



Perinatal outcome in pregnant females at term having low amniotic fluid index.

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ABSTRACT... Objectives: To determine the frequency of perinatal outcome in pregnant females at term having low amniotic fluid index. **Study Design:** Descriptive, Case Series study. **Setting:** Department of Obstetrics & Gynecology, Independent University Hospital, Faisalabad. **Period:** 1st October 2019 to 31st March 2020. **Materials & Methods:** A total of 90 women having singleton pregnancy with cephalic presentation having 37-40 weeks of gestation with AFI <8cm, 20 to 35 years of age were included. Patients with multiple pregnancy, ruptured membrane, fetal anomaly, gestational diabetes and Rh Incompatibility were excluded. Cesarean delivery, meconium stained liquor, low birth weight, NICU admission and APGAR score <7 at 5 min were assessed by consultant gynecologist. **Results:** Age range in this study was from 20 to 35 years with mean age of 28.92 ± 4.45 years. Majority of the patients 43 (47.77%) were between 31 to 35 years of age. Mean gestational age was 38.31 ± 1.20 weeks. Mean parity was 2.72 ± 1.02 . In this study, frequency of perinatal outcome in pregnant females at term having low amniotic fluid index was as follows; cesarean section was performed in 60 (66.67%), low birth weight was observed in 58 (64.44%) patients, APGAR score <7 at 5 minutes in 56 (62.22%), meconium stained liquor in 24 (26.67%) and NICU admission in 17 (18.89%) patients. **Conclusion:** This study concluded that proper antenatal monitoring and management should be done in these high risk patients in order to reduce the morbidity and mortality of the fetus.

Key words: Cesarean Section, Low Amniotic Fluid Index, Low Birth Weight.

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INTRODUCTION

Amniotic fluid assessment is an integral part of the antenatal evaluation of pregnancies at risk for an adverse pregnancy outcome especially in the third trimester. Detecting the fetus at risk for in utero damage or death, quantifying, and balancing the fetal risk against the risk of neonatal complications from immaturity, and determining the optimal time and mode of intervention is the cornerstone of modern day obstetrics care and perinatal medicine.¹ Assessment of amniotic fluid volume by ultra sonography is more reliable.²

Amniotic fluid index (AFI) is the preferred method of amniotic fluid measurement in pregnancy although single deepest pocket is used in pregnancies. For measuring AFI the uterus divided into four equal quadrants. AFI is the sum of deepest pocket from each quadrant. The normal range of AFI is between 5-24 cm while any value

above 24 cm will be considered as Hydraminios and with value below 5 cm will be indicated as Oligohydraminios.³

Reduced amniotic fluid index (AFI) is associated with adverse effects such as meconium staining, congenital anomalies, growth retardation, dysmaturity, and fetal asphyxia.” However, some studies show that AFI is a poor predictor of adverse perinatal outcome and should not be the only parameter for predicting perinatal outcome.⁴

Amniotic fluid plays a major role in the fetal growth and development. It provides the fetus with a protective low resistance environment suitable for growth and development. It provides a cushion against the constricting confines of the gravid uterus, allowing the fetus room for the movement and growth and protecting it from external trauma. It prevents compression of the umbilical

cord and thus protects the fetus from vascular and nutritional compromise.^{5,6} The abnormalities of the fluid volume can thus interfere directly with the fetal development or may be an indirect sign of underlying disorder such as fetal hypoxia, neural tube defect or gastrointestinal obstruction. Amniotic fluid index (AFI) of <5 cm defines oligohydramnios.

Literature shows variability of perinatal outcome associated with low AFI. Cesarean delivery was observed in 74%⁷, meconium stained liquor was found in 40.62%⁸, low birth weight was noted in 64%, APGAR score < 7 at 5 min was found in 34%⁶ and NICU admission was noted in 92% patients of low AFI.⁹ In other studies, cesarean delivery was observed in 36%, meconium stained liquor was found in 12%¹⁰, low birth weight was noted in 32%¹¹, APGAR score < 7 at 5 min was found in 4%⁹ and NICU admission was noted in 3.12% patients of low AFI.¹²

As there is controversy in literature regarding the relation of adverse perinatal outcome and low AFI. So, I have conduct this study to assess the frequency of adverse perinatal outcome in females having low amniotic fluid index.

