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Original Research Article

Study of effect of oligohydramnios on maternal and perinatal outcomes in tertiary care center-hospital based cross-sectional study

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ABSTRACT

Background: Oligohydramnios is described as a condition with decreased amniotic fluid volume relative to gestational age. The amniotic fluid (AF) is a part of the fetal life support system. Oligohydramnios was defined as amniotic fluid index (AFI) ≤5 (or less than the 5th percentile) or single vertical pocket less than 1 cm. With the help of method of amniotic fluid volume estimation by Phelan AFI method, using four quadrant techniques during transabdominal USG, helps in detecting oligohydramnios and foetuses at high risk.
Methods: 45 pregnant women presented with oligohydramnios to our hospital, a tertiary care centre at Bagalkot, from April 2023 to October 2023. Maternal and perinatal characteristics were retrieved from case papers.
Results: Of 45 cases of oligohydramnios, more than 50% underwent caesarean section, due to various causes. 44 cases had live born and 1 was still born due to prematurity. 15 cases (33%) were preterm at the time of presentation, whereas 21 cases (67%) were term at presentation. Of 45 cases, 21 cases required NICU admission, among them 10 were due to prematurity and IUGR component.
Conclusions: With this study we can conclude that oligohydramnios predisposes to raising caesarean rates, preterm delivery and NICU admission. Further research on large scale with larger sample and multicentric approach, follow up is required to predict the perinatal outcome in future.

Keywords: Oligohydramnios, Mode of delivery, Neonatal outcome

INTRODUCTION

Oligohydramnios is a condition characterized by low amniotic fluid levels relative to gestational age. Approximately 3-8% of pregnancies experience low amniotic fluid at some point, usually during the third trimester.[1] Amniotic fluid plays a crucial role in fetal development, serving as a vital component of the baby's life support system.[2] The fluid is initially produced by the mother's circulation but is later replaced by fetal urine around the 20th week of gestation. Oligohydramnios is diagnosed when the amniotic fluid index (AFI) is ≤5 or when no pocket measures at least 2 × 1 cm.[3] With the help of method of amniotic fluid estimation by AFI using four quadrant techniques during transabdominal USG, as per described by Phelan et al in 1997, better identification of fetus at high risk can be done.[3]

This condition affects 1-5% of pregnancies and can occur at any stage but is most common during the last trimester.[4] Accurate diagnosis is possible through ultrasonographic examination. Low amniotic fluid levels can lead to various complications, including fetal growth restriction, low birth weight, and increased risk of stillbirth.

Causes of oligohydramnios include placental hypoperfusion, intrauterine growth restriction, and decreased fetal urine output. Early detection and management are essential to reduce perinatal morbidity and mortality. Associated risk factors include congenital

fetal abnormalities, premature rupture of membranes, and maternal illnesses like hypertension and preeclampsia.

Oligohydramnios can occur at any stage of pregnancy, but it's most prevalent during the third trimester. A significant decrease in amniotic fluid levels is observed after 42 weeks of gestation. Research suggests that approximately 12% of pregnancies that extend beyond 41 weeks may develop oligohydramnios.[5]

The severity of oligohydramnios is often linked to the degree of placental hypoperfusion and intrauterine growth restriction (IUGR). In cases of IUGR, decreased fetal urine production is a common cause of oligohydramnios.[6] This reduction in amniotic fluid can have adverse effects on both maternal and fetal health, highlighting the importance of monitoring amniotic fluid levels during pregnancy.

A decrease in amniotic fluid, particularly during the third trimester, poses significant risks to the fetus. This can lead to complications such as umbilical cord compression, musculoskeletal abnormalities like facial distortion and clubfoot, and restricted fetal growth. Additionally, low amniotic fluid levels can result in low birth weight, fetal distress during labor, and meconium aspiration syndrome. In severe cases, it may even lead to severe birth asphyxia, low APGAR scores, and admission to the neonatal intensive care unit (NICU). Furthermore, congenital abnormalities and stillbirths are also potential risks associated with insufficient amniotic fluid.[7] Therefore, monitoring amniotic fluid levels is crucial to minimize these risks and ensure a healthy pregnancy outcome.

The sequel from long standing oligohydramnios includes pulmonary hypoplasia, potter's syndrome, club foot and hand and hip dislocation. Early detection of oligohydramnios and its management may help in reduction of perinatal morbidity and mortality on one side and decreased caesarean deliveries on the other side.

The findings of oligohydramnios can be associated with congenital fetal abnormalities, premature rupture of membranes, uteroplacental insufficiency, growth retardation, post datism, chronic abruptio placentae, maternal illness i.e. hypertension, preeclampsia, abnormalities of twinning, history of drug intake etc. Preeclampsia, intrauterine growth restriction (IUGR) and post-dated pregnancies are the commonest causes.[1]

This study aimed to investigate the impact of oligohydramnios on maternal and perinatal outcomes, including mode of delivery, operative interference, induced labor, and neonatal outcomes.

Aim and objectives of the study

To study the effect of oligohydramnios on maternal and perinatal outcomes based on- 1) mode of delivery, 2) neonatal outcome.

