

ORIGINAL RESEARCH

Comparison Of Doppler And Non-Stress Test In Oligohydramnios For Assessment Of Perinatal Outcome Beyond 34 Weeks

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ABSTRACT

Background: Oligohydramnios has been associated with a higher risk of labor induction and cesarean birth, as well as a higher risk of maternal morbidity. This study was done to compare between Non-Stress Test and Doppler Velocimetry in oligohydramnios for maternal & fetal outcome beyond 34 weeks of pregnancy.

Methods: Patients with oligohydramnios <5cm with more than 34 week of gestation and having normal NST and Normal color doppler were managed conservatively and followed up to term. After collection of all data in Microsoft Excel and statistical analysis was done by using SPSS version 22 with significant value (P value < 0.05).

Results: The majority (54.7%) of patient with oligohydramnios were in the age group between 26-35 years. APGAR less than 7 was significantly more among groups C (Doppler Normal/NST Abnormal) and D (Doppler Abnormal/NST Abnormal). NICU admission was significantly more among group D. The mean NICU stay was significantly more among groups B (Doppler Abnormal/NST Normal) and D. The mean weight at birth was significantly more among groups A (Doppler Normal/NST Normal) and C. The sensitivity and specificity of Doppler (78.60, 82.50) was more as compared to NST (62.5, 61) in prediction of perinatal outcome.

Conclusion: This study concluded that Doppler is a stronger indication of early Fetal impairment than NST because NST detects acute events in the presence or absence of chronic hypoxia, but Doppler detects chronic alterations.

Keywords: Doppler Test, Non stress Test, Oligohydramnios, Perinatal

INTRODUCTION

Every woman's aim is to have a healthy child but preconceptionally, an illness in the mother or fetus might make the pregnancy eventful. A high-risk pregnancy might raise the chances of maternal and neonatal mortality and morbidity. About 20-30% of pregnant women meet high-risk criteria, accounting for 75% of perinatal deaths and 80% of maternal deaths.¹⁻³ The foundation of obstetrics management is to diagnose and treat maternal and fetal factors, with the goal of reducing negative outcomes such as preterm birth, determining when to terminate a pregnancy, and maternal morbidity related with interventions.^{4,5}

Fetal compromise can occur during the antepartum or intrapartum period in high-risk pregnancies due to Placental Insufficiency.⁶ Amniotic fluid acts as a cushion, helping the

embryo to develop in a secure environment while also regulating temperature and protecting it from injury. It has bacteriostatic properties and prevents infection and it functions as primary source of fetal nutrients. The volume of amniotic fluid at term is roughly 1000 ml, and it decreases as the pregnancy progresses.⁷

Oligohydramnios is defined as an amniotic fluid volume of less than 5 cm or an SDP of less than 2 cm. Borderline oligohydramnios is defined as an AFI of 5 to 8 cm. Oligohydramnios affect 0.5 and 8% of all pregnancies⁸. Oligohydramnios has been associated with a higher risk of labor induction and cesarean birth, as well as a higher risk of maternal morbidity. Perinatal outcomes like Preterm birth, SGA newborn, Fetus Hypoxia, MSL, 5 mins APGAR score < 7, and IUGR are associated to it.⁹ Pregnancy-induced hypertension is a prominent cause of maternal and fetal mortality and morbidity in India, accounting for 24%^{10,11}.

It is crucial to discover placental insufficiency earlier in order to reduce or to eliminate the hazards.¹² Non-stress tests, obstetric color doppler, contraction stress test, and biophysical profile are some of the antenatal fetal surveillance methods used to assess risk in oligohydramnios¹³. Nowadays non stress tests are more commonly used for antepartum fetal surveillance. It is commonly done as an outpatient procedure.

We will be able to recognize early fetal compromise and prevent further worsening in oligohydramnios by comparing non-stress test and doppler in oligohydramnios, hence preventing early and late neonatal complications. Hence, the study was done to compare between Non-Stress Test and Doppler Velocimetry in oligohydramnios for maternal & fetal outcome beyond 34 weeks of pregnancy.

