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RESEARCH ARTICLE
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NORMAL VS ABNORMAL DOPPLER: COMPARISON OF PERINATAL OUTCOMES

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ABSTRACT

Background: In routine obstetric scans, it is monitored that amniotic fluid volume measurement forms an integral part of the antenatal fetal. One of the leading causes of increased perinatal morbidity and mortality is identified as oligohydramnios. In such a scenario, doppler ultrasound helps in evaluating maternal and fetal hemodynamics. An indirect marker of fetoplacental function is amniotic fluid index (AFI) with 0.5% to 5% pregnancies having oligohydramnios. It is most commonly due to pregnancy-induced hypertension (25%) and idiopathic causes (50%). Umbilical Artery Doppler is superior to AFI in predicting adverse obstetric and perinatal outcomes.

Objective: To compare perinatal outcomes among patients with abnormal and normal Doppler.

Study design: A descriptive study

Duration and place of study: This study was conducted at Sir Syed College of Medical Sciences For Girls / Sir Syed Hospital Karachi from October 2024 to October 2025

Methodology: This research is a descriptive study which was performed in the Department of Obstetrics and Gynaecology. There were a total of 160 patients who were a part of this research. Females with singleton pregnancy along with cephalic presentation were a part of this study. All the participants were divided into 2 groups with equal numbers, 80 patients in each group. One group was normal one where systolic/diastolic ratio of flow velocity was less than 3 and the other group was abnormal where systolic/diastolic ratio of flow velocity was greater than 3. SPSS version 21 was used to analyse the data.

Results: There were a total of 160 females involved in this research. All the participants were divided into 2 groups with each group having an equal number of participants (n=80 each). The mean age calculated was 29.07 years. The mean gestational age calculated was 36.98 weeks. The

rate of LSCS was higher in group B. NICU admission rate was higher in females who had abnormal doppler findings which was 53.75%.
Conclusion: Umbilical artery doppler is found to be effective in women with oligohydramnios to eliminate adverse neonatal and maternal outcomes.

INTRODUCTION

In routine obstetric scans, it is monitored that amniotic fluid volume measurement forms an integral part of the antenatal fetal [1]. One of the leading causes of increased perinatal morbidity and mortality is identified as oligohydramnios [2]. In such a scenario, doppler ultrasound helps in evaluating maternal and fetal hemodynamics [3]. A direct measure of uteroplacental function is Umbilical Artery Doppler [4]. This tool is used to evaluate high-risk pregnancies. In normal pregnancies, the last trimester Umbilical Artery Doppler shows low resistance and high diastolic flow [5]. However, it shows high resistance and reduced flow in complicated pregnancies.

An indirect marker of fetoplacental function is amniotic fluid index (AFI) with 0.5% to 5% pregnancies having oligohydramnios [6]. It is most commonly due to pregnancy-induced hypertension (25%) and idiopathic causes (50%) [7]. There are a number of factors which are associated with oligohydramnios. They include cord compression, low Apgar scores, fetal growth restriction, increased perinatal morbidity, poor labour tolerance, and non-reactive CTG [8]. Umbilical Artery Doppler and AFI are strongly associated with each other. They are the key components of fetomaternal surveillance in high-risk pregnancies [9]. However, Umbilical Artery Doppler is superior to AFI in predicting adverse obstetric and perinatal outcomes. It demonstrates higher specificity, sensitivity, and predictive values, mostly in pregnancy-induced hypertension.

In pregnancies with AFI less than 5 cm, abnormal Umbilical Artery Doppler was in 42% [10]. It was linked with higher rates of adverse outcomes which includes meconium-stained liquor, increased induction of labour, fetal distress, higher NICU admission rates, low Apgar scores, and LSCS [11,12]. If doppler findings are abnormal such as reversed end-diastolic flow, it indicates increased placental vascular resistance. These findings are linked with a high risk of perinatal mortality. They often appear days or hours before abnormalities are seen on CTG. Umbilical Artery Doppler helps in early detection of fetoplacental insufficiency. Due to this, better timely obstetric decisions are made and it reduces severe perinatal outcomes in oligohydramnios cases.

