



**To study the Doppler indices in high risk third trimester pregnancies**

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**Abstract**

**Background:** Pregnancy can be considered as the most beautiful period of a woman’s life. The recent medical advances are helpful in taking very good care of the female throughout her pregnancy.

**Methods:** The present study was an observational prospective study of Doppler velocimetry in predicting perinatal outcome in high risk pregnancies in Department of Radio-Diagnosis and Modern Imaging, Sardar Patel Medical College & Associate Group of PBM Hospitals, Bikaner.

**Results:** Present study showed that in all high risk pregnancies, the ratio of resistive index of middle cerebral artery / umbilical artery was more sensitive (92.3%) and had higher positive predictive value (92.3%) than resistive index of umbilical artery and resistive index of middle cerebral artery in predicting adverse fetal outcome.

**Conclusion:** One of the main goals of antepartum fetal monitoring is to identify the fetuses at increased risk for

perinatal morbidity and mortality. Doppler technology had a significant impact on our ability to assess the physiological status of the fetus. It can help in identifying the changes in the fetal circulation at a time when other tests are normal, identifies the truly hypoxic fetus.

**Keywords:** Pregnancy, Doppler, Morbidity.

**Introduction**

Pregnancy can be considered as the most beautiful period of a woman’s life. The recent medical advances are helpful in taking very good care of the female throughout her pregnancy. The pregnancy is constantly observed by clinical examination, laboratory investigations and radiographic examinations at specific intervals throughout its course. The use of Doppler ultrasound has been recently introduced for the study of fetal circulation and various vessels including the uterine artery, umbilical artery and middle cerebral artery (MCA)<sup>(1)</sup>.

In obstetrics, the use of Doppler ultrasound to study blood flow is of major importance because fetal inaccessibility precludes many other methods of the study of fetal hemodynamics<sup>(2)</sup>.

Doppler velocimetry is a rapid non-invasive test that provides valuable information about hemodynamic situation of the fetus and is an efficient diagnostic test of fetal jeopardy which helps in timely intervention and management of high risk pregnancy for better perinatal outcome.<sup>(3)</sup>

### Materials And Methods

**Study Area:** Department of Radio-diagnosis, SPMC & A.G. OF PBM Hospitals, Bikaner.

**Sample Size:** 50 patients.

**Duration Of Study:** March 2018 till desired sample reached.

**Inclusion criteria:**Third trimester pregnancies (28 weeks and beyond) with

- Pregnancy Induced Hypertension (PIH)

### Observations

Table: 1 High risk pregnancies included in the study

HIGH RISK FACTOR	NO. OF CASES	%
IUGR	33	66
PIH	26	52
ANEMIA	10	20
OLIGOHYDRAMNIOS	10	20
PREV.CAESAREAN SECTION	5	10
DIABETES	3	6
RH ISOIMMUNISATION	3	6
POLYHYDRAMNIOS	2	4

The table shows that majority of the cases included in high risk pregnancies were intrauterine growth

- Oligo/Polyhydramnios
- Anaemia
- Diabetes Mellitus
- Rh isoimmunisation
- Previous CS

### Exclusion Criteria

- 1st trimester pregnancies
- 2nd trimester pregnancies
- Multifetal pregnancy

### Abnormal perinatal outcome

The perinatal outcome was considered abnormal when any one or a combination of the following was present.

- 1) Intrauterine death
- 2) Perinatal death
- 3) Fetal distress
- 4) Low birth weight

restricted pregnancies (68%) followed by pregnancy induced hypertension.

Table: 2 Distribution of perinatal outcomes in high risk pregnancies

PERINATAL OUTCOME	NO. OF CASES	%
IUD	7	14
PERINATAL DEATH	3	6
FETAL DISTRESS	13	26
LOW BIRTH WEIGHT	16	32
GOOD	11	22
TOTAL	50	100

Low birth weight (32%) is most common fetal outcome followed by fetal distress (26%).

