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Original Research Article

## Feto-maternal outcome of oligohydramnios in tertiary care hospital

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### ABSTRACT

**Background:** The importance of amniotic fluid volume as an indicator of fetal wellbeing has made its assessment an important part of antenatal fetal surveillance. Oligohydramnios complicates 0.5% to 8% of pregnancies and the prognosis for pregnancies complicated by oligohydramnios is dependent on the gestational age and the underlying aetiology. This study aims to determine the feto-maternal outcome of oligohydramnios in a tertiary care hospital.

**Methods:** In this study, we included 100 patients of oligohydramnios, with AFI  $\leq 5$  cm with a singleton pregnancy with intact membranes. The maternal outcome was assessed by mode of delivery and maternal complications and the neonatal outcome was studied by birth weight, APGAR score, NICU admission and perinatal mortality.

**Results:** PIH was the most common risk factor in 38% of cases followed by IUGR in 29%, doppler changes in 24%. The reduced diastolic flow was the most common abnormal doppler finding in the 23% abnormal doppler cases, from which 39% underwent caesarean section, 9% required NICU admission and 61% had neonatal death. 53% delivered by caesarean section of which 13% had neonatal death. NICU admission is required in 64% of cases.

**Conclusions:** We conclude that oligohydramnios is a high-risk pregnancy and proper antepartum care, intensive fetal surveillance and intrapartum care are required in a patient with oligohydramnios. Every case of oligohydramnios needs careful antenatal evaluation, parental counselling, individualization, decisions regarding time and mode of delivery. Continuous intrapartum fetal monitoring and good neonatal care are necessary for a better perinatal outcome.

**Keywords:** Oligohydramnios, AFI, Feto-maternal outcome, IUGR, Perinatal mortality

### INTRODUCTION

Amniotic fluid (AF) is the protective liquid contained by the amniotic sac of a gravid amniote. It provides temperature stability, cushioning and a necessary presence in collapsed airways to help stimulate lung development.

The importance of amniotic fluid volume as an indicator of fetal wellbeing has made its assessment an important part of antenatal fetal surveillance. Abnormalities such as meconium staining, congenital anomalies, growth retardation, dysmaturity and fetal asphyxia have been associated with reduced amniotic fluid volume.<sup>1-3</sup>

Amniotic fluid volume is the sum of inflow and outflow of fluid into amniotic space and as such reflects fetal fluid

balance. The amniotic fluid volume at each week of pregnancy is variable. It increases from 20 ml at 10 weeks to 770 ml at 28 weeks, remains at a steady state till 39 weeks after which it decreases dramatically. The average amniotic fluid volume in 3rd trimester is 700-800 ml. Clinical assessment of amniotic fluid volume including bimanual palpation, symphysial-fundal height is unreliable. Diagnosis is usually done by ultrasound. Definition of increased or decreased amniotic fluid volume is based on sonographic criteria. Oligohydramnios is diagnosed when the ultrasonographic amniotic fluid index (AFI) is  $\leq 5$  cm or 5th percentile, or a single deepest pocket of  $< 2$  cm. It is associated with a high risk-averse perinatal outcome like fetal distress, meconium staining, low APGAR and neonatal resuscitation, NICU admission. This

assessment is a helpful tool in determining the risk of potentially adverse obstetric and perinatal outcomes.

The volume of the amniotic fluid decreases with increasing gestational age. The decrease in amniotic fluid volume is called oligohydramnios.<sup>4</sup> The findings of oligohydramnios can be associated with increased risk of intrauterine growth retardation (IUGR), meconium aspiration syndrome, severe birth asphyxia, low APGAR scores and congenital abnormalities, premature rupture of membranes, uteroplacental insufficiency, post-dates.<sup>5</sup> Oligohydramnios increases maternal morbidity by increasing rates of induction and/ or operative interference.<sup>6</sup> The sequel from long-standing oligohydramnios includes pulmonary hypoplasia, potter's syndrome, club foot, club hand and dislocation of the hip. It is found to be associated with a high incidence of maternal and perinatal morbidity and mortality.

During labor, the predominant mechanical function of amniotic fluid is to provide an aquatic cushion for the umbilical cord. Without this cushion, compression of the cord between the fetus and the uterine wall may occur during contractions or fetal movement, this cord compression causes severe fetal heart rate (FHR) decelerations which are associated with low APGAR scores and acidosis at birth, meconium staining, caesarean section for fetal distress.

