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**Original Research Article**

# Analysis of fetal growth restriction in pregnancy in a tertiary care hospital

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## ABSTRACT

**Background:** IUGR is a major cause of perinatal morbidity, perinatal mortality and both short-term and life-long morbidities. New protocols for the diagnosis and management of late onset FGR need to be implemented.
**Methods:** A retrospective observational study was conducted in the Department of Obstetrics and Gynaecology, Shri Lal Bahadur Shastri Government medical college Mandi, Himachal Pradesh for period of one year from 1st January 2023 to 31st December 2023.
**Results:** Total incidence of fetal growth restriction was 773 (16.9%). Most common age group was 31 to 35 year. In 58.3% patients, the cause of fetal growth restriction was unknown. The second commonest cause was hypertensive disorder of pregnancy (23.2%). Majority had vaginal delivery. There were 38.31% NICU admissions and 11.49% premature neonates.
**Conclusion:** This study analyses the risk factors which can be used for screening and vigilant monitoring of antenatal patients with fetal growth restriction and preventing iatrogenic preterm termination of pregnancy and improving the perinatal outcome. Strict fetal surveillance is keystone to good perinatal outcome.

**Keywords:** FGR, Doppler, Fetal surveillance

## INTRODUCTION

Currently, the American College of Obstetricians and Gynecologists (2021) and the Society for Maternal-Fetal Medicine (2020) recommend defining FGR as either an EFW <10th percentile for gestational age or an AC <10thpercentile for gestational age.[1] IUGR is a major cause of perinatal morbidity, perinatal mortality, and both short-term and life-long morbidities.[2]

Although the terms intrauterine growth restriction (IUGR), fetal growth restriction (FGR), and small for gestational age (SGA) are used interchangeably, IUGR and FGR identify pathologically small fetuses, whereas SGA indicates a fetus below a specific cutoff without designation of pathology.[2] Importantly, as many as 70 percent of SGA newborns are not pathologically growth restricted. In low-risk pregnancies, the diagnosis is suspected based on clinical abdominal examination after 24 weeks' gestation in which the fundal height lags by ≥3 cm. Sonography is then performed. If the pregnancy is at risk for FGR, sonography is considered to assist with detection. This is performed at approximately 32 weeks' gestation.[1]

The most adverse outcomes occur in newborns smaller than the 3rd percentile (Manning).[3] The incidence of fetal growth restriction varies depending upon the population residing in the developing and developed countries with an incidence rate of 6-30% to 2-5% in these countries, respectively.[4,5] IUGR remained the second leading cause of perinatal mortality following prematurity.[6] New protocols for the diagnosis and management of late onset FGR need to be implemented.[7,8]

## METHODS

### *Study type*

It was a retrospective observational study.

### *Study place*

was conducted in the Department of Obstetrics and Gynaecology, Shri Lal Bahadur Shastri Government medical college Mandi, Himachal Pradesh.

### *Study duration*

The study period of one year from 1st January 2023 to 31st December 2023.

### *Inclusion criteria*

All booked and unbooked cases of pregnant women having an estimated fetal weight less than the 10th percentile in any ultrasound scan.

### *Exclusion criteria*

Patients with fetal structural or chromosomal anomalies. Patients with uncertain gestational age.

### *Data collection*

Clinical data of the Patients presenting with fetal growth restriction was obtained from the delivery records and analysed. The detailed records of clinical history, gestational age, maternal and perinatal outcomes were collected from hospital delivery register and case files.

Age of the patient, occupation, place of residence, education level, socio economic status, booking status, parity, BMI, previous history of stillbirth or abortion, ultrasound growth parameters, doppler velocimetry, mode of delivery were recorded on performa. APGAR score, birth weight of babies, complications resulting in the admission in NICU were also recorded.

### *Statistical analysis*

Data was entered in excel and analysed by using software SPSS 17.

## RESULTS

Total number of deliveries was 4548 in one year study period from 1st January to 31st December 2023.Total incidence of Fetal growth restriction was 773(16.9%). Most common age group was 31 to 35 years affecting 386(49.9%) cases followed by 26-30 years affecting 160(20.6%) pregnancies. Incidence of fetal growth restriction was more in primigravida patients. In 451 (58.3%) patients, the cause of fetal growth restriction was unknown. The second commonest cause was hypertensive disorder of pregnancy (23.2%).

**Table 1: Age distribution.**

| Age group (in years) | n=773 | % |
|---|---|---|
| **<20** | 20 | 2.58 |
| **20-25** | 127 | 16.42 |
| **26-30** | 160 | 20.6 |
| **31-35** | 386 | 49.9 |
| **36-40** | 70 | 9.05 |
| **>40** | 10 | 1.29 |

**Table 2: Parity.**

| | n=773 | % |
|---|---|---|
| **Primigravida** | 541 | 69.98 |
| **Multipara** | 232 | 30.02 |

