COLOUR DOPPLER STUDY OF FOETOMATERNAL CIRCULATION IN PIH, OLIGOHYDRAMNIOSES AND ITS PERINATAL OUTCOME

Bhavana S, Sowmya S

1Junior Consultant, Department of Obstetrics and Gynaecology, Motherhood Hospital, Bangalore, Karnataka, India. 2Assistant Professor, Department of Obstetrics and Gynaecology, Basaveshwar Medical College, Chitradurga, Karnataka, India.

ABSTRACT

BACKGROUND
Hypertensive disorders of pregnancy are one of the most common complications that affect the mother. It is one of the leading causes of maternal and foetal morbidity and mortality. Oligohydramnios is defined by Phelan1 as AFI <5 cm but Jeng2 et al proposed a cut off of 8 cms demonstrating increased incidence of meconium staining, caesarean delivery for foetal distress. Abnormal foetal heart rate pattern and Apgar score of 7/less at one minute when AFI was < 8. The aim of the study is to evaluate and study the foetomaterna circulation using colour Doppler in hypertensive disorders of pregnancy and oligohydramnios in third trimester so that we may predict various complications that may arise and to follow the foetal outcome.

MATERIALS AND METHODS
This observational study has been carried out in the department of Obstetrics and Gynaecology, Sri Adichunchanagiri Institute of Medical Sciences, B. G. Nagara, in pregnant women attending OPD/admitted and satisfying the inclusion (PIH and oligohydramnios in third trimester) and exclusion criteria, during the period November 2012 to October 2014. Doppler study was conducted in all these high-risk cases.

RESULTS
Out of 100 high risk cases, 56% had hypertension, 24% had Oligohydramnios and 20% had both hypertension and Oligohydramnios. Majority of the patients (48%) were in the mean age group of 21-25 years. In uterine artery Doppler study, abnormal RI >0.6 was present in 11%, PI >1.1 in 25% and S/D ratio >2.6 in 24%. 39% showed persistence of notching in uterine artery. Umbilical artery Doppler revealed, abnormal RI >0.6 in 58%, PI > 1 in 39% and abnormal S/D ratio >3 in 29%. Majority were term at the time of termination. 58% of neonates had a mean birth weight of <2.5 kg. Meconium staining was present in 40% of babies and low APGAR < 7 at 1 min and 5 mins in 19%. NICU admission was needed for 38% of babies. 12% perinatal mortality was observed.

CONCLUSION
Present study conducted in high risk pregnancies with Doppler parameters, revealed those with abnormal Doppler study had an adverse outcome. Hence, Doppler study has got a better prediction of adverse perinatal outcome and thus provide the obstetrician adequate time during which early intervention can be made, to improve foetal outcome.

KEY WORDS
Hypertension, Oligohydramnios, Doppler Study, Perinatal Mortality.
The availability of colour Doppler facility in Adichunchanagiri Institute of Medical Sciences, facilitated the study of role of colour Doppler evaluation of foetomaternal circulation in hypertensive disorders of pregnancy and oligohydramnios.

**Aims and Objectives**

The aim of the study is to evaluate and study the foetomaternal circulation using colour Doppler in hypertensive disorders of pregnancy and oligohydramnios in third trimester so that we may predict various complications that may arise because of the above mentioned and to follow the foetal outcome.

**MATERIALS AND METHODS**

**Design**
The study was observational study.

**Study Period**
Two year.

**Sample Size**
Patients attending Sri Adichunchanagiri Institute of Medical Sciences with complains of PROM were examined and subjects fulfilling inclusion criteria were selected for the study. Study by convenient sample size technique since the duration of the study was 2 Year.

**Source of Data**
This observational study Conducted on 100 patients, was carried out in the department of Obstetrics and Gynaecology, out of 100 high risk cases, 56% had hypertension, 24% had Oligohydramnios and 20% had both hypertension and Oligohydramnios. The patients were included in the trial after due consideration of inclusion and exclusion criteria. Majority of the patients (48%) were in the mean age group of 21-25 years, Sri Adichunchanagiri Institute of Medical Sciences, B.G. Nagar, in pregnant women attending OPD/admitted and satisfying the inclusion and exclusion criteria for 24 months. Study by convenient sampling technique since the duration of the study was 24 Months.