With the help of amniotic fluid estimation by amniotic fluid Index (AFI) using the four-quadrant technique during transabdominal USG, as described by Phelan et al in 1997.<sup>7</sup> Better identification of fetuses at high risk is done. Increased elective caesarean deliveries are currently practised for better perinatal outcomes.

Oligohydramnios complicates 0.5% to 8% of pregnancies and the prognosis for pregnancies complicated by oligohydramnios is dependent on the gestational age and the underlying aetiology (Marino, 2004).<sup>8</sup>

In this study, we accessed maternal outcomes in the form of the mode of delivery: normal vaginal delivery (spontaneous or induced), instrumental vaginal delivery and caesarean section, in all patients of Oligohydramnios of different age groups and parity. We studied different causes of Oligohydramnios. Fetal surveillance was done by non-stress test (NST) and doppler study. The neonatal outcome was studied by IUGR, APGAR score, NICU admission, perinatal mortality and congenital anomalies.

## METHODS

The present study is a prospective observational hospital-based study carried out from September 2018 to September 2020 at the department of obstetrics and gynaecology, PDU medical college, Rajkot, Gujarat. During this period 100 patients in the third trimester of pregnancy with Oligohydramnios were selected randomly

after satisfying inclusion and exclusion criteria. Ethical clearance was obtained for this study from the institution.

### **Inclusion criteria**

Singleton pregnancy in the third trimester ( $\geq 28$  weeks).  
Pregnancy with intact membranes. AFI  $\leq 5$  cm in USG.

### **Exclusion criteria**

Patient with multiple gestations. Patient with PROM. Polyhydramnios.

The study was conducted to observe the outcome of labor in the form of perinatal morbidity and maternal outcome in the form of vaginal or caesarean section deliveries.

A detailed history and examination were done. History about the patient's age, obstetric code, gestational age, menstrual history, obstetric history, associated complications in present pregnancy was noted. Symphysial-fundal height was measured in centimetres. Fetal movements and fetal heart rates were recorded serially. All required investigation: - Hemogram, Blood grouping and Rh typing, cell counts, BSL, TFT, VDRL, HIV, HBsAg, Ultrasound Doppler study, NST, urine routine and microscopy were done. Speculum and per vaginal examination were done to rule out draining per vaginum and confirmed intact membranes. After taking informed consent patients were treated. Iron, calcium, and multivitamin supplements were continued orally as before. AFI measurements were done. These women were followed till discharge.

Oligohydramnios was confirmed in all by measuring amniotic fluid index (AFI). Routine management in the form of rest left lateral position, oral and intravenous hydration and control of etiological factor (if present) were done.

Fetal surveillance was done by USG, a non-stress test (NST) and Doppler.

The decision of delivery by vaginal route or elective/emergency LSCS was done as required. Some patients were already in labour and others were allowed to go into spontaneous labour or were induced to go into labour. If delivery is made by caesarean section, the indication was recorded.

A pre-designed study proforma was filled for each case.

Cases were then studied for the maternal and perinatal outcomes. The outcome of the baby was studied by birth weight, APGAR score, NICU admission or perinatal mortality.

The following outcomes were recorded: mode of delivery, meconium staining, APGAR score at 5 minutes, birth weight, NICU admissions. final outcome.

**RESULTS**

Out of 100 patients recruited in the study maximum patients (94%) were in the 20-30 years age group. Out of this 94% of patients 48% were delivered vaginally and 52% were delivered by caesarean section. 1% of patients were less than 20 years of age which were delivered by caesarean section. 5% of patients were more than 30 years of age, of which 80% were patients delivered by caesarean section. The rate of caesarean was highest in patients of age group 20-30 years (Table 1).