The amniotic fluid that bathes the fetus is necessary for its proper growth and development. It cushions the fetus from physical trauma, permits fetal lung growth, and provides a barrier against infection. Normal amniotic fluid volume varies. The average volume increases with gestational age, peaking at 800-1000 mL, which coincides with 36-37 weeks' gestation. An abnormally high level of amniotic fluid, polyhydramnios, alerts the clinician to possible fetal anomalies. Inadequate volume of amniotic fluid, oligohydramnios, results in poor development of the lung tissue and can lead to fetal death.

The objective of the study was to determine the perinatal outcome in pregnant females at term having low amniotic fluid index.

MATERIAL & METHODS

This was a descriptive case series conducted at independent university hospital, Faisalabad,

from October 2019 to March 2020. The study was approved by institutional ethical committee. The sampling was done by Non-probability, consecutive sampling. The sample size was calculating by using by using WHO sample size calculator $P = 34\%$ ⁶, Absolute precision required = 10%, Confidence level = 95%, ample size = 90.

Following was the inclusion and exclusion criteria:

Inclusion Criteria

Females age ranges from 20-35 years.

Females having singleton pregnancy with cephalic presentation having 37-40 weeks of gestation.

Females having AFI < 8 cm.

Females having intact membranes.

Exclusion Criteria

Females having

Ruptured membranes

Fetal anomaly

Gestational diabetes

Rh incompatibility

Multiple pregnancies.

After taking approval from hospital ethical committee, patients coming through OPD fulfilling the inclusion criteria were enrolled and informed consent was taken. Cesarean delivery, meconium stained liquor, low birth weight, NICU admission and APGAR score < 7 at 5 min were assessed by consultant Obstetrician. All the information was collected on a specially designed proforma.

The data was entered and analyzed in SPSS version 22. Descriptive statistics including mean and standard deviation of numerical values like age, parity and gestational age were calculated. Frequency and percentage were calculated for all qualitative variables like cesarean delivery, meconium stained liquor, low birth weight, NICU admission and APGAR score < 7 at 5 min.

Effect modifiers like age, parity and gestational age were controlled by stratification. Post stratification chi-square test was applied. P-value < 0.05 was considered significant.

OPERATIONAL DEFINITIONS

Low amniotic fluid index: Amniotic fluid index < 8 cm on ultrasound was said to be low amniotic fluid index.

Pregnant females at term: Females having 37-40 weeks of gestation on ultrasound.

Perinatal outcome: It was assessed in terms of

Cesarean section: Cesarean section is a surgical procedure in which fetus was delivered through an incision in the mother's abdomen and uterus.

Meconium stained liquor: After artificial rupture of membrane, light to dark green or brown color of amniotic fluid was said to have meconium stained liquor.

Low birth weight: It was the weight of baby < 2.5 kg at birth.

NICU admission: It was the admission of baby to neonatal intensive care unit within 24 hours of birth.

APGAR score < 7 at 5 min: It was assessed after 5 minutes of birth as follows:

	Indicator	0 Point	1 Point	2 Point
A	Activity (muscle tone)	Absent	Flexed arms & legs	Active
P	Pulse	Absent	Below 100 bpm	Over 100 bpm
G	Grimace (reflex irritability)	Floppy	Minimal response to stimulation	Prompt response to stimulation
A	Appearance	Blue, pale	Pink body, blue extremities	Pink
R	Respiration	Absent	Slow and irregular	Vigorous cry

RESULTS

Age range in this study was from 20 to 35 years with mean age of 28.92 + 4.45 years. Majority of

the patients 43 (47.77%) were between 31 to 35 years of age as shown in Table-I. Mean gestational age was 38.31 + 1.20 weeks (Table-II). Mean parity was 2.72 + 1.02 (Table-III).

In this study, frequency of perinatal outcome in pregnant females at term having low amniotic fluid index was as follows; cesarean section was found in 60 (66.67%), low birth weight in 58 (64.44%) patients, APGAR score <7 at 5 minutes in 56 (62.22%), meconium stained liquor in 24 (26.67%) and NICU admission in 17 (18.89%) patients as shown in Table-IV.

