The Role of Uterine Artery Doppler Sonography in Predicting Pre-eclampsia at 14-20 Weeks of Gestation

Thesis

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List of Abbreviations

Abbr.	Full-term
HELLP	**:** Hemolysis, Elevated Liver enzymes and Low Platelet count
HLA	**:** Human leukocyte antigen
PI	**:** Pulsatility index
RI	**:** Resistance Index
S/D	**:** Systolic/diastolic
SD	**:** Standard deviation
SPSS	**:** Statistical Package for Social Science

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Abstract

Background: the introduction of Doppler technology has proved the first opportunity for repetitive, non invasive hemodynamic monitoring in human pregnancy compared to other methods of maternal and fetal monitoring. **Aim of the Work:** this study aimed to predict usefulness of uterine artery Doppler in predicting pre-eclampsia and to study uterine artery Doppler waveforms at 14-20 weeks of gestation. **Patients and Methods:** this prospective study was carried out in the Radiodiagnosis Department Ain Shams University. This study included 33 pregnant women (between 14 to 20 weeks of pregnancy); they were chosen randomly from patients referred from maternal clinics, all were primigravida, single pregnancy during the period from June 2017 to December 2017. **Results:** regarding our results when RI index was used, sensitivity, specificity were 90.0%, 87.0% and when PI index was used sensitivity, specificity were 60.0%, 87.0%. **Conclusion:** we can conclude that uterine artery Doppler between 14- 20 weeks of gestation is a simple rapid non-invasive procedure and it can be used as a reliable indicator for prediction of preeclampsia to use it as a screening test. **Recommendations:** we recommend another studies with a wide scale of population (large number) in more than one center; this will lead to increased surveillance and delivery in a well-equipped setup in high risk detected patient which is necessary to reduce the maternal and fetal complications.

Key words: uterine, artery, Doppler, solography, pre-eclampsia, gestation

Introduction

Pre-eclampsia is heterogeneous disorder with variable maternal and fetal manifestations ***(Dehghani-firouzabad et al., 2013).***

Pre-eclampsia complicates 3%-8% of pregnancies worldwide, overall 10-15% of maternal deaths are associated with preeclampsia and eclampsia ***(Uzan et al., 2011).***

Even in the era of modern obstetrics, pre-eclampsia remains as a major complication of pregnancy which can lead to significant incidences of maternal and neonatal mortality and morbidity. Despite advances in medical research, reliable screening test for prediction of these adverse complications still lacking ***(Dehghani-firouzabad et al., 2013).***

In the mother, pre-eclampsia may cause premature cardiovascular disease, such as chronic hypertension, ischemic heart disease and stroke later in life, while children born after pre-eclamptic pregnancies and who are relatively small at birth, have an increased risk of stroke, coronary heart disease and metabolic syndrome in adult life ***(Uzan et al., 2011).***

Pre-eclampsia is defined as the development of hypertension, proteinuria, or both, after 20 week in women with previously normal blood pressure ***(Khalil et al., 2014).***

It may be associated with many other signs and symptoms such as edema, visual disturbances, headache, and epigastric pain ***(Bhide et al., 2015).***

The fundamental cause of pre-eclampsia is thought to be the abnormal uteroplacental circulation resulting from the failure of second wave of trophoblastic invasion into spiral arterioles, this will result in increased resistance to flow within the uterine arteries and decreased plancental perfusion as well as due to imbalance between prostacycline & thrombaxane A2 production ***(Salomon et al., 2014).***

The crucial issue to understand is that the prime mover of pre-eclampsia is abnormal placentation. Two common theories appear to be interlinked, ie, a genetic theory and an immunological theory ***(Palei et al., 2013).***

Pre-eclampsia can be perceived as an impairment of the maternal immune system that prevents it from recognizing the feto-placental unit ***(Lin et al., 2015).***

This concept has led to the idea of using Doppler assessment of uterine artery flow velocity waveform as a screening test for predicting preeclampsia ***(Gupta et al., 2014).***

Doppler examination of uterine arteries is a non invasive tool that can be used to indirectly assess trophoblast development and uteroplacental perfusion ***(James et al., 2017).***

Uterine artery Doppler sonography done during second trimester can accurately predict pre-eclampsia, Resistance Index (RI), pulsatility index (PI) which are considered indirect measures of uteroplacental circulation ***(Chakraborty and Saharan, 2017).***

Aim of the Work

To predict usefulness of uterine artery Doppler in predicting pre-eclampsia and to study uterine artery Doppler waveforms at 14-20 Weeks of Gestation.