MATERIAL AND METHODS

After receiving approval from the Board of Studies and the Ethical Committee, we conducted this study over an 18-month period in the Obstetrics and Gynecology Department at Teerthanker Mahaveer Medical College & Research Center. This was an observational study that was conducted in the future.

All antenatal patients attending the Antenatal OPD or admitted in IPD with AFI < 5 cm after taking informed consent during the study period were subjected to two groups (NST, DOPPLER). After fulfilling inclusion, exclusion criteria 126 cases were considered for the study with AFI < 5 cm. Patients with oligohydramnios < 5 cm with more than 34 week of gestation and having normal NST and Normal color doppler were managed conservatively and followed up to term. Women with multiple pregnancy, PROM, fetal congenital malformation, intrauterine fetal death, post term pregnancy and leaking per vagina were excluded from the study.

Informed consent was obtained from the subjects followed by detailed history and examination of all the study subjects as per the clinical proforma. This was followed by NST and USG Colour doppler assessment. Diagnosed cases of oligohydramnios with AFI < 5 CM are further considered for study. After collection of all data in Microsoft Excel and statistical analysis done by using SPSS version 22 with significant value (P value < 0.05).

RESULTS

It is clear from table 1 that the majority (54.7%) of patients with oligohydramnios were in the age group between 26-35 years. Majority of the patients belonged to class II (40.4%) and class III (39.6%). 57.1% of patients with oligohydramnios were primigravida rest were multigravida. Majority of patient was found between gestational age between 38-40 weeks. About 71.4% patients were unbooked status.

Table 1: Distribution of subjects

Variables	N	%	Mean
Age groups in years			
18-25	44	34.9 %	25.78 years
26-35	69	54.7 %	
>35	11	8.7 %	
Socioeconomic status			
I	9	7.14%	28.76
II	51	40.4%	
III	50	39.6%	
IV	1	0.79%	
V	15	11.9%	
Parity			
Primigravida	72	57.1 %	25.35
Multipara	54	42.8 %	
G.A.			
34-36	23	18.2%	
36-38	42	33.33 %	
38-40	61	48.4%	
TOTAL	126	100%	
Booking status			
Booked	36	28.6%	27.92
Unbooked	90	71.4%	
Total	126	100%	

Table 2 showed that maximum (56.3%) patients belonged to acute infection group, 13.4% patient was idiopathic group, 11.9% belongs to pregnancy induced hypertension, 8.73 % were anemia, 3.17% had abruption, 47% was fetal causes.

Table 2: Risk factor associated with oligohydramnios

High Risk Factor	NIL	1-3	3-4	<5	Total	%
Idiopathic	1	7	7	2	17	13.4%
Maternal Causes						
PIH	5	1	3	6	15	11.9%
HD	0	0	0	0	0	0%
DM	0	0	2	0	2	1.58%
Anemia	1	4	1	5	11	8.73 %
Drugs	0	0	0	01	0	
Acute event (fever, acute gastroenteritis, dehydration etc.)	0	8	25	38	71	56.3%
Placental Factor						
PP	0	0	0	0	0	0%
Abruptio Placenta	0	1	1	2	4	3.17%
Fetal Causes (Torch, Congenital Anomaly, Cord Around Neck, Msl)	1	1	0	4	6	4.7%
Total	8	22	39	57	126	100%

Out of 29 abnormal NST, 29 patient undergo Emergency LSCS, about 17 patients have <7 Apgar score, 7 have NICU Admission and 2 was Still Birth (table 3).

