

Role of Amniotic Fluid Index in the Management of Pregnancy beyond 40 Weeks

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ABSTRACT

Aim: To evaluate the role of amniotic fluid index as a reliable fetal surveillance test in the management of pregnancy beyond 40 weeks.

Methods: The present analytical study was carried out in the Department of Obstetrics and Gynaecology, Nishtar hospital Multan from June 2007 to June 2008. A total of 100 women at 40 weeks or > 40 weeks of gestation booked or unbooked were included in the study.

Results: In present study, mean age of the patients was 25.35 ± 4.59 years. Majority of the patients were between 21–25 years in both AFI classes. Majority of women were primigravida in two AFI classes. 14(50%) out of 28 patients with AFI of more than 6 cm went into spontaneous labour. Total of 44 women in two AFI classes were successfully induced. Data revealed significantly high rate of caesarean section in the cases of AFI of 6 cm or less. Data also revealed a significantly high rate of delivering a baby with no complication at AFI of more than 6 cm. There was 1 (3.6%) neonatal death due to meconium aspiration syndrome with AFI of <6cm.

Conclusion: Serial AFI is a reliable antepartum fetal surveillance test for postdate pregnancy, but other methods like cardiotocography should be added with AFI estimation to reduce perinatal morbidity and mortality.

Keywords: Post term pregnancy, Amniotic fluid index, Cardiotocography

INTRODUCTION

The months later her obstetrician, Dr. Croft, committed suicide, unable to bear the burden of the responsibility for the death of the British heir to the throne¹. As this event resulted in the death of an infant, the mother and her physician, it has historically been referred to as the "The Triple Obstetric Tragedy".

Pregnancies of 294 days duration or more are defined as Prolonged, Postdates or Post-term². Approximately 5-10 percent of all pregnancies continue to at least 42 weeks gestation^{3,4}. Advances in obstetric and neonatal care have lowered the absolute mortality risk; however, retrospective studies² of these so called past term pregnancies have found an increased risk to the mother and fetus. The perinatal mortality rate (i.e. still births plus neonatal deaths) of two to three deaths per 1,000 deliveries at 40 weeks gestation, approximately doubles by 42 weeks and is four to six times greater at 44 weeks⁵.

According to Danish birth registry study², maternal risks associated with post-term pregnancies were; increased chances of caesarean delivery, cephalopelvic disproportion prolong labor, postpartum haemorrhage, puerperal infection. Among

the perinatal complications were asphyxia, aspiration, dystocia, peripheral nerve paralysis, pneumonia, septicemia and death.

Fetal well being is assessed by various methods in post-term pregnancy. One of the most important parameter is the measurement of amniotic fluid index. Decrease in amniotic fluid indicates placental dysfunction and insufficiency which in turn leads to changes in placental thickness⁶.

In pregnancies beyond 40 weeks of gestation decreased amniotic fluid index was usually associated with an increased risk of fetal heart rate abnormalities, meconium stained amniotic fluid and caesarean section for fetal distress⁷.

Amniotic fluid volume falls significantly beyond 40 weeks. Serial assessment of amniotic fluid volume after 40 weeks of pregnancy therefore indicates patients with low amniotic fluid volume that should be delivered to reduce perinatal morbidity and mortality⁸.

Amniotic fluid volume measurement may be done by various methods like a largest single pocket of amniotic fluid or by semi quantitative four quadrant techniques of amniotic fluid index. The amniotic fluid index is shown to be more effective test than single pocket measurement⁹. Amniotic fluid index of < 5 cm is significantly associated with birth asphyxia, meconium aspiration, cord arterial PH of < 7, low Apgar score and increased chances of caesarean delivery for fetal distress in labor⁹. That's why I took a limit of AFI as 6 cm to allow a safety margin for

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induction and vaginal delivery¹⁰.

Since there is more risk of caesarean section or a vacuum extraction for the women who are undergoing elective induction as compared to the women who are opting for spontaneous onset of labor beyond term¹¹.

The objective of the study was to evaluate the role of amniotic fluid index as a reliable fetal surveillance test in the management of pregnancy beyond 40 weeks.

MATERIALS AND METHODS

The present analytical study was carried out in the Department of Obstetrics and Gynaecology, Nishtar hospital Multan from June 2007 to June 2008. A total of 100 women at 40 weeks or > 40 weeks of gestation booked or unbooked were included in the study.

RESULTS

Neonatal birth weight was between 2.5-4 kg in all the women who were included in the study.

Table-1: Age distribution

Age (years)	No. of patients	
	AFI = 6 cm or < (n=72)	AFI > 6 cm(n=28)
16-20	6(8.3%)	2(7.1%)
21- 25	34(47.2%)	15(53.6%)
26-30	24(33.3%)	10(35.7%)
31-35	4(5.6%)	0
36-40	4(5.6%)	1(3.6%)
Mean ±SD	25.35±4.59	24.68±3.54

AFI = Amniotic fluid index

Table-2:Gravidity distribution

Gravidity	No. of patients	
	AFI = 6 cm or < (n=72)	AFI > 6 cm (n=28)
Primigravida	45(62.5%)	14(50%)
Gravid 2-5	25(34.7%)	14(50%)
Gravid 6 or more	02(02.8%)	-

Majority of the patients were between the age of 21-25 years between two AFI classes (Table1). Forty five (62.5%) out of 72 were primigravida with AFI of 6 cm or less than 6 cm is shown in Table-2. Data revealed a significantly high rate of caesarean section in the cases of AFI of 6 cm or less ($P=0.01$) as shown in Table-3. Babies of 40 women (55.6%) out of 72 with AFI of 6 cm or less than 6 cm were having no complication as shown in table-4. Fifty (69.4%) were of the mothers who's AFI was 6 cm or less and 24 (85.7%) were of the mothers with more than 6 cm AFI (Table-5). Sixty five out of seventy two (90.3%) babies were having APGAR score is shown in table-6.

