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ORIGINAL ARTICLE

Identification of Fetal Intrauterine Growth Restriction in Pregnancy-Induced Hypertension Women in Saudi Arabia

Umme Salma, Md Sayed Ali Sheikh, Reem maged Elshamy

Introduction: There is evidence that intrauterine growth restriction (IUGR) has negative effects on pregnancy. Placental dysfunction, which limits foetal growth, is intimately related to pregnancy-induced hypertension. This study aims to identify the IUGR in women with pregnancy-induced hypertension.

Methods: This cross-sectional study, which was done at the Obstetric Department of the Maternity and Children Hospital (MCH) Sakaka, Aljouf, Saudi Arabia, between January 2021 and January 2022, included 162 women with pregnancy-induced hypertension (PIH). Whether nulliparous or multiparous, all of the PIH women were between the ages of 16 and 45. We observed IUGR and outcomes in accordance with the criteria listed in the operational definition. Clinical examinations, patient data files, and ultrasound reports were used to collect the data.

Results: Of these, 105 (64.8%) had foetal detected intrauterine growth restriction, which included low Apgar scores of 19.3%, abortions at 11.4%, low birth weights at 19.3%, preterm births at 20%, and stillbirths at 13.3%. According to our findings, the mean SD values for the population as a whole were 38.95±8.92, 33.73±6.92, 3.00±2.0, 4.91±1.52, 1,811±3.32 and 4.21±1.21 for the maternal age, gestational age, duration of disease (weeks), baby weight (grams), and Apgar score, respectively. The relationship of stillbirth in PIH women to maternal age, gestational age, and parity is 89%, 88.8%, 86.6%, 72.7% and 84.2%, 88% and 87.6%,85% at considered (p = 0.00), (p = 0.05) and (p=0.00), respectively.

Conclusion: The frequency of intrauterine growth restriction (IUGR) in patients with PIH was found to be 64.8%. IUGR is frequently a complication of hypertensive disorders during pregnancy.

Dr Umme Salma
Department of Obstetrics & Gynecology,
College of Medicine,
Jouf University,
Sakaka, Kingdom of Saudi Arabia

Dr Md Sayed Ali Sheikh
Department of Internal Medicine,
College of Medicine,
Jouf University,
Sakaka, Kingdom of Saudi Arabia

Reem maged Elshamy
Faculty of Medicine,
Mansoura College of Medicine,
Mansoura University,
Mansoura, Egypt

The second most frequent medical condition found during pregnancy is hypertension, which, combined with bleeding and infection, significantly increases maternal complications and death.[1] Pregnancy-induced hypertension (PIH), a significant cause of maternal and neonatal morbidity and mortality, has virtually disappeared from the clinical landscape in developed countries thanks to better prenatal care and rapid medication.[2] However, it remains a significant obstetric issue in developing nations like ours and among the rural populace, and its consequences are to blame for the majority of PIH mortality.[3] Pregnancy-related hypertension has an impact on the outcome of the foetus and is linked to intrauterine death, low birth weight, and a higher risk of admission to the neonatal intensive care unit. It was discovered to be the main reason for stillbirth in a hospital-based study from MCH Sakaka, Aljouf, Saudi Arabia. While the cause of hypertensive disorders of pregnancy is yet unknown, the rate of virulence from hypertension during pregnancy is significantly more in underdeveloped countries than in the developed world.[4] It is frequently believed that PIH and unexplained intrauterine growth restriction are connected to placental insufficiency and intimately linked to placental malfunction, which causes foetal growth restriction. Foetuses with birth weights below the 10th percentile for gestational age are said to have intrauterine growth restriction (IUGR).[5] Intrauterine growth restriction is thought to affect 5% of pregnant women in general, and it affects 28% of pregnant women in PIH. Low Apgar scores (19%), abortion (11%), low birth weight (31%), preterm birth (2%), stillbirth (10%), neonatal morbidities and deaths, and even long-term effects on children are all caused by IUGR.[6] Reducing prenatal and neonatal problems, mortality, and morbidity is facilitated by early identification of intra-uterine growth limitations.[5] Hence, the aim of our study is to the assessment of the IUGR in pregnancy-induced hypertension women.

