

Research Paper—OB & GYN



Feb, 2010

## Analytical Study of Cases of Intra Uterine Growth Restriction

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**OBJECTIVE(S):** - 1. Identify high risk cases, 2. Early recognition of IUGR, 3. Study etiological factors and management options, 4. Evaluate overall outcome in terms of Perinatal mortality and morbidity.

**MATERIALS AND METHODS:** Pregnancies with IUGR have been studied prospectively and their outcome analyzed. 50 cases with IUGR have been studied and compared with an equal size of control group. Detailed history and ANC checkup, laboratory investigations, fetal wellbeing assessment, serial USG and colour doppler were done. Data was analyzed and compared.

**RESULTS:** Moderate to severe Malnutrition (64%) and moderate to severe PIH (44%) were two commonest factors found responsible for IUGR. Regular ANC visits, Serial fundal height examination, fetal weight estimation, maternal weight gain, and DFMC have high diagnostic and prognostic value. Serial USG is very helpful for diagnosing IUGR. HC, HC/AC ratio, approximate fetal weight, AFI and placental grading are more valuable than FL and BPD only. Persistence of diastolic notch in uterine artery beyond 24 wks, increase resistance, AEDF, REDF and increased flow in MCA in colour doppler were studied. Abnormal flow is present in 56.09% of subjects. 78.26% had abnormal UA flow, 65.21% had abnormal Uterine artery flow and 47.82% had abnormal flow in both vessels. Changes were more

consistent in severe pre-eclampsia and chronic hypertension. The perinatal mortality in IUGR babies was 13.72%. Increased operative interference in the form of 42% caesarean deliveries was seen.

**CONCLUSION:** IUGR is multi-factorial in origin. Appropriate clinical methods supplemented with USG and Colour doppler imaging help in early diagnosis and proper management of these cases. Early salvage can be planned and neonatal morbidity can be reduced.

**KEYWORDS:** IUGR, Serial USG, Colour Doppler Imaging.

**INTRODUCTION** IUGR is a major contributor to perinatal mortality & morbidity, affecting 23.8% newborns around the world. Perinatal mortality rates are 4-8 times higher for growth restricted infants & morbidity is present in 50% of surviving infants. The fetus is no longer regarded as maternal appendage ultimately to be shed. Instead, it is now — “**THE UNBORN PATIENT**”<sup>1,2</sup> The present study is an effort to analyze the aetiopathogenesis of IUGR, monitoring the course of pregnancy and Outcome of pregnancies in these cases of growth restricted babies. A comparison with control group is done.

**Terminologies:**

— AGA (Appropriate for GA): Birth weight b/w 10<sup>th</sup> & 90<sup>th</sup> percentile for GA.

— SGA (small for gestational age): Birth weight <10<sup>th</sup> percentile for GA. Other definitions

used are <3<sup>rd</sup> percentile for GA or > than 2SD below the mean.

— **IUGR** is failure of fetus to reach its genetic growth potential in utero, putting it at risk of Perinatal mortality & morbidity.

— **IUGR** refers to deviation & reduction in expected fetal growth pattern.

**MATERIALS & METHODS:** While attending to patients visiting our ANC clinic, we have studied 50 pregnancies with IUGR prospectively & analyzed their outcome. The study was conducted during the period 1<sup>st</sup> May 2007- 30<sup>th</sup> November 2009. The cases were compared with equal number of controls. Controls were selected from the normal intrauterine pregnancies without obvious high risk factors. Detailed History of patients including specific history of Socio economic status, Menstrual history, Past obstetric history, History of relevant medical conditions, Personal history, specifically for any addictions like smoking, tobacco and alcohol consumption and History of Present pregnancy was taken. Detail examination done (general & systemic) was done. Built & Nutritional Status, Symphysio Fundal height, Abdominal Girth, BP, Pallor, Edema, Fetal Heart Sound, Amount of Liquor were specifically noted. All routine and specific **Lab Investigations** were carried out. **Fetal wellbeing** assessment was done with Daily Fetal Movement Count (DFMC), Non-stress Test, Bio-physical Profile and Serial USG Examination. **Serial USG Examination** done to evaluate BPD, HC, FL, AC, HC : AC ratio, Placental Grading / Abnormality, Estimated Fetal Weight, Fetal Ponderal index and Malformations, if any. Colour Doppler was carried out to study waveforms of Umbilical Artery, Uterine Artery & Middle Cerebral Artery. Intrapartum monitoring was done, mode of delivery was noted. Baby details e.g. Sex, Weight, Height, Ponderal index, APGAR score were also noted.<sup>8</sup>

