International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 12, December 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.12.2024.145

ORIGINAL RESEARCH

Analysis of effects of oligohydramnios on perinatal outcome in the form of NICU admission, APGAR scores, congenital malformation

Dr. Shikha Sonker

Assistant Professor, Department of Obstetrics & Gynecology, People's College of Medical Sciences and Research Centre, Bhopal, MP, India

Corresponding author
Dr. Shikha Sonker
Assistant Professor, Department of Obstetrics & Gynecology, People's College of Medical Sciences and Research Centre, Bhopal, MP, India

Received Date: 26 October, 2024 Accepted Date: 30 November, 2024

ABSTRACT

Background: Oligohydramnios is a condition characterized by a decreased amount of amniotic fluid, which can lead to adverse fetal outcomes. **Objectives:** To investigate the effects of oligohydramnios on perinatal outcome in terms of NICU admission, APGAR scores, and congenital malformations. **Materials and Method:** A hospital-based study was conducted among 100 clinically diagnosed cases of oligohydramnios in the third trimester (≥ 28 weeks of gestation) at the Department of Obstetrics & Gynecology, Sri Aurobindo Medical College and Postgraduate Institute, Indore.In patients with AFI <8cm, meticulous fetal scanning was performed to detect congenital anomalies. Patients were closely monitored during labor and post-delivery for fetal heart rate, meconium staining, APGAR scores, and perinatal outcomes. **Results:** The mean birth weight was 2347.2 ± 517.96 gm, and 61% of babies had low birth weight (≤2500 gm). Twenty percent of babies had low APGAR scores (<7 at 5 min), and 51% required NICU admission. Congenital anomalies were seen in 7% of cases. **Conclusion:** Oligohydramnios is associated with adverse perinatal outcomes, including low birth weight, low APGAR scores, and increased NICU admission. Proper antenatal care and close monitoring of women with oligohydramnios are essential to improve perinatal outcomes.

Keywords: Oligohydramnios, perinatal outcome, NICU admission, APGAR scores, congenital malformations.

INTRODUCTION

Oligohydramnios is an abnormally decreased amount of amniotic fluid. Oligohydramnios complicates approximately 1 to 2 percent of pregnancies.Fetuses in women with oligohydramnios at an increased risk for growth abnormalities and disturbances in the ecology of the fragile environment of the fetus.In normal condition, amniotic fluid volume increases until about 36 weeks of pregnancy and its volume decreases thereafter. Amniotic fluid assessment by ultrasound is one of the important tools in assessing the fetal health in all risk categories especially beyond the period of viability.[1]

Oligohydramnios may be associated with premature rupture of membranes, congenital fetal anomalies, abnormalities of twinning, or uteroplacental insufficiency which is associated with growth retardation, postdatism, chronic abruption placentae, significant maternal illness i.e. hypertension, preeclampsia, idiopathic,with the history of drug intake. Thus, oligohydramnios is known to be associated with high incidence of perinatal and maternal morbidity and mortality.[2]

The amniotic fluid provides the adequate cushion for umbilical cord during the labor which avoids the compression of the cord between the fetus and the uterine wall during contractions or fetal movement. This cord compression causes severe FHR decelerations which are associated with low APGAR scores and acidosis at birth, meconium staining, and cesarean section and/or assisted vaginal delivery for fetal distress.[3]Once diagnosed oligohydramnios with or without associated conditions should lead to intensive fetal biophysical surveillance, including frequent ultrasound evaluation.[3] The role of amnioinfusion as an adjunct to continuous fetal monitoring in labor to improve neonatal outcome appears beneficial in selected series. The role of

DOI: 10.69605/ijlbpr_13.12.2024.145

repetitive amnioinfusion in the preterm patient remote from term may offer marginal clinical benefit to the neonatal outcome and is considered experimental at this time.[4]

Oligohydramnios is associated with higher rates of pregnancy complications and increased fetal morbidity and mortality. Since these disorders of liquor amnii have a significant impact on pregnancy and fetus, we did this study to find out fetal outcome in cases of oligohydramnios.