METHODOLOGY

This research is a descriptive study which was performed in the Department of Obstetrics and Gynaecology. A consecutive non-probability sampling was used to select the sample. There were a total of 160 patients who were a part of this research. Females with singleton pregnancy along with cephalic presentation were a part of this study. Moreover, females with intact membrane, gestational age ≥ 34 weeks, and oligohydramnios amniotic fluid were also included in this research. All of the participants were informed about this study and their written consent was obtained. The Ethical Review Committee approved this research.

Exclusion criteria: Females with vaginal leaking, multiple pregnancies, maternal morbidity, and congenital anomaly were not a part of this study.

All the participants were evaluated by the researcher. The researcher filled a performa during interviews with the participants. Researchers also performed the ultrasound. On the other hand, radiologists performed doppler in all oligohydramnios. All the participants were divided into 2 groups with equal numbers, 80 patients in each group. One group was normal one where systolic/diastolic ratio of flow velocity was less than 3 and the other group was abnormal where systolic/diastolic ratio of flow velocity was greater than 3.

SPSS version 21 was used to analyse the data. Chi-square test was used to compare perinatal outcomes between both the groups. The age and gestational age was expressed in terms of mean and standard deviation.

RESULTS

There were a total of 160 females involved in this research. All the participants were divided into 2 groups with each group having an equal number of participants (n=80 each). One group was normal (Group A) where systolic/diastolic ratio of flow velocity was less than 3 and the other group was abnormal (Group B) where systolic/diastolic ratio of flow velocity was greater than 3. The mean age calculated was 29.07 years. The mean gestational age calculated was 36.98 weeks. Table number 1 shows the age and gestational age in both the groups in terms of mean and standard deviation.

Table No. 1:

Demographics	Group A (n=80)	Group B (n=80)
Age (yrs)	28.98 ± 5.3	29.17 ± 5.9
Gestational Age (weeks)	36.93 ± 1.4	37.03 ± 1.3

Table number 2 compares LSCS in both the groups.

Table No. 2:

LSCS	Group A (n=80)		Group B (n=80)	
	N	%	N	%
Yes	18	22.50	50	62.50
No	62	77.50	30	37.50

Table number 3 compares NICU admission in both the groups.

Table No. 3:

NICU Admission	Group A (n=80)		Group B (n=80)	
	N	%	N	%
Yes	13	16.25	43	53.75
No	67	83.75	37	46.25

DISCUSSION

This study shows the assessment of umbilical artery doppler to reduce perinatal morbidity and mortality in obstetric situations where there is a high risk. The evaluation of the downstream impedance to the flow in the umbilical arteries is done by fetal umbilical artery doppler [13]. It is linked with higher incidence of perinatal complications.

Our study shows that the rate of LSCS was higher in group B whose doppler findings were abnormal. The results were 62.50% (abnormal) vs 22.50% (normal). P-value was 0.00. Moreover, NICU admission rate was higher in females who had abnormal doppler findings which was 53.75%. These results are similar to an Indian study who showed that the rate of LSCS is higher in women with abnormal doppler findings [14]. However, Young Ji Byun revealed that there was no significant association of umbilical artery S/D ratio with LSCS and NICU admission [15]. These results are opposite to the results of our study.

Another study by Carol et al. showed 61.7% patients who had normal S/D ratio while 38.3% had abnormal doppler findings [16]. Moreover, the study of Manoj Mathur from India reported 62% females with normal doppler findings while 38% had abnormal doppler findings [17]. Previous studies show that if the amniotic fluid volume and umbilical artery S/D ratio are normal, severe outcomes will only be seen during delivery of the baby [18,19,20]. Therefore, close antenatal surveillance may be unnecessary.

CONCLUSION

Umbilical artery doppler is found to be effective in women with oligohydramnios to eliminate adverse neonatal and maternal outcomes.

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This study was conducted without receiving financial support from any external source.

Conflict in the interest
The authors had no conflict related to the interest in the execution of this study.

Permission
Prior to initiating the study, approval from the ethical committee was obtained to ensure adherence to ethical standards and guidelines.

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