MATERIAL AND METHODS

The Maternity and Children Hospital (MCH) Sakaka, Aljouf, Saudi Arabia, received 162 pregnant women between January 2021 and January 2022 for this cross-sectional study. all pregnant women between the ages of 16 and 45, whether nulliparous or multiparous and were recruited for the study after receiving verbal consent. All of the PIH patients underwent IUGR and outcome evaluations in accordance with the operational definition's criteria (PIH= after 20 weeks of pregnancy, blood pressure greater than 140/90 measured twice, more than six hours apart, without any evidence of protein in the urine, IUGR is defined as a weight below the 10th percentile for gestational age as seen on ultrasonography. and Apgar score was below 6 at 5 minutes, Babies who were born with low birth weights typically weighed less than 2,500 grams, preterm birth: the delivery of a child before 37 weeks of pregnancy, and Stillbirth: the delivery of a dead child after 24 weeks of pregnancy). By means of clinical examinations and ultrasound, we evaluated each individual. The data was gathered using a pre-made proforma. Considering that there are 162 individuals with pregnancy-induced hypertension, the lowest prevalence of IUGR in PIH is 28%12 d=7%. Women who were expecting were not included, as were those who had ischemic heart disease, connective tissue/autoimmune illnesses, or known chronic renal disease. SPSS version 22.00 was used to analyze the data. The frequency and percentage were calculated taking into account the following factors: IUGR, PIH findings, parity, length of illness, mode of delivery, and maternal and gestational age. Maternal and gestational age, as well as the length of the disease, were determined using the mean and standard deviation (SD). The following characteristics were stratified: maternal and gestational age, mode of birth (cesarean section or vaginal delivery), parity, and length of the disease in order to see their effects on the outcome and manage effect modifiers. Categorical variables were subjected to the post-stratification chi-square test at a 95% confidence level, and a p-value of 0.05 was deemed statistically significant. The University of Jouf's ethical review board gave the study its approval.

RESULTS

Over the course of the 1-year trial period, 162 cases of PIH were assessed for intrauterine growth restriction. **Table 1** and **Figure 1** show the demographics and clinical characteristics of the study. A total of 105 (64.8%) IUGRs were detected in PIH women.

The mean SD values for the total participant group were.84±7.86, 43.61±5.76, 4.83±1.44, 3.00±3.0,

Table 1 *Demographic characteristics of study participants*

Factors	Frequency (%)
Maternal age (yrs)	
20	32 (19.7)
21-30	53 (32.7)
31-40	59 (36.4)
Over40	18(11.1)
Gestational weeks (age)	
28	51 (31.4)
28-34	59 (36.4)
35-37	31 (19.1)
Over 37	21 (12.9)
Parity	
0-1	73 (45
2-5	47 (29
Over 5	42 (25.9)
Delivery approach	
CS	86 (53)
Vaginal delivery	64 (39.5)
Spontaneous abortion	12 (7.4)
IUGR	
Yes	105 (64.8)
No	57 (35.1)

Table 2 *The participants of this study variables with mean ±SD*

Measurable variables	Mean ±SD
Age of mother	37.84±7.86
Age of Gestational weeks	43.61±5.76
Disease period	4.83±1.44
Parity	3.00±3.0
Infant weight	1812±3.33
Apgar score	4.34±1.30

Table 3 *Outcomes of IUGR*

Factors	Number (n= 105) %
low Apgar score	29 (19.3)
Abortion	12 (11.4)
Low birth weight	29(19.3)
Preterm birth	21(20)
Stillbirth	14(13.3)

1812±3.33and 4.34±1.30, for the mother's age (years), gestational age (weeks), disease duration (weeks), baby weight (grams), and APGAR score respectively (Table 2).

The outcome was a low Apgar score of 29 (19.3%), abortion of 12 (11.4%), low birth weight of 29 (19.3%), preterm birth of 21 (20%), and stillbirth of 14 (13.3%) in 105 (64.8%) foetal IUGR, as shown in Table 3, Figure 2 and Figure 3.[7,8]

However, our findings and stratification for the factors under research are as follows: Regarding the IUGR in connection to maternal age, the percentages were 37.5% (16–19 years), 25.7% (20–29 years), 28.5% (30–39 years), and 10.4% (40–45 years) [p = 0,00]. The IUGR was 36.1% (21-34 years) and 63.8% (35–42 years) in relation to gestational age [p = 0.05]. The IUGR was 61.9% for nulliparous parity and 38% for multiparous (p=0.00), whereas the IUGR was 53% for cesarean section deliveries and 39.5% for vaginal deliveries (p=0.21). Table 4 shows the relationship between maternal age, gestational age, and parity with stillbirth.

