Perinatal Outcomes in Amniotic Fluid Index in Postdated Pregnancies at Tertiary Care Center, Karimnagar

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Abstract

Background: The Amniotic fluid is the protective liquid and important part of pregnancy sac. This fluid serves as or helps for the growing fetus and also serves to facilitate the exchange of nutrients, water and biochemical product between mother and fetus. Patients with Low Amniotic fluid Index (AFI) need to deliver quickly, So, an assessment of amniotic fluid volume has become an important component of antenatal testing for the high-risk pregnancy.

Aim & Objective: Study aimed to find the significance of amniotic fluid index in determining the maternal and perinatal outcome in pregnant women who came postdated.

Material and Methods: This was an Prospective observational study conducted at Department of OBG, CAIMS, Karimnagar, for the duration of one year. 100 antenatal women whose gestational age is > 40 weeks admitted in the hospital and who fulfilled the following inclusion and exclusion criteria and after getting ethical clearance considered for the study

Results: Out of 100 patients Maximum number of patients were getting admitted from a low socioeconomic status who lacked the knowledge about the maternal and perinatal morbidity and mortality associated with postdatism. Parity, gestational Age, mode of Delivery and APGAR score were significantly associated with Amniotic Fluid Index (P-value<0.001). Perinatal outcome like CTG, onset of labour, colour of Liquor, Indication for LSCS and NICU Admission was statistically significant. It means these parameters were strongly associated with AFI.

Conclusion: Amniotic Fluid Index is important predictor of adverse event in high risk pregnancies. Women with AFI ≤ 5 cm can expect a good outcome if they have regular ANC visits and intrapartum monitoring than the AFI > 5 cm.

Keywords: Amniotic Fluid Index, LSCS, NICU, High Risk Pregnancies

Introduction

The aquatic environment of the fetus has long remained a mystery to the patient and obstetricians, and the precise origin of the amniotic fluid is still not completely understood. Amniotic fluid is a clear, slightly yellowish liquid that surrounds the unborn baby (fetus) during pregnancy. It is contained in the amniotic sac.

The fluid is faintly alkaline with low specific gravity of 1.010, osmolarity of 250 mOsmol/litre-which is suggestive of fetal maturity. It protects foetus from trauma, maintains body temperature and it has bacteriostatic proportion. Its pressure helps in reducing the loss of lung fluid and assist in pulmonary development. [1] It helps in development of musculoskeletal system by permitting foetal movements, growth and development of gastrointestinal system by swallowing amniotic fluid. [2]

The Amniotic Fluid Index (AFI), which was designed by Phelan and better reflects the intrauterine content, seems to be more advantageous than the measurement of the single deepest amniotic fluid pouch [3]. Amniotic fluid volume rises to a plateau between 22 to 39 weeks of gestation reaching up to 700 to 800 ml, which corresponds to amniotic fluid index of 14 to 15cm. [2]

Oligohydramnios is defined as the amniotic fluid is deficient in amount to the extent of less than 200 ml at term or sonographically amniotic fluid index (AFI) less than 5 cm. [4, 5] Its incidence is 2.3%. The incidence increases, up to 11% in post-dated pregnancies. Assessment of amniotic fluid volume(AFI) by ultrasonogram is reliable. It is calculated as the sum of deepest vertical pocket in each quadrant of the uterus [2].

Phelan et al., described amniotic fluid index by USG and explained that oligohydramnios is a condition when amniotic fluid index (AFI) was <= 5cm. But later Jeng et al., proposed a cut-off as 8 cm demonstrating increased incidence of meconium staining, caesarean delivery for fetal distress, abnormal fetal heart rate pattern and Apgar scores of 7 or less at one minute when AFI was < 8 cm .

Oligohydramnios is associated with increased maternal morbidity, increased rate of induction of labour and caesarean section. It is also associated with adverse perinatal outcomes such as preterm delivery, low birth weight, fetal distress ,meconium passage, low APGAR score, neonatal resuscitation and NICU admission.

Thus, this study was conducted to find the significance of amniotic fluid index in determining the maternal and perinatal outcome in pregnant women who came postdated to our department, admitted, and evaluated to find out the maternal and fetal outcome with regards to amniotic fluid index in those patients.

Materials and Method

This was an Prospective observational study conducted at Department of OBG, CAIMS, Karimnagar, for the duration of one year. 100 antenatal women whose gestational age is > 40 weeks admitted in the hospital and who fulfilled the following inclusion and exclusion criteria and after getting ethical clearance considered for the study

Inclusion Criteria:

1. Pregnant woman in age group of 18-35 yrs with

2. Single live intrauterine gestation

3. Cephalic presentation

4. Gestational age >40 completed weeks

5. Intact membrane

6. Who have given written informed consent to participate in this study

Exclusion Criteria:

1. Ruptured membranes

2. Amnioinfusion

3. Multiple gestation

4. Gestational age<40completed weeks

5. Associated fetal malformations

6. High risk pregnancies like hypertension, diabetes, chronic renal disease, preeclampsia, connective tissue disorders, RH-negative.