**Inclusion Criteria**
**Colour Doppler Study in Pregnant Women with >28 Weeks of Gestation having**

a) Hypertensive disorders of pregnancy.
   - Gestational Hypertension.
   - Pre-Eclampsia.
   - Eclampsia.

b) Oligohydramnios: AFI<8 cm.

**Exclusion Criteria**
**Pregnant Women with**

- Chronic Renal Diseases.
- Severe Malnutrition.
- Chronic Hypertension.
- Hypertension due to other causes like vascular, endocrinal, neurogenic.
- Symmetrical IUUGR due to genetic causes and infection, chromosomal disorders occurring in 1st trimester.

**Collection of Data**
The salient features of proforma included name, age, obstetrical history, history of present illness including headache, visual disturbance, epigastric pain, increased blood pressure on antenatal check-up, decreased foetal movements and past and personal history of pre-edempsia, the findings of general physical examination (GPE) and systemic examination especially abdominal and vaginal examination. Patients were assessed on the basis of history, clinical examination, ultrasound and laboratory investigations.

**RESULTS**

**Age Distribution according to High Risk Category**
Majority of the patients, in both hypertension group (44.7%) and Oligohydramnios group (58.3%) belonged to mean age group of 21-25 years.

**Socioeconomic Status of the Patients**
Patients were categorized based on their socioeconomic status into three division’s viz. Upper middle and lower, according to Kuppuswamy Scale.
Doppler findings in Umbilical Artery using all Parameters
Out of 58% having abnormal diastolic flow in umbilical artery, 49% had decreased diastolic flow, absence of end diastolic flow velocity in 3% (3 patients) and reversal in 6% of patients.

Adverse Perinatal Outcome in Present Study
Out of 100 cases, 34 patients had preterm delivery, 3 had still birth, foetal distress was present in 24 cases, meconium staining in 40 cases, low APGAR in 19 cases, 38 needed NICU admission and neonatal deaths were noted.

DISCUSSION
Present study comprises of 100 high risk cases and among these, maximum number of patients were in the mean age group of 21-25 years. Only 30% of the patients were booked in our hospital. As this is a tertiary centre, most cases were referred and presented as unbooked emergencies. 46% of patients belonged to low socioeconomic class, as per modified Kuppuswamy classification.

Out of 100 high risk cases, 56% had hypertension, 24% had oligohydramnios and 20% had both hypertension and oligohydramnios.

Among 76 patients having hypertension, 44.7% were in the mean age group of 21-25 years. These results were similar to the study conducted by Smitha k et al.6. Patients were recruited for the study irrespective of their parity, out of 100 patients, 51% of patients were primigravidae and 49% were multigravida. Among 76% hypertensive patients, 51% were multigravida. In Oligohydramnios group, majority (58%) were Primigravida.

Patients with earlier History of PIH and with Family History of Hypertension
In present study 76% (76 patients) were hypertensives. In these, 9.2% had H/o PIH in previous pregnancy and 2.6% had positive family history.

Umbilical artery PI
In 39% (39 patients) of the patients umbilical artery PI was elevated > 1, whereas it was within normal range in 61% (61 patients).

Uterine artery RI Distribution
Out of 100 patients, 11% (11 patients) had elevated RI > 0.68 and in 89% (89 patients) it was within normal limits.

Parity of Patients
Patients were recruited for the study irrespective of their parity, out of 100 patients 51% of patients were primigravidae and 49% were multigravida. Among 76% hypertensive patients, 51% were multigravida. In Oligohydramnios group, majority (58%) were Primigravida.

Uterine artery S/D ratio
Artery S/D r Out of 100 patients with uterine artery Doppler study, 24% (24 patients) had elevated S/D ratio more than 2.6.

RI
Elevated
Normal
Total

Uterine artery RI Distribution
Out of 100 patients, 11% (11 patients) had elevated RI > 0.68 and in 89% (89 patients) it was within normal limits.

RI
No. of Cases
Percentage
Elevated
11
11%
Normal
99
99%
Total
110
100%

Table 7b. Uterine Artery RI Distribution

Umbilical artery PI
In 39% (39 patients) of the patients umbilical artery PI was elevated > 1, whereas it was within normal range in 61% (61 patients).

