



## Comparative Study of Amniotic Fluid Index in Normal & High Risk Pregnancy Complicated By PIH

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### ABSTRACT

*Amniotic fluid is an indicator of placental function on the fetal development. The amniotic fluid index is the most commonly used method of measuring amniotic fluid.*

**Objective:** *The purpose of this study was to study amniotic fluid index in normal and high risk pregnancy (PIH) at term (37-40 weeks) and to correlate amniotic fluid index with foetal outcome.*

**Materials and Methods:** *The present study of assessment of Amniotic Fluid Index in high risk cases of pregnancy was carried out in the Department of Obstetrics and Gynaecology, D.M.C.H. Laheriasarai, Bihar. The ultrasonic examination was performed in the radio diagnosis department of D.M.C.H.L aheriasarai, Bihar. Scans were performed from 37 weeks to 40 weeks earlier if indicated.*

**Results:** *This study showed that maximum numbers of cases admitted in both the groups were ranged between 37-39 weeks of gestational age. It was also seen that maximum patients in high risk (100) and control (100) groups were in 21-30 years age and minimum patients belong to age group > 37 years. Most of the patients were from antenatal clinic, 60 patients in control group and all 100 patients in PIH group attended antenatal clinic regularly. It was also seen in both groups that maximum patients were primigravida (40.5%).*

*The amniotic fluid volume as measured by amniotic fluid index was within normal limits (86%) in low risk group patients. Incidence of congenital anomaly in high risk group was 20% and with oligohydramnios was 7.41%. We found one case of renal agenesis and one of multiple anomalies with oligohydramnios, also incidence of IUGR was very high in both groups.*

**Conclusion:** *This study showed that, amniotic fluid volume estimation by ultrasonography is a good method of estimation of foetal wellbeing. Amniotic fluid volume is altered in high risk (PIH) pregnancies; it reflects intrauterine growth retardation and congenital malformations in few cases.*

**Keywords:** *Amniotic fluid index, Perinatal outcome, High risk pregnancies, Pregnancy induced hypertension.*

## INTRODUCTION

Descriptive and retrospective studies indicate that prolonged pregnancy is associated with increased perinatal morbidity and mortality.<sup>1</sup> The risk increases from the expected date of confinement (40 weeks of gestation) such that placental insufficiency and postmaturity (greater than 42 weeks of gestation) are associated with an increase in the risk of perinatal death.<sup>2</sup> Hippocrates was the first to attribute the development of amniotic fluid to fetal urine. Fetal urination is the major source of amniotic fluid after fetal kidney function begins at 10 – 12 weeks, fetal lung fluid is a minor contributor to amniotic fluid.<sup>7</sup>

Amniotic fluid is an important part of pregnancy which plays a vital role in the normal growth of the fetus and, promotes muscular-skeletal development and allows for easier fetal movement.<sup>3</sup> Amniotic fluid assessment<sup>3</sup> by ultrasound<sup>4</sup> is an essential part of evaluation of fetus health in terms of fetal distress, meconium aspiration, caesarean and fetal mortality.<sup>3</sup> Though there are several ways to assess quantity of amniotic fluid ranging from clinical palpation to measurement of single deepest vertical pocket, amniotic fluid index (AFI) by fourquadrant technique is most popular and reliable method of quantifying amniotic fluid till today.<sup>3,4</sup>

The assessment of amniotic fluid volume is very crucial for the survival of the fetus. Amniotic Fluid Index (AFI) is performed by ultrasound method.<sup>3</sup> Amniotic fluid volume varies with gestational age<sup>5,7</sup> it peaks at 32 to 34 weeks of gestation<sup>4</sup>, rising to a plateau between 22-39 weeks of gestation and reaching 700-800 ml, which correspond to an AFI of 14-15 cm.<sup>5</sup> Any decrease or increase in the volume of amniotic fluid leads to pregnancy complications.<sup>3</sup> a drastic reduction in its quantity may indicate underlying placental insufficiency, which has definite implications on growing fetus.<sup>4</sup>

In most studies oligohydramnios<sup>4</sup> (defined as an AFI of 5 cm or less<sup>6</sup>), AFI values between 8 and 25 are considered to be normal, 5–8 low normal,

and less than 5 oligoamnios.<sup>4</sup> At values less than 5, there is higher incidence of perinatal morbidity and mortality and many a time immediate delivery is the only way out. AFI is the fifth parameter in traditional five-point biophysical profile and second parameter in rapid two-point modified BPP (the other one being NST)<sup>4</sup>.

