ORIGINAL RESEARCH PAPER

Gynaecology

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TRIPLE VESSEL WAVE PATTERN BY DOPPLER STUDIES IN PRE ECLAMPSIA AND ITS PERINATAL OUTCOME

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ABSTRACT

BACKGROUND: The increasing incidence of pre eclampsia necessitates its early detection and intervention for a better perinatal outcome. Doppler plays a significant role in antepartum fetal surveillance. Early and accurate detection of abnormal doppler velocimetry demands the Obstetrician to plan accordingly and thereby improving the perinatal outcome.

MATERIALS AND METHODS: All antenatal patients who deliver in the department of Obstetrics and Gynaecology, Chengalpattu Medical College and Hospital during the period of febraury 2015 to September 2015. 200 Patients were taken for my study. Out of which 100 belong to control group(normotensive patients) and 100 were in study group. Doppler pattern was studied in Uterine artery, Umbilical artery and Middle cerebral artery for all pre-eclampsia patients.

RESULTS: Umbilical artery and middle cerebral artery doppler abnormality are a better indicator of perinatal outcome.In the study with uterine artery, 27% were found to have abnormal pattern ,27% with uterine artery high resistance and 28% showed uterine artery early diastolic notch in study group. With the study of umbilical artery in the study group, 55% were found to have abnormal pattern, 56% with umbilical artery high resistance, 54% with absent end diastolic flow and 29% with reversed end diastolic flow. 17% were found to have abnormal middle cerebral artery pattern among the study group. Cesarean section rate incidence was higher in the study group (43%) compared with the control group (17%). Neonatal mortality accounted to 8% which is similar to Mikovic study et all. Those who have abnormal doppler velocimetry, there is an increased incidence of still birth and IUD when compared to control group.

CONCLUSION: APGAR rate for babies with abnormal Doppler velocimetry are low when compared to control group. And also the incidence of neonatal complications after birth is also increased with abnormal dopper velocimetry. The incidence of caesarean section rate is increased among abnormal Doppler velocimetry. Thus Doppler velocimetry is a major support for the conventional antepartum surveillance especially in pre eclampsia. Abnormal doppler velocimetry alarms the obstetrician to plan the pregnancy in a tertiary care centre with a better NICU setup as it warrants effective monitoring of the patient and expert neonatal care.

Introduction:

Pre eclampsia is defined as the presence of systolic blood pressure more than 140 mmhg and diastolic blood pressure more than 90 mmhg , along with proteinuria in pregnant women. It usually occurs after 20 weeks of pregnancy or sometimes earlier when there is multi-fetal pregnancy or molar pregnancy. The incidence is 5- 10 % of pregnancies. It is a pregnancy specific disease and is associated with high maternal and fetal morbidity and mortality.

Berg and colleagues reported that 16% of 3201 maternal death in the united states from 1991 to 1997 were complications of gestational hypertension. During this study, black women had 3% times higher mortality compared with the white women.The pathophysiology is characterized by a failure of trophoblastic invasion of spiral arterioles, leading to the maladaptation of maternal spiral arterioles which is associated with increased vascular resistance of the uterine artery and decreased perfusion of the placenta.Spiral arterioles plays an significant role in pre eclampsia. The structural and physiological changes in the normal spiral arterioles may lead to the development of pre eclampsia. The precise cause of the vascular endothelial dysfunction, an important factor in etiopathogenesis of pr- eclampsia remains unclear. The complications of severe pre eclampsia could be prevented by prompt diagnosis of high risk cases, antenatal care and timely intervention. Doppler plays a significant role in antepartum fetal surveillance. Early and accurate detection of abnormal doppler velocimetry demands the Obstetrician to plan accordingly and thereby improving the perinatal outcome.

AIMS AND OBJECTIVES

To study the association between pre eclampsia and abnormal doppler velocimetry of triple vessel Uterine artery, Umbilical artery and Middle cerebral artery. Perinatal outcome with abnormal doppler velocimetry in patients with pre eclampsia

REVIEW OF LITERATURE

HISTORY

History of eclampsia starts from Hippocratic writings(430-330 BC). In the year (384 – 322 BC) Aristotle was the first to realise that the fetal nutrients are transferred through the umblical cord , which is the only source of connection between the mother and fetus. He also realised that the fetus is fully surrounded by membranes. De-La Motte, in the year 1726, considered that unless associated with convulsions, the oedema is mostly benign.

In 18th century, the idea of proteinuria linked with eclampsia was identified and during the same period, association between oedema, headache and blurred vision were also remarked.

In 19th century, pre eclampsia was studied in a large manner. As a result of these researches, hypertension was identified as an important factor in pre eclampsia. The triad of oedema, hypertension and proteinuria which often precedes the convulsion was came to known as pre eclampsia.

The Doppler effect is "apparent change observed in the frequency of a sound wave caused by relative motion between the source and the observer". The Doppler effect applies only when the motion is directly towards or away between the source and the observer. This was discovered by an Australian physicst & Mathematician, "Christian Andreas Doppler".