**Table 1: Relation between age and mode of delivery.**

Age in years	Vaginal delivery	Caesarean	Total
Less than 20	0	01 (100%)	01 (1%)
20-30	45 (48%)	49 (52%)	94 (94%)
More than 30	01 (20%)	04 (80%)	05 (5%)

**Table 2: Incidence of gravida.**

Gravida	No. of cases
Primi	50 (50%)
2nd	25 (25%)
3rd	17 (17%)
4th	04 (4%)
5th	01 (1%)
6th	03 (3%)

**Table 3: Mode of delivery.**

Mode of delivery	No. of cases
Induced vaginal	34 (34%)
Spontaneous vaginal	13 (13%)
LSCS	53 (53%)
Instrumental delivery	00 (0%)

**Table 4: Birth weight distribution.**

Baby weight (kg)	No. of cases
<1.5	20 (20%)
1.5-2.0	26 (26%)
2.1-2.5	31 (31%)
2.6-3.0	19 (19%)
>3.0	04 (4%)

The majority (50%) of cases in this study were primigravida, 25% of cases were of the second gravida, 17% were the third gravida, 4% were the fourth gravida, 1% was the fifth gravida and 3% were the sixth gravida. (Table 2)

In this study at the time of presentation, 42% of cases were having a gestational age of 37 to 39 weeks, 22% had 34

to 36 weeks, 18% had 31 to 33 weeks, 15% had more than 39 weeks and 3% had 28 to 30 weeks.

In my study, the most common risk factor was hypertension in pregnancy (38%) followed by intrauterine growth retardation in 29%, Doppler changes in 24%, post dates in 9%, and 30% of cases had no risk factors.

**Table 5: Relation between NICU admission and doppler findings.**

NICU admission	Yes	No	Total
Normal Doppler	43 (66%)	34 (44%)	77 (77%)
Abnormal Doppler	21 (91%)	02 (09%)	23 (23%)

**Table 6: Prevalence of anomalies.**

Anomaly	No. of cases
Cleft lip and palate	02 (2%)
Multicystic kidney disease	02 (2%)
B/L renal agenesis	01 (1%)
No anomaly	95 (95%)

**Table 7: Relation between NST and mode of delivery.**

NST	Vaginal delivery	Caesarean	Total
Reactive	38 (55%)	31 (45%)	69 (69%)
Non-reactive	12 (39%)	19 (61%)	31 (31%)

**Table 8: Relation between Doppler and mode of delivery.**

Doppler Study	Normal vaginal delivery	Caesarean	Total
Normal	34 (44%)	43 (66%)	77 (77%)
Abnormal	14 (61%)	09 (39%)	23 (23%)

In my study 31% of the patients had 4cm of AFI, 27% had 2cm of AFI, 21% had 3cm of AFI, 14% had 0 of AFI, 4% had 2 cm of AFI, 3% had 5 cm of AFI.

In the study majority of the cases (69%) had a reactive non-stress test.

In this study the most common doppler abnormality was reduced diastolic flow in uterine artery in 12% cases, 6% cases showed absent diastolic flow in uterine artery, 4% had brain sparing effect and 1% showed early diastolic notch while 77% cases had no abnormality in doppler.

The majority, 53% of the cases underwent LSCS for delivery, 34% underwent induced vaginal delivery and

13% had a spontaneous vaginal delivery. There was no instrumental delivery in our study. (Table 3)

Of all the cases that underwent LSCS, severe oligohydramnios was the reason in 42% cases, previous CS in 13 %, Fetal distress in 11 %, doppler changes in 9%, breech and IUGR both had 7.5% of prevalence, failed induction in 6%, and placenta previa had least 4% of prevalence.

In our study, 4% of cases had Postpartum Haemorrhage, of which 2 were primigravida and 2 were multigravida. Otherwise, there were no maternal complications in 96% of cases.

In this study, the birth weight of the baby was between 2.1 to 2.5 kg in 31% cases, 1.5 to 2 kg in 26% cases, <1.5 kg in 20% cases, 2.6 to 3.0 kg in 19% cases and >3 kg in 45 cases. (Table 4)

A total 73% of neonates had APGAR scores between 7 to 9 and 27% had between 4 to 6.

In our study, we observed that from the 23% cases with abnormal Doppler findings 91% required NICU admission, while of the 77% cases having normal doppler had only 66% NICU admission. (Table 5)

In the study we encountered 5 anomalies in neonates at childbirth, 2 had cleft lip and palate, 2 had multicystic kidney disease, one had B/L renal agenesis. (Table 6)

Of the 50% primigravida, the incidence of vaginal delivery was 24% and caesarean section was 52%. While from the 50% multigravida there was 50% incidence for both vaginal and caesarean section.

