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Original Research Article

Study of fetomaternal outcome in oligohydramnios in term pregnancy and its correlation with non-stress test

Priti S. Naykodi*, Aishwarya N. Ghogare

Department of Obstetrics and Gynecology, Rajiv Gandhi Medical College, Kalwa, Thane, Maharashtra, India

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***Correspondence:**
Dr. Priti S. Naykodi,
E-mail: pritinayakodi@gmail.com

ABSTRACT

Background: A reduced volume of amniotic fluid, known as oligohydramnios, complicates about 1-5% of pregnancies and is frequently linked to poor perinatal outcomes**.** A diagnostic criterion for oligohydramnios is an amniotic fluid index (AFI) of ≤5 cm. The AFI is used to quantify the volume of amniotic fluid. The purpose of this study was to examine the perinatal outcomes in term pregnancies with oligohydramnios and compare them to the findings of the non-stress test (NST), a test used to evaluate the health of the fetus.
Methods: A tertiary care hospital held this prospective observational study. One hundred pregnant women with singleton term pregnancies (≥37 weeks gestation) who have been diagnosed with oligohydramnios (AFI≤5 cm) are included in this study. Demographic information, NST results, delivery method, and perinatal outcomes were gathered and analyzed using the proper statistical techniques.
Results: The study population's mean age was 25.12. Women who were multigravida made up 71% of the participants. Fetal distress was the main indication (56%), and the rate of lower segment cesarean section (LSCS) was 43%. A higher rate of LSCS (87%), low birth weight (<2.5 kg) (69.6%), and NICU admission (26%) were all substantially correlated with a non-reactive NST.
Conclusions: Oligohydramnios during term pregnancy is associated with a high incidence of LSCS. A non-reactive NST in the presence of oligohydramnios is a strong predictor of poor perinatal outcomes, such as increased rates of operative delivery, low birth weight, and NICU admission. As a result, careful fetal surveillance, including NST, is critical in managing such pregnancies in order to improve perinatal outcomes.

Keywords: Fetomaternal outcome, Oligohydramnios, Pregnancy

INTRODUCTION

Amniotic fluid is a vital component of the intrauterine environment, playing a crucial role in fetal development and well-being. It provides a protective cushion for the fetus, facilitates musculoskeletal development by allowing free movement, supports lung maturation, and prevents umbilical cord compression.[1] The best estimates of daily amniotic volume flows in the term fetus are Oligohydramnios, defined as a pathologically reduced amount of amniotic fluid, is a significant obstetric complication affecting approximately 1-5% of all pregnancies.[2] Sonographically it is defined as amniotic fluid volume <5 percentile expected for gestational age; the AFI, with a value of ≤5 cm, or the single deepest vertical pocket of liquor (SDP) <2 cm.[3] This condition can arise from various etiologies, including placental insufficiency, fetal congenital anomalies (especially of the renal system), preterm rupture of membranes, certain maternal conditions like preeclampsia and post-term pregnancy, and fetal demise.[4,5] Occasionally oligohydramnios in mid-pregnancy may not have an identifiable etiology, like the absence of any maternal or fetal risk factors, e.g., IUGR, spontaneous rupture of membrane, diabetes, pre-eclampsia, or severe maternal systemic diseases is termed “isolated oligohydramnios”

(IO).[4,5] The term "isolated oligohydramnios" is used to describe oligohydramnios in the absence of maternal or fetal risk factors, e.g., IUGR, spontaneous rupture of membrane, diabetes, pre-eclampsia, or severe maternal systemic diseases.