MATERIALS AND METHOD

The study was conducted at the Department of Obstetrics & Gynecology, Sri Aurobindo Medical College and Postgraduate Institute, Indore, between October 2015 and March 2017. The study included 100 clinically diagnosed cases of oligohydramnios in the third trimester (≥ 28 weeks of gestation). Institutional ethics committee approval and informed consent from participants were obtained prior to the study.

The study's inclusion criteria consisted of singleton pregnancy, a gestational age of at least 28 weeks, the presence of a live fetus, and an Amniotic Fluid Index (AFI) of 8cm or less. Conversely, women with multifetal gestation or those who had experienced intrauterine death (IUD) were excluded from the study.

A comprehensive medical history was obtained from each participant, including their booking status (booked or emergency case). Furthermore, detailed information was collected on their presenting complaints, menstrual history (including last menstrual period, expected date of delivery, and previous menstrual cycle), obstetric history (including gravidity and parity), and past medical history (including hypertension, pre-eclampsia, eclampsia, and congenital malformations). A thorough physical examination was conducted, comprising general examination, systemic examination and obstetric examination.

Routine laboratory investigations were also carried out. Ultrasonographic examination was performed to determine the number of fetuses, presentation, gestational age (BPD, HC, AC, FL), placental localization, amniotic fluid volume (amniotic fluid index), and congenital anomalies (head, spine, abdomen, limbs).

Patients with AFI more than 8 cm excluded from the study. In patients with AFI less than 8 cm, a meticulous scanning of each system of the fetus were done for congenital anomalies as the fetal examination in cases of oligohydramnios were considerably more difficult as compared to that of normal AFV. The patients were monitored carefully during labor for fetal heart rate (CTG), meconium staining, and mode of delivery. APGAR score at 1 min and 5 min, weight, age, maturity, congenital anomalies and perinatal mortalityif the present were noted and neonate was followed till seventh postnatal day.

The initial data was captured in the customized proforma and then transferred to Microsoft excel 2007 for tabulation. The data was analyzed using online software for statistical analysis. Pearson chi-square test was applied to find out the association between two non-parametric variables. A p value of < 0.05 was taken as statistically significant.

Table 1: Distribution according to Birth weight

(N=100)

Birth Weight	Number	Percentage
2000 gm	24	24.0
2001-2500 gm	37	37.0
2501-3000 gm	33	33.0
>3000 gm	6	6.0
Total	100	100.0
Mean ± SD (Birth weight)	2347.2 ± 517.96 gm	

The mean birth weight in the present study was 2347.2 ± 517.96 gm. The percentage of low birth date weight (≤2500 gm) babies was 61%.

Table 2: Distribution according to APGAR at 5 min

APGAR at 5 min	Number	Percentage
<7	20	20%
≥7	80	80%
Total	100	100%

Out of 100 born alive babies, 20% babies had low APGAR score (less than 7 at 5 min) as shown in the table 2. The rest 80 babies had APGAR score ≥ 7 at 5 min.

Table 3: Distribution according to NICU admission

NICU admission	Number	Percentage
No	49	49.0
Yes	51	51.0

DOI: 10.69605/ijlbpr_13.12.2024.145

Total	100	100.0

51% (51 Infants) required NICU admission while remaining 49% infant had uneventful early neonatal period (table 3).

Table 4: Congenital Anomalies Associated With Oligohydramnios

Number of Cases of Oligohydramnios	No.of Congenital anomalies detected	Percentage
100	7	7.0%

In our study, there were 7 (7%) congenital anomalies seen (table 4).

Table 5: Congenital anomaly in relation to AFI
(N=100)

Congenital anomaly	AFI≤ 5 cm		AFI> 5-8 cm	
	No.	%	No.	%
NAD	45	88.2	48	98.0
Bilateral polycystic kidney	2	4.0	0	0.0
Dilated atrium	1	2.0	0	0.0
Hydrocephalus	1	2.0	0	0.0
PUV	1	2.0	0	0.0
Renal agenesis	1	2.0	0	0.0
Microcephaly	0	0.0	1	2.0

The table 5 shows the distribution of congenital anomalies in relation to AFI.In the AFI≤ 5 cm, 2 (4.0%) had bilateral polycystic kidney, 1 (2.0%) each had dilated atrium, hydrocephalus, PUV and renal agenesis.In the AFI> 5-8 cm, 1 (2.0%) had microcephaly. Overall, 6 congenital anomalies were seen in AFI≤ 5 cm in comparison to AFI>5-8 cm.