Table-3:Delivery outcome variables in women undergoing ultrasonic AFI assessment

Variables	No. of patients	
	AFI = 6 cm or less (n=72)	AFI > 6 cm (n=28)
Bishop score	\	
5	69(95.8%)	20(71.4%)
>5	03(04.2%)	08(28.6%)
Mode of delivery SVD	-	14(50%)
Induction	33(45.8%)	11(39.3%)
C. section	39(54.2%)	03(10.7%)

P.value = 0.02; 0.1 ; 0.01

Table-4:Neonatal complications in pregnancies undergoing AFI assessment

Variables	No. of patients	
	AFI = 6 cm or less (n=72)	AFI > 6 cm (n=28)
No complication	40(55.6%)	23(82.1%)
Early complications	-	
Meconium stained liquor	27(37.5%)	04(14.3%)
Meconium aspiration syndrome	05(06.9%)	01(03.6%)

P. value = 0.02

Table-5:Neonatal mortality in pregnancies undergoing AFI assessment

Variables	No. of patients	
	AFI = 6 cm or less (n=72)	AFI > 6 cm (n=28)
Neonatal death	01(01.4%)	-
Alive & discharge	50(69.4%)	24(85.7%)
Need care	21(29.2%)	04(14.3%)

P. valuve = 0.1

Table6: Apgarscore of the babies in pregnancies undergoing AFI assessment

Apgar Score	No. of patients	
	AFI = 6 cm or less (n=72)	AFI > 6 cm (n=28)
<7 at 0 min	65(90.3%)	22(78.6%)
>7 at 0 min	07(09.7%)	06(21.4%)
<7 at 5 min	29(40.3%)	02(07.1%)
>7 at 5 min	43(59.7%)	26(92.9%)

P. value=0.2

DISCUSSION

Approximately 5-10% of all pregnancies continue to at least 42 weeks gestation^{3,4}. Post term pregnancy is associated with decrease in amniotic fluid; the pathophysiologic mechanism responsible for the development of oligohydramnios has not been established. Estimation of the amount of amniotic fluid is recommended to be a part of post term pregnancy management protocol¹². In Norway estimation of the amount of amniotic fluid is a part of follow up in 95% of birth units¹³.

Amniotic fluid measurement may be done by various methods like a largest single pocket of amniotic fluid or by semi-quantitative four quadrant techniques of amniotic fluid index. The amniotic fluid index is shown to be more effective test than single pocket measurement. Amniotic fluid index of < 5 cm is significantly associated with birth asphyxia, meconium aspiration, cord arterial PH of 2.7, low APGAR score and increased chances of caesarean delivery for fetal distress in labour⁹.

In a study by Alfirevic, five hundred women with singleton, uncomplicated pregnancies with gestational age > 290 days were randomly allocated to fetal monitoring by either AFI and CTG or maximum pool depth and CTG. The proportion of abnormal AFI measurements was significantly higher than the proportion of abnormal maximum pool depth. This resulted in more inductions for abnormal post term monitoring in the AFI group, but there was no other statistically significant differences in perinatal or labour outcomes¹⁴.

In our study 14(50.0%) out of 28 patient with AFI of more than 6 cm went into spontaneous labour. 33(45.8%) out of 72 women with AFI of 6 cm or less were successfully induced. Data revealed significantly high rate of caesarean section in the cases of AFI of 6 cm or less.

Meconium in amniotic fluid is found in 7% to 22% of deliveries at term, with a 40% incidence in post term deliveries. Expulsion of meconium from intestinal lumen into amniotic cavity is thought to be a consequence of increased intestinal peristalsis and of anal sphincter relaxation resulting from vagal stimulation¹⁵. A correlation exists between fetal hypoxia and increased intestinal peristalsis. That's why the incidence of unfavourable neonatal outcome increases in fetuses with meconium stained amniotic fluid especially when fetal heart rate abnormalities are also present¹⁶.

In our study rate of meconium stained liquor was 37.5% with AFI of 6 cm or less and 14.3% with AFI of more than 6 cm. There was one neonatal death due to meconium aspiration syndrome.

NICU admission rate is increased for post term neonates^{17,18}. In our study 22 (30.6%) of 72 babies with AFI of 6 cm or less needed paediatric care. Only 3(10.7%) out of 28 babies with AFI of more than 6 cm needed paediatric care. The risk of low APGAR score at five minutes has been found to be increased in post term compared to term deliveries in some¹⁹ but not all studies¹⁷.

Sixty five out of seventy two (90.3%) babies were having APGAR score of less than 7 at 0 minute and 22/28 (78.6%) babies who's mothers were having AFI of more than 6 cm were having APGAR

score of less than 7 at 0 minute

CONCLUSION

Serial AFI is a reliable antepartum fetal surveillance test for postdate pregnancy, but other methods like cardiotocography should be added with AFI estimation to reduce perinatal morbidity and mortality.

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