Operative morbidity was significantly higher in NST non-reactive (61%) group than NST reactive (45%) group. 55% of patients with reactive NST delivered vaginally. (Table 7)

In our study, 23% of cases had abnormal doppler findings of which 39% had to undergo caesarean section and 61% had vaginal delivery. 77% had normal doppler of which 66% had caesarean section and 44% had vaginal delivery. (Table 8)

We noticed in our study significantly higher NICU admission in non-reactive NST cases 93% compared to reactive cases which had 45% NICU admission. We noted higher mortality in neonates with abnormal doppler amounting to 61% of the 23 cases with abnormal doppler findings compared to only 19% neonatal deaths from the 77 cases with normal doppler. In our study, there was 13% neonatal mortality in cases who underwent elective caesarean section, while there was 44% and 54% neonatal mortality in induced vaginal and spontaneous vaginal delivery respectively. Neonatal morbidity was

significantly higher in the non-reactive group having 52% neonatal death compared to the reactive NST group 19%.

## DISCUSSION

### *Impact of age*

Out of 100 patients recruited in our study maximum number of patients 94% were in the 20-30 years age group with a mean age of 24.6 years. In Bhat et al the maximum number of patients 85% were 20-30 years of age.<sup>9</sup> In Modi et al 90% of cases were between 20-30years.<sup>10</sup> In Casey et al, the mean maternal age was 23.9 years.<sup>11</sup> In Radhamani et al most of the patients (54.6%) were between 37-40 years of age.<sup>12</sup> Of the 94% in our study 45% were delivered vaginally and 49% had to undergo caesarean section, in Bhat et al, from the 85%, vaginal delivery occurred in 65% and caesarean section in 35%, in Modi et al from the 90% caesarean section was done in 44% cases.<sup>9,10</sup>

### *Impact of gravida*

The incidence of oligohydramnios was 50% in primigravida and 50% in multigravida. Bhat et al showed an incidence of 54% in primigravida and 46% in multigravida.<sup>9</sup> In Donald D et al, the incidence of oligohydramnios was 60% in primigravida.<sup>13</sup>

### *Gravida and operative morbidity*

The incidence of caesarean section was more in primigravida in both our study (52%) and Bhat et al study (44.5%) compared to multigravida cases 50% and 30.5% respectively.<sup>9</sup> In Modi et al the incidence on caesarean in primigravida was 56% and in multigravida was 27%.<sup>10</sup>

### *Doppler findings and its impact*

23% of cases in our study had abnormal doppler findings of which 39% had to undergo caesarean section. While in Bhat et al study 14% of cases had abnormal doppler findings of which 71% underwent caesarean section.<sup>9</sup> In Modi et al 7% had abnormal doppler findings of which 86% underwent caesarean section.<sup>10</sup> In Weiss et al and Young et al, it was 71% and 69.7% respectively.<sup>14,15</sup> Thus, the operative morbidity was much lower in our study for cases with abnormal doppler findings.

### *NST and its impact*

In our study due to non-reactive NST which was 31% of total cases 61% of cases underwent caesarean section. In Bhat et al study from 38% of non-reactive NST cases 74% of cases underwent caesarean section.<sup>9</sup> The operative morbidity was lower in our study for this group. The caesarean section was done in 73.6% of patients with non-reactive NST in the Charu Jandial study.<sup>16</sup>

### **Operative morbidity**

The mode of delivery for the majority of cases 53% in our study was caesarean section and 47% underwent vaginal delivery and in Bhat et al study 62% cases underwent vaginal delivery and 38% by caesarean.<sup>9</sup> Sir Gangaram Hospital study shows 68% vaginal deliveries and 32% caesarean section.<sup>17</sup> Manzanares et al shows 84% vaginal deliveries and 16% by caesarean section.<sup>18</sup> Bansal et al show 47% caesarean section.<sup>19</sup> Golan et al found that, the caesarean section was performed in 35.2% of pregnancies.<sup>20</sup>

### **Operative cause**

The major indication for caesarean in our study was oligohydramnios amounting to 42% of cases and fetal distress amounting to only 11% cases. In Bhat et al study fetal distress was the major cause 66% and oligohydramnios amounting to only 13% of the cases.<sup>9</sup> In Modi et al fetal distress caused caesarean in 21% of cases and oligohydramnios in 9% of cases Fetal distress was the major indication for caesarean section in these studies as well, Radhamani et al 31%, Bachhav et al 24%, Nazlima et al 58%, Jandial et al 42%.<sup>10,12,16,21,22</sup>

### **Impact on birth weight**

The mean baby weight in our study was 2.1 kg with 77% having <2.5 kg birth weight. Bhat et al study had a mean baby weight of 2.3kg with only 36% having <2.5 kg birth weight.<sup>9</sup> In Radhamani et al 17.7% had <2.5 kg birth weight and 64% in Bachhav et al and 65.3% in Nazlima et al.<sup>12,21,22</sup> The incidence of low-birth-weight babies are higher in Oligohydramnios except in post maturity where the babies may have average birth weight, suggesting a correlation of IUGR with oligohydramnios.

