

# Perinatal outcome in terminal oligohydramnios



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## ABSTRACT

**Background of the Study:** Amniotic fluid or liquor, the fluid around the developing fetus serves various functions. A balance of formation and reabsorption of this fluid has to be maintained. The amniotic fluid volume (AFV) undergoes changes during pregnancy. Oligohydramnios is a condition in which the AFV decreases and is associated with conditions like renal agenesis, placental dysfunction, congenital anomalies, anemia, PIH, hypoxia. Its effects depend on the duration of pregnancy. But when AFV decreases terminally, the chances of having a normal baby are more. **Aims and Objective:** This study was aimed to find the perinatal outcome in terms of LSCS and instrumental deliveries, needs for induction, neonatal mortality, low apgars, meconium staining, NICU admissions in women with oligohydramnios occurring after 34 weeks of pregnancy. **Materials and Methods:** A prospective observational study included women with singleton pregnancy admitted with intact membranes after 34 weeks. AFV was calculated by USG. **Results:** Less number of women had AF Index less than 5 cm but as AFV decreases risk of LSCS increases and spontaneous onset of labor ends mostly with vaginal deliveries. Amniotic fluid Index less than 5 cm increases the risk of low Apgar, septicemia and neonatal mortality. Although Apgar was low at 1 min, it improved at 5 min suggesting a good adaptation outside utero. **Conclusion:** Low AF Index (as determined by USG) in last trimester was associated with increased risk of adverse perinatal outcome like operative delivery, fetal distress, NICU, low apgar, septicemia, neonatal mortality. Here, Doppler can relieve obstetrician stress in decision making and amnioinfusion in selected cases can reduce operative morbidity. Parameters like risk of septicemia and effects in extremes of maternal age need to be evaluated further in a larger number of cases.

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**Key words:** terminal oligohydramnios, perinatal, apgars, amniotic fluid index, LSCS

## INTRODUCTION

Amniotic fluid or liquor is the fluid around the developing fetus. When it becomes <5<sup>th</sup> percentile or less than 500 ml at more than 34 weeks, is termed as oligohydramnios. The amniotic fluid serves various important functions including cushioning the fetus, maintaining temperature within the uterus, prevention of cord compression, allowing fetal movements and also aids the digestive and respiratory systems of the fetus to develop because the fetus “swallows and excretes” and “inhales and exhales” this fluid.

Circulation is initially as a transudate from maternal blood. There are osmotic and hydrostatic forces across the vessel walls till 14 wks. At about 20 weeks fetal swallowing and urination starts.

A balance between input and output or formation and reabsorption of fluid is maintained.<sup>1</sup>

The AFV (Amniotic Fluid Volume) undergoes characteristic changes with gestation. It progressively rises from 10 - 20 ml at 10 weeks gestation to ~ 250ml at 16 weeks reaching ~ 800 ml at 33 weeks and reaching a plateau ~ 1000 ml

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at 38 - 39 weeks before finally decreasing to ~ 800 ml at 40 weeks.<sup>2-5</sup> Although the etiology is complex, it is mostly associated with conditions like renal agenesis, placental dysfunction, congenital anomalies, under nutrition, PIH, hydration anemia and hypoxia.

The effects of oligohydramnios depend largely on the stage of pregnancy at which it occurs.<sup>6-9</sup> For example, in 1<sup>st</sup> trimester there can be serious consequences like birth defects. In 2<sup>nd</sup> trimester problems like miscarriage, premature births, IUD, muscle and limb defects can occur. In 3<sup>rd</sup> trimester there can be fetal distress, RDS, IUD, fetal compression syndrome/ pulmoypoplasia /amniotic band syndrome. But, when oligohydramnios appears terminally in pregnancy, the chances of having a normal baby are increased.<sup>10-12</sup>

With this background, the present study was taken up with the aim to find out the perinatal outcome in mothers showing oligohydramnios at >34 weeks gestation (terminal) in terms of: LSCS and instrumental deliveries, need for induction, neonatal mortality, low apgars, meconium staining, NICU admissions, septicemia, IUD, modifications in management.

#### Ethical issues

The participants were informed about the nature of study, the importance of doing USG, notification of the birth outcome and the ability to withdraw from the study at any point of time without any hindrance in management. Their participation was voluntary and confidentiality was assured.