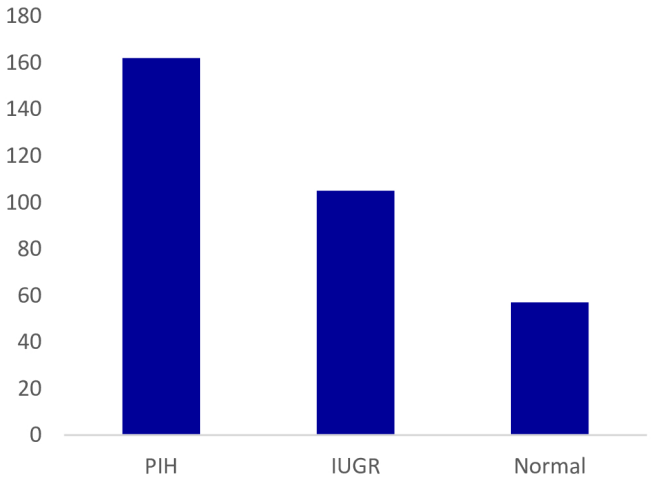

Figure 1 *Normal foetal and IUGR in PIH women*

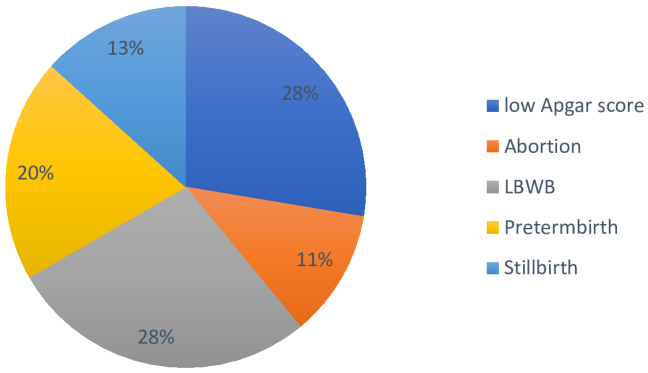

Figure 2 *Status of IUGR in PIH women*

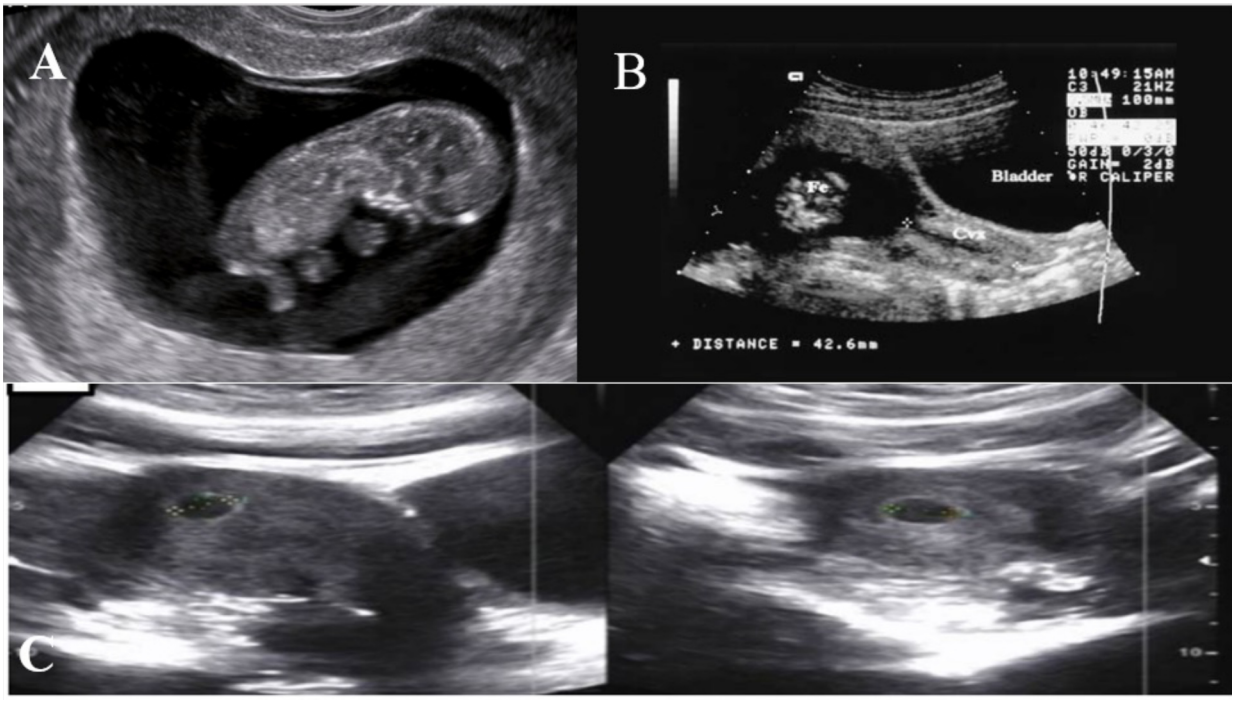

Figure 3 *(A) 2D ultrasound imaging of a 9 weeks gestation foetus in utero(normal). (B) the cervix (Cvx) can be seen clearly and measured. A cervical length of less than 25–30 mm is associated with an increased risk of preterm delivery. (C) The yolk sac was not clearly shown under ultrasonography at 6 weeks of gestation indicating embryo damage (Threated abortion)*[7,8].