Table 6: Congenital anomaly in relation to AFI status

Congenital anomaly	AFI≤ 5 cm	AFI> 5-8 cm	Total
NAD	45 48.4%	48 51.6%	93 100.0%
Bilateral polycystic kidney	2 100.0%	0 0.0%	2 100.0%
Dilated atrium	1 100.0%	0 0.0%	1 100.0%
Hydrocephalus	1 100.0%	0 0.0%	1 100.0%
Microcephaly	0 0.0%	1 100.0%	1 100.0%
PUV	0 0.0%	1 100.0%	1 100.0%
Renal agenesis	1 100.0%	0 0.0%	1 100.0%
Total	50 100.0%	50 100.0%	100 100.0%

χ2 value= 7.097, df=6, P value = -0.45

The table 6 shows the distribution of congenital anomalies in relation to AFI status.There was no statistically significant association seen between congenital anomaly and the AFI status (P>0.05), showing that AFI status is not dependent on the congenital anomaly.

Table 7: Association of perinatal outcome in relation to maturity

Perinatal Outcome	Preterm	Term	Total
Alive	31 91.2%	66 100.0%	97 97.0%
Died	3 8.8%	0 0.0%	3 3.0%
Total	34 100.0%	66 100.0%	100 100.0%

χ2=6.004, df=1, P value = 0.014, Significant

The table 7 shows the association between perinatal outcome and maturity.

DOI: 10.69605/ijlbpr_13.12.2024.145

In the preterm, 31 (91.2%) were alive, while 3 (8.8%) died.In the term, all 66 (100.0%) were alive.There was statistically significant association seen between perinatal outcome and maturity (P<0.05), showing that perinatal outcome is dependent on the maturity of the baby.

DISCUSSION

The present study investigated fetal outcomes in cases of oligohydramnios and found high incidence of low birth weight (61%), low APGAR scores (20%), and NICU admissions (51%), with 7% congenital anomalies and 10% perinatal mortality. The mean birth weight in the study group was 2347.2 ± 517.96 gm which is similar to the study conducted by Ott **et al (2005)[68]&Chetani et al(2017)[85],** with the mean birth weight of 2.4 kg & 2.65±0.43 respectively.

The incidence of low birth weight babies (Weight <2500 gm) was as high as 61 % in our study.Similar aftermath were seen in various studies conducted by **Sharma et al(2016)[5],Chaudhari et al(2017)[5],Sudha et al(2017)[7], Bawa et al (2017)[8]**all had birth weight <2.5kg in73%,65.3%,64% and 55.9% cases respectively.

In extremes of ages there was the prevalence of low birth weight in our study, depicting mean birth weight at≤20 years 2.28 ± 0.37, and in >25 years 2.39 ± 0.59 and baby weight was normal at21-25 years 2.82 ± 3.49.

In our study, mean birth weight in multigravida is 2.26 ± 0.69 with higher NICU admission rate as compared to primigravida in which it is 2.76 ± 3.19.In the present study, 20% neonates had low APGAR score (less than 7 at 5 min).The rest of 80 neonates had APGAR score of ≥7.

Comparison of Apgar score <7 at 5min in cases of oligohydramnios with various studies:

Authors	APGAR score <7 at 5min
Vidyasagar et al (2015)[9]	19.51%
Sharma et al(2016)[10]	55%
Gaikwad et al(2016)[11]	7%
Chetani et al(2017)[12]	14%
Sudha et al(2017)[7]	10%
Chaudhari et al(2017)[13]	3.8%
Present study	20

The above studies were partial in agreement with our study.

Booked patients are shown to have high APGAR score and better perinatal outcome as compared to unbooked patients of oligohydramnios. Although the difference is not statistically significant (P value = 0.678).