**Table 3: Causes of FGR.**

| Causes of FGR | n=773 | % |
|---|---|---|
| **First trimester bleeding** | 41 | 5.3 |
| **Hypertensive disorder of pregnancy** | 180 | 23.2 |
| **Anaemia** | 70 | 3.8 |
| **Heart disease** | 4 | 0.51 |
| **Antepartum hemorrhage** | 12 | 1.55 |
| **APLA** | 5 | 0.64 |
| **Twin pregnancy** | 10 | 6.46 |
| **Unknown cause** | 451 | 58.3 |

**Table 4: Sonographic results.**

| Ultrasound findings | | |
|---|---|---|
| **AFI** | **n=773** | **%** |
| **<5 cm** | 60 | 7.76 |
| **5-8 cm** | 213 | 27.55 |
| **>8 cm** | 500 | 64.68 |
| **Birth weight** | | |
| **<3$^{rd}$ percentile** | 122 | 15.78 |
| **>3$^{rd}$ percentile** | 651 | 84.21 |
| **NST reactive** | 723 | 93.53 |
| **NST nonreactive** | 50 | 6.46 |

**Table 5: Doppler findings.**

| Doppler findings | n=773 | % |
|---|---|---|
| **Normal doppler** | 551 | 71.28 |
| **Umbilical artery S/D >3** | 100 | 12.9 |
| **Decreased flow in UA** | 95 | 12.2 |
| **MCA PI < 5$^{th}$ percentile** | 5 | 0.64 |
| **CPR pathological <5$^{th}$ percentile** | 5 | 0.64 |
| **Absent diastolic flow in UA** | 12 | 1.55 |
| **Reverse diastolic flow in UA** | 5 | 0.64 |

**Table 6: Mode of delivery.**

| Mode of delivery | n=773 | % |
|---|---|---|
| **Vaginal delivery** | 502 | 64.95 |
| **Caesarean section** | 271 | 35.05 |

**Table 7: Perinatal outcome.**

| | n=783 (773+10 twins) | % |
|---|---|---|
| **Prematurity** | 90 | 11.49 |
| **Antepartum IUD** | 5 | 0.63 |
| **Fresh stillbirth** | 4 | 0.51 |
| **Normal APGAR** | 352 | 44.95 |
| **NICU admission** | 300 | 38.31 |
| **Birth asphyxia** | 28 | 3.57 |
| **Neonatal death** | 4 | 0.51 |

On ultrasound there was severe oligohydroamnios in 60 (7.76%), birth weight was less than third percentile in 122 (15.78%) and NST nonreactive in 50 (6.46%). 551 (71.28%) cases had normal doppler whereas absent diastolic flow in umbilical artery was observed in 12 (1.55%) and reversed diastolic flow in 5 (0.64%). Majority 502 (64.95%) had normal vaginal delivery. There were 300 (38.31%) NICU admissions and 90 (11.49%) premature neonates.

## DISCUSSION

In our study, the incidence of fetal growth restriction was 773 (16.9%) out of total 4548 deliveries in one year study period. According to national perinatal database, the incidence of FGR is said to be 9.65% among new born.[9] In the study by Rangarajan et al and Chandra et al, incidence of FGR was 14.1%.[10] In our study majority of pregnant women were in age group 31-35 years (49.9%) while in study Singh A et al, Satyavrathan V et al and Shenoy et al the most affected group was 25-34 years.[12-14] In our study ,majority of patients were primigravida (69.98%) which coincides with 72% in the study by Seal et al.

Primiparity is an independent risk factor for intrauterine growth restriction.[15] In our study, the cause was unknown in 58.3% cases. The second most common cause was hypertensive disorders of pregnancy (23.2%) which is similar to study by Shenoy (24.39%).[14] Placentation is the determinant for developing early or late onset FGR.[7] Our 5 patients were antiphospholipid antibody positive. According to Williams, Anti-β2 glycoprotein-I antibodies may have a stronger association with FGR, particularly early-onset disease.[1] Doppler studies are non-invasive and involve maternal uterine arteries (Ut A), Fetal Umbilical artery (UA) for the placenta, Middle cerebral artery (MCA) for preferential brain perfusion and cerebro-placental ratio.[16,17]

Doppler helps in fetal surveillance and timely intervention to prevent fetal acidosis and fetal death. In our study, 64.55% had vaginal delivery which is similar to study by Rangarajan et al (62.4%).[10] Due to strict CTG monitoring in our institute, we succeeded in vaginal deliveries. The indications for cesarean section were mainly fetal distress, meconium-stained amniotic fluid, non-reactive NST, absent end diastolic flow or reversed end diastolic flow in umbilical artery. In our study,11.49% babies were premature due to iatrogenic termination of pregnancy due abnormal Doppler, nonreactive NST or severe oligohydroamnios. The inverse relationship between abnormal BPP scores and presence of fetal distress, FGR, NICU admissions were described by Manning et al.[3] Perinatal morbidity and even neonatal outcome depends on prematurity, fetal distress, APGAR and low birth weight.

## CONCLUSION

The incidence of fetal growth restriction has increased with rise in hypertensive disorders of pregnancy and elderly pregnancies. This study analyses the risk factors which can be used for screening and vigilant monitoring of antenatal patients with fetal growth restriction and preventing iatrogenic preterm termination of pregnancy and improving the perinatal outcome. Strict fetal surveillance is keystone to good perinatal outcome.

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