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Corelation between Sonographic Estimated Fetal Weight and Amniotic Fluid Index in III Trimester of Pregnancies, in Healthy Women

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Abstract
Fetal weight (FW) estimation in late pregnancy is an important guide in obstetric care. Amniotic fluid surrounds the fetus throughout pregnancy providing nutrition & cushion. Estimation of amniotic fluid volume is an important part of routine obstetric USG scan and mostly it is done by the Amniotic Fluid Index (AFI). The amniotic fluid is also a strong indicator of possible associated congenital anomalies. So the study was carried out to find out whether there is any correlation between FW and AFI in healthy pregnant women.163 cases of healthy pregnant women were studied by an ultra-sonography in Dr. D.Y. Patil hospital, Navi Mumbai. Fetal weight and Amniotic fluid index were estimated. The mean values of AFI and FW in I group (26-28 weeks) of Gestational Age (GA) are 14.92 cm and 1319.3 gm, II group (29-31 weeks) are 13.8 cm and 1550.4 gms, in III group (32-34 weeks) 12.24 cm and 2308.04 gms, in IV group (35-37 weeks) values are 11.64 cm and 2960.4 gms, In V group (38-40 weeks) 10.38 cm and 3584.6 gms respectively. So there was no statistically significant relationship between AFI and FW.
Keywords: *Amniotic fluid, Gestational age, fetal weight, III trimester, Ultrasonography.*

Introduction

Fetal weight (FW) and Amniotic fluid index (AFI) estimation is an important guide in obstetric care also important part of routine obstetric scan.

Amniotic fluid protects the fetus against traumatic and infective insults. It is one of major and deciding component of fetal biophysical profile and by itself it can predict pregnancy outcome also a strong indicator of possible associated congenital anomalies. Low values are associated with intrauterine growth restriction and renal anomalies, high values indicates GI anomalies, maternal diabetes mellitus and so forth.

FW is also useful parameter when it is calculated a few days before delivery. EFW can also be used earlier in gestation to monitor fetal growth and it is easy to understand the patients. Fetal weight (FW) and Amniotic fluid index (AFI) estimation is an important guide in obstetric care also important part of routine obstetric scan.

Amniotic fluid protects the fetus against traumatic and infective insults. It is one of major and deciding component of fetal biophysical profile and by itself it can predict pregnancy outcome also a strong indicator of possible associated congenital anomalies. Low values are associated with intrauterine growth restriction and renal

anomalies, high values indicates GI anomalies, maternal diabetes mellitus and so forth.

In the late pregnancy, amniotic fluid production is largely dependent on fetal micturation and renal size, in the newborn has been shown to bear a significant relationship to birth weight.

AFI and FW assessment by ultrasound are important tools in assessing the fetal health in all risk categories, especially beyond the period of validity. It is therefore reasonable to postulate a relationship between sonographically determined AFI and FW.

Hence study was designed to check whether there is any correlation between FW and AFI estimated by USG.

Aims and Objectives

- To study the pattern of changing Amniotic fluid index from 26 to 40 weeks of GA.
- To establish reference ranges of Amniotic fluid index and fetal weight from 26 to 40 weeks of gestation.
- To find out whether any significant relationship between Amniotic fluid index (AFI) and Fetal weight (FW) in Indian healthy pregnant women.

Materials and Methods

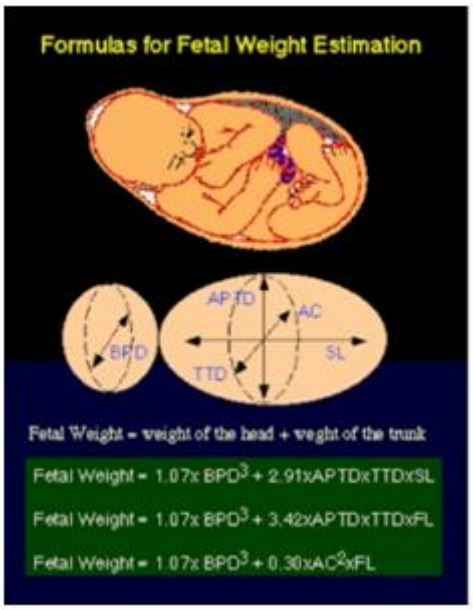
Prospective study was conducted in department of Anatomy, Radiology, and Obstetrics and gynecology in D.Y. Patil medical college Navi Mumbai. 163 healthy pregnant women registered in D.Y. Patil Hospital were studied.

Patients with Regular past menstrual cycle, 20 to 30 yrs of age group, Singleton pregnancy and known LMP date patients were included for study. Multiple Pregnancies and patients with suspected Anomalies were excluded.

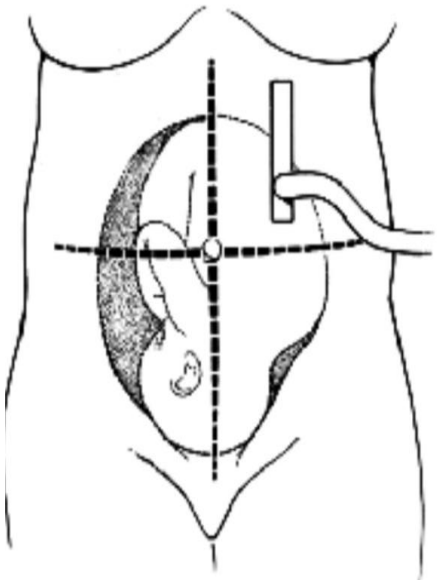
Sonography was performed by radiologist on MINDRAY Ultrasonographic machine with a convex transducer at 3.5 Mhz.