Table 3: Association of NST in perinatal outcomes

Outcomes	NST normal		NST abnormal	
Elective LSCS	17	25.6%	0	0%
Emergency LSCS	7	17.07%	29	100%
Vaginal delivery	58	82.9%	0	0%
Meconium-stained liquor	2	2.4%	7	24.1%
Apgar<7	6	7.3%	17	58.6%
Apgar>7	76	92.9%	10	34.4%
NICU admission	6	7.3%	7	24.1%
IUGR	6	7.3%	9	31.3%
Still birth	0	0%	2	6.8%

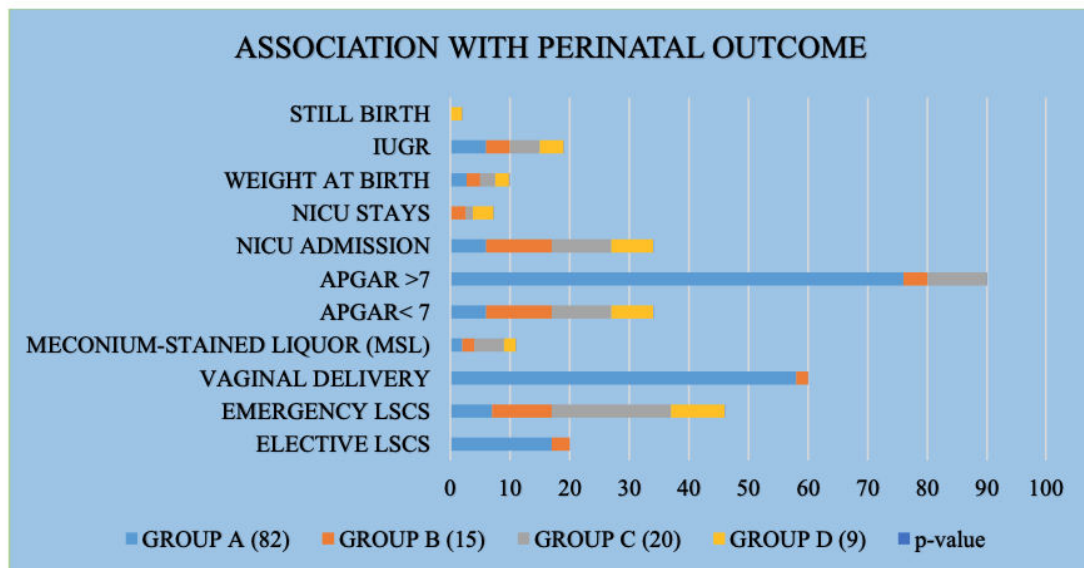
Total patient was 24 with abnormal doppler from which 79.1 % was undergo emergency LSCS (table 4).

Table 4: Association of doppler in perinatal outcome

Outcomes	Doppler Normal		Doppler Abnormal	
Elective LSCS	17	25.6%	3	12.5%
Emergency LSCS	7	17.07%	19	79.1%
Vaginal Delivery	58	82.9	2	8.33%
Meconium-Stained Liquor	2	2.43%	4	16.66%
APGAR<7	6	7.31%	18	75%
APGAR>7	76	92.6%	4	16.66%
NICU admission	6	7.31%	18	75%
NICU stays	1.0	0.11%	3.0	3.0%
IUGR	6	7.31%	8	33.33%
Still Birth	0	0%	2	8.33%

In group A (Doppler Normal/NST Normal) 82 patients, group B (Doppler Abnormal/NST Normal) 15 patients, in group C (Doppler Normal/NST Abnormal) 20 patients and group D (Doppler Abnormal/NST Abnormal) 9 patients. APGAR less than 7 was significantly more among groups C and D. NICU admission was significantly more among group D. The mean NICU stay was significantly more among groups B and D. The mean weight at birth was significantly more among groups A and C (graph 1).

Graph 1: Association with perinatal outcome



The sensitivity, specificity, positive predictive value and negative predictive value of NST was found to be 62.5, 61, 58.48 and 67.2 respectively. The sensitivity, specificity, positive predictive value and negative predictive value of doppler was found to be 78.60, 82.50, 86.50 and 74.49 respectively (table 5).

