

A STUDY TO ASSESS MATERNAL AND PERINATAL OUTCOME IN OLIGOHYDRAMNIOS AT A TERTIARY CARE HOSPITAL OF CENTRAL INDIA

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Abstract

Background: Amniotic fluid protects the foetus from trauma and cord compression, and provides nutrition. It is essential for the development of gastrointestinal, neuromusculoskeletal and respiratory system. The aim is to evaluate the maternal and perinatal outcomes in pregnancies with oligohydramnios. **Materials and Methods:** This prospective observational study was performed at a tertiary care hospital in Madhya Pradesh from March 2021 to August 2022. Pregnant women with an amniotic fluid index of less than 5 cm were classified as having oligohydramnios. Maternal and perinatal outcomes of 300 cases were noted and analysed. **Result:** Out of 300 study subjects, the majority (52.3%) were primigravidas. Maternal risk factors linked with reduced amniotic fluid volume were anemia (19.7%), hypertensive disorders of pregnancy (22.7%), and postdate pregnancy (31.3%). Increased rates of obstetric interventions like induction of labor (45%) and cesarean section (57.7%) were noted among pregnancies complicated by oligohydramnios. Fetal outcomes included low birth weight (53.7%), 5' APGAR score <7 (56.3%), meconium aspiration syndrome (48%), and growth restriction (14.7%), necessitating NICU admission in 60.7% of babies. Congenital anomalies were seen in 4.3% of cases. **Conclusion:** Adverse maternal and fetal outcomes such as the increased risk of intrapartum complications, cesarean section, and high perinatal morbidity and mortality are common in oligohydramnios. Timely diagnosis and meticulous monitoring can help avoid preventable maternal and fetal morbidity due to oligohydramnios. It is prudent that pregnancies with oligohydramnios be managed at tertiary care hospitals with facilities for cesarean section and neonatal intensive care units.

INTRODUCTION

Amniotic fluid forms a protective sanctuary around the developing fetus. It shields the fetus against trauma and cord compression, and provides nutritional support. It plays a vital role in the lung maturation, and development of the fetus's gastrointestinal tract and neuromusculoskeletal system.^[1]

In early gestation, amniotic fluid passes freely through fetal skin and the chorionic villi till the 8th week of gestation. This continues until keratinisation occurs at 22-25 weeks.^[2,3] During the later half of gestation, the primary sources of amniotic fluid

include fetal urine production and fluid secreted by the fetal lung.^[4]

The average amniotic fluid volume varies from approximately 30 ml at 10 weeks gestation to 200 ml by 16 weeks, and reaches 800 ml by the mid-third trimester.^[1,5]

Amniotic fluid volume can be estimated by subjective assessment and ultrasound techniques such as the amniotic fluid index and single deepest pocket. These techniques are non-invasive and ideal for amniotic fluid volume determination in cases where abnormalities are suspected clinically.⁶

Amniotic fluid index of less than 5 cm or single deepest pocket of less than 2 cm is suggestive of

Oligohydramnios (American College of Obstetricians and Gynecologists, 2020). An AFI threshold of 5 cm is below the 2.5th percentile throughout the second and third trimesters.^[1,7]

The absence of any measurable pockets of amniotic fluid is termed anhydramnios.^[1]

The majority of oligohydramnios cases are idiopathic. Other conditions include maternal factors such as uteroplacental insufficiency, hypertension, preeclampsia, chronic hypoxia, rupture of amniotic membranes, dehydration, and post-term gestation, and fetal factors such as anomalies of the kidneys, including the congenital absence of renal tissue, obstructive uropathy or decreased renal perfusion.^[6,8]

Complications of oligohydramnios include increased rates of cesarean delivery, preterm labor, pulmonary hypoplasia, meconium aspiration syndrome, fetal compression, fetal distress during labor, fetal acidosis, low birth weight, Intrauterine growth retardation, and stillbirths. In cases resulting from prolonged rupture of membranes, oligohydramnios can be associated with infections.^[9-11]

Normal amount of amniotic fluid is pivotal for the growth and development of the fetus and is associated with a reduced risk of maternal complications during pregnancy and labor. This study intends to evaluate maternal and perinatal outcomes associated with abnormally low amniotic fluid volume.

MATERIALS AND METHODS

This study was conducted at the Department of Obstetrics, Netaji Subhash Chandra Bose Medical College, Jabalpur, from March 2021- August 2022

Study Type and Design: Prospective observational study.