The pathophysiology of IO is not known, but it reflects chronic or late-onset placental insufficiency. In term pregnancies with IO, the baby should be delivered, and in preterm IO, conservative management is advisable to minimize perinatal morbidity due to prematurity.[6]

The clinical significance of oligohydramnios lies in its strong association with adverse perinatal outcomes. It has been linked to an increased risk of intrauterine growth restriction (IUGR), meconium aspiration syndrome, fetal distress during labor, low APGAR scores, low birth weight, high rate of NICU admission, and even perinatal mortality.[7-9]

NST

It is a procedure of graphically recording the fetal heart activity and uterine contraction, both recorded in the same time scale simultaneously and continuously through uterine quiescence and contraction. Hammacher observed that “the fetus can be regarded as safe, especially if reflex movements are accompanied by an obvious increase in the amplitude of oscillations and in the baseline fetal heart rate (FHR).” This formed the basis for the NST and its association with FHR accelerations and fetal health. Fetal well-being in high-risk pregnancies, including those with oligohydramnios, is frequently assessed using the NST.

The NST is a non-invasive test that monitors the FHR in response to fetal movements, providing insights into the functioning of the fetal autonomic nervous system and the adequacy of fetal oxygenation. A reactive NST is generally reassuring, while a non-reactive NST may indicate fetal compromise and warrants further investigation or intervention.[10]

While the association between oligohydramnios and adverse perinatal outcomes is well-documented, the predictive value of NST in this specific context needs further elucidation. Some studies suggest that the combination of oligohydramnios and a non-reactive NST is a particularly ominous sign, predicting a higher likelihood of poor outcomes.

Given these controversies and the clinical dilemma faced by obstetricians in managing term pregnancies with oligohydramnios, this study was undertaken to evaluate the perinatal outcomes in this high-risk group.

The primary objectives were to determine the incidence of various adverse outcomes and to assess the correlation between NST findings and the perinatal outcomes in term pregnancies complicated by oligohydramnios.

METHODS

Study design and setting

This was a hospital-based prospective observational study conducted in the department of obstetrics and gynecology of a tertiary care health cente at Rajiv Gandhi medical college and hospital Kalwa Thane over the period of 6 month from December 2024 to May 2025.

Study population

The study population comprised 100 consecutive pregnant women admitted to the obstetrics and wards who were diagnosed with oligohydramnios at term. In this study we include Singleton pregnancy at term (gestational age ≥37 weeks) and AFI≤5 cm as measured by ultrasound and exclude the antenatal women with Presence of known fetal congenital anomalies, particularly renal agenesis or polycystic kidney disease and clinically or sonographically confirmed ruptured membranes or leaking per vaginum.

Data collection

After obtaining informed written consent from each participant, a detailed history was taken, including age, parity, menstrual history, and any associated medical or obstetric complications. A thorough general and obstetric examination was performed on all patients.

Baseline investigations, including complete blood count, blood grouping, blood sugar levels, and screening for infectious diseases (HIV, VDRL and HBsAg), were carried out. A speculum and per vaginal examination were done to confirm intact membranes.

AFI measurement

Transabdominal ultrasonography was performed to assess fetal well-being and to measure the AFI using the four-quadrant technique. The uterus was divided into four quadrants, and the deepest vertical pocket of amniotic fluid, free of fetal parts and umbilical cord, was measured in each quadrant. The sum of these four measurements constituted the AFI, and a value of ≤5 cm was used to diagnose oligohydramnios.

NST

All participants underwent an NST using a fetal monitor. The FHR was recorded continuously for a minimum of 20 minutes. The NST was interpreted as 'reactive' or 'non-reactive' based on standard criteria, including baseline FHR, variability, and the presence of FHR accelerations and decelerations.

Perinatal outcome measures

The primary perinatal outcome measures collected included-mode of delivery (spontaneous vaginal,

instrumental, or LSCS) and indication for LSCS. Color of amniotic fluid at delivery (clear, thin, or thick meconium-stained). Birth weight, categorized as low birth weight (<2.5 kg) or normal birth weight (≥2.5 kg). APGAR scores at 1 and 5 minutes and admission to the neonatal intensive care unit (NICU).

Statistical analysis

All collected data were entered into a Microsoft excel spreadsheet and analyzed using SPSS software version 22. Qualitative data were presented as frequencies and percentages and were analyzed using the chi-square test. Quantitative data were presented as mean and standard deviation (SD) and were compared using the t-test. A $p<0.05$ was considered statistically significant.