### **Liquor color**

In our study, the liquor was clear in 80% and meconium-stained in 20%. In Radhamani et al 81.5% clear liquor and 18.5% had meconium-stained liquor.<sup>12</sup>

### **Impact on APGAR score**

In our study, 27% of cases had APGAR <7. Bhat et al study, Modi et al study and Manning et al study had 15% cases with APGAR <7.<sup>9,10,23</sup> In Sariya et al it was 38%. In Bansal et al it was 17.5%.<sup>19,24</sup>

### **Impact on NICU requirement**

In our study, 64% of neonates required NICU which was much higher than Bhat et al study which had only 28% NICU admissions.<sup>9</sup> In Jhonson et al 20% of babies had NICU admission, in Manning et al and Sariya et al, 43% and 88.88% respectively. Bansal et al had 36% NICU admissions.<sup>19,23-25</sup>

### **Death of the child**

Neonatal death was higher in our study amounting to 29% cases than Bhat et al study which had 5% neonatal deaths and Golan et al show 6.3% neonatal death. Bansal et al study had 15%, Casey had 6.3% and Modi et al had 4% perinatal death.<sup>9-11,19,20</sup>

### **Congenital anomalies**

Birth anomalies in our study was 5% while in Bansal et al it was 9%. Manning et al had 13%, Casey had 10% and Modi et al had 1% congenital abnormalities.<sup>10,11,19,23</sup>

Oligohydramnios is a frequent occurrence and demands intensive fetal surveillance and proper antepartum and intrapartum care. Oligohydramnios is a frequent finding in pregnancy involving IUGR, PIH, and pregnancy beyond 40 weeks of gestation. Amniotic fluid volume is a predictor of fetal tolerance in labour and its decrease is associated with an increased risk of abnormal heart rate and meconium-stained fluid. Due to intrapartum complications and a high rate of perinatal morbidity and mortality, rates of caesarean section are rising, but the decision between vaginal delivery and caesarean section should be well balanced so that unnecessary maternal morbidity can be prevented and on the other side timely intervention can reduce perinatal morbidity and mortality.

### **CONCLUSION**

Oligohydramnios is being detected more often these days due to routinely performed obstetric USG. Oligohydramnios is one of the indicators of poor perinatal outcome. It is associated with fetal heart rate abnormalities, meconium staining of amniotic fluid, umbilical cord compression, poor tolerance of labour, low APGAR score and fetal acidosis. Pregnancy-induced hypertension; post-dated pregnancies are the commonest causes of reduced amniotic fluid during the third trimester of pregnancy. Oligohydramnios with reactive NST is associated with a good prognosis. Oligohydramnios with nonreactive NST needs careful monitoring and results in early delivery, increased incidence of caesarean delivery for fetal distress, NICU admission, low APGAR score at 5 mins, and neonatal death. The mode of delivery depends on the severity of oligohydramnios and the status of fetal wellbeing. Caesarean section is mostly required for cases with anhydramnios with intrapartum fetal heart abnormalities. Babies are relatively more prone to certain complications like intrapartum fetal distress, MAS, and birth asphyxia. Oligohydramnios associated with IUGR carries a poor perinatal outcome (increased neonatal death, NICU admission, increased rate of caesarean section for fetal distress, very low birth weight). Hence, they need good neonatal care. From this study, we conclude that oligohydramnios is a high-risk pregnancy and proper antepartum care, intensive fetal surveillance and intrapartum care are required in a patient with oligohydramnios. Every case of oligohydramnios needs

Careful antenatal evaluation, parental counselling, individualization, decisions regarding time and mode of delivery. Continuous intrapartum fetal monitoring and good neonatal care are necessary for a better perinatal outcome.

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