ASSOCIATION OF PREECLAMPSIA WITH OLIGOHYDRAMNIOS DURING THE LAST TRIMESTER OF PREGNANCY

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ABSTRACT:

Introduction:

Preeclampsia is a complication of pregnancy. The patient suffers from high blood pressure and high levels of protein in urine that indicate kidney damage (proteinuria), or other signs of organ damage. Its poses significant maternal and fetal risks. It can lead to serious complications, including eclampsia, HELLP syndrome, along with maternal and fetal morbidity and mortality.

Aim of Study:

To determine the association of preeclampsia with oligohydramnios during last trimester.

Methods:

We conducted a cross-sectional study of 150 pregnant women with a mean age of 29.3 ±

5.9 years and a mean gestational age of 34.07 ± 2.4 weeks. Participants underwent clinical assessment, uterine artery Doppler ultrasonography, and measurement of amniotic fluid index (AFI). Chi-square tests were used to analyze associations between variables.

Results:

The prevalence of hypertension was 18%, diabetes 11.3%, and IUGR 14.7%. Mean AFI was 10.3 ± 3.7 cm. Uterine artery Doppler indices showed similar mean values for right and left arteries. Significant associations were found between hypertension and IUGR ($p < 0.0001$), hypertension and right uterine artery Doppler indices ($p = 0.01$), and hypertension and left uterine artery Doppler indices ($p = 0.02$). IUGR was significantly associated with both right ($p = 0.031$) and left ($p = 0.008$) uterine artery Doppler indices. No significant association was observed between hypertension and AFI ($p = 0.766$).

Conclusion:

Our findings demonstrate strong relationships between hypertension, IUGR, and altered uterine artery blood flow in pregnancy. The lack of association between hypertension and AFI contrasts with some previous studies and warrants further investigation. These results underscore the importance of comprehensive monitoring in high-risk pregnancies, particularly focusing on fetal growth and uteroplacental blood-flow assessment.

Keywords:

Oligohydramnios, Pre-eclampsia, Amniotic Fluid Index (AFI), Uterine Doppler indices, Intrauterine Growth Restriction (IUGR).

INTRODUCTION:

Preeclampsia commonly develops after 20 weeks of gestation in women whose blood pressure was previously within normal limits. If left untreated, it can cause significant, even deadly consequences for both the mother and the fetus [1, 2]. The patient suffers from hypertension and proteinuria, or the patient may have no obvious symptoms [3, 4]. Early preeclampsia signs are typically discovered during routine pregnancy examinations by medical professionals [5]. Preeclampsia symptoms and signs include high blood pressure, raised liver enzymes that show liver problems, decreased platelet counts in the blood

(thrombocytopenia), proteinuria or other signs of kidney problems, severe headaches, vision changes such as short-term blindness, double vision, or light sensitivity, shortness of breath resulting from fluid in the lungs, pain in the upper abdomen, usually under the right ribs, nausea or vomiting [6-8].

Preeclampsia's cause is most likely a mix of circumstances. According to doctors, the placenta, which nourishes the embryo throughout pregnancy, is where it all begins. Early in pregnancy, new blood vessels form and alter to provide the placenta with nutrition and oxygen [9]. Preeclampsia's cause is most likely a mix of circumstances. According to doctors, the placenta, which nourishes the embryo throughout pregnancy, is where it all begins. Early in pregnancy, new blood vessels form and alter to supply the placenta with nutrition and oxygen [10].

Objective:

To determine the association of preeclampsia with oligohydramnios during the last trimester of pregnancy

Methods:

This cross-sectional analytical and observational study was conducted at Government Mian Meer DHQ Hospital in Lahore, spanning a comprehensive four-month research period. The research employed a non-probability purposive sampling technique to recruit 100 participants. Women having a clinical diagnosis of pre-eclampsia who were 32–36 weeks pregnant were chosen for the trial. Amniotic Fluid Index (AFI) measurements and singleton pregnancies were prerequisites for participation. A uniform study population with clearly established clinical parameters was guaranteed by the inclusion criteria. Exclusion criteria included patients with severe prenatal abnormalities, numerous gestations, and pre-existing chronic diseases such autoimmune disorders, persistent hypertension, or renal failure.

Results:

Participants in the research ranged in age from 18 to 40, with a mean age of 29.3 ± 5.9 years. An average gestational age of 34.07 ± 2.4 weeks was recorded. Of the individuals,

14.7% had intrauterine growth restriction (IUGR), 7.3% experienced placental abruption, 11.3% had diabetes, and 18% had hypertension. The average deepest vertical pocket (DVP) was 5.5 ± 1.69 cm, while the average amniotic fluid index (AFI) measured 10.3 ± 3.7 cm.

Doppler indices for the left and right uterine arteries were found by within-group studies. The pulsatility index (PI), resistance index (RI), and systolic/diastolic (S/D) ratio mean values for the right uterine artery were 1.1 ± 0.56, 0.67 ± 0.2, and 2.7 ± 0.9, respectively. Similarly, the left uterine artery showed mean values of 1.1 ± 0.61 for PI, 0.66 ± 0.25 for RI, and 2.6 ± 1.0 for S/D ratio.

Between-group analyses demonstrated significant associations between several factors. Hypertension was significantly associated with IUGR ($p < 0.0001$) and both right ($p = 0.01$) and left ($p = 0.02$) uterine artery Doppler indices. IUGR showed significant associations with both right ($p = 0.031$) and left ($p = 0.008$) uterine artery Doppler indices. However, no significant association was found between hypertension and AFI ($p = 0.766$).