## MATERIALS AND METHODS

A prospective observational study was carried out for 3 months that included women having singleton pregnancy and admitted with oligohydramnios detected on USG at > 34 weeks with intact membranes. These women in whom

clinically oligohydramnios was suspected were subjected to USG for confirmation. The gestational age of women was confirmed from earlier ANC follow-ups and early USG (this also ensured that they did not have oligohydramnios earlier) –thus only low risk terminal oligohydramnios cases were included. Women with PROM, APH, uterine or fetal anomalies, maternal diseases like anemia, diabetes mellitus, heart disease, pregnancy induced hypertension, HD, PIH were excluded from the study.<sup>10</sup>

USG performed using Siemens sector probe 3.5MHz used to measure vertical depth in 4 quadrants. Precautions were taken to keep the probe perpendicular, no pressure was applied, no limbs or no cord were observed in the measured pockets. Qualitative estimation included inter-observer/intra-observer variability which was avoided by using only one sonologist for the study. A four quadrant assessment done for the quantitative estimation. The AFI (Amniotic Fluid Index) which is the sum of four quadrants, was calculated as per Phelan as very low/low/normal/poly which coincides with <5/5-8/>8/18 cm.<sup>13</sup> Once oligohydramnios was detected the women were subjected to Doppler for determination of fetal well being. Accordingly, management (LSCS/Vaginal) was decided after doing P/V examination. After birth, APGAR was noted at 1 and 5 min, and follow-up was till day 15 of birth. Number of babies getting admitted in NICU and appearance of septicemia were recorded separately.

## RESULTS

Incidence of oligohydramnios as calculated from the hospital admission register was 12.5/100 women getting admitted at 34 weeks and above. The total number of cases studied were 51, which included (1)33 women in 22-32 yrs age group.(2) 9 women in 18-21 yrs age group.

**Table 1: Comparison of vaginal vs LSCS in AFI ≤5 (Group A)**

S. No.	Route of delivery	Mean±SD	T calculated	T tabulated	Level of significance d, f
1	8 (vaginal)	3.3125±3.0919	0.0039	1.833	0.05,9
2	10 (LSCS)	3.31±0.3324			

**Table 2: Comparison between vaginal vs LSCS if AFI>5 (Group B)**

S. No.	Number of patients	Mean±SD	T calculated	T tabulated	Level of significance d, f
1	21 (vag)	7.2905±0.7004	1.4839	1.796	0.5,11
2	12 (LSCS)	6.9±0.4308			

**Table 3: Comparison between AFI ≤5 and >5 for LBW i.e., baby weight less than or equal to 2.5 kg**

AFI	Number of patients	Mean±SD	T 0.5494 (calculated)	T (tabulated)
≤ 5 cm (A)	9	3.3111±1.0787		
≥5cm (B)	23	6.9870±0.5494	_9.6955	1.833

(3) 5 women in 33 -38yrs age group. The total participating women were 51.

Patient distribution was done as per Phelan<sup>2,13</sup> after calculating the AFI. Women with AFI  $\leq 5$  cm were belonged Group A comprising of 18 women. Women with AFI  $> 5$  cm (i.e., 5-8 cm) were added to Group B, comprising of 33 women. Thus, being only terminal oligohydramnios, a lesser number of women had AFI  $< 5$  cm. The comparison of vaginal with LSCS in AFI  $\leq 5$  (A) is shown in Table 1 and comparison between vaginal vs LSCS if AFI  $> 5$  (Group B) is shown in Table 2. More women had cesarean when AFI  $< 5$  cm whereas number of women delivering vaginally was more when AFI  $> 5$  cm. Thus, increasing AFI is safer for vaginal delivery.

Table 3 presents the comparison between AFI  $\leq 5$  and  $> 5$  for LBW i.e. baby weightless than or equal to 2.5 kg. A total 32/51 i.e., 62.74% babies were LBW. Thus, low AFI is likely to be associated with LBW babies.

**Outcome with spontaneous labor**

A total of 9 women went into spontaneous labor. Of these 9 women, 4 women had AFI  $\leq 5$  cm and 5 women had AFI  $> 5$  cm. Eight of the total 9 women delivered vaginally while one of the 9 underwent LSCS. The effect of induction (baby weight  $< 2.5$  kg) is illustrated in Table 4. A total of 24 inductions were required for baby weight  $< 2.5$  kg, of which 75% delivered vaginally. Table 5 presents the indications of LSCS with AFI  $< 5$  cm, severe oligohydramnios was the main cause of LSCS.