7. Abruption

8. PG synthetase inhibitors& ACE inhibitors therapy

Methodology:

Postdated pregnant patients fulfilling my inclusion and exclusion criteria were admitted. Detailed history were obtained from the patient about the socioeconomic status, booked/unbooked, the patient's age, obstetric code, gestational age, menstrual history, obstetric history. Obstetric examination carried out. Symphysio-fundal height measured. Fetal heart rates was recorded serially. It is reasonable to start antenatal surveillance between 41-42 weeks of gestation despite lack of evidences it improves the outcome. No single method has been recommended as superior in making of fetomaternal outcome.

After taking informed consent from the patients, AFI was measured ultrasonographically and for each case continuous CTG tracing was monitored. These women were followed till discharge.

A study proforma was filled for each case. During delivery the colour of liquor was observed. APGAR of the baby was recorded at 1 minute and 5 minute. Birth weight of the baby recorded. The rate of NICU admission is recorded. The perinatal outcome is followed up for 28 days after delivery.

Results :

In this prospectively conducted study, we selected 100 postdated patients who got admitted in our labour ward and have fulfilled the inclusion and exclusion criteria. Our study mainly aims to find the significance of amniotic fluid index in determining the maternal and perinatal outcome in pregnant women

Our study encompassed a total of 100 postdated antenatal women who fulfilled the inclusion and exclusion criteria and they were classified based on their AFI found using ultrasonogram. Various factors like socioeconomic status, age, parity, mode of induction of labour, CTG, colour of liquor, mode of delivery, caesarean section rate and the indication for LSCS, APGAR and weight of the baby, NICU admission rate and the final outcome of each baby delivered were followed up. These factors were tabulated and percentage of each calculated and compared with each factor which affects the perinatal outcome of a baby born to a postdated woman.

Maximum number of patients were getting admitted from a low socioeconomic status who lacked the knowledge about the maternal and perinatal morbidity and mortality associated with postdatism shown in Table 1.

Table shows that except age and socio-economic status, other parameter like parity, gestational Age, mode of Delivery and APGAR score were significantly associated with Amniotic Fluid Index (P-value<0.001)

Table 1 : Demographic distribution of patients according to the AFI

AFI	< 3	03 - 08	> 8	Nil	Total	Chi-square/ F-value	P-value
Age							
	22.36 ± 3.35	23.3 ± 3.30	21.14 ± 1.06	22.83 ± 1.32	22.4 ± 3.16	0.673	0.571
Socio Economic Status							
III	28	7	2	3	40	5.774	0.442
IV	29	1	3	1	34		
V	20	2	2	2	26		
Parity							
Primi	52	5	5	0	62	11.305	0.006
Multi	25	5	2	6	38		
Gestational Age							
40 - 41 Weeks	70	5	4	0	79	37.13	<0.001
41 - 42 Weeks	6	5	2	3	16		
>42 Weeks	1	0	1	3	5		
Mode of Delivery							
Natural	58	3	0	0	61	32.98	<0.001
LSCS	19	7	7	6	39		
APGAR Score							
>7	71	0	0	0	71	70.44	<0.001
<7	6	10	7	6	29		

Education plays a main role in creating awareness among these low socioeconomic class people. This aids in reducing

postdatism and oligohydramnios associated with it by early identification of third trimester oligohydramnios

Table 2 : Distribution of Perinatal outcome with AFI

AFI	< 3	03 - 08	> 8	Nil	Total	Chi-square/ F-value	P-value
CTG							
Reactive	71	2	0	0	73	59.22	<0.001
Non-Reactive	6	8	7	6	27		
Onset of Labour							
Spontaneous	17	2	1	0	20	29.34	<0.001
Foley Induction	27	3	0	0	30		
Gel Induction	21	0	0	0	21		
LSCS	12	5	6	6	29		
Colour of Liquor							
Clear	68	5	2	0	75	32.65	<0.001
Neconium	9	5	5	6	25		
Indication for LSCS							
Fetal Distress	3	2	5	2	12	14.29	0.461
Failed induction	4	2	0	2	8		
Failure to Progress	1	0	0	0	1		
Mobile Head/CPD	3	1	0	1	5		
Abnormal Presentation	3	0	1	0	4		
ANHYDRAMNI	0	1	0	1	2		
NICU Admission							
No	71	0	0	0	71	70.44	<0.001
Yes	6	10	7	6	29		
Baby Weight							
2.5 - 4 Kg	68	8	1	4	86	21.69	<0.001
<2.5 Kg	9	1	7	2	14		

Above table shows the association between perinatal outcome and AFI. It was observed that perinatal outcome like CTG, onset of labour, colour of Liquor, Indication for LSCS and NICU Admission was statistically significant. It means these parameters were strongly associated with AFI.