Stratification of the cesarean section, APGAR score <7 at 5 minutes, meconium stained liquor and NICU admission with respect to age is shown in Table V, VI, VII, VIII respectively. Stratification of low birth weight and NICU admission with respect to gestational age is shown in Table IX & X.

Age (in years)	No. of Patients
20-25	24 (26.67%)
26-30	23 (25.56%)
31-35	43 (47.77%)

Table-I. Age distribution of patients (n=90) Age Mean ± 4.45 years

Gestation Age (weeks)	No. of Patients
37-38 weeks	53(58.89%)
39-40 weeks	37 (41.11%)
Mean ± SD	38.31 ± 1.20

Table-II. Distribution of patients according to gestational age (n=90)

Parity	No. of Patients
0-2	72 (80.0%)
3-5	18 (20.0%)

Table-III. Distribution of patients according to parity (n=90)

Fetomaternal Outcome	Frequency (%)	
	Yes	No
Cesarean section	60 (66.67%)	30 (33.33%)
Low birth weight	58 (64.44%)	32 (35.56%)
APGAR score <7 at 5 minutes	56 (62.22%)	34 (37.78%)
NICU admission	17 (18.89%)	73 (81.11%)
Meconium stained liquor	24 (26.67%)	66 (73.33%)

Table-IV. Frequency of perinatal outcome in pregnant females at term having low amniotic fluid index

Age (in years)	Cesarean Section		P-Value
	Yes	No	
20-25	14	10	0.335
26-30	18	05	
31-35	28	15	

Table-V. Stratification of the cesarean section with respect to age

Age (in years)	APGAR Score < 7 at 5 min		P-Value
	Yes	No	
20-25	13	11	0.018
26-30	20	03	
31-35	23	20	

Table-IV. Stratification of the APGAR score < 7 at 5 min with respect to age

Age (in years)	Meconium Stained Liquor		P-Value
	Yes	No	
20-25	03	21	0.183
26-30	07	16	
31-35	14	29	

Table-VII. Stratification of the meconium stained liquor with respect to age

Age (in years)	NICR Admission		P-Value
	Yes	No	
20-25	02	22	0.103
26-30	03	20	
31-35	12	31	

Table-VIII. Stratification of the meconium stained liquor with respect to age

GA (Weeks)	Low Birth Weight		P-Value
	Yes	No	
37-38	33	20	0.605
39-40	25	12	

Table-IX. Stratification of the low birth weight with respect to gestational age

GA (Weeks)	NICU Admission		P-Value
	Yes	No	
37-38	33	42	0.588
39-40	06	31	

Table-X. Stratification of the NICU admission with respect to gestational age

DISCUSSION

Amniotic fluid assessment is an essential part of evaluation of fetus health in terms of fetal distress, meconium aspiration, caesarean and fetal mortality.¹³ The assessment of amniotic fluid volume is very crucial for the survival of the fetus and the Amniotic Fluid Index (AFI) is the

most common way for the estimation of amniotic fluid volume which is performed by ultrasound method.^{14,15} Studies have revealed that AFI is an accurate criterion for estimating adequate placental function.¹⁶ Amniotic fluid volume varies with gestational age, rising to a plateau between 22-39 weeks of gestation and reaching 700 and 800 ml, which correspond to an AFI of 14-15 cm.^{17,18} Any decrease or increase in the volume of amniotic fluid leads to pregnancy complications.

In spite of different views on borderline AFI in different studies, there are, also, different views about its function and influence on maternal and fetal complications and medical care for fetus health. In most reported studies, the pregnancies with borderline AFI of 5-10 cm have shown outcomes such as non-reactive non-stress tests, fetal heart rate (FHR) deceleration, meconium aspiration, immediate caesarean delivery, low APGAR score, LBW, NICU admission and SGA in comparison with control subjects with normal amniotic fluid level (8.1-18 cm)¹⁹⁻²⁶. Also the low amniotic index may increase the operative delivery rate.