Oligohydramnios is associated with fetal congenital anomalies and IUGR.<sup>7</sup> a recent study has shown that unrecognized IUGR is the single largest risk factor to pregnancies that end in still birth. The severity of oligohydramnios is associated with degree of IUGR and it reflects the placental dysfunction.<sup>3</sup> Oligohydramnios can cause asymmetrical fetal growth, contracture of joints and hypoplasia of fetal lungs by decreasing the lung expansion due to compression of fetal abdomen which limits the movements of fetal diaphragm and decreases the flow of amniotic fluid into and out of the fetal lung.<sup>7</sup> In this study amniotic fluid assessment is done in which amniotic fluid volume assessment is helpful in optimizing pregnancy outcome.

## MATERIALS AND METHODS

A total 200 Patients were selected randomly from the sample. All selected patients were divided in to two groups namely Normal Cases (100) and High Risk Cases (100). Inclusion Criteria: The date of LMP was correctly known with previous three regular period and not using oral contraceptives in that period. In High risk group Pregnancy induced hypertension patients were included and in control both primigravida and multigravida without any pregnancy related and medical complications were included.

Ultrasound Examination: Shimadzu SDU 500 real time ultrasound scanners were used for ultrasound examination with frequency 3.5 MHz.

Linear transducer was used for all cases. The images were displayed in gray scale presentation at a rate of 20 frames per seconds. Built in video monitor displayed 2D linear images and freeze frame images.

Amniotic Fluid Index method: Uterus was divided in to four quadrants using the maternal sagittal midline vertically and an arbitrary transverse line approximately half way between the symphysis pubis and the upper edge of the uterine fundus.

The transducer was kept parallel to the maternal sagittal plane and perpendicular to maternal coronal plane throughout. The deepest unobstructed and clear pocket of amniotic fluid was visualized and the image was frozen, the ultrasound calipers were manipulated to measure the pocket in a strictly vertical direction.

The process was repeated in each of the four quadrants and the pocket measurement was summed as amniotic fluid index and then was compared with standard values. More than 25 cm value was recorded as polyhydramnios and value less than 5cm was as oligohydramnios. Statistical analysis: All the data were expressed in numbers (%).

**RESULTS**

Study found that maximum number of cases in both the groups was ranged between 37-39 weeks of gestation age. (Table 1)

**Table 1: Distribution of cases according to gestation age**

Gestation Age (weeks)	Cases	Percentage (%)	Control	Percentage (%)
37-38	48	48	42	42
38-39	34	34	36	36
39-40	18	18	22	22
Total	100	100	100	100

Table 2 Shows that maximum numbers of patients in both the groups were in 20-30 years of age and minimum patients belong to age group of > 35 years.

**Table 2: Age distribution of cases**

Age Group (years)	Control	PIH	Total	Percentage (%)
15-20	8	13	21	10.5
21-25	38	24	52	26
26-30	40	43	83	41.5
31-35	14	18	32	16
>35	0	2	2	1
Total	100	100	200	100

60 patients in control and 100 patients in PIH group attended antenatal clinic regularly. 35

patients in control group and 42 patients in PIH group attended clinic irregularly. 5 patients of control group and 3 patients of high risk group were emergency admission at term. (Table 3)

**Table 3: Distribution of cases according to antenatal care**

Antenatal visit	Control	Case (PIH)	Total	Percentage (%)
Regular	60	55	115	57.5
Irregular	35	42	77	38.5
No antenatal visit	5	3	8	4
Total	100	100	200	100

Table 4 shows distribution of cases according to gravidity, and it was found that maximum patients in both the group were primigravida (40.5%).

**Table 4 : Distribution of cases according to gravidity**

Gravidity	Control	Cases (PIH)	Total	Percentage (%)
G1	38	43	81	40.5
G2	22	19	41	20.5
G3	30	26	56	28
G4	10	6	16	8
G5	0	4	4	2
>G5	0	2	2	1
Total	100	100	200	100

**DISCUSSION**

Prolonged pregnancy is a subject of interest because of its presumed association with increased fetal morbidity and mortality. Placental insufficiency is postulated to be the cause of the adverse obstetric outcomes associated with prolonged pregnancy.<sup>8</sup>

The failing placenta has been demonstrated to be accompanied by a reduction in the volume of amniotic fluid.<sup>1</sup> In our study we found that amniotic fluid volume estimation by ultrasonography is a good method of estimation of foetal well being. We also found that if amniotic fluid is altered in high risk (PIH) pregnancies, it reflects intrauterine growth retardation and congenital malformation in a few cases.

Alteration in amniotic fluid volume also has adverse effect on mode of delivery with increased operative interference. Pregnancy outcome is also

often very poor with decreased or increased amniotic fluid index values. It is suggested that AFI estimation should be included as an integral part of antepartum foetal surveillance in high risk pregnancies.

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