Discussion :

Postdated pregnancy is a high risk obstetric condition. AFI provides a quantitative result that is proportional to actual volume and more predictive than other methods. It is well-established that Oligohydramnios is associated

with a high-risk of adverse perinatal outcome. The perinatal mortality and morbidity are increased in several folds when pregnancy is advanced beyond term i.e. 40 weeks.

In the present study we have observed that 40% of the patients from socioeconomic status of Class III. The incidence of prolonged pregnancy is, inversely related to the pregnant women's socio-economic status and education. This means that's the lower her level of education or socio-economic status, the greater the likelihood she would have a postdated pregnancy. Study by Tiparse et al where the lower socioeconomic class accounted to nearly 112 out of 200 patients., that is 58.5% of the population. [6]

In India 20 to 25 yrs is the reproductive age group. Many studies agreed that advancing maternal age does not appear to influence the incidence of postdated pregnancy. In our study, maximum postdated women lie in the age group of 21-25 yrs and mean age of the all patients was 22.4 ± 3.16 which comparable to study done by Tiparse et al 2017 and Gita guin et al 2011. [6,7] and Kaur T et al [8] respectively.

In our study, 95% of the antenatal women falls between 40 to 42 weeks which is comparable with the study by Akhter et al 2014 where 91% of post dated women falls between 40 to 42 weeks. [9]

Study conducted by Ahmar et al 2018, 44.44% patients went in for spontaneous labour, 42.22% patients went in for induction of labour, 13.33% patients were taken up for LSCS. [10] these results were similar to our study.

The most important constrain to influence the decision to proceed with caesarean delivery is objective interpretation of fetal heart rate tracing. Similarly, the caesarean delivery for fetal distress would be preferable only after a fetal scalp pH value is obtained. In our study 39% of the patients delivered by caesarean and 61% were natural. Study conducted by Akhter et al in 2014,51% of postdated cases delivered by labour naturalis,40% by LSCS,9% by ventouse,0% by outlet forceps. [9]

One of the greatest challenges an obstetrician faces is to deliver an active and neurologically well baby. When the neonatal outcome is poor, a clear evaluation of the intrapartum fetal monitoring is done to find out what is missed. Fetal distress is said to occur when FHR is below 100 bpm or more than 160 bpm. Until 20th century, fetal monitoring was done by intermittent auscultation. Then came the continuous electronic fetal heart monitoring which resulted in many unwanted interventions and increased rate of caesarean sections due to early interventions.

Decreased amniotic fluid has been associated with multiple fetal risks like cord compression, musculoskeletal abnormalities such as facial distortion and clubfoot, intrauterine growth restriction, low birth weight, fetal distress ,meconium aspiration syndrome, severe birth asphyxia, low APGAR scores, NICU admission, congenital abnormalities and stillbirths. Long standing oligohydramnios leads to pulmonary hypoplasia, potter's syndrome, club foot and hand and hip dislocation.

In our present study, AFI>8 constituted 7% of low birth weight babies, AFI 3 TO 8 constituted only 1% of low birth weight baby, AFI<3 constituted 11.8% of low birth weight babies and anhydramnios constituted 9% low birth weight babies and the statistical significance is <0.001 which is highly significant.

Oligohydramnios is associated with intrauterine growth restriction in 15 babies

(16.7%) in a study conducted by Bangal et al in 2018.

In the present study, APGAR<7 at 5 minutes is seen in 7% of babies born to antenatal postdated women with AFI>8 ,10% of women with AFI 3 to 8, 77% of women with AFI<3

In a study conducted by Bangal et al 2011, 16% of babies born to postdated women with oligohydramnios showed APGAR <7 at 5 minutes. [11]

Postdated pregnancies carry a high risk of fetal morbidity and mortality thereby increasing the rate of NICU admissions. In our study we had 29% of the babies admitted to the NICU, study by Chate P et al in 2013 [12] and Bansal et al in 2015 [13], found 42% and 36% NICU admissions respectively.

These babies are more prone for certain complications like intrapartum fetal distress meconium aspiration syndrome, post maturity syndrome, physiological jaundice, septicaemia, umbilical sepsis, respiratory tract infection, birth asphyxia etc. [14]

Conclusion :

From overall observation and results we can conclude that AFI is a predictor of fetal tolerance in labour and its decrease is associated with increased risk of abnormal heart rate and meconium stained fluid. This is overcome by assessing AFI through ultrasonogram at the earliest in third trimester, biophysical profile scoring, and proper intrapartum fetal heart rate monitoring.

Conflict of Interest : None to declare

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