METHODS

It was a retrospective case series study from April 2023 to October 2023 in HSK Hospital labour room, Bagalkot.

Maternal characteristics studied were age, gravida, parity, abortions, period of gestation at presentation, co-existing severe preeclampsia, postdated pregnancy, ruptured membranes, mode of delivery, indication for cesarean section, complications like NICU admission of the baby, hematological parameters at admission, NST at the time of admission, ultrasonography with doppler parameters. Perinatal outcome was assessed using following characteristics-prematurity, live born versus stillborn, birth weight, Apgar score, NICU admissions, postnatal morbidity, and mortality.

All singleton pregnancies after 20 weeks of gestation with live fetus with amniotic fluid index equal to or less than 5, no gross fetal anomalies were included in the study. Twins, multiple gestation and intrauterine fetal demise was the exclusion criteria for the study.

RESULTS

In this study maximum number of patients were in the age group of 20-30 years which accounted for 73% of the patients (Figure 1).

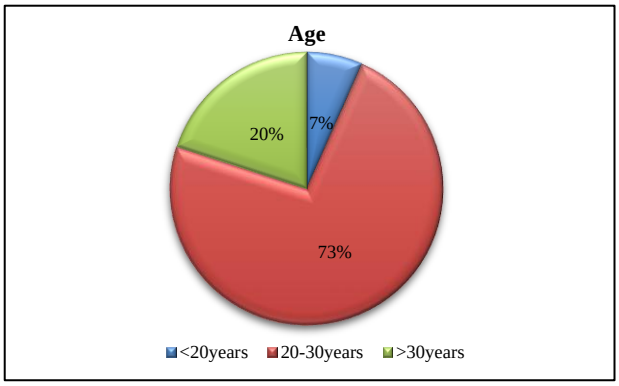

Figure 1: Age distribution of patients.

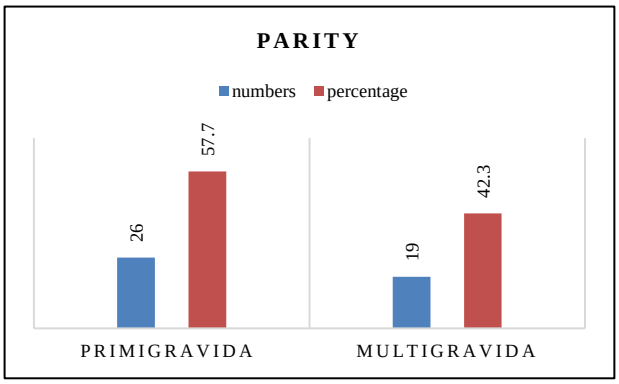

Figure 2: Distribution of parity.

In our study 45 pregnant women with oligohydramnios 57.7% were primigravida and 42.3% were multigravida (Figure 2). 18% patients presented at less than 28weeks of gestation, 49% pregnant women presented at 37-40 weeks of gestation while 33% pregnant women presented with at less than 36 weeks of gestation (Figure 3).

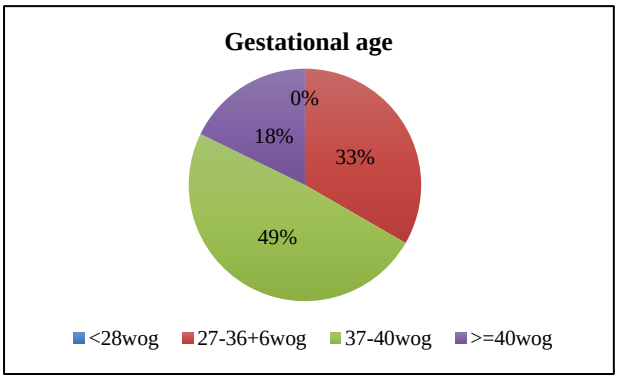

Figure 3: Distribution of gestational age.

Table 1: Mode of delivery.

Mode of delivery	Numbers	Percentage
Vaginal	17	37.8
Induced	9	20.0
Spontaneous	8	17.9
LSCS	28	62.3

Majority (62%) underwent cesarean section in spite of inducing labor. 17 patients underwent vaginal delivery, out of which 8 patients went into spontaneous labour and 9 patients were induced. Out of 9 patients who were induced, 2 other patients in whom labour was induced delivered by c section due to non-progression (Table 1).

Table 2: Maternal comorbidities.

Maternal comorbidities	Numbers	Percentage
Severe pre-eclampsia	4	8.9
Postdated	8	17.8
Hypothyroidism	2	4.4
Others	31	68.9

In the present study 4(8.9%) patients were severe pre-eclampsia, 8 patients were postdated accounting for 17.8% of patients, 2 (4.4%) patients were having hypothyroidism and others being 68.9% isolated oligohydramnios-idiopathic (Table 2).

In terms of neonatal outcome, 3 babies weighed less than 1.5 kg, of which 1 baby required NICU admission, 1 baby was still born due to prematurity- gestational age being 30 weeks of gestation. Total of 16 babies in the range of 1.5 to 2.5 kg out of which 10 babies required NICU admission. 25 babies in the range of 2.5-3.5 kg 8 babies required NICU admission. 1 baby being more than 3.5 kg required NICU admission. Out of 44 babies 21 required NICU admission irrespective of birth weight or gestational age (Table 3).

