ORIGINAL RESEARCH PAPER

Gynaecology

DOPPLER STUDY IN IUGR IN A TERITIARY HOSPITAL.

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ABSTRACT

Background:
Doppler plays an important role in IUGRwhere hemodynamic rearrangements occur in response to fetal hypoxaemia.Itis now proved that significant Doppler changes occur with reduction in fetal growth at a time when of the fetal well being tests are still normal.
Early and accurate diagnosis of IUGR may reduce the motality and morbidity of foetuses with this condition.Successful perinatal outcome depends on proper management in the antepartum,intrapartum and neonatal period.The obstetricians must weigh the balance between 1.Conservative management in a potentially hostile environment versus,
2.Intervention which may lead to neonatal morbidity.This study explores the predictive value of fetal Doppler syudy of umbilical,middle cerebral and uterine arteies on diagnosing the adverse perinatal outcome in patients with IUGR.

AIMS AND OBECTIVES:
a)To study the association between the severity of IUGR and abnormal Doppler velocimetry of the umbilical,middle cerebral and uterine artery.
b)To evaluate the predictive value of Doppler studies in IUGR with relevance to perinatal outcome.
c)To evaluate the efficacy of Doppler inthemanagement of patients with IUGR.

Materials and Methods:
STUDY DESIGN: Prospective observational study
Source of data: This study was carried out in the antenatal caseswho deliveredat the department of Obstetrics and Gynaecology,Kilpauk medical college, Chennai. Cases were enrolled during the period from Jan 2017 to December 2017.

Results:
The prevalence of IUGR (less than 10th percentile) was8% similar to quoted by North et al 1994,(6.6%). Among the 100 patients studied 36 patients had abnormal Doppler of uterine artery ,with15 patients having unilateral notch and 3 having bilateral notch. There were 24 patients with abnormal umbilical artery Doppler ,with 6 of them having absent end diastolic flow and 8 having reversal of diastolic flow. Once an abnormal Doppler finding is identified the obstetrician is made well aware of the possible complications that can set in and the delivery should be planned in a tertiary care centres with good neonatal facilities.

Introduction:

Intrauterine growth is an important sign of fetal wellbeing .IUGR complicates 3-5% of pregnancies .It contributes significantly to perinatal morbidity and mortality.

Intrauterine growth restriction is a common clinical sign of chronic fetal hypoxaemia. It is difficult to differentiate between suboptimal fetal growth due to intrauterine starvation and adequate growth of a constitutionally small infant.

Antepartum surveillance tests to evaluate fetal health have been the focus of intense interest for more than three decades.There are many tests avaliable today each with its advantages and disadvantages.

Doppler plays an important role in IUGRwhere hemodynamic rearrangements occur in response to fetal hypoxaemia.Itis now proved that significant Doppler changes occur with reduction in fetal growth at a time when of the fetal well being tests are still normal.

Early and accurate diagnosis of IUGR may reduce the motality and morbidity of foetuses with this condition.Successful perinatal outcome depends on proper management in the antepartum,intrapartum and neonatal period.The obstetricians must weigh the balance between

1. Conservative management in a potentially hostile environment versus,
2. Intervention which may lead to neonatal morbidity.

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PREDCTION AND SCREENING OPTION FOR FETAL GROWTH RESTRICTION:

History:
As outlined above ,several risk factors can be identified at booking such as BMI<19 and maternal smoking.

Past history of IUGR increases therisk of recurrence in subsequent pregnancies.

Patients with significant medical or obstetrichistory such as chronic hypertension,severe toxaemia of pregnancy,chronic renal disease and advance insulin dependent diabetes areat high risk of having IUGR foetuses.

MATERIALS ANDMETHOD OF STUDY

STUDY DESIGN:
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Source of data:
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the departmentof Obstetrics and Gynaecology,Kilpauk medical college,Chennai.Caseswere enrolled during the period from Jan 2017 to December 2017.

INCLUSION CRITERIA:
All singleton pregnant women irrespective of age or parity complicated by IUGR which is diagnosed either clinically or ultrasonographically.

EXCLUSION CRITERIA:
a)patient with congenital anomaly of fetus
b)Multiple gestation
c)Preterm babies
d)unreliable LMP or without first trimester scan

METHOD OF STUDY:
In this study ,antenatal pregnant women complicated by IUGR were identified and who fulfilled the criteria mentioned above were enrolled as cases.For each case,history as mentioned in the proforma was taken followed by a general physical ,systemic and obstetric examination. Ultrasound was done in the cases and the following parameters namely fetal biometry estimated fetal weight,amniotic fluid index and Doppler ultrasound of the umbilical ,middle cerebral and uterine artery were noted. Doppler USG was done with duplex Doppler system(3.5Mhz). The patient was placed in supine position with left lateral tilt of 15vto avoid caval compression.

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

UMBILICAL ARTERY:
Flow velocimetry was recorded from the free floating loops in the 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.colour Doppler is used to map the circle of willis.

