **Cassey et al (2000)**[3]

In study conducted by **Charu Jandial et al (2007)**[4] to evaluate perinatal outcome in term patients with low risk patients found high rate of pregnancy complications and increased perinatal morbidity and mortality.

VI. Summary

This study was conducted on two groups of two hundred low risk pregnant women in each, of the gestational age 37 weeks and above, at Kamla Raja Hospital ,GRMC Gwalior for the period from febuary 2015 to August 2014.

AFI was measured in all cases and oligohydramnios was considered if AFI was less than 5 cm. The results were recorded, tabulated and statistically analyzed using parameters like mean and chi square test.

- The mean age for study group A and group B was 23.99 and 23.62 respectively.
- Most of them were prime gravida in both the groups.
- Only those pregnant women who were sure of their LMP were taken for study and all of them had completed 37 weeks of gestation.
- The amniotic fluid index was measured by four quadrant semi quantitative technique by ultrasound and those with AFI ≤ 5 cm were considered as oligohydramnios and those with AFI ≥ 5 cm were considered normal.
- Labor was induced in 48% in group A as compared to 19.5% in group B. Induction of labor was significantly more in cases with AFI ≤ 5 cm of same gestational age group was statistically significant (p<0.001).
- The non-reassuring FHR were recorded more often in group A i.e. AFI ≤ 5 cm. was statistically significant (p=0.003).

- Incidence of thick meconium was more in group A i.e. AFI ≤ 5cm.(0.499)
- Incidence of LSCS was more in group A i.e. 71% as compared to group B i.e. 35%. This was statistically significant (p<0.001).
- The low 1 minute Apgar score was 43% in group A as compared to 37% in group B and this was statistically equivocal as (p=0.128).
- The low 5 minute Apgar score was 28% in group A as compared to 15% in group B and this was statistically equivocal as (p=0.116).
- NICU admission were more in group A i.e. 14 as compared to group B i.e. 04 was statistically significant (p=0.041) in group A with AFI ≤ 5cm.
- There were 10 perinatal deaths in group A and 02 in group B and this was statistically significant (p=0.032).

Summary of maternal and perinatal outcome

S.No.	Outcome parameters	Group A (n=200)		Group B (n=200)	
		N	%	N	%
1.	Non reassuring FHR	96	48%	78	39%
2.	Induction of labor	30	60%	18	36%
3.	Thick meconium stained liquor	02	1%	00	0%
4.	Total no. of LSCS	143	71.5%	70	35%
5.	Total no. of FTND	57	28.5%	130	65%
6.	Apgar score < 7 - 1 min	85	43%	74	37%
7.	Apgar score < 7 - 5 min	56	28%	30	15%
8.	Admission to NICU	14	7%	4	2%
9.	Perinatal death	10	5%	02	1%

VII. Conclusion

- The above study concludes that amniotic fluid index ≤5 cm is a helpful tool in determining poor maternal and perinatal outcome in otherwise low risk patients.
- The study shows high statistical significance between low AFI and occurrence of non-reassuring FHR.
- Rate of induction of labor and incidence of cesarean section was high in patients with AFI ≤5cm.
- Incidence of meconium stained liquor was higher in patients with low AFI.
- The study shows higher incidence of low Apgar score, rate of admission to NICU and perinatal mortality in patients with AFI≤5cm.

Maternal morbidity is increased in patients with AFI≤ 5cm due to increase incidence of induction their labor and cesarean section and its associated complications.

Patients with AFI≤5cm should be intensively monitored with intermittent auscultation and four hourly intra-partum CTG to decrease perinatal morbidity and mortality.

Bibliography

[1]. Bhagat Megha, Chawla Indu. Correlation of Amniotic Fluid Index with perinatal outcome. The Journal of Obstetrics andGynecology of India. (Jan. To Feb. 2014) 64(1) : 32-35.
[2]. Magann F, Sanderson M, Martin M et al. The amniotic fluid index, single deepest pocket and two-diameter pocket in normal pregnancy. Am J Obstet Gynecol 2000; 182: 1581-1588?
[3]. Cassey BM, MC Intire DD, Donald D, et al. Pregnancy outcome after diagnosis of oligohydramnios at or beyond 34 weeks of gestation. Am J Obstet Gynecol 2000; 182: 902-12?
[4]. Charu Jandia, Shashi Gupta, Sudha Sharma, Maju Gupta. Perinatal Outcome after antepartum diagnosis of oligohydramnios at or beyond 34 weeks of gestation, from the Department of Obstetric & Gynecology, Radio diagnosis, Govt. Medical College and J&K Health Services, Jammu, JK Science, Vol. 9 No. 4 Oct. - Dec. 2007.
[5]. Kahraman Ulker, Isa Aykut Ozdemi. The relation of Intrapartum Amniotic Fluid Index to Perinatal Outcomes., Kafkas J Med. Sci. 2011, 1(1):1-7.
[6]. 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.
[7]. Bachhav AA, Waikar M. Low amniotic fluid index at term as a predictor of adverse perinatal outcome. J Obstet Gynaecol India. 2014 Apr; 64(2):120-3.
[8]. Ashwal E, Hiersch L, Melamed N, Aviram A, Wiznitzer A, Yogev Y. Arch Gynecol Obstet.2014 Nov;290(5):875-81.
[9]. Naverio-Fuentes M et al. Study of perinatal outcomes with isolated oligohydramnios at term pregnancy .in retrospective analysis of obstetric outcomes.J Perinatal Med. 2015.-10.1515/jpm-2015-0198.
[10]. Choi SR et al. Study of borderline amniotic fluid index and perinatal outcomes in the uncomplicated term pregnancy. J Matern Fetal Neonatal Med. 2016 Feb; 29(3):457-60.
[11]. Alchalabi HA ,Obeidat BR, Jallad MF, Khader YS. Induction of labor and perinatal outcome: the impact of the amniotic fluid index. Eur J Obstet Gynecol Reprod Biol. 2006Dec; 129(2):124-7.

Dr sonal kulshestha prof ""Amniotic Fluid Index as a Predictor of Maternal and Neonatal Outcome in Low Risk Patients "A Non Randomized Comparative Prospective Study."IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 8, 2018, pp 37-42.