Oligohydramnios was associated with intrauterine growth retardation in 10 (22.2%) babies (Table 4).

Table 3: Relationship between birth weight and NICU admission.

Birth weight (kg)	NICU admission	No NICU admission	Total	Chi-square	P value
<1.5	2 (1 still born)	1	3	4.9	0.17 (not significant)
1.5- 2.5	10	6	16		
2.5-3.5	8	17	25		
>3.5	1	0	1		

Table 4: Neonatal outcome, NICU admission, birth weight, IUGR.

Neonatal outcome	Numbers	Percentage
Term	29	64.4
Preterm	16	35.4
NICU admission*		
Yes	21	46.6
No	23	51.1
Fetal growth		
AGA	35	77.8
SGA	10	22.2

*One baby is still born

Table 5: Relationship between mode of delivery (MOD) and neonatal outcome.

MOD	NICU admission	%	chi-square	P value
Vaginal (18)	8	47.05	0.18	0.96 not significant
LSCS (28)	13	46.4		

Among all babies 8 babies (47%) delivered vaginally had NICU admission and 13 babies (46%) delivered by cesarean section had NICU admission. Percentage of NICU admission was almost same in cesarean section or vaginal delivery. The incidence of neonatal outcome did not vary with respect to mode of delivery (Table 5).

DISCUSSION

Cases of oligohydramnios should be evaluated by fetal medicine consultant for fetal causes, placental causes and managed by an experienced obstetrician if there are maternal causes. Isolated oligohydramnios is on rising trend.

In our study 57.7% were primigravida and 42.3% were multigravida. A study conducted by Ghosh et al, study participants being 55 in number 35.5% were primigravida and 65.5% were multigravida which was contrast to our study.[8]

In our study maximum number of patients were in the age group of 20-30 years which accounted for 73% of the patients. In a similar study conducted by Sreelakshmi et al, participants belong to age group of 20-30 years were 70%.[9] Other studies showing similar results were a study conducted by Ghosh et al, Biradar et al, percentage of participants belonging to age group 20-30 were 87%, 65% respectively.[8-3]

In our study 49% pregnant women presented at 37-40 weeks of gestation while 33% pregnant women presented with at less than 36 weeks of gestation. A study conducted by Ghosh et al, 12.7% less than 34 weeks of gestation, 72.7% belong to 34-37 weeks of gestation and 14.6% belong to 37-40 weeks of gestation.[8]

In the present study 4(8.9%) patients were severe pre-eclampsia, 8 patients were postdated accounting for 17.8% of patients, 2 (4.4%) patients were having hypothyroidism and others being 68.9% isolated oligohydramnios-idiopathic, oligohydramnios was associated with intrauterine growth retardation in 10 (22.2%) babies. A study conducted by Sreelakshmi et al, isolated oligohydramnios seen in 15%, pre-eclampsia in 16%, hypothyroidism in 11%, intrauterine growth retardation in 17% others being 28% respectively.[9]

In our study out of 46 study participants 18 patients underwent vaginal delivery and 28 patients underwent caesarean section. in a study conducted by Hangarga et al, a total of 140 participants of which 95 patients underwent caesarean section and 45 patients underwent vaginal delivery.[10]

In our study out of 9 patients who were induced, 2 patients in whom labour was induced delivered by caesarean section due to non-progression. A prospective study of oligohydramnios by Ahmar et al, in 2018 has concluded that incidence of idiopathic oligohydramnios was 44% and significantly increased caesarean section due to non-reassuring fetal heart rate patterns.[2]

In our study a total of 28 (62.3%) underwent caesarean section, 21 (46.6%) babies required NICU admission. In a study conducted by Biradar et al the incidence of caesarean section 36% NICU 23% irrespective of mode of delivery.[3]

In our study one baby was still born due to prematurity-gestational age being 30 weeks of gestation, there were no cases of neonatal death in a study conducted by Sriya et al.[11]

The limitations of this study are that it was a retrospective study and included a small number of participants from a single hospital. Further research on large scale with larger sample and follow up is required to predict the perinatal outcome in future. The findings hence cannot be generalized to the broader population.

CONCLUSION

Oligohydramnios during pregnancy has always posed the expectant mother and the treating obstetrician with a challenge for a safe and successful outcome. It requires intensive fetal surveillance, timely intervention with unconditional antepartum and intrapartum care. Serial amniotic fluid index and single vertical pocket assessment by a trained sonologist with watchful changes for BPP and doppler studies helps in having the best possible outcome. Planned induction of labour with strict intrapartum monitoring helps in achieving safe vaginal deliveries. Prophylactic caesarean sections are on raising trend due to maternal anxiety, obstetrician experience, NICU availability and other confounding factors. The best possible mode of delivery should be individualized depending on the maternal and fetal factors for a better outcome. This goes to highlight that even though oligohydramnios is diagnosed, vaginal delivery could still be an option with meticulous intrapartum monitoring.

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