Table 5: Effectiveness of obstetric doppler and non-stress test for prediction of perinatal outcome

	NST	C.I.	Doppler	C.I.
Sensitivity	62.50	51.59-79.60	78.60	67.50-86.57
Specificity	61.00	50.50-78.70	82.50	75.70-93.00
Positive Predictive Value	58.48	48.50-68.80	86.50	77.42-96.45
Negative Predictive Value	60.20	49.9-70.5	74.49	65.21-85.51
Accuracy	60.63	50.0-71.0	80.52	71.12-90.31

DISCUSSION

AF volume is the most important predictor of foetal well-being. AFI of less than 5cm Oligo was linked to a higher scale for labour induction and LSCS, as well as increased maternal and foetal morbidity. The major purpose of this research is to evaluate Doppler and NST in oligohydramnios for perinatal outcomes beyond 34 weeks of pregnancy in order to better understand perinatal outcomes and reduce perinatal morbidity and mortality.¹⁴ The current study is being conducted in the TMMRC OBGYN OPD. This is phenomenological observational research. The current study included 126 pregnant women with an AFI of less than 5 cm who were seen in the OPD and IPD.

The bulk of the patients in our study were between the ages of 26 and 35, with a percentage of 54.7 percent, which is comparable to Choudhury N et al¹⁵ (2017) age group 26-30 years (41 percent). Similarly, Sonal et al¹⁶ had a mean age of 20-25 years (64.7%) and Verma U et al¹⁷ had a mean age of 20-25 years (40%).

In our study, the majority of patients were primigravida, which was compared to Choudhury N et al¹⁵ study, in which the majority of patients were also primigravida and Sonal et al¹⁶ found equivalent results. Verma U et al¹⁷ reported similar findings in a study sample that was primarily made up of primigravida females. The findings of Pai et al¹⁸ research is comparable.

The majority of the patients fall within the modified kuppuswamy categorization classes 2 (40.4%) and 3 (39.6%). In research by Yashodhara et al¹⁹, the majority of patients with oligohydramnios (42.1%) belonged to class four. This was similar to a study conducted in Nepal by Radha Devi et al²⁰, which found that oligohydramnios was more common among the lowest classes (54.1 percent). This could be because persons in the lower class are more likely to be unbooked (71.4 percent) with nutritional deficits, whereas people in the upper class are more conscious and hence treated early.^{18,21}

In terms of gestational age, all of the women in our study were in the 38–40-week range. The gestation age was between 34 and 37 weeks in the current study, which corresponded to Choudhury N et al¹⁵ and Verma U et al¹⁷. Morris et al²² found that the gestational age was greater than 40 weeks, which is in contrast to our current study, where all of the patients were at term or post term pregnancies. With maximum recruits of 37-40 weeks of gestation, our study was comparable to Moses et al. The risk of oligohydramnios rises with increasing gestational age, which could be related to uteroplacental insufficiency, which results in a low amniotic fluid volume.

In neonates, abnormal NST indicates acute abnormalities, while abnormal Doppler shows persistent changes, therefore both modalities are significant and indicate a poor prognosis. A poor newborn outcome can also be anticipated if both NST and Color Doppler readings are abnormal. The effects of oligohydramnios in different combinations of NST and Doppler are

analyzed, and it is discovered that abnormal NST with abnormal Doppler has the worst maternal and foetal prognosis when compared to normal NST with normal Doppler. We can't say which is better because NST and Doppler are affected by a variety of circumstances. However, both NST and Doppler are possible methods for identifying high-risk fetuses.

CONCLUSION

As perinatal outcome was the primary end measure in our study, NST has a sensitivity and specificity of 62.50 percent and 61 percent positive and negative predictive value of 58.4 percent and 60.2 percent, respectively. This study concluded that Doppler is a stronger indication of early Fetal impairment than NST because NST detects acute events in the presence or absence of chronic hypoxia, but Doppler detects chronic alterations.

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