RESULTS

Maternal characteristics

The mean age of the participants was 25.12±4 years, with the majority (60%) being in the 20-24 years age group. Most women (71%) were multigravida. The diagnosis of oligohydramnios was most frequently made between 37 and 37.6 weeks of gestation (78%).

Maternal complications

Out of the 100 participants, 36 (36%) had associated obstetric complications. Preeclampsia was the most common complication, affecting 16 women (44.44% of those with complications), followed by severe anaemia in 13 women (36.11%). Other complications included recurrent pregnancy loss, gestational diabetes mellitus (GDM), and chronic hypertension.

Delivery outcomes

Labor was induced in a large proportion of the study participants (76%). Spontaneous onset of labor occurred in 24% of the women. Regarding the mode of delivery, 53% of the women had a normal vaginal delivery, 4% had an instrumental delivery, and 43% underwent a LSCS.

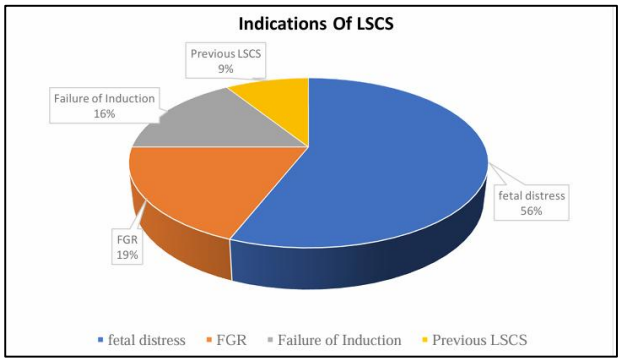

Figure 1: Indications of LSCS.

The most common indication for LSCS was fetal distress, which accounted for 56% of the caesarean deliveries. Other indications included FGR (19%), failure of induction (16%), and previous LSCS (9%) (Figure 1). The consistency of the amniotic fluid (liquor) was noted at delivery; it was clear in 47% of cases, while meconium staining was present in 53% (32% thick and 21% thin) (Figure 2).

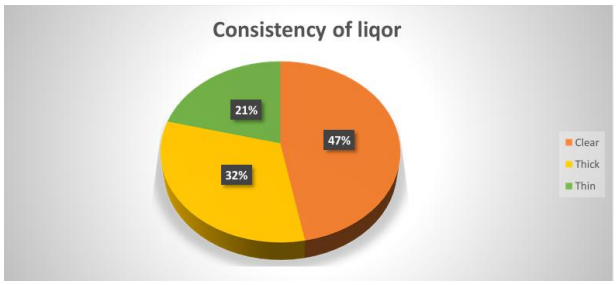

Figure 2: Consistency of liquor.

Perinatal outcomes

There were 98 live births (98%) and 2 stillbirths (2%) in the study cohort. The majority of newborns (76%) had a birth weight of ≥2.5 kg, while 24% had a low birth weight (<2.5 kg). APGAR scores were assessed at 1 and 5 minutes. Among the 52 babies with an APGAR score <7 at either time point, 61.5% had a score <7 at 1 minute, and 38.4% had a score <7 at 5 minutes. Ten percent of the newborns required admission to the NICU.

Correlation of NST with perinatal outcomes

The study found a strong and statistically significant correlation between NST results and perinatal outcomes. Out of the 100 participants, 77 (77%) had a reactive NST, and 23 (23%) had a non-reactive NST.

Mode of delivery vs. NST

A non-reactive NST was significantly associated with a higher rate of LSCS. While 70.1% of women with reactive NST had vaginal delivery (NVD), only 13% of those with a non-reactive NST delivered vaginally. Conversely, 87% of women with a non-reactive NST underwent an LSCS, compared to 29.9% in the reactive NST group ($p=0.002$), which is significant.

Birth weight vs. NST

There was a significant association between NST results and birth weight. A non-reactive NST was seen in newborns with low birth weight (<2.5 kg). Specifically, 69.6% of low-birth-weight babies had a non-reactive NST, whereas only 10.4% had a reactive NST. In contrast, among babies with normal birth weight (≥2.5 kg), 89.6% had reactive NST ($p=0.001$), which is significant.