Inclusion Criteria

- Singleton pregnancy
- Period of gestation: >28 weeks
- Cephalic presentation
- Amniotic fluid index <5 cm on ultrasound
- Intact membranes

Exclusion criteria

- Premature rupture of membranes
- Malpresentation
- Previous cesarean section/ myomectomy/ hysterotomy
- Pregnant women requiring elective cesarean section for medical/ obstetric conditions not related to amniotic fluid variations

Sample Size

300 Women clinically suspected to have low amniotic fluid volume were subjected to obstetric ultrasound to ascertain fetal well-being, presentation, gestational age, liquor status, placental localization, and anomalies if present. The amniotic fluid index was measured by Phelan's technique. Maximum deepest vertical pocket from each quadrant was measured, and the sum of the four measurements gave the value of amniotic fluid index. Women with an amniotic fluid index of less than 5 cm were classified as having oligohydramnios. These women were closely monitored, and pregnancy outcome was noted.

The data was recorded in a predesigned proforma, entered in MS Excel, and eventually analysed using the statistical software SPSS Version 21.

None

RESULTS

In our study, 300 pregnancies complicated by oligohydramnios were evaluated. Table 1 depicts the demographic picture of the study subjects. Most women with oligohydramnios were in the age group of 21-25 years(57.3%). Only 31.7% of study subjects were booked (i.e., had more than three antenatal visits) at a healthcare facility during antenatal period. Maximum study subjects were unbooked (68.3%), of which 18.3% of subjects had no antenatal visits. Oligohydramnios was found to be more common in Primigravidas (52.3%).

A major portion of study subjects delivered at term. Preterm delivery was seen in 25.33% of cases, of which 5.3% occurred before 32 weeks of gestation.

Table 1: Demographic profile of study subjects with Oligohydramnios

Demographic profile	Frequency	Percentage (n=300)
Age		
<20 years	11	3.7
21-25 years	172	57.3
26-30 years	68	22.7
31-35 years	40	13.3
>35 years	9	3
Number of antenatal visits		
0	55	18.3
1	92	30.7
2	58	19.3
≥3	95	31.7
Parity		
G1	157	52.3
G2-G3	136	45.3
≥G4	7	2.3
Gestational age at delivery		
28-31 weeks	16	5.3
32-36 weeks	60	20

37-40 weeks	130	43.3
>40 weeks	94	31.3

The majority of cases were idiopathic. As shown by Table 2, Postdate pregnancies (beyond 40 weeks) were 31.3%. Hypertensive disorders of pregnancy were noted in 22.7% of cases. 19.7% of cases had anemia.

Table 2: Maternal risk factors associated with oligohydramnios

Maternal risk factors	Frequency	Percentage (n=300)
Anemia	59	19.7
Hypertensive disorders of pregnancy	68	22.7
Postdate pregnancy	94	31.3

[Table 3] shows maternal outcomes in the study subjects. Induction of labor was required in 45% of pregnancies. The majority of women underwent cesarean section (57.7%), while only 42.3% delivered vaginally. Most common complication of labor was preterm labor (25.3% of cases). Meconium staining of liquor was seen in 48% of cases.

Table 3: Maternal outcome in Oligohydramnios

Maternal outcome	Frequency	Percentage (n=300)
Onset of labor		
Spontaneous	165	55
Induced	135	45
Mode of delivery		
Vaginal delivery	127	42.3
Cesarean section	173	57.7
Complications during delivery		
Preterm labor	76	25.3
Abruption	3	1.3
Atonic PPH	14	2.6
Retained placenta	4	1.2

Table 4: Perinatal outcome in Oligohydramnios

Perinatal outcome	Frequency	Percentage
Birth weight <2.5 kg	161	53.7
Intrauterine growth retardation	44	14.7
5' APGAR <7	169	56.3
Meconium stained liquor	144	48
Respiratory distress	92	30.7
NICU admission	182	60.7
Intrauterine demise	19	6.3
Early neonatal death	28	9.3

Table 5: Congenital anomalies in Oligohydramnios

Congenital anomalies	Frequency
Cleft lip	1
CTEV	1
Skeletal hypoplasia	1
Pelvi-ureteric junction obstruction	1
Renal agenesis	1
Multicystic dysplastic kidney disease	1
Hydronephrosis	2
Gastroschisis	1
Hirschsprung's disease	1
Microcephaly	1
Single umbilical artery	1
Hydrocephalus	1
Total	13 (4.3%)

Fetal distress was the most common indication for cesarean section, accounting for 54.9% of cases. Other indications were severe oligohydramnios (17.3%), failed induction of labor (9.2%), cephalopelvic disproportion (7.5%), non-progression of labor (5.8%), and intrauterine growth retardation (5.2%).

Perinatal outcomes observed are shown in Table 4. NICU admission was required in 60.7% of newborns.