The Seattle research team developed pulsed wave Doppler equipment for the first time. This research team was headed by Dennis Watkins, John Rein and Donald Baker. The project was started way back in 1966. Duplex instrumentation was also first constructed by this Seattle team. Single transducer crystal does both Doppler and imaging function on a time-sharing basis. This is helpful for the operator to detect the target of Doppler insonation

by the Duplex Doppler technique. This discovery marks a milestone in the obstetric and gynaecological field.

METHODOLOGY

In this study, antenatal pregnant women – Primigravida with Pre-eclampsia were identified and who filled the criteria mentioned above were enrolled as study group. And same number of normotensive patients were enrolled as control group. For each patient, history as mentioned in the proforma was taken followed by a general, physical, systemic and obstetric examination.

Ultrasound was done in these patients and doppler ultrasound of the uterine artery,umbilical artery and Middle cerebral artery were noted.

Doppler ultrasound was done with duplex doppler system.

The patient was placed in supine position with left lateral tilt of 15 degree to avoid caval compression.

UTERINE ARTERY:
Uterine artery was examined with the probe kept 3 cm medial to anterior superior iliac spine and directed towards the lateral wall of the uterus. The cross over of the uterine artery and the external iliac artery was identified and the sample site was chosen. Waveforms were recorded from both uterine arteries.

UMBILICAL ARTERY:
Flow velocity waveforms were recorded from the free floating loops in mid position. The diagnosis of absent end diastolic flow or reversed end diastolic flow were made when same doppler patterns was demonstrated in three separate sampling sites.

MIDDLE CEREBRAL ARTERY:
Waveforms are recorded from MCA as it courses through the lateral sulcus.

RESULTS AND DISCUSSION:

TABLE :1

PARAMETERS	STUDY	CONTROL	CHI SQUARE	P
1. AGE				
< 20 YEARS	5	6	0.3126	0.8553 NOT SIGNIFICANT
20-30 YEARS	93	91		
>30 YEARS	2	3		
2.UTERINE ARTILLERY PATTERN				
PRESENT	27	0	31.21	<0.0000001
ABSENT	73	100		
3.UTERINE ARTERY HIGH RESISTANCE				
PRESENT	27	0	31.21	<0.0000001
ABSENT	73	100		
4.UTERINE ARTERY/ EARLY DIAGNOSTIC NOTCH				
PRESENT	28	0	32.56	<0.0000001
ABSENT	72	100		
5.UMBILICAL ARTERY PATTERN				
PRESENT	55	0	75.86	<0.0000001
ABSENT	45	100		
6.UMBILICAL ARTERY HIGH RESISTANCE				
PRESENT	56	0	77.78	<0.0000001
ABSENT	44	100		
7.UMBILICAL ARTERY AEDF				
PRESENT	54	0	73.97	<0.0000001
ABSENT	46	100		
8.UMBILICAL ARTERY REDF				
PRESENT	29	0	33.92	0.000008149
ABSENT	71	100		
9.MCA PATTERN				
PRESENT	17	0	18.58	0.000008149
ABSENT	83	100		
10.MCA IDF				
PRESENT	17	0	18.58	0.000008149
ABSENT	83	100		

SUMMARY:

In this prospective study in a set up of tertiary level care, significance of Doppler indices abnormality and its perinatal outcome have been evaluated among pre eclamptic patients.

In the study with uterine artery, 27% were found to have abnormal pattern ,27% with uterine artery high resistance and 28% showed uterine artery early diastolic notch in study group.

With the study of umbilical artery in the study group, 55% were found to have abnormal pattern, 56% with umbilical artery high resistance, 54% with absent end diastolic flow and 29% with reversed end diastolic flow. 17% were found to have abnormal middle cerebral artery pattern among the study group.

Cesarean section rate incidence was higher in the study group (43%) compared with the control group (17%).Neonatal mortality accounted to 8% which is similar to Mikovic study et all.

CONCLUSION:

200 Patients were taken for my study. Out of which 100 belong to control group and 100 were in study group. In study group there is an increase in the doppler abnormality among all three major vessels which includes uterine artery, umbilical artery and middle cerebral artery. Umbilical artery and middle cerebral artery doppler abnormality are a better indicator of perinatal outcome. Those who have abnormal doppler velocimetry, there is an increased incidence of still birth and IUD when compared to control group.

Similarly one minute and five minute APGAR rate for those babies are low when compared to control group. And also the incidence of neonatal complications after birth is also increased with abnormal dopper velocimetry. The incidence of caesarean section rate is increased among abnormal Doppler velocimetry.

Thus Doppler velocimetry is a major support for the conventional antepartum surveillance especially in pre eclampsia.

Abnormal doppler velocimetry alarms the obstetrician to plan the pregnancy in a tertiary care centre with a better NICU setup as it warrants effective monitoring of the patient and expert neonatal care.

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