Also, according to Luo et al the pregnancy outcomes of a borderline versus normal AFI suggested no difference in the incidence of fetal distress or neonatal mortality, but the rate of caesarean delivery in borderline AFI was reported higher than the rate in normal cases. They evaluated 196 trials of labor with a borderline AFI (5.1-8) and 200 women with normal AFI (8.1-18).²⁷ Meanwhile, in another study, oligohydramnios was shown to be associated with pregnancy complications but the diminished amniotic fluid volume doesn't seem to have any noticeable effect on anticipating the outcomes.²⁸

In my study, frequency of perinatal outcome in pregnant females at term having low amniotic fluid index was as follows; cesarean section was found in 60 (66.67%), low birth weight in 58 (64.44%) patients, APGAR score <7 at 5 minutes in 56 (62.22%), meconium stained liquor in 24 (26.67%) and NICU admission in 17 (18.89%) patients. In another study, the caesarean section rate in oligohydramnios was 68% as compared to 28%

in the control group. The incidence of meconium stained liquor in the oligohydramnios group was 32%, compared with 18% in the control group, APGAR score <7 at 5 minutes was 14% versus 4% and NICU admission was 14% versus 4%.²⁹ In Al Bayatti study, the caesarean section rate in oligohydramnios was 27% as compared to 13% in the control group. The incidence of meconium stained liquor in the oligohydramnios group was 42%, compared with 16% in the control group, APGAR score <7 at 5 minutes was 16% versus 3% and NICU admission was 16% versus 3%.³⁰

Study by Casey B et al³¹ found that, there was increased rate of induction of labour (42%) and caesarean section (32%) in oligohydramnios cases. Jun Zhang et al³² found that, the overall caesarean delivery rates were similar between women with oligohydramnios and the controls (24% vs. 19%). Golan A et al³³ et al. found that, the caesarean section was performed in 35.2% of pregnancies. Oligohydramnios is associated with increased maternal and foetal morbidities. The perinatal morbidity and mortality is due to foetal distress, low APGAR scores and meconium aspiration syndrome in the foetus.³⁴⁻³⁶

Literature shows variability of perinatal outcome associated with low AFI. Cesarean delivery was observed in 74% meconium stained liquor was found in 40.62%, low birth weight was noted in 64%, APGAR score < 7 at 5 min was found in 34% and NICU admission was noted in 92% patients of low AFI.

In the study by Magann et al. meconium stained amniotic fluid was not different between the groups.³⁷ In study by Nargis et al meconium stained liquor was seen in 44% of the women with low AFI (<5 cm) as compared to present study where 12% had meconium stained liquor.³⁸ Ahmad et al³⁹ also found no difference in the low APGAR score at 5 minutes in the two groups. Ahmad et al observed that oligohydroamnios group when compared with control group had significantly lower birth weight babies and they were delivered at a significant earlier gestation due to iatrogenic preterm delivery via induction of labor or caesarean sections as compared to

control group.⁴⁰

In a prospective comparative study⁴¹ included a total of 100 women with singleton term pregnancy with cephalic presentation, divided into two groups of 50 each. Women in Group 1 had amniotic fluid index <5 cm and in Group 2, had AFI from 6-20 cm. An AFI <5 cm was associated with significant high rate of induction of labor ($p<0.001$), caesarean section ($p=0.04$) and fetal distress ($p<0.05$). Meconium-stained liquor ($p=0.76$), Apgar score less than seven at 5 minutes ($p=0.307$), low birth weight ($p=0.130$) or NICU admission ($p=1$) were comparable in the two groups.⁴²

Another study showed significantly higher rate (65.5%) of low birth weight resulting from the low AFI. The APGAR score less than 7 in 5 minute was significantly higher in severe oligohydramnios group and majority of the neonate experienced complications like RDS (13%), meconium aspiration (21%) with admission in neonatal ward (54%). Low AFI has poorer prognosis to some extent with maternal as well as fetal outcome. It is responsible for a significantly higher rate of caesarean section and also associated with low birth rate along with low APGAR score and increase in neonatal complications.

CONCLUSION

This study concluded that frequency of perinatal outcome in pregnant females at term having low amniotic fluid index was as follows; cesarean section was found in 66.67%, low birth weight in 64.44% patients, APGAR score <7 at 5 minutes in 62.22%, meconium stained liquor in 26.67% and NICU admission in 18.89% patients. So, we recommend that proper antenatal monitoring and management should be done in these high risk patients in order to reduce the morbidity and mortality of the fetus.

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