Table 1: Maternal demographic and clinical characteristics.

Characteristic	N	Percentage (%)
Age group (in years)		
20-24	60	60
25-29	26	26
30-35	14	14
Total	100	100
Parity		
Primigravida	29	29
Multigravida	71	71
Total	100	100
Gestational age at diagnosis (weeks)		
37-37.6	78	78
38-38.6	15	15
39-40	7	7
Total	100	100

Table 2: Distribution of maternal complications.

Variables	N	Percentage (%)
Preeclampsia	16	44.44
Severe anaemia	13	36.11
Recurrent pregnancy loss	3	8.3
GDM	2	5.5
Chronic hypertension	2	5.5
Total with complications	36	100

Table 3: Labor and Delivery Outcomes.

Delivery	N	Percentage (%)
Onset of labour		
Induced	76	76
Spontaneous	24	24
Total	100	100
Mode of delivery		
Vaginal	53	53
Instrumental	4	4
LSCS	43	43
Total	100	100

Table 4: Perinatal outcomes.

Perinatal outcome	N	Percentage (%)
Birth outcome		
Live birth	98	98
Still birth	2	2
Birth weight (kg)		
≥2.5	76	76
<2.5	24	24
APGAR score <7		
At 1 minute	32	61.5 (of 52)
At 5 minutes	20	38.4 (of 52)
NICU admission		
Yes	10	10
No	90	90

NICU admission vs. NST

Babies with a non-reactive NST had a much higher rate of NICU admission (26%) compared to those with a reactive NST (5%). The difference was statistically significant (p=0.001).

Table 5: Correlation between mode of delivery and NST results.

Mode of delivery	Reactive NST, (n=77)	Non-reactive NST, (n=23)	P value
NVD	54 (70.1%)	3 (13%)	0.002
LSCS	23 (29.9%)	20 (87%)	

Table 6: Correlation between birth weight and NST results.

Birth weight	Reactive NST, (n=77)	Non-reactive NST, (n=23)	P value
<2.5 kg	8 (10.4%)	16 (69.6%)	0.001
≥2.5 kg	69 (89.6%)	7 (30.4%)	

Table 7: Correlation between NICU admission and NST results.

NICU admission	Reactive NST, (n=77)	Non-reactive NST, (n=23)	P value
Yes	4 (5%)	6 (26%)	0.001
No	73 (95%)	17 (74%)	

DISCUSSION

This study investigated the perinatal outcomes in term pregnancies complicated by oligohydramnios and explored the correlation of these outcomes with NST findings. The results confirm that oligohydramnios at term is a high-risk condition associated with increased rates of maternal and perinatal morbidity and that a non-reactive NST is a significant predictor of adverse outcomes in this population.

The demographic profile of our study population shows most of the study population was between 20 and 24 years old (60%), with a mean age of 25.12 years and a predominance of multigravida women (71%). This is largely consistent with findings from other studies conducted in similar settings. In the study conducted by Ghosh et al in which 65.5% participants belonged to the 20-25-year-old age group, and 65.5% of participants were multigravida.[11] In the study, 64% of participants in a study by Biradkar et al were between the ages of 20 and 24, and 77% of them were multigravida.[12]

The majority of participants in this study were between 37- and 37.6-weeks gestational age (78%) and then between 38 and 38.6 weeks (15%). Ghosh et al study, in which 72.7% of participants were between 34- and 37-weeks gestation, is comparable.[11] Maximum participants in the Swapan Das et al. study were between 38 and 40 weeks

along in their gestation.[13]

Our cohort's high rate of preeclampsia (44.44% among those with complications) confirms the established connection between placental insufficiency, a leading cause of oligohydramnios, and hypertensive disorders of pregnancy. The current study found that 44%, 36.11%, 5.5%, 8.3%, and 5.5% of pregnancies had high-risk conditions such as preeclampsia, severe anaemia, GDM, recurrent pregnancy loss, and chronic hypertension, respectively. Similar findings were made in the Medha et al. study, where the majority of patients had IUGR (17%) and pre-eclampsia (23%), followed by severe anaemia (21%).[14]