Table 6 presents the relationship between maternal age and neonatal mortality. Total neonatal mortality observed in the study was 7 (13.72%). As the maternal age moved to extremes, the neonatal mortality persisted. In group A (AFI  $\leq 5$  cm), 5 neonatal deaths occurred. These included 3 babies of LSCS. One of these babies died of septicemia while 2 were neonatal deaths. Two babies delivered vaginally were IUD (Intra Uterine Death). In group B (AFI  $> 5$ cm), there were 2 deaths, 1 LSCS delivery which was a NICU admission had septicemia and died

on day10; 1 vaginal delivery was an IUD. Thus, as AFI decreases neonatal morbidity and mortality increases.

**APGAR**

A Total of 19/51(37.25%) had low apgar  $\leq 6$  at 1 min. Sixty-two pint seventy five percentage had apgar  $> 7$  at 5 min.

Apgar at 1 min: When AFI was less than 5 cm, 9/18 babies had a low Apgar of which 2 babies could not recover (neonatal mortality).

The number of NICU admissions is presented in Figure 1 and the number of septicemia cases is presented in Figure 2. There were 4 (7.8%) NICU admissions, of which 3 had AFI  $< 5$  cm. There were 3 cases of septicemia (5.88%), of which 2 had AFI  $< 5$  cm. Conclusively, septicemia and NICU admissions increase with decreasing AFI.

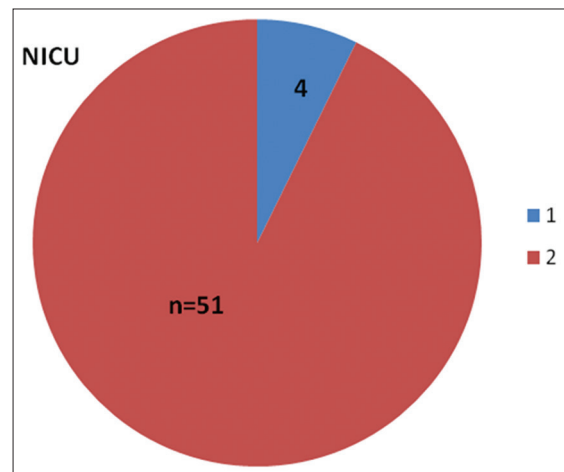


Figure 1: NICU Admissions

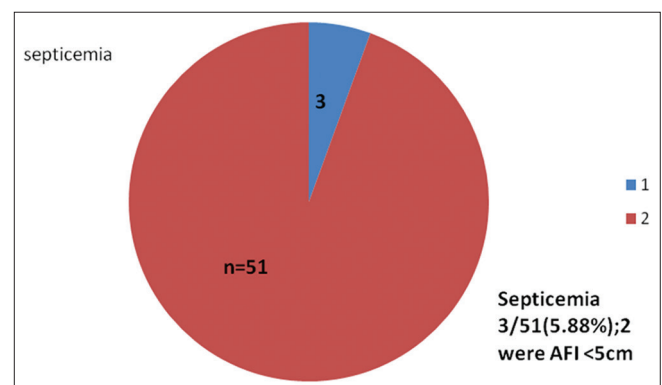


Figure 2: Percentage of Septicaemia cases

**Table 4: Effect of induction (baby weight  $< 2.5$  kg)**

AFI index	n=24	Induced and had vaginal delivery	Induced and had LSCS
AFI $\leq 5$ cm (A)	4	4	0
AFI $> 5$ cm (B)	20	14 (63.6%)	6 (27.27)

**Table 5: Indications LSCS when AFI  $\leq 5$  and AFI  $> 5$**

AFI	LSCS	Indications	%
$\leq 5$ (A) n=18	10	10 (severe oligo)	55.55
$> 5$ (B) n=33	12	6 (FD) 3 (FP) 3 (Derranged doppler)	36.36