The most common indication for NICU admission was respiratory distress, which accounted for 30.7% of births. 5' APGAR score was less than 7 in 56.3% of cases. Low birth weight was seen in 39.3% of cases, very low birth weight in 10.7%, and extremely low birth weight in 3.7%. Intrauterine growth retardation was observed in 14.7% of cases. Early neonatal death was noted in 9.3% of newborns, while 6.3% suffered intrauterine demise. [Table 4]

Congenital anomalies were seen in 4.3% of cases, as noted in [Table 5]. The most common anomalies were those involving the Genito-urinary system, including pelvi-ureteric junction obstruction, renal agenesis, and multicystic dysplastic kidney disease.

DISCUSSION

In the present study, most study subjects were in the age group of 21-25 years, comparable to the studies conducted by Sharma S et al,^[12] and Gupta N et al.^[13] In the present study, 22.7% of oligohydramnios cases were found to be associated with hypertensive disorders of pregnancy. In a survey by Bansal L et al,^[14] 22.2% cases of oligohydramnios were reported to have hypertensive disorders. Postdate pregnancy was seen in 31.3% of study subjects. In comparison, 15.3% cases of oligohydramnios were postdated, according to Sharma S et al.^[12] Ahmer R et al,^[15] observed 20% postdate pregnancies among oligohydramnios cases.

This study found that most study subjects with oligohydramnios delivered at term, which was supported by the findings of Punithavathi J.^[16] Induction of labor was done in 45% of cases, consistent with observations made by Sharma S et al (44%).^[12]

Our study found that 57.7% of women with oligohydramnios had to undergo Cesarean delivery. Similar observations were reported by Gupta N et al,^[13] according to which 52% cases underwent cesarean section. In a study by Guin G et al, 42.8% of oligohydramnios cases were delivered by LSCS.^[17] Our study was carried out at the same institution as Guin et al. The cesarean section rate in cases of oligohydramnios increased from 42% in 2008 to 57.7% in 2022. This can be attributed to the increased use of techniques like Colour Doppler and cardiotocography for antenatal fetal assessment. The indication for a significant portion of cesarean sections (54.9%) was fetal distress. In a study by Bansal L et al, fetal distress was seen in 86.4% of cases.^[14]

The most frequent complication of labor was preterm labor, which was seen in 25.3% of pregnancies. In comparison, Punithavathi J et al demonstrated 30% of cases of preterm deliveries in oligohydramnios.^[17] Meconium-stained liquor was noted in 48% of the women in our study. Meconium-stained liquor was noted in 56.67% of oligohydramnios cases as per Punithavathi J et al.^[17] In the present study, oligohydramnios was associated with LBW, VLBW, and ELBW in 39.3%, 10.7%, and 3.7% cases, respectively. In comparison, 45% were LBW, and 4% were VLBW, according to Ghimire et al.¹⁸ Similar conclusions were reported by Sarmishta M et al, who observed that 50.9% of cases were LBW.^[19] Growth restriction was seen in 14.67% of the women. Gupta N et al observed 26% IUGR babies in oligohydramnios.^[13]

In the present study, the APGAR score at 5 minutes was less than 7 in 56.3% of cases, similar to Punithavathi J (56%).^[16] Oligohydramnios was found to be associated with an increased rate of NICU admissions (60.6%), which was comparable with Punithavathi J et al (53.3%),^[16] and Sarmishta M et al (48.1%).^[19] The most common neonatal complication was respiratory distress (30.6%). Gupta N et al,^[13] observed respiratory distress in 40% of cases.

In our study, congenital anomalies were seen in 13 cases (4.3%), consistent with Gupta N et al (3% anomalies).^[13] Out of these, 5 cases had anomalies involving the Genito-urinary system. This was consistent with the study by Tajinder K et al,^[20] which reported renal anomalies as the most common congenital anomalies in oligohydramnios. Guin G et al,^[17] reported 8.5% of cases of anomalies, while Gupta N et al,^[13] reported 3% anomalies in oligohydramnios cases.

In our study, early neonatal deaths observed in oligohydramnios were 9.3%, while Ahmer R et al reported 7.7% early neonatal deaths.^[15]

CONCLUSION

This study concludes that oligohydramnios is associated with poor maternal and fetal outcomes, manifesting as an increased risk of intrapartum complications, operative interventions, and high perinatal morbidity and mortality. In cases with clinically suspected diminished amniotic fluid, ultrasonography is an important tool for timely identification, diligent monitoring, and careful management of oligohydramnios. Early diagnosis and timely intervention play an important role in the prevention of maternal morbidity as well as improvement of fetal prognosis.

Recommendations

Efforts should be made at all levels to improve antenatal care services. All women should have at least eight antenatal visits, as recommended by WHO. The government should take the necessary steps to ensure that ultrasound and target scan facilities are readily available to women living in remote areas. Early identification and regular follow-up of high-risk pregnancies should be stressed. All women with abnormal liquor volume should be referred to tertiary care centres, where emergency cesarean section and neonatal intensive care facilities are available at the earliest to optimize neonatal outcomes.

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