ORIGINAL ARTICLE

Evaluation of fetal outcome by uterine artery colour doppler in high- risk pregnancy

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ABSTRACT:
Background: The relationship between abnormal uterine artery doppler velocimetry and pre-eclampsia and intrauterine growth restriction and adverse pregnancy outcomes are well-established. The present study was conducted to assess the fetal outcome by uterine artery colour doppler in high- risk pregnancy. **Materials & Methods:** 60 antenatal patients were included. Data such as age group, gravida, delivery, FGR, pre- eclampsia, pre- term delivery, LBW and oligohydramnios were recorded. **Results:** There were 32 multigravida and 28 primigravida. Age group 18-22 years had 18, 22-26 years had 24 and 26-30 years had 18 patients. 24 were delivered vaginally and 36 through caesarean section. The difference was non-significant (P> 0.05). The incidence of FGR, pre- eclampsia, LBW, oligohydramnios and at least 1 adverse outcome was significantly higher in women with abnormal uterine artery doppler as compare to normal uterine artery doppler women. The difference was significant (P< 0.05). **Conclusion:** Uterine artery doppler ultrasonography at 22-24 weeks of gestation is a significant predictor of at least one adverse pregnancy outcome, with the highest prediction for preeclampsia.
Key words: gestation, preeclampsia, Uterine artery doppler ultrasonography

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INTRODUCTION

The addition of doppler flow studies of maternal and fetal vessels has provided a tool where the physiology of the maternal- fetal unit can be evaluated.[1] The relationship between abnormal uterine artery doppler velocimetry and pre-eclampsia and intrauterine growth restriction and adverse pregnancy outcomes are well-established.[2] Maternal hypertensive disorders are often associated with inadequate blood supply to the placenta.[3] An increased risk of maternal and fetal complications have been reported in women showing an increased resistance in the uterine arteries. Abnormal uterine artery doppler findings have shown a significant correlation with the risk of adverse perinatal outcomes such as small for gestational age and admission to neonatal intensive care units (NICU).[4]

Evidence suggests that persistence of a resistant flow or abnormal uterine artery doppler velocimetry in the late second or third trimester may be associated with inadequate trophoblast invasion.[5] Several studies have reported that uterine artery doppler velocimetry has a valuable role as a non-invasive intrauterine method for predicting pregnancies likely to be complicated by pre-eclampsia or IUGR, others have reported a high false-positive rate in an unselected population.[6] There is also no consensus on the best indices or the ideal gestational age for screening.[7] The present study was conducted to assess the fetal outcome by uterine artery colour doppler in high- risk pregnancy.

MATERIALS & METHODS

The present study consisted of 60 pregnant females with high- risk pregnancy.

Data such as name, age etc. was recorded. Detailed history, clinical examination and lab investigations of the patient was done. Parameters such as pulse, blood pressure, and respiratory rate, pulse oximetry oxygen saturation, fetal heart sounds and CTG were recorded. Post- delivery parameters such as weight of baby, mode of delivery, baby status and period of NICU stay, postdelivery hemoglobin level after 48 hours, post- natal febrile episodes, duration of hospital stay, purpeurial infections and the incidence of burning micturition and dysuria were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Assessment of parameters

Parameters	Variables	Number	P value
Gravida	Multi	32	0.95
	Primi	28	
Age group	18-22	18	0.72
	22-26	24	

		26-30	18	
Delivery		Vaginal	24	0.05
		Caesarean	36	

Table I, graph I shows that there were 32 multigravida and 28 primigravida. Age group 18-22 years had 18, 22-26 years had 24 and 26-30 years had 18 patients. 24 were delivered vaginally and 36 through caesarean section. The difference was non- significant (P> 0.05).
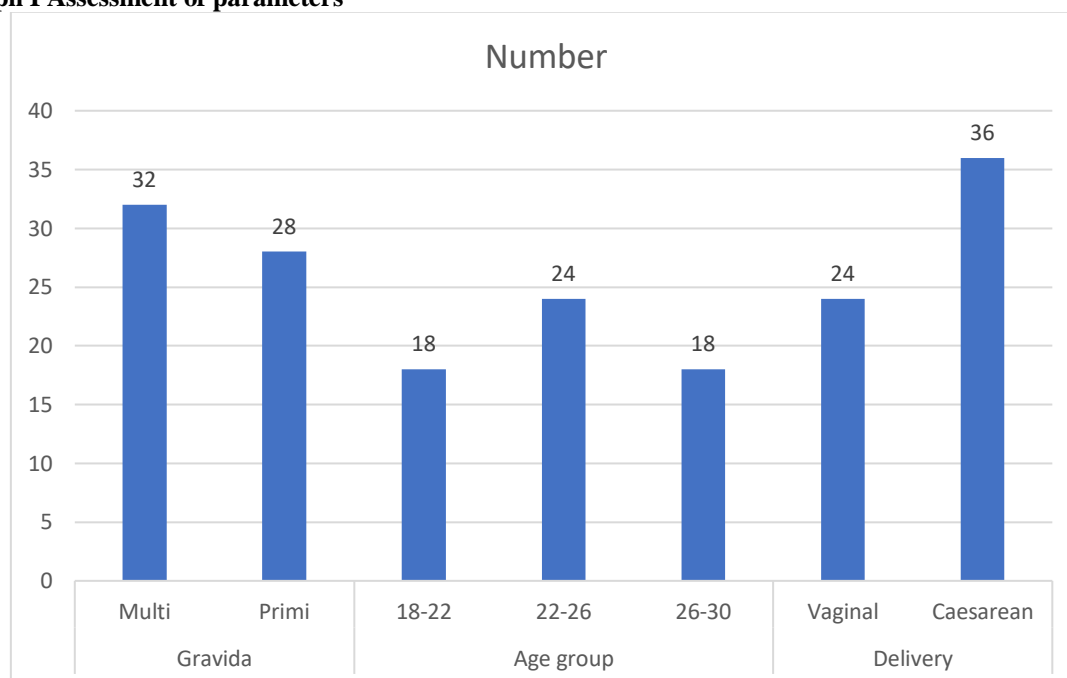
Graph I Assessment of parameters