Table: 3 Test performance value for RI of umbilical artery (UA)

PARAMETER	VALUE	PARAMETER	RESULTS%
TRUE POSITIVE	24	SENSITIVITY	61.3
TRUE NEGATIVE	8	SPECIFICITY	72.7
FALSE POSITIVE	3	PPV	88.8
FALSE NEGATIVE	15	NPV	34.8

RI of umbilical artery is 61.3% sensitive and 72.7% specific in predicting adverse fetal outcome.

Table: 4. Test performance value for S/D ratio of umbilical artery (UA)

PARAMETER	VALUE	PARAMETER	RESULTS%
TRUE POSITIVE	27	SENSITIVITY	69.2
TRUE NEGATIVE	7	SPECIFICITY	63.6
FALSE POSITIVE	4	PPV	87.1
FALSE NEGATIVE	12	NPV	36.8

S/D of umbilical artery is 69.2% sensitive and 63.6% specific in predicting adverse fetal outcome.

Table: 5 Test performance value for RI of middle cerebral artery (MCA)

PARAMETER	VALUE	PARAMETER	RESULTS%
TRUE POSITIVE	10	SENSITIVITY	25
TRUE NEGATIVE	7	SPECIFICITY	70
FALSE POSITIVE	3	PPV	76.9
FALSE NEGATIVE	30	NPV	18.9

RI of middle cerebral artery is 25% sensitive and 70% specific in predicting adverse fetal outcome.

Table: 6 Test performance value for ratio of RI of MCA/ UA

PARAMETER	VALUE	PARAMETER	RESULTS%
TRUE POSITIVE	36	SENSITIVITY	92.3
TRUE NEGATIVE	8	SPECIFICITY	72.7
FALSE POSITIVE	3	PPV	92.3
FALSE NEGATIVE	3	NPV	72.7

The ratio of MCA / UA RI was the most sensitive (92.3%) and specific (72.7%) in predictive value in predicting adverse fetal outcome in high risk pregnancies.

Table: 7 Test performance value for S/D ratio of uterine artery

PARAMETER	VALUE	PARAMETER	RESULTS%
TRUE POSITIVE	8	SENSITIVITY	20.5
TRUE NEGATIVE	9	SPECIFICITY	81.8
FALSE POSITIVE	2	PPV	80
FALSE NEGATIVE	31	NPV	22.5

S/D of uterine artery is 20.5% sensitive and 81.8% specific in predicting adverse fetal outcome.

### Discussion

In developing countries, there is a high prevalence of adverse perinatal outcomes, of which perinatal mortality is indicative of health development in the country. In the recent decade, Doppler ultrasound has been identified as a part of examination in midwifery. Due to the incidence of hemodynamic changes in uteroplacental vessels and fetus before clinical incidence of midwifery complications, the placental and fetal immaturity could be diagnosable through blood flow measurement.

Thus, the objective of this study is to evaluate the role of fetal Doppler in detection of any hemodynamic changes at the earliest and to assess the placental dysfunction and the consequences of this on fetal growth and well-being.

**Maulik D et al**<sup>(4)</sup> did a study in 350 high risk patients with umbilical artery Doppler and foetal outcome was noted. The sensitivity of S/D ratio was 79% specificity

93%, Positive Predictive Value 83% and Negative Predictive Value 91%.

In the study done by **Pere-Joan Torres and co-worker**<sup>(5)</sup> on hypertensive pregnancies, abnormal resistance index of the umbilical artery showed a high specificity (95.16%), positive predictive value (83.33%) and negative predictive value (86.76%). Sensitivity was 62.5%. It was concluded that umbilical artery Doppler velocimetry is a useful tool to assess fetal well being in hypertensive pregnancies.

According to the study done by **SerapYalti and co-workers**<sup>(6)</sup> on hypertensive pregnancies, with respect to adverse perinatal outcomes, umbilical Doppler indices alone had sensitivity of 30% and positive predictive value of 50%.

### Conclusion

One of the main goals of antepartum fetal monitoring is to identify the fetuses at increased risk for perinatal morbidity and mortality. Doppler technology had a significant impact on our ability to assess the physiological status of the fetus. It can help in

identifying the changes in the fetal circulation at a time when other tests are normal, identifies the truly hypoxic fetus.

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