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Research Article

## A prospective study of effect of amniotic fluid index less than 5 at term on perinatal outcome

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### ABSTRACT

**Background:** To study the effect of oligohydramnios in pregnancy and its value in predicting adverse perinatal outcome.

**Methods:** A prospective case control study of pregnancy outcome in 100 cases with ultrasound diagnosis of oligohydramnios at term compared with 100 controls with no oligohydramnios. The study was done over a period of 3 years at SSMC Tumkur, India.

**Results:** Oligohydramnios at term is associated with poor perinatal outcome. Significant increase in abnormal foetal heart rate, meconium stained liquor, delivery by cesarean section, low Apgar intrauterine growth restriction (IUGR), increased admissions to neonatal intensive-care unit (NICU) were seen in study group, however perinatal mortality was more in study group but not statistically significant (P=0.31)

**Conclusions:** AFI <5 at term is an important fetal surveillance methods to identify poor perinatal outcome and thereby makes possible intervention so as to reduce perinatal morbidity and mortality.

**Keywords:** Oligohydramnios, Amniotic fluid index, Meconium stained liquor, Perinatal outcome

### INTRODUCTION

Amniotic fluid which surrounds the developing fetus in amniotic sac provides a supportive environment for fetal development and is an important indicator of fetal well-being.<sup>1</sup> Abnormality of amniotic fluid volume (AFV) is associated with increased incidence of perinatal mortality and morbidity.<sup>2-4</sup> The amniotic fluid index (AFI) measured by the 4 quadrant ultrasonic technique was added to identify fetuses at higher risk of poor perinatal outcome.

Oligohydramnios is defined as amniotic fluid volume <5cm, originally described by Phelan et al. Oligohydramnios is due to uteroplacental insufficiency. It is associated with structural anomalies, intrauterine growth restriction, abnormal fetal heart rate (FHR)

pattern, low Apgar score, pulmonary hypoplasia, increased risk of cesarean delivery and neonatal death.<sup>5,6</sup>

In high risk pregnancies, oligohydramnios is frequently used to identify fetuses at risk of an adverse outcome. The purpose of this study was to evaluate the effect of oligohydramnios at term on perinatal outcome.

### METHODS

A prospective case control study for 3 years in department of OBG, SSMC, Tumkur, Karnataka, India between March 2013 to January 2016. The study consists of 100 cases diagnosed as oligohydramnios at term with AFI <5 by USG compared with 100 controls with no oligohydramnios. Clearance from ethical committee taken matched for variables such as age, parity and

gestational age. Consent from the patient was taken and cases satisfying the inclusion and exclusion criteria were studied.

**Inclusion criteria**

- Patients with 37 completed weeks of gestation.
- Intact membranes.
- AFI <5 cm.
- Singleton pregnancy with cephalic presentation.

**Exclusion criteria**

- Multiple pregnancies.
- Rupture of membranes.
- Congenital anomalies of the fetus.
- Intrauterine death of the fetus.
- Postterm pregnancy.
- High risk pregnancy.
  - i. Preeclampsia.
  - ii. Diabetes.
  - iii. Chronic renal disease.

For all the selected cases through history was taken complete examination was done (systemic, per abdomen and pelvic examination), clinical evidence for oligohydramnios was looked for. Routine investigations like hemoglobin, blood group and Rh typing, urine examination was done. Non stress test was done for all patients. For all the pregnant women, ultrasound examination was done, and AFI was calculated by 4 quadrant amniotic fluid volume measurement technique.<sup>7</sup> Oligohydramnios defined as AFI ≤5 cm. The amniotic fluid volume is considered normal if AFI is between 5.1 cm and 20 cm. for each case a control was taken with similar gravidity, parity, gestational age but the AFI, of more than 8 cm and <20 cm. The mean AFI for the study group was 3.55 cm and for the control group was 9.25 cm.

Various perinatal outcome parameters recorded were abnormal fetal heart (non-reactive non-stress test (NST), colour of amniotic fluid (meconium stained liquor), mode of delivery, Apgar score, birth weight and admission to neonatal intensive care unit and perinatal mortality) and the results were statistically analysed.