Preterm babies have low Apgar as compared to term babies in our study and the difference was statistically significant (P value = 0.000). As, preterm babies have a high preponderance to infection, RDS, HIE and many other consequences.

NICU admission was needed in 51% cases in the early neonatal period. While other studies showed a variable rate of admission to NICU tabulated below.

Comparison of NICU admission in cases of oligohydramnios with various studies

Authors	NICU admission
Ghike et al (2013)[14]	43.24%
Vidyasagar et al (2015)[9]	36.59%
Gaikwad et al(2016)[11]	3.9%
Chetani et al(2017)[12]	38%
Sudha et al(2017)[7]	34%
Chaudhari et al(2017)[6]	38%
Present study	51%

Thus, above comparison revealed that rate of admission to NICU was partially in agreement to present study.

There was a significant association seen between booking status and NICU admissions (P value = 0.030), showing higher NICU admissions in an emergency in comparison to booked cases. Hence, our study showed a positive correlation between lack of proper antenatal care and adverse perinatal outcome with poorer outcomes in unbooked than booked patients. Improving the availability and accessibility of quality antenatal and delivery care services in our environment will improve perinatal outcome.

There was also a significant association seen between NICU admission and maturity (P value = 0.017), showing that NICU admission is dependent on the maturity of the baby. As gestational age is a well-known factor for good fetal outcome.

The incidence of congenital anomalies is 7% i.e.7 cases out of 100 total cases. Out of these, congenital anomalies of the urinary tract system were most

DOI: 10.69605/ijlbpr_13.12.2024.145

common (4). Others were dilated atrium (1), hydrocephalus (1), Microcephaly(1).

In agreement with, the study done by the **Casey et al (2000)**[15] in which it was 10%. The study by **Guin et al (2011)**[16] had 8.5% of the congenital anomalies and **Yashodhara et al (2017),**[17] in which 3(4.05%) cases had a congenitalanomaly, quite comparable to our study.

5(71%) cases of the congenital anomaly were seen in AFI ≤5. And 2(29%) cases had AFI>5-8. Although statistically there was no association but after having congenital malformation, there is an increase in the incidence of severe oligohydramnios.

In our study, the perinatal mortality was seen in 10(10%) cases. And 90% were alive, amongst which, 3 (3.0%) had RDS and 3 (3.0%) had MAS, rest 84% were healthy.

Comparison of perinatal mortality with various studies:

Authors	Perinatal Mortality
Jagatia et al(2013)[18]	2%
Moses et al(2016)[19]	13.33%
Sharma et al(2016)[20]	7%
Chetani et al(2017)[12]	10%
Chaudhari et al(2017)[13]	2.4%
Present study	10%

Thus, above table shows various studies partially in agreement with our study. Highest mortality is seen in the study by **Moses et al(2016).**[19]

Septicemia was most common cause of the early neonatal death. IUGR and PIH were the most common condition leading to perinatal mortality, in our study.

There was a significant association seen between perinatal outcome and gestational age (P value = 0.014), showing that perinatal outcome is dependent on the gestational age of the baby.

CONCLUSION

In conclusion, the present study a high incidence of low birth weight babies (61%) and low APGAR scores (20%). NICU admission was required in 51% of cases, with a significant association between booking status and NICU admissions. The incidence of congenital anomalies was 7%, with no significant association between congenital anomaly and AFI status. Perinatal mortality was 10%, with septicemia being the most common cause of early neonatal death. IUGR and PIH were the most common conditions leading to perinatal mortality. The study highlights the importance of proper antenatal care and the need for close monitoring of women with oligohydramnios to improve perinatal outcomes.