Table 1: Chi-Square Test Hypertension * Amniotic Fluid Index AFI

Chi-Square Tests	Value	df	Asymptotic Significance (2-sided) P Value
Pearson Chi-Square	28.670[a]	35	.766

There was no association of hypertension with AFI in current study as the p value is above 0.05 (Table 1).

Table 2: Chi-Square Test Hypertension * Intra-uterine growth restriction

	Value	df	Asymptotic Significance (2-sided)p value
Pearson Chi-Square	177.343[a]	10	.0001

| Likelihood Ratio | 33.451 | 10 | .0000 |

There is significant association of the hypertension with the IUGR during last semester of pregnancy as the p value as less than 0.05 (Table 2).

Table 3: Chi-Square Test Hypertension * Right Uterine artery Doppler indices

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	126.68	12	0.01

A statistical significance was seen between hypertension and right uterine artery Doppler indices (Table 3).

Table 4: Chi-Square Test Hypertension * Left Uterine artery Doppler indices

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	132.73	14	0.02

A statistical significance was seen between hypertension and right uterine artery Doppler indices (Table 4).

Table 5: Chi-Square Test IUGR * Right Uterine artery Doppler indices

	Value	df	Asymptotic Significance (2-sided) P value
Pearson Chi-Square	137.019[a]	108	0.031

Right uterine artery Doppler indices have significant association with IURG (Table 5).

Table 6: Chi-Square Test IUGR * Left Uterine artery Doppler indices

	Value	Df	Asymptotic Significance (2-sided) P value
Pearson Chi-Square	153.256[a]	114	.008

Left uterine artery Doppler indices have significant association with IUGR (Table 6).

Discussion:

Oligohydramnios, a syndrome defined by decreased amniotic fluid, has been the focus of numerous recent research investigating its link to pre-eclampsia and poor mother and newborn outcomes. These research have shed light on the prevalence, risk factors, and effects of oligohydramnios in preterm pre-eclamptic individuals.

Our study included 150 pregnant women, with an average age of 29.3 years and a mean gestational age of 34 weeks. Our findings revealed that 18% of individuals were hypertensive, 11.3% were diabetic, and 14.7% had intrauterine growth restriction (IUGR). various numbers give significant information on the prevalence of various illnesses in our research population. Our investigation of uterine artery Doppler indices found comparable mean values for the right and left arteries. For example, the pulsatility index averaged 1.1 on both sides. These measures are critical for determining uteroplacental blood flow and possible pregnancy problems.

Interestingly, we found substantial relationships between hypertension and IUGR, as well as hypertension and uterine artery Doppler indices. IUGR also correlated strongly with Doppler indices in both uterine arteries. However, unlike some other investigations, we found no significant relationship between hypertension and amniotic fluid index (AFI). According to a 2019 research by Rabinovich et al., around 4.8% of preterm pre-eclamptic individuals experienced oligohydramnios. These investigations found that individuals with oligohydramnios have various features, including an age more than 35, a higher risk of being primiparous, and a history of delivering small for gestational age (SGA) or dead fetuses. Additionally, both research studies showed that oligohydramnios is a distinct risk indicator for early neonatal mortality in premature pre-eclamptic individuals, indicating

that an Amniotic Fluid Index (AFI) of less than 5 cm could be an essential factor in delivery decision-making for these high-risk pregnancies [11].

Taqweem-ul-Hassan et al.'s [12] 2024 study indicated that 77% of hypertensive pregnant women had oligohydramnios (p = 0.002). This study also found a significant link between substantially echogenic amniotic fluid and oligohydramnios (p=0.0451), stressing the need of ultrasonography screening in these patients. Similarly, Moses and Thakre's 2016 study found that pregnancy-induced hypertension (PIH) is the second most prevalent cause of oligohydramnios after idiopathic reasons [13].

Sharma et al. (2016) gave thorough insights into maternal and neonatal outcomes. They discovered that 71% of oligohydramnios cases were linked to prenatal problems such pre-eclampsia, intrauterine growth restriction (IUGR), and premature rupture of membranes (PROM). In addition, the study found that oligohydramnios patients had much greater rates of labor induction (65% vs 21%) and surgical deliveries (44% vs 10%) than controls. In oligohydramnios instances, neonatal outcomes were much worse, with 73% of newborns having a birth weight < 2.5 kg, 55% having an APGAR score < 7, and 44% needing NICU care [14].

Our findings are both consistent with and different from previous studies in fascinating ways. For example, Taqweem-ul-Hassan et al.'s [12] recent research in 2024 found a greater prevalence of hypertension (30.2%) than ours (18%). They also discovered a substantial correlation between hypertension and oligohydramnios, in contrast to our findings, which revealed no link between hypertension and AFI.

The frequency of IUGR in our study (14.7%) is similar with previous studies. Rabinovich et al.'s [11] 2019 study and Sharma et al.'s [14] 2016 study both found a greater rate of growth-restricted fetuses in oligohydramnios. This highlights the need of tracking fetal development in pregnancies compromised by hypertension or aberrant AFI.

Our finding of strong correlations between high blood pressure, IUGR, and uterine artery Doppler indices is consistent with the larger literature. These results support the use of

Doppler ultrasonography as a risk assessment tool in pregnancies involving hypertensive diseases or suspected fetal growth limitation.

The lack of relationship we discovered between hypertension and AFI is noteworthy, especially considering that previous investigations, such as Moses and Thakre's [13] 2016 study, identified pregnancy-induced hypertension as a prevalent cause of oligohydramnios. This disagreement underlines the complexities of these linkages and the need for more study to understand their correlations.

Conclusion:

These findings highlighted the significance of extensive monitoring in high-risk pregnancies, with a focus on fetal development and uteroplacental blood flow. The lack of a link between hypertension and AFI calls for more exploration, as it contradicts some previous evidence.

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