The high rate of intervention-76% of women underwent induction of labor, and 43% had a caesarean delivery-is one of our study's main conclusions. This result is consistent with a number of studies, including those by Biradar et al and Bangal et al which found that the incidence of LSCS was 62% and 44%, respectively. In our study, fetal distress was the main reason for LSCS (56%).[12,15] Sixty-one percent of the study population had an APGAR score below seven at one minute, and 38.4 percent had an APGAR score below seven at five minutes. According to studies by Guin et al and Sriya et al 39% and 38.88% of participants, respectively, had low APGAR scores at 1 minute.[16,17]

The serious risks of oligohydramnios were illustrated by the perinatal outcomes of our study, which included a 10% NICU admission rate, a 25% incidence of low birth weight, and a 2% stillbirth rate. Despite being similar to those of other studies, rates of specific outcomes may vary depending on the study population and management practices. Similar research by Mushtaq et al revealed a stillbirth rate of 0.68%, while Swapan Das et al. revealed that 62% of the study population had a birth weight of less than 2.5 kg.[13,18] In the studies by Mushtaq et al and Jhonson et al the NICU admission rates were 7.6% and 20%, respectively.[18,19] It is also concerning that meconium-stained liquor is so common (53%) because meconium aspiration syndrome increases the risk of meconium aspiration syndrome, a dangerous respiratory complication in infants.

Our study's most important contribution is the proof of NST's high predictive value in pregnancies with term oligohydramnios. Low birth weight, the need for LSCS, and the chance of NICU admission were all strongly predicted by a non-reactive NST.[10] In this study, 69.6% of participants with non-reactive NST had birth weights under 2.5 kg, 26% required NICU admission, and 20% had undergone LSCS. A study by Kaur et al found that 60.22% of women with non-reactive NST underwent caesarean sections, and 75.92% of babies with non-reactive NST required NICU admission.[10] Similar to our findings, Das et al. reported that 19.05 percent of babies needed to be admitted to the NICU.[20] A non-reactive NST should be viewed as a warning sign, as reactive NSTs are associated with a favorable prognosis when oligohydramnios are present. To avoid negative consequences, careful monitoring and timely delivery are taken into account.

Limitations

One of our study's main advantages is its prospective design, which minimized the possibility of recall bias and enabled systematic data collection. Our findings are more broadly applicable because the study was carried out in a real-world clinical setting. Our study does, however, have certain limitations. The statistical power to identify subtler differences in results may have been limited by the study's single-center design and small sample size. Furthermore, because this is an observational study, we are unable to prove a link between perinatal outcomes, NST results, and oligohydramnios. Confounding factors could have affected the outcomes, such as underlying maternal or fetal conditions.

CONCLUSION

In conclusion, this study demonstrates that oligohydramnios in term pregnancy is a significant risk factor for adverse perinatal outcomes, including high rates of labor induction, caesarean delivery, low birth weight, and NICU admission. The NST is a valuable tool for risk stratification in this population. A non-reactive NST in a patient with term oligohydramnios is a strong predictor of adverse outcomes and warrants close surveillance and timely intervention. These findings emphasize the importance of a comprehensive approach to the management of term oligohydramnios, including routine ultrasound assessment of amniotic fluid volume and fetal monitoring with NST, to optimize both maternal and perinatal health. Further large-scale, multi-center studies are needed to confirm these findings and to develop evidence-based management guidelines for this challenging clinical scenario.