RESULTS:
1.DISTRIBUTION OF CASES BASED ON AGE :
100 patients delivered at government Kilpauk medical college were taken for analysis

AGE	NO OF CASES	PERCENTAGE
<20	10	10
20-30	77	77
>30	13	13

2.DISTRIBUTION OF CASES BASED ON PREGNANCY WEIGHTGAIN:

Weight gain	No.of cases	Percentage
<5kgs	9	9
6-10kgs	71	71
>11 kgs	20	20
Total	100	100

71 %had weight gain between 6-10 kgswhereas 20 % had weight gain of >11 kg due toassociated pre eclampsia,pedal edema,abdomen wall edema

3.DISTRIBUTION OF CASES BASED ON AFI

AFI	No of cases	Percentage
<5	34	34
6-10	41	41
11-15	19	19
>15	6	6
Total	100	100

4.DISTRIBUTION OF CASES Based on FL/AC:

FL/AC	Noof cases	Percentage
Normal	13	13
abnormal	87	87

5.DISTRIBUTION OF CASES BASED ON HC/AC:

HC/AC	NO of cases	percentage
Normal	18	18
abnormal	82	82

6.Uterine artery Doppler value distribution and perinatal outcome:

Uterine artery Doppler	Perinatal outcome	
	Normal	Abnormal
Normal(64)	54	10
Abnormal(36)	14	22

7.Umbilical artery doppler value distribution and perinatal outcome:

Umbilical artery Doppler	Perinatal outcome	
	Normal	Abnormal
Normal(76)	68	8
Abnormal(24)	5	19

8.Middle cerebral artery value distribution and perinatal outcome:

MCA Doppler	Perinatal outcome	
	Normal	Abnormal
Normal(86)	68	8
Abnormal(14)	5	19

9.CORRELATION OF UTERINE ARTERY DOPPLER WITH PREGNANCY OUTCOMES:

Uterine artery doppler	Pre eclampsia	IUGR	NICU admission
S/D ratio	33	33	22
RI	29	29	14
Early diastolic notch	38	38	25

10.CORRELATION OF UMBILICAL ARTERY DOPPLER WITH PREGNANCY OUTCOMES:

Umbilical artery doppler	Pre eclampsia	IUGR	NICU admission
S/D ratio	60	40	22
RI	13	25	12
Absent diastolic flow	100	100	0

11.STATISTICAL SIGNIFICANCE OF DOPPLER STUDIES:
UTERINE ARTERY STUDIES:

UTERINE ARTERY	Perinatal outcome	
	abnormal	Normal
Abnormal	22(a)	14(b)
Normal	10(c)	54(d)
Total	a +c=32	b+d=68

Sensitivity=68.75%
Specificity=54.68%
Positive predictive value=61.1%
Negative predictive value=84.37%
Percentage offalse positive=38.8%
Percentage of false negative=31.25%
P value=   <0.001 significant
This study shows uterine artery Doppler stydy has statistically significant role in adverse perinatal outcome.

12.UMBILICAL ARTERY STUDIES

UMBILICAL ARTERY	Perinatal outcome	
	abnormal	Normal
Abnormal	19(a)	5(b)
Normal	8(c)	68(d)
Total	a +c=27	b+d=73

Sensitivity=70.37%
Specificity=93.15%
Positive predictive value=79.16%
Negative predictive value=89.47%
Percentage offalse positive=20.83%
Percentage of false negative=29.62%
P value=   <0.001 significant

This study shows umbilical artery Doppler study has statistically significant role in adverse perinatal outcome.

MCA STUDIES

MCA values	Perinatal outcome	
	abnormal	Normal
Abnormal	14(a)	0(b)
Normal	8(c)	78(d)
Total	a +c=22	b+d=78

Sensitivity=63.67%
Specificity=100%
Positive predictive value=100%
Negative predictive value=90.69%
Percentage offalse positive=38.83%
Percentage of false negative=36.36%
P value=   <0.001 significant

This study shows MCA study has statistically significant role in adverse perinatal outcome.

SUMMARY:

In this prospective study in a set up of tertiary level care centre,whose inflow,includes Indian women from rural sector,the predictive values of various dopplerstudies have been evaluated.

The prevalence of IUGR (less than 10th percentile) was8% similar to quoted by North et al 1994,(6.6%)

Among the 100 patrients studied 36 patients had abnormal Doppler of uterine artery ,with15 patients having unilateral notch and 3 having bilateral notch.

There were 24 patients with abnormal umbilical artery Doppler ,with 6 of them having absent end diastolic flow and 8 having reversal of diastolic flow.

Out of these 100 patients studied ,33 patients developed pre eclampsia.This is similar to the results obtained by Kurdi et al.It is seen that notch in uterine artery is a better predictor of preeclampsia.This is genital to obvious by Bower et al 1993,Chan et al 1995 and angta rlis et al 2000.

The sensitivity ,specificity,positive predictive and negative predictive value of uterine artery in predicting perinatal outcome is 68.75%,54.68%,61.1% and84.37%

This is similar to opinion by Irion et al and Bower et al.
The sensitivity ,specificity,positive predictive and negative predictive value of umbilical artery in predicting perinatal outcome is 70.37%,93.15%,79.16%,89.47%

This is similar to opinion by Alkension et al and Beathe dorman et al.
The sensitivity ,specificity,positive predictive and negative predictive value of umbilical artery in predicting perinatal outcome is 63.63%,100%,100% and 90.69%

Conclusion:

1. IUGR foetuses with abnormalumbilical, middle cerebral and uterine flow velocity are at significantly greater thanthose with normal study.
2. Diastolic notch in uterine artery as a single parameter is better than the individual Doppler indices in uterine artery in predicting pre eclampsia
3. Umbilical(AEDF or RDF) and MCS(increased diastolic flow)

Doppler velocimetry is a better predictor of fetal growth restriction and perinatal outcome.

4. Dopplervelocimetry can be an important adjunct to conventional antepartum fetal surveillance tests on patients with IUGR foetuses.
5. Abnormal Doppler alone should not warrant an obstetric intervention if other antepartum fetal surveillance tests are reassuring.
6. Once an abnormal Doppler finding is identified the obstetrician is made well aware of the possible complications that can set in and the delivery should be planned in a tertiary care centres with good neonatal facilities.

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