**RESULTS**

Table 1 shows age distribution. The age of the patients ranges from 18-30 years. Majority of them belong to 21-25 years. The mean age was 22.82±2.83 years.

The mean gestational age was 39.4 weeks for the study group and 39.5 weeks for the control group which was similar (Table 2).

**Table 1: Age distribution.**

Age	Distribution	n=100
18-20	20	20%
21-25	68	68
26-30	12	12
Total	100	100%

**Table 2: Gestational age relationship to amniotic fluid index.**

Age in weeks	Study (AFI <5)	Control (AFI>5-24)
37-40	24	41
40-42	26	9
Total	50	50

**Table 3: Comparison of perinatal outcome parameters in study and control group.**

Outcome parameters	Study group		Control group		p-value
	No	%	No	%	
Non-reactive NST	40	40	20	20	0.04
Thick meconium stained liquor	48	48	18	18	0.001
LSCS	62	62	24	24	0.0001
Apgar score <7					
1 min	38	38	20	20	0.04
5 min	8	8	4	4	0.04
Birth weight kg	64	64	16	16	0.0095
Admission to NICU ward	44	44	14	14%	0.0007
Perinatal mortality	2	2	0	0	0.31

NST was not reactive in 40% in study group as compared to 20% in control group with a p-value of 0.04. Variable deceleration was the most common fetal heart rate (FHR) abnormality in study group. Meconium stained liquor was seen in 48% in study group 18% in control group with a p-value of 0.01. Incidence of LSCS, low Apgar IUGR, admission to NICU and perinatal mortality was more in study group (Table 3).

**DISCUSSION**

Oligohydramnios defined as amniotic fluid index ≤5 cm or <5<sup>th</sup> percentile for gestational age. Antepartum oligohydramnios increases the risk of meconium staining, intrapartum cardiotocographic abnormalities and operative delivery for fetal distress.<sup>8</sup>

Because oligohydramnios has been circumstantially associated with a variety of ominous pregnancy outcome such as perinatal death, fetal distress in labor and poor

infant condition at birth, obstetricians have increasingly resorted to induction of labor or antepartum testing of

fetal health in pregnancies complicated by decreased amniotic fluid volume.<sup>9</sup>

**Table 4: The results of outcomes of present study are comparable with results of similar studies.**

	Sriya R et al <sup>11</sup>	Chandra P et al <sup>13</sup>	Kumar P et al <sup>10</sup>	Umber et al <sup>14</sup>	Present study
Non reactive NST	41.55%	69.23%	40%	52.7%	40%
Thick meconium stained liquor	38.8%	23.7%	-	6%	48%
LSCS	43.05%	76.92%	63.1%	32%	62%
Apgar					
1 minute	38.8%	-	-	8%	38%
5 minute	9.72%	23.07%	-	6%	8%
Birth weight <2.5kg	58.38%	61.53%	-	36.3%	64%
Admission to NICU	88.88%	46.15%	-	7%	44%

Non-reactive NST was seen in 40% of patients in present study which is similar to studies done by Sriya et al and Kumar et al.<sup>10,9</sup> In study done by Chandra et al incidence of LSCS was 62 % in present study as compared to 63.1 and 76.92 in Kumar P et al and Chandra et al study (Table 4).<sup>10,13</sup>

The occurrence of meconium stained liquor was more in women with oligohydramnios i.e., 48% which is comparable to study by Rutherford, which is 54%. Various studies show different rates of LSCS for fetal distress in pregnant women with oligohydramnios. 66.7%, 76.92% and 43.05% in studies done by Kumar P et al Chandra et al and Sriya R et al.<sup>10,11,13</sup> The 5 minute Apgar of less than 7 in study group was 8% in present study and 7% new borns were admitted to NICU with morbidities like birth asphyxia and meconium aspiration. This is comparable to studies by Chandra et al.<sup>13</sup> The study by Sriya et al showed higher incidence of admissions to NICU i.e 88.8%.<sup>11</sup>

There were 2 perinatal deaths in study group and no death in control group as compared with 1 death in Chandra P et al study. There were no neonatal death in Baron and Casey et al study.<sup>9,12</sup> The 2 neonatal death in present study were due to meconium aspiration syndrome.

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