Table II Uterine artery doppler in adverse pregnancy outcomes

Pregnancy outcome	Normal uterine artery Doppler(40)	Abnormal uterine artery doppler (20)	Median uterine artery P1 level	Mean	OR	P value
FGR	17%	31%	1.47	1.12	4.31	0.04
Pre- eclampsia	16%	42%	1.52	1.32	10.3	0.03
Pre- term delivery	10%	31%	1.40	1.17	0.99	0.85
LBW	7%	13%	1.06	1.13	6.21	0.02
Oligohydramnios	4%	15%	1.21	1.12	3.92	0.04
At least 1 adverse outcome	21%	82%	1.32	1.28	8.12	0.02

Table II shows that incidence of FGR, pre- eclampsia, LBW, oligohydramnios and at least 1 adverse outcome was significantly higher in women with abnormal uterine artery doppler as compare to normal uterine artery doppler women. The difference was significant (P< 0.05).

DISCUSSION

Pregnancies that are destined to result in normal term deliveries show increased diastolic blood flow velocity and loss of the early diastolic notch by 22 weeks of gestation, while pregnancies that show persistent high resistance waveforms with early diastolic notches are at risk of preterm delivery, due to pre-eclampsia, abruption, and intrauterine growth restriction (IUGR).[8,9] It must be presumed that a reduction in uteroplacental blood flow alone, does not result in placental insufficiency, and therefore, does not necessarily trigger pre-eclampsia or reduce fetal growth.[10] Women who have failed to modify uterine artery blood flow by 20 weeks represent one of the highest risk groups in pregnancy, particularly for the development of preterm delivery, IUGR, and early onset of pre-eclampsia. Perhaps, the potential for stratifying care is the greatest benefit of mid-trimester uterine artery doppler screening.[11] The present study was conducted to assess the fetal outcome by uterine artery colour doppler in high- risk pregnancy.

We found that there were 32 multigravida and 28 primigravida. Age group 18-22 years had 18, 22-26 years had 24 and 26-30 years had 18 patients. 24 were

delivered vaginally and 36 through caesarean section. Papageorghiou et al[12] examined uterine artery doppler findings in women with adverse pregnancy outcome. Almost two-thirds of stillbirths that occur in the early preterm period can be predicted by uterine artery doppler at 23 weeks. First trimester screening studies have shown that an abnormal result increases the risk of subsequent fetal growth restriction, and such women are at particularly high risk when indices remain abnormal in the second trimester. Studies combining uterine artery doppler with maternal serum markers have demonstrated that measurement of first-trimester maternal serum pregnancy associated plasma protein A and free b human chorionic gonadotrophin improve sensitivities of second-trimester doppler. As these are frequently measured in down syndrome screening and they lend themselves in screening for pre-eclampsia. Women with abnormal first and second-trimester serum markers constitute a high-risk group. Maternal serum placental protein 13 remains a promising method for early screening, although a recent study suggests lower sensitivities than initially reported.

We found that incidence of FGR, pre- eclampsia, LBW, oligohydramnios and at least 1 adverse outcome was significantly higher in women with abnormal uterine artery doppler as compare to normal uterine artery doppler women. Barati et al[13] investigated the predictive value of a uterine artery Doppler in the identification of adverse pregnancy outcomes such as 'pre-eclampsia' and 'small fetus for gestational age' (SGA). 329 women, with singleton pregnancy, between 18 and 40 years of age, without risk factors, randomly underwent doppler interrogation of the uterine arteries, between 16-22 weeks of gestation. Those who had a mean pulsatility index (PI) of >1.45 were considered to have an abnormal result, and were evaluated and compared with those who had normal results for adverse pregnancy outcomes, including pre-eclampsia and small for gestational age. The relationship between the variables was assessed with the use of the chi-square test. There were 17 cases (4.5%) of abnormal uterine artery Doppler results and 15 of them (88.2%) developed pre-eclampsia and four cases (23.5%) had neonates small for gestational age. For predicting pre-eclampsia, the mean uterine artery PI had to be >1.45, had to have a specificity of 95.5%, a sensitivity of 79%, a negative predictive value (NPV) of 98.9% and a positive predictive value (PPV) of 88.2%. In the case of 'small for gestational age' it had to have a specificity of 96.5%, a sensitivity of 57%, an NPV of 99.2% and a PPV of 23.5%.

The limitation the study is small sample size.

CONCLUSION

Authors found that uterine artery doppler ultrasonography at 22-24 weeks of gestation is a significant predictor of at least one adverse pregnancy outcome, with the highest prediction for preeclampsia.

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