RI
No. of Cases
Percentage
Elevated
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11%
Normal
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99%
Total
110
100%

Table 7b. Uterine Artery RI Distribution

Umbilical artery PI
In 39% (39 patients) of the patients umbilical artery PI was elevated > 1, whereas it was within normal range in 61% (61 patients).

Parameter
No. of Cases
Percentage
Absence EDF
3
3%
Reversal EDF
6
6%
Total
9
9%

Table 8. Absence or Reversal of End Diastolic Velocity in Umbilical Artery
min and 5 min, 48.2% needed NICU admission and 12% had perinatal deaths.

Absent diastolic flow in umbilical artery was present in 3%, out of which 66% had perinatal mortality. Reversal flow was noted in 6% and all cases had perinatal death. Similar to this was noted in studies performed by Smitha k et al showing 18% with absent diastolic flow, out of which 27.3% had perinatal mortality. 8% with reversal diastolic flow and all cases had perinatal death.

MCA Doppler studies revealed low RI < 0.75 in 71%, supported by Das k et al10 54% and Hazra et al10 62%, PI <1.2 in 40%, supported by Smitha k et al 68%. Since middle cerebral artery of foetus is last to get affected in PH, Oligohydramnios due to brain sparing effect, it is expected that middle cerebral artery PI will be normal in second trimester and third trimester. Reduced PI in MCA indicates presence of decreased impedance to cerebral circulation. Such foetuses are at high risk of poor perinatal outcome.

All these high-risk cases were monitored, and termination of pregnancy was planned according to biochemical parameters, gestational age, Doppler studies.

Majority of the patients, 66% were at the mean gestational age of 37-40 weeks and 34% were preterm. Consistent to study by Pires et al12 where 59.7% were preterm and 39.4% were >37 weeks.

40% underwent vaginal delivery, out of which 50% were induced, 50% had spontaneous onset. 7.5% needed instrumental delivery. 60% had caesarean section, out of which 40% were due to foetal distress, 25% for failed induction, 16.6% for CPD and failure to progress each, 1.6% for breech presentation. Consistent to this was noted by Pires et al12 with caesarean section and vaginal delivery in 74.4% and 25.6% respectively.

58% of neonates in our study had a mean birth weight of <2.5 kg. Meconium staining was present in 40% of babies and low APGAR < 7 at 1 min and 5 mins in 19%, NICU admission was needed for 38% of babies. 62% were shifted mother side and did not need NICU admission. Among 38%, 10% had RDS, 20% for MAS and 8% for VLBW.

Of the 38% requiring NICU admissions, 30% were discharged and 0% neonatal deaths were present. of 30 neonates being discharged, 25 needed NICU stay for less than 1 week, 4 for upto 10 days and 1 neonate for upto 1 month for severe IUGR with birth weight 1.1 kg.

12% perinatal mortality was observed in my study. 1% had IUD, 3% of still births and 0% neonatal deaths of them, 3 were due to RDS, 3 due to MAS and 2 had early neonatal sepsis consistent to this was observed by Das k et al19 with 2.7% with IUD, no still births, 5.4% with early neonatal deaths respectively. Other study by Pires et al had 2% with IUD, no still births, 6.5% with early neonatal deaths.

In patients who had perinatal deaths as foetal outcome, most of them showed absent/reversal EDF, raised S/D ratio and PI in umbilical artery and majority showed decreased PI in MCA.

No maternal mortality was noted in our study.

CONCLUSION

• The objective of every pregnancy is to give birth to a live and healthy baby.

• High risk pregnancy is an obstetric emergency. One of the main aims of routine antenatal care is to identify the foetus at risk in order to apply clinical interventions which result in reduced perinatal morbidity and mortality.

• Currently, Doppler ultrasound, an evolved noninvasive technique, is widely used to assess blood flow in both foetal and maternal hemodynamic circulatory function. Due to its feasibility and safety, this new innovation has now become an effective instrument for foetal surveillance. Colour Doppler and spectral Doppler studies have further added a new dimension and has provided information which has helped in improved management of obstetric cases that were earlier hither to not salvageable.

• Present study conducted in high risk pregnancies with Doppler parameters, revealed those with abnormal Doppler study had an adverse outcome.

• To conclude, Doppler study has got a better prediction of adverse perinatal outcome and thus provide the obstetrician adequate time during which early intervention can be made to improve foetal outcome.

REFERENCES