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REFERENCES

1. Van Otterlo LC, Wladimiroff JW, Wallenburg HCS. Relationship between fetal urine production and amniotic fluid volume in normal pregnancy and pregnancy complicated by diabetes. Br J Obstet Gynaecol. 1977;84(3):205.
2. Brace RA, Hanson MA, Rodeck CH. Body fluids and kidney function. Cambridge Cambridge University Press. 1998;328.
3. Phelan JP, Smith CV, Broussard P, Small M. Amniotic fluid volume assessment with the four-quadrant technique at 36-42 weeks' gestation. J Reprod Med. 1987;32(7):540-2
4. Sherer DM. A Review of Amniotic Fluid Dynamics

and the Enigma of Isolated Oligohydramnios. Am J Perinatol. 2002;19(5):253-66.
5. Elasandabesee D, Majumdhar S, Sinha S. Obstetricians' attitudes towards 'isolated' oligohydramnios at term. J Obstet and Gynecol. 2007;27(6):574-76.
6. Gizzo S, Noventa M, Vitagliano A, Dall'Asta A, D'Antona D, Aldrich C, et al. An Update on Maternal Hydration Strategies for Amniotic Fluid Improvement in Isolated Oligohydramnios and Normohydramnios: Evidence from a Systematic Review of Literature and Meta-Analysis. PLoS One. 2015;10(12):e0144334.
7. Magann EF, Bass JD, Chauhan SP, Young RA, Whitworth NS, Morrison JC. Amniotic fluid volume in normal singleton pregnancies. Obstet Gynecol. 1997;90(4pt1):524.
8. 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 Obstetr Gynecol. 2000;182(4):909-12.
9. Locatelli A, Zagarella A, Toso L, Assi F, Ghidini A, Biffi A. Serial assessment of amniotic fluid index in uncomplicated term pregnancies: prognostic value of amniotic fluid reduction. J Matern Fetal Neonatal Med. 2004;15(4):233-6.
10. Kaur N, Jindal P. Study of 'Nonstress Test at Admission' and its Corelation with Maternal and Fetal Outcome. J South Asian Feder Obst Gynae. 2018;10(3):161-6.
11. Ghosh R, Oza H, Padhiyar B. Maternal and fetal outcome in oligohydramnios: study from a tertiary care hospital, Ahmedabad, India. Int J Reprod Contracept Obstet Gynecol. 2018;7(3):907-10.
12. Biradar KD, Shamanewadi AN. Maternal and perinatal outcome in oligohydramnios: study from a tertiary care hospital, Bangalore, Karnataka, India. Int J Reprod Contracept Obstet Gynecol. 2016;5(7):2291-4.
13. Das S, Haldar R, Sinhababu P, Sharma M, Mahaptra B. Pregnancy Outcome in Oligohydramnios At Term: A Study of 100 Cases. J Dental Med Sci. 2017;16(6):53-5.
14. Medha, Datta SK. Non- stress test: A test to assess the outcome of high-risk pregnancy. Int J Health Clin Res. 2021;4(21):209-11.
15. Bangal VB, Giri PA, Sali BM. Incidence of oligohydramnios during pregnancy and its effects on maternal and perinatal outcome. J Pharmaceut Biomed Sci. 2011;12(05):1-4.
16. Sriya R, Singhai S. Perinatal outcome in patients with amniotic fluid index <5 cm. J Obstet Gynaecol India. 2001;51(5):98-100.
17. Guin G, Punekar S, Lele A, Khare S. A prospective clinical study of fetomaternal outcome in pregnancies with abnormal liquor volume. J Obstet Gynaecol India. 2011;61(6):652-5.
18. Mushtaq E, Parveen S, Shaheen F, Jan S, Abdullah A, Lone YA. Perinatal Outcome in Patients with Isolated Oligohydramnios at Term: A Prospective Study. J Preg Child Health. 2017;4:332:1-5.
19. Johnson JM, Chauhan SP, Ennen CS, Niederhauser A, Magann EF. A comparison of 3 criteria of oligohydramnios in identifying peripartum complications: a secondary analysis. Am J Obstet Gynecol. 2007;197(2):207.e1-7.
20. Das V, Agrawal D, Malik GK, Kumar P. Modified Biophysical Profile and Fetal outcome. J Obste Gynecol India. 2001;51(5)101-4.

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