



## Antepartum Oligohydramnios and Perinatal Outcome: A Reevaluation

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### Abstract

**Objective:** *The study was undertaken to re-evaluate the impact of isolated oligohydramnios on pregnancy and perinatal outcome.*

**Study Design:** *The study was a case-control study of 100 antenatal subjects in the Department of Obstetrics and Gynaecology in collaboration with Departments of Pathology and Radio-diagnosis, Jawaharlal Nehru Medical College, AMU, Aligarh, India over a period of two years (2012-2015). Two groups, study and control, based on their latest amniotic fluid assessment, were evaluated to determine the relationship between amniotic fluid index (AFI) and gestational age at delivery, induction of labour, meconium-stained liquor, cesarean delivery, birth weight, congenital anomalies, Apgar Score at 5 minutes and neonatal complications. Statistical evaluation was done using z-test. Subjects and controls were matched for age, social status and gravidity.*

**Results:** *AFI determinations in 100 pregnant females beyond 34 weeks gestation were used to allocate the patients to the study (AFI < 5cm, oligohydramnios) and the control (AFI 5-25cm) groups.*

*The mean gestational age at delivery was significantly lower in the study group. Labour was induced in a significantly higher number of patients in the study group compared to the control group. The incidence of cesarean delivery and congenital anomalies was significantly higher in the study group. There was no statistically significant difference in meconium-staining of liquor, birth weights, low 5-minute Apgar Score and neonatal complications between the two groups.*

**Conclusion:** *Oligohydramnios has been classically considered an indicator of fetal compromise and compromised utero-placental circulation but recent studies have called this into question. The present study suggests that the benefits of AFI in ante-partum surveillance need to be re-determined in a large, multi-center, randomised study.*

**Introduction**

Oligohydramnios, defined as an amniotic fluid index (AFI) of less than 5 cm (standard definition)<sup>1</sup>, complicates 0.5 to 8 % pregnancies.<sup>2</sup> AFI is calculated by summing up the maximum vertical pockets of amniotic fluid in each quadrant of uterus using Phelan’s method.<sup>3</sup> Oligohydramnios has been associated with poor pregnancy outcome but some recent studies have shown different results.<sup>4-7</sup> To reevaluate the relationship between oligohydramnios and perinatal outcome, a prospective case-control study was done in the author’s institution, a tertiary-care hospital at Aligarh.

**Materials and Methods**

The study was carried out on 100 antenatal cases over a period of two years, with their consent. Approval was taken from the Institutional Ethics Committee. AFI determinations, according to Phelan’s method, were done using 2-4 MHz sector and linear array transducers, using Siemens Sonoline Adara and GE model RT 3200 machines. The study group consisted of 40 females with singleton pregnancies beyond 34 weeks gestation with the latest AFI of less than 5 cm (isolated

oligohydramnios), without any other pregnancy complications.

The control group consisted of 60 females with singleton pregnancy beyond 34 weeks gestation with the latest AFI between 5 and 25 cm.

No cases with ruptured membranes, abnormal presentations, gestation beyond 40 weeks or with other pregnancy complications like PIH, GDM, etc were included. Cases were followed till delivery. Cases with abnormal Doppler studies were excluded from the study. Correlations were made between AFI and parameters like gestational age at delivery, induction of labour, meconium-in-liquor, mode of delivery, birth weight, congenital anomalies, poor Apgar Score and neonatal complications.

**Results**

Perinatal outcome was correlated with the latest AFI and comparison was made between the study and the control groups.

Table I compares gestational age at delivery, labor induction, meconium staining and caesarean delivery rates between the study and the control groups.

**Table I: AFI & Labor Outcome**

Parameter	AFI < 5cm (n=40)	AFI 5-25cm (n=60)	p Value
Gestational age at delivery (weeks)	36.5 ±2.1	38.1 ± 1.9	< 0.001
Labor induction	38 (95%)	17 (28.3%)	< 0.001
Meconium staining	10 (25%)	11 (18.3%)	> 0.5
Cesarean delivery	21 (52.5%)	18 (30%)	< 0.05

The gestational age at delivery was significantly lower in the study group (p<0.001). Labor was induced in significantly higher number of patients in the study group (95%) compared to the control group (28.3%).

There was no statistically significant difference in the incidence of meconium in liquor between the two groups. Meconium-in-liquor was assessed either after spontaneous or artificial membrane rupture.

As shown in Table I, more number of cases in the study group were delivered by cesarean section as

compared to that in the control group (p<0.05). The most common indications for cesarean section in the study group were fetal distress 47.6%, followed by cervical dystocia in 28.5%, whereas the most common indications in the control group were dystocia, 44.4%, followed by fetal distress, 16.7%. Fetal distress was defined as abnormal fetal heart rate on auscultation or cardiotocogram, not correctable by simple measures, like left lateral position, oxygen inhalation and discontinuation of uterotonics.