REFERENCES

1. Cunnigham FG, Gant NF, Leveno KJ, Gilstrap LC, Hauth JC WK. Chaper 11: Placenta and fetal membranes. In: Text book of Williams obstetrics. 24th Editi. New Delhi: McGraw-Hill Company; 2014. p. 98–100.
2. ShripadHebbar, LavanyaRai, PrashantAdiga, and ShyamalaGuruvare. Reference Ranges of Amniotic Fluid Index in Late Third Trimester of Pregnancy: What Should the Optimal Interval between Two Ultrasound Examinations Be?. Journal of Pregnancy,Volume 2015 (2015), Article ID 319204, 7 pages
3. McCurdy CM Jr, Seeds JW. Oligohydramnios: problems and treatment. SeminPerinatol. 1993 Jun;17(3):183-96.
4. Levine R. B. Goldstein P. W. Callen N. Damato S. Kilpatrick. The Effect of Oligohydramnios on Detection of Fetal Anomalies with sonography. AJR:168, June 1997
5. Manisha Sharma, D K Bhagwani, Mala Chaurasia, P K Jain., Maternal and Perinatal Outcome in Pregnancies with Oligohydramnios in Third Trimester, Indian Journal of Neonatal Medicine and Research. 2016 July, Vol-4(3)
6. Chaudhari KR et al. Int**Perinatal outcome associated with oligohydramnios in third trimester.** J ReprodContraceptObstet Gynecol. 2017 Jan;6(1):72-75
7. Sudha.H.C, Sunanda, K. M. Pregnancy Outcome after Diagnosis of Oligohydramnios.International Journal of Science and Research. Volume 6 Issue 5, May 2017
8. Bawa R, Neerja. The predictive value of amniotic fluid index for adverse perinatal outcome and suggested plan of action.Int J ReprodContraceptObstetGynecol 2017;6:2952-4.
9. Vidyasagar V, Chutani N. Fetomaternal outcome in cases of oligohydramnios after 28 weeks of pregnancy. Int J Reprod Contraception, Obstet Gynecol. 2015;4(1):1.
10. Manisha Sharma, D K Bhagwani, Mala Chaurasia, P K Jain., Maternal and Perinatal Outcome in Pregnancies with Oligohydramnios in Third Trimester, Indian Journal of Neonatal Medicine and Research. 2016 July, Vol-4(3)
11. Gaikwad PR et al.Perinatal outcome in oligohydramnios and borderline amniotic fluid index: a comparative study.Int J ReprodContraceptObstet Gynecol. 2016 Jun;5(6):1964-1968
12. Monica Chetani, Deepika, SantoshKhajotia, Swati Kochar. A Clinical study of amniotic fluid index at or beyond 28 weeks of gestation and its relation to perinatal outcome..Int J ReprodContraceptObstet Gynecol. 2017 Aug.
13. Chaudhari KR et al. Int**Perinatal outcome associated with oligohydramnios in third trimester.** J ReprodContraceptObstet Gynecol. 2017 Jan;6(1):72-75

DOI: 10.69605/ijlbpr_13.12.2024.145

14. Ghike S, Reddy G, Ghike N. Increasing Severity of Oligohydramnios : A Risk Factor For Outcome. J South Asian Fed Obstet Gynaecol. 2013;5(1):8–10.
15. Casey BM, McIntire DD, Bloom SL, Lucas MJ, Santos R, Twickler DM, et al. Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks' gestation. Am J Obstet Gynecol. 2000 Apr 17;182(4):909–12.
16. Guin G, Punekar S, Lele A, Khare S. A prospective clinical study of feto-maternal outcome in pregnancies with abnormal liquor volume. J Obstet Gynecol India. 2011;61(6):652–5.
17. Yashodhara Gaur, HemlataParashar, DeepikaDhurve.Maternal and fetal factors in pregnancy with oligohydramnios and maternal and perinatal outcome.International Journal of Medical and Health Research.April 2017,Volume 3; Issue 4; Page No. 13-16
18. Jagatia K, Singh N, Patel S. Maternal and fetal outcome in oligohydramnios- Study of 100 cases. Int J Med Sci Public Heal. 2013;2(3):724–7.
19. Vibha Moses, SaritaThakre. A study of maternal and fetal outcome in third trimester diagnose case of oligohydramnios. Int J ReprodContraceptObstet Gynecol. 2016 Sept.
20. Manisha Sharma, D K Bhagwani, Mala Chaurasia, P K Jain., Maternal and Perinatal Outcome in Pregnancies with Oligohydramnios in Third Trimester, Indian Journal of Neonatal Medicine and Research. 2016 July, Vol-4(3)