

AMNIOTIC FLUID INDEX IN NORMAL PREGNANCIES

RAJ CHEEMA

SUMMARY

This study was undertaken to determine the normal range of amniotic fluid index ultrasonographically in normal pregnancies by four quadrant method as described by Phelan et al (1984). Amniotic fluid index was recorded in 412 normal pregnant women with known LMP and without any medical or obstetrical complications with a gestation period between 20 and 42 weeks.

412 women had AFI between 80 mm and 210 mm. Values of 2.5, 5, 50, 95 and 97.5 percentile of AFI were determined for each week of pregnancy in 412 women with normal pregnancies and a line diagram was made. Highest mean values of 194, 181 and 180 mm were recorded at 22, 23 and 25 weeks gestation period respectively. Another peak was observed at 32 weeks. Mean AFI between 20-36 weeks and 37-42 weeks was $163.6 \pm SD 27.6$ and $150.1 \pm SD 30.9$. Mean AFI of all cases was $159.2 \pm SD 29.5$.

Amniotic fluid analysis provides a means of assessing fetal health and predicting certain perinatal disorders. Previous investigators using different techniques have identified that the amniotic fluid volume increases in the first trimester, continues to rise during the second, remains static in the third and decreases after term.

This study was undertaken to evaluate the above concept and to determine the range of amniotic fluid index by four quadrant method as described by Phelan et al (1987) during normal pregnancies. Semi-quantitative approaches typically estimate amniotic fluid volume by measurement of the depth of the largest clear amniotic fluid pocket. These techniques have demonstrated co-relation between abnormal amniotic fluid volume and

Dept. of Obst. & Gynec. Tagore Hospital & Nursing Home, Ludhiana.

Accepted for Publication on 18.01.1994.

adverse fetal outcome but the definition of normal have been somewhat arbitrary. In this study, we have investigated the use of an ultrasonographically derived index of amniotic fluid obtained from measurement in four quadrants of the uterus. The aim of the study was to establish the normal range of the amniotic fluid index values across gestation in normal pregnancies.

MATERIAL AND METHODS

412 women with normal pregnancies of 20 weeks or above were evaluated prospectively. These patients had history of regular menstrual cycles, known LMNP and had no obstetric or medical complication. Women with multiple pregnancies PRM, IUGR, Hypertensive disorders and transverse lie were excluded from the study. Scanner used was B mode real time grey scanner linear accelerator and operated at 3.5 MHZ.

Method employed for determination of amniotic fluid index was : Patient in supine position, uterus viewed as four equal quadrants, ultrasound transducer placed perpendicular to plane of the floor and aligned longitudinally with the patient's spine. Vertical depth of the largest clear amniotic fluid pocket is measured in millimeters in each quadrant. Amniotic fluid index is sum of four quadrant depths.

Data obtained were analysed by microcomputerised package. Because the amniotic fluid index volume in each gestational period (week) were not normally distributed, the data were transformed into logarithmic (base 10) value for further analysis.

RESULTS

Amniotic fluid index determination of 412 normal subjects were analysed further according to each week of pregnancy. Values of 2.5, 5, 50, 95 and 97.5 percentiles were determined for each week of pregnancy and are shown in Table I. Values between 80 and 210 mm were considered as normal.

A graph was prepared by plotting each week of pregnancy against 50th percentile of the amniotic fluid index and is shown in Figure 1. Mean amniotic fluid index in pregnancies between 20 and 36 weeks was $163.6 \pm SD 27.6$ and between 37 to 42 weeks i.e. term pregnancies it was $150.1 \pm SD 30.96$. Mean of all cases (between 20-42 weeks gestation) was $159.2 \pm SD 29.5$.

DISCUSSION

The goal of Antepartum foetal surveillance is to identify the fetus at increased risk. That the measurement of amniotic fluid volume assists the obstetrician in risk assessment is not surprising because amniotic fluid volume has been proved as an indirect measure of fetoplacental function. Phelan etal (1987) obtained

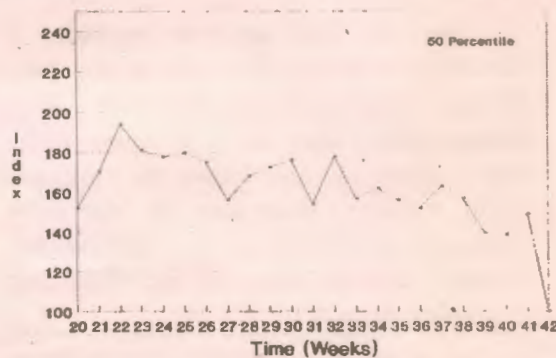


Fig. 1

Table I

Amniotic Fluid Index in percentile values in shown in Table I

Weeks	2.5th	5th	50th	95th	97.5th	N
20	108	108	152	208	208	5
21	108	143	170	185	185	7
22	145	145	194	208	208	8
23	126	126	181	204	204	14
24	110	110	178	199	199	11
25	114	114	180	206	206	5
26	148	148	175	209	209	7
27	112	112	156	185	185	9
28	111	111	168	208	208	11
29	122	122	172.5	208	208	16
30	120	120	176	206	206	18
31	122	122	154	193	193	13
32	111	123	178	206	208	26
33	123	123	156.8	203	203	16
34	101	106	162	194	195	28
35	106	110	156	202	205	45
36	110	114	152	207	207	37
37	94	120	163	200	207	35
38	104	111	152	206	206	50
39	106	107	139.5	198	208	22
40	80	83.5	138.5	201	204	20
41	94	94	149	177	177	6
42	81	81	100	127	127	3

amniotic fluid index values across a range of gestation ages in a group of 197 selected patients. They demonstrated a peak amniotic fluid index at 27-29 weeks with a relative plateau until term. In the present study, highest values of amniotic fluid index i.e. 194, 181 and 180 mm were obtained at 22, 23 and 25 weeks respectively. Another peak was also observed at 32 weeks.

Marked decrease in amniotic fluid is associated with increased perinatal risks. Oligohydramnios is found more often in

pregnancies complicated by IUGR, preeclampsia, congenital anomalies, breech presentation and post-dated pregnancies. Pregnancies complicated by oligohydramnios show a higher incidence of foetal distress in labour, low apgar score and increased perinatal risks. Pregnancies with AFI below 8 cm should be watched and observed closely. AFI of more than 21 cm is taken as cut off point for upper normal limit of AFI. Pregnancies complicated by Polyhydramnios are also high risk pregnancies.

Semi-quantitative estimation of amniotic fluid can help us to differentiate extreme decrease or increase in amniotic fluid volume. A more intense fetal surveillance is required specially with a very low amniotic fluid index.

Mean AFI of 129 ± 46 mm was observed amongst 353 pregnancies with gestational age of 36-42 weeks by Phelan et al (1987). In the present study, 412 women with normal pregnancies of 20 weeks or more had AFI between 80-210 mm which are considered as normal values. Low AFI between 80-100 mm was obtained only in 4 normal cases. Highest mean AFI was recorded at 22, 23 and 25 weeks of pregnancies and was 194, 181 and 180 respectively.

Another peak was observed at 32 weeks.

Phelan et al (1987) found greater morbidity in postdate patients with a largest pocket of 1 cm or less vertically or with subjectively decreased volume by ultrasound examination. Chamberlain et al showed that perinatal mortality was highest and fetal growth retardation was more frequent in a series of high risk patients with serial sonographic evidence of decreased amniotic fluid volume.

REFERENCES

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