**Table II:** AFI & Perinatal Outcome

Parameters	AFI < 5cm (n=40)	AFI 5-25cm (n=60)	p Value
Birth weight (grams)	2300 ± 500	2760 ± 450	> 0.5
Congenital anomalies	06 (15%)	01 (1.7%)	< 0.05
Apgar score < 7 at 5 min	06 (15%)	05 (8.3%)	> 0.5
Neonatal complications	06 (15%)	05 (8.3%)	> 0.5

Table II compares the birth weights, congenital anomalies, Apgar score at 5 minutes and neonatal complications between the study and the control groups. The mean birth weight of neonates was 2300 ± 500 grams in the study group and 2760 ± 450 grams in the control group, the difference being statistically insignificant. The apparent difference in the birth weights could be attributed to the difference in the gestational ages at delivery. As shown in Table II, there were significantly more anomalies in the study group (15%) than in the control group (1.7%). The anomalies in the study group included Infantile Polycystic Kidney Disease (PCKD), 02, omphalocele with pinna amputation and talipo–equino–varus, 01, Down’s Syndrome with hypoplastic kidneys, 01, absent urinary bladder, 01 and anencephaly, 01. Hypoplastic kidneys, PCKD and absent urinary bladder lead to oligohydramnios due to decreased urine production. Anencephaly and omphalocele are classically linked with polyhydramnios due to excessive transudation of the body fluids through the exposed membranes.

Low Apgar Score at 5 minutes was observed in 15% cases in the study group and 8.3% cases in the control group, making the difference statistically insignificant.

Neonatal complications like sepsis, seizures, meconium aspiration syndrome were present in 15% cases in the study group and 8.3% cases in the control group. Statistically, there was no significant difference in the occurrence of neonatal complications between the two groups.

### Discussion

Ultrasonographic assessment of AFI is used frequently to identify at-risk fetuses antenatally. Oligohydramnios is linked with pulmonary

hypoplasia, fetal distress, cord-compression, and increased perinatal morbidity and mortality.<sup>8,9</sup>

In the present study, with respect to perinatal outcome, there was an association between oligohydramnios and lower gestational age at delivery, increased induction of labour, caesarean delivery and congenital anomalies.

Lower gestational age at delivery was because of early induction in the oligohydramnios group, the sole indication for induction being the diagnosis of oligohydramnios per-se. This result is consistent with Locatelli et al, who reported that a significantly higher number of patients with oligohydramnios were induced compared to those with normal AFI.<sup>10</sup>

A higher rate of caesarean deliveries in our study group could be explained on the basis of very high induction rates (95% vs 28.3%) compared to the control group. Fetal distress was the most common indication for caesarean in the study group. However, fetal distress could not be confirmed objectively because of non-availability of scalp pH and arterial blood gas analysis.

A meta-analysis done by Suneet P Chauhan et al found that an antepartum AFI ≤ 5 cm, in comparison with AFI > 5 cm, was associated with an increased risk of caesarean delivery.<sup>11</sup>

A high rate of fetal anomalies was observed in the oligohydramnios group, suggesting a need of detailed fetal anomaly- scan whenever oligohydramnios is detected.

Statistically, there were no differences in meconium staining of liquor, birth weights, low Apgar Score at 5 minutes and neonatal complications between the two groups.

Locatelli et al also reported no difference in meconium staining of liquor between the oligohydramnios and the normal groups.

However, Alchalabi et al,<sup>12</sup> Brain M Casey et al<sup>13</sup> reported a higher incidence of meconium staining in the oligohydramnios group. This discrepancy could be explained because of the inclusion of other risk factors in their studies, namely post-dated gestations, hypertensive disorders, diabetes, etc.

William J Ott reported similar results as ours when comparing the birth weights between the AFI groups.<sup>14</sup> He also found no differences in Apgar Scores at 5 min and occurrence of neonatal complications between the oligohydramnios and the normal groups, the results being similar to ours.<sup>14</sup>

Alchalabi et al, on the contrary, reported significant difference in Apgar Scores of oligohydramnios and normal groups.

Assessment of AFI is an essential and heavily weighted parameter of fetal surveillance. Oligohydramnios has been classically considered an indicator of fetal compromise and compromised utero-placental circulation but recent studies have concluded otherwise. Kreiser et al did not find a poor perinatal outcome in cases of isolated oligohydramnios.<sup>5</sup> William J Ott concluded that oligohydramnios was a rather weak predictor of perinatal outcome.<sup>14</sup> Magann et al studied 1001 patients and concluded that high risk pregnancies with an AFI  $\leq 5$  cm appear to carry intrapartum complication rates similar to those of high risk pregnancies with an AFI  $> 5$  cm.<sup>15</sup> A meta-analysis done by Suneet P Chauhan et al found that an antepartum AFI  $\leq 5$  cm, in comparison with AFI  $> 5$  cm, is associated with an increased risk of caesarean delivery for fetal distress and low Apgar Score at 5 minutes.<sup>11</sup>

### Conclusion

The present study suggests that the benefits of AFI in ante-partum surveillance need to be re-determined in a large, multi-center, randomised study.

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