**Table 6: Maternal age and neonatal mortality**

Age	18-21	22-32	33-38
Mortality	1	5	1
%	14.2	71.42	14.2

## DISCUSSION

Although the incidence of oligohydramnios is 4.5% at term, the incidence in a tertiary referral hospital is higher. The effects of oligohydramnios in extremes of age has not been studied extensively in the referred literature.<sup>14,15</sup> In present study, the age range is wider but more patients are required to come to a conclusion for effects of oligohydramnios in extremes of age. According to Gumus, Koktener and Turhan the rate of induction is high (73%) in oligohydramnios.<sup>16</sup> Manzanares et al found high operative delivery rate than spontaneous, with no difference in perinatal outcome.<sup>17</sup> Leeman and Almond recommended the management be individualized based on parity /cx ripening.<sup>18</sup> Crowley et al concluded that inductions are associated with an increased rate of LSCS along with statistically significant increase in meconium staining.<sup>19</sup> Sarno et al reported an increased rate of LSCS for FD and one minute Apgar was <7.<sup>20</sup> In the present study, total inductions were 47% while 17.6% of subjects had spontaneous labor. Of the total inductions, 6 inductions ended up in LSCS for FD with meconium for 3 of them and baby weight less than 2.5 kg. Hoddick et al reported that oligohydramnios was a poor predictor of baby weight less than 2.5 kg.<sup>21</sup> Perni et al found no significant relation between AFI and birth weight less than 2.5 kg.<sup>22</sup> Chamberlain et al<sup>23</sup>, Gumus, Koktener and Turhan<sup>16</sup> reported that even borderline low AFI has a high incidence of baby weight less than 2.5 kg. Banks and Miller<sup>24</sup> found an increased incidence of LBW (low birth weight) babies and meconium in borderline AFI. In Present study, baby weight less than 2.5 kg in both groups of AFI (Total=62.7%) suggests that the process of decreased nutrition (vasc) could have started earlier thereby giving more babies with less than 2.5 kg, although oligohydramnios was detected as a terminal event.

### Apgar

A low apgar at 5 min for borderline AFI was reported by some authors, but the results were not found to be statistically significant.<sup>6,15,16,24</sup> Most of the babies having low apgar at 1 min have good apgar at 5 min.<sup>25</sup> Ghosh, Marsal and Gudmundsson<sup>26</sup> observed a high incidence of low apgar at 1 and 5 min even in borderline AFI. In present study, although Apgar was low at 1 min (which may mean that the birth process was not well tolerated or it created stress) but it improved to normal at 5 min suggesting that they were well adapting to the new environment outside utero.

### NICU

Ghosh, Marsal and Gudmundsson<sup>25</sup> and Gumus, Koktener and Turhan<sup>16</sup> reported higher rates of NICU admissions in low AFI. Verma<sup>27</sup> reported oligohydramnios was associated with more number of preterm deliveries, non-reactive NST, fetal distress and more NICU admissions. In the present study only 7.8% subjects had NICU admissions. However, most admissions were for AFI less than 5 cm. Conclusively, a decrease in AFI is reflected by an increase in the rate of NICU admissions.

### Septicemia

Septicemia in oligohydramnios has not been reported extensively in the referred literature. In the present study, septicemia was seen in total 3 cases (2 were in AFI less than 5 cm) and all of the septicemia cases had a fatal outcome. However, more detailed studies are needed for any definitive conclusions.

### Limitations

Effect of parity (previous vaginal deliveries) with respect to vaginal deliveries and inductions was not considered in this study. It might help the outcome by facilitating a fast labor.

DOPPLER was not done for most cases in the study, but a successful induction was seen with good Doppler indices in the present study.

### Plan of future research

Effect of amnioinfusion in selected cases of oligohydramnios going in spontaneous labor can help to reduce LSCS morbidity.

## CONCLUSION

- Low AFI in (terminal) last trimester is associated with increased risk of adverse perinatal outcome like increasing LSCS, FD, NICU admissions, low Apgar, deaths due to septicemia. AFI decreasing below 5 cm further increases the risk.
- Women with spontaneous onset of labor largely deliver vaginally (this aspect is not much reported in referred literature). This was seen even in mothers with severe oligohydramnios. Here the role of amnioinfusion for selected cases in competent hands can be helpful to reduce operative interferences.
- Doppler can relieve the obstetricians stress wherever vaginal delivery is anticipated or in women with spontaneous onset labor, even if AFI is less than 5 cm.
- More studies are needed to evaluate the outcome on parameters like septicemia which can be a dangerous manifestation in LBW babies with severe oligohydramnios.

- Outcome in extremes of maternal age also needs to be studied on a larger number of women.

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### Authors Contribution:

**RTP-** Concept of study, Study design, data collection, analysis and interpretation of data, Manuscript preparation; **RVP-** Data collection and Final Approval.

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