Table 4 *Relationship of stillbirth in PIH women associated with the age of maternal, gestational, and parity*

Factors	Stillbirth			
	Yes (%)	No (%)	Total (%)	P value
Maternal age (years)				
16-19 (years)	4 (10.8)	33(89.1)	37 (35.2)	
20-29(years)	3 (11.1)	24 (88.8)	27 (25.7)	
30-39(years)	4(13.3)	26 (86.6)	30 (28.5)	0.00
40-45(years)	3(27.2)	8(72.7)	11 (10.4)	
Total	14	91	105	
Gestational weeks (age)				
21-34	6 (15.7)	32(84.2)	38(36.1)	
35-42	8 (11.9)	59 (88)	67 (63.8)	0.05
Total	14	91	105	
Parity				
Nulliparous	8 (12.3)	57(87.6)	65(61.9)	
Multiparous	6(15)	34(85)	40(38)	0.00
Total	14	91	105	

DISCUSSION

When compared to gestations without hypertension problems, hypertensive pregnancies have higher rates of perinatal morbidity and mortality, and the major foetal consequence of these pregnancies is IUGR.[9] Early morbidity is adversely affected by the degree of intrauterine growth restriction.[10] Through placental microcirculation, the foetus receives nutrients and oxygen from the mother during embryogenesis and development. Pre-eclampsia and pregnancy-induced hypertension are intimately linked to placental malfunction.[9] The lack of blood that is well-oxygenated and rich in all nutritional components reaching the fetomaternal unit during pregnancy is the direct cause of pregnancy-induced hypertension and intrauterine growth limitation.[11] There was a correlation between the mother's parity and pregnancy-induced hypertension. PIH is prevalent in primigravida and is likely the primary cause of IUGR and low placental weight.[12] In our study, 64.8% of patients with IUGR the primigravida (61.9%), and the remaining were multiparous (38%), this is comparable with a study conducted formerly where primigravida was 57.5%, and similar results were reported in a different study.[13] Our findings are analogous to those of research on IUGR conducted in Japan, where 57% of cases had early-onset PIH and 43% had late-onset PIH.[14] It was discovered such early-onset moderate to severe PIH could raise the danger of foetal death, whereas delivery by cesarean section could lower hazards in PIH-affected women. In line with the earlier study, the current study found that 13.3% and 19.3% of pregnant women with pregnancy-induced hypertension, respectively, had stillbirths.[15] The current study's findings highlighted low birth weight and prematurity as the perinatal repercussions and revealed a low stillbirth rate. Early detection of hypertension and the implementation of the appropriate treatment increased the likelihood of a healthy pregnancy for both the mother and the foetus.[16] The previous study found that pregnancy-induced hypertension was present in 5% of the women who experienced stillbirth, a low birth weight of 16%, and Apgar score of 20%, in addition to preterm birth.[17] The current study's findings revealed a link between PIH and having a child with a w birth weight. The increased risks associated with PIH are concerning because low birth weight is a key predictor of adult health outcomes and also has a long-term impact. Therefore, one of the methods to lower the risk of low birth weight and its effects is to prevent and/or manage PIH.[18] An increased risk of poor perinatal outcomes was linked to hypertensive problems during pregnancy. However, Preterm delivery, low birth weight babies, neonatal death, and low Apgar scores were all more likely to occur in pregnant women with hypertensive diseases. The observation that effective quality improvement programs can contribute to high-quality care in a situation with limited resources highlights the need to maintain the focus on improving care quality.

CONCLUSION

In the current study, intrauterine growth restriction, which is usually a complication of hypertensive disorders of pregnancy, was recorded at 64.8%, with low Apgar scores of 29 (19.3%), abortion at 12, low birth weight at 29, preterm birth at 21, and stillbirth at 14.3% as outcomes. Therefore, in contemporary obstetrics, assessing this growth abnormality is a simple process that may be quickly detected and tracked using clinical and ultrasonographic screening.

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