The fetal weight was automatically estimated by scanner using a combination of the BPD, FL, AC, and HC by specific formula.

Photograph 1: Formula for fetal weight



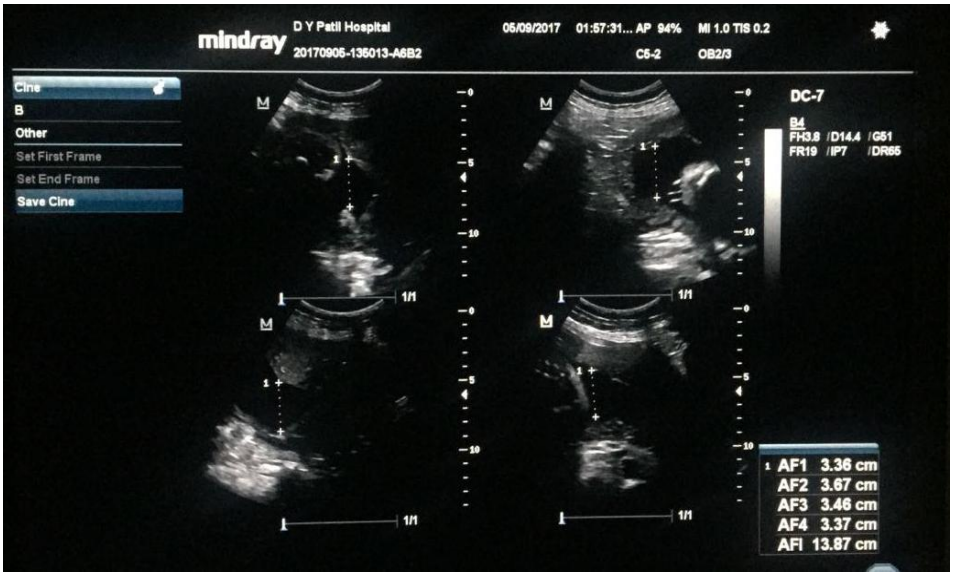
Photograph 2: Four quadrants for AFI



AFI was assessed by four quadrant technique of Phelan. Uterus was divided into four quadrant using linea nigra as a vertical line passing through umbilicus. The transducer was placed in each quadrants in sagittal plane and maximum depth of amniotic fluid measured in centimeter. The sum of measurements of four quadrants' was recorded for each subject.

Collected data was transferred on excel sheet and analysis was done by software Stastatical Package of Social Science.

Photograph 3: Ultrasonographic estimation of AFI



Observations and Results

Table No. 1 shows that the Fetal weight (FW) inclines according to Gestational weeks .In this study the minimum fetal weight 981 gm and maximum 4603 gm which signifies fetal well being.

Table No. 1 Fetal Weight

Name of Groups	GA Weeks	No. of cases	F W Mean (gm)	SD
Group - A	26 – 28	12	1319.3	354.8
Group – B	29 – 31	25	1550.0	187.2
Group – C	32 – 34	25	2308.0	237.7
Group – D	35 - 37	77	2960.4	267.3
Group – E	38 - 40	24	3584.6	320.2

Table No. 2 : Amniotic Fluid Index

Name of Groups	GA Weeks	No. of cases	AFI Mean (cm)	SD
Group - A	26 – 28	12	14.92	2.4
Group - B	29 – 31	25	13.84	2.5
Group - C	32 – 34	25	12.24	2.4
Group - D	35 - 37	77	11.64	2.9
Group - E	38 - 40	24	10.38	1.8

Table No. 2 showed gradual declines of AFI values as gestational age approaches the term.In present study the minimum value of AFI was 7 cm and maximum was 21 cm. The values ranges from 7 cm to 25 cm are worldwide accepted and established as normal range for AFI values. So the values of this study correlates with world wide range

Discussion

Amniotic fluid disorders oligohydramnios, and polyhydramnios highly associated with intra uterine growth restriction and abnormal fetal growth, but this relationship across the entire fetal weight is unclear. 37 week of GA where as it is significantly superior to clinical estimates of weight for preterm birth.

Table No. 3 : Comparison of FW with previous study. (gm)

Ademola A Adeyekun		Present Study	
GA weeks	**F W (gm)**	**G A weeks**	**FW (gm)**
27-29	1250.2	26 – 28	1319.3
30-32	1648.0	29 – 31	1550.0
33-35	2273.5	32 – 34	2308.0
36-38	2906.1	35 – 37	2960.4
39-40	3222.6	38 - 40	3584.6

Ademola A Adeyekun et.al in 2012 found decrease in mean AFI values from 17.21 cm in early trimester (27-29 wks group), 14.40 cm in 36-38 wks and increase in fetal weight noticed throughout pregnancy.

Table No. 4: Comparison AFI with previous study AFI (CM)

Ademola A Adeyekun		This Study	
GA weeks	**AFI (cm)**	**GA weeks**	**AFI (cm)**
27-29	17.21	26 – 28	14.91
30-32	17.03	29 – 31	13.83
33-35	16.23	32 – 34	12.27
36-38	14.40	35 – 37	11.63
39-40	12.50	38 - 40	10.37

Ademola A Adeyekun study and present study showed difference between AFI values which shows values can be varies according to ethnic group. The result also showed AFI values decreases as gestational age increases. .

Conclusion

- Study gives reference ranges of Amniotic fluid index and estimated Fetal weight this may have a clinical benefit to accurate, reliable and semiquantitative diagnosis.
- There is no significant relationship exists between Amniotic fluid index and estimated Fetal weight.
- The implication of this is fetal size may not need to be considered in variations of amniotic fluid volume across the gestational age.

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