**RESULTS:** There was no significant relation between Maternal age, parity and IUGR. The incidence of IUGR is high in Low socio-economic group and low in high socio economic group of patients. Out of 50 study patients, 76% patients

belonged to Low socio-economic class. There is decrease in incidence of IUGR with increase in Maternal weight. 66% of the study group had weight < 50 kg with average Birth weight of 1.87kg<sup>4</sup>.

**TABLE -1 POSSIBLE ETIOLOGY OF IUGR**

Possible causative Factor	Number of Case	Percentage
Malnutrition	32	64%
PIH	22	44%
Chronic Malaria	1	2%
CardioPulm disease	4	8%
Twins	1	2%
Viral Hepatitis	1	2%
Epilepsy	1	2%
Pregnancy with Gestational DM	1	2%
Pregnancy with 3 <sup>rd</sup> degree Prolapse	1	2%
Low lying Placenta	2	4%
Renal Disease	1	2%
Idiopathic	6	12%

Table 1 suggests that most common etiology were malnutrition and PIH<sup>3</sup>. This difference is statistically significant.

**TABLE -2 Severity of Anemia and IUGR**

Severity	Hb (gm%)	No. of Cases	Percent %
No Anemia	>10	6	12
Mild Anemia	8.1-10	25	50
Moderate Anemia	6.1-8.1	15	30
Severe Anemia	<6	4	8

Table 2 shows that 88% patients had anemia ranging from mild to severe anemia. According to severity of anemia, term of pregnancy along with BT, haematinics and multivitamins were given to these patients. But still, they delivered IUGR babies.

**PREECLAMPSIA AND IUGR:** Out of 22 patients having PIH, 11 were primigravidae. 8 patients had mild PIH (BP-140/90 -160/100mmHg) on admission & 14 had severe PIH (BP>160/100mmHg). The incidence of IUGR is more in the groups with severe PIH amongst total PIH cases. All the 22 patients were treated with antihypertensives, MgSO<sub>4</sub> and with Rest in Left lateral position. The study suggests that IUGR

occurs even in well controlled cases of PIH. Probably due to prevalence of chronic placental insufficiency even before PIH became apparent clinically.

**MATERNAL WEIGHT GAIN AND IUGR:**

Average Maternal Weight Gain was 0.48 kg/month in study group compared to 0.87 kg/month in control group. Average total weight gain during pregnancy among cases is 6.88 kg and control is 9.78 kg.<sup>5,6</sup>

**TABLE -3 FUNDAL HEIGHT AND IUGR**

Gestational age in wks.	Avg(cms) study group	Avg. (cms) Control group
28	23	25.1
32	24.9	28.3
36	28.2	31.7

Table 3 shows that average fundal height was less in study group compared to control group.

**TABLE -4 SERIAL USG IN IUGR**

USG Gestational	STUDY			CONTROL		
age (in Wks )	28	32	36	28	32	36
Avg BPD cm	6.8	7.8	8.6	6.9	7.9	8.9
Avg FL cm	5.4	6.2	7.1	5.6	6.2	7.4
Avg AC cm	23.2	25.9	27.4	26.1	30.3	33.1
Avg HC cm	25.9	29.8	31.6	24.1	27.9	31.9
Avg HC/AC	1.11	1.15	1.16	1.05	1.06	1.04
Avg AFI cm	9-10	8-9	5-6	>12	>12	10-12
Pl. Grading	0-2	2-3	3	0-1	2	3
Avg EFW kg	1.0	1.4	1.8	1.19	1.95	2.68

Table 4 shows that FL and BPD are individually not good USG parameter for diagnosis of

**TABLE -5 DOPPLER INDICES AND PERINATAL OUTCOME**

Doppler indices	Live births	Percent %	Perinatal mortality	Percent %
Normal(18)	17	94.44%	1	5.55%
Abnormal(23)	17	73.91%	6	26.08%

**Table-6 Birthweight and Perinatal Mortality**

Brith wt (kg)	No. of babies	Perinatal mortality	Percent %
< 1	1	1	100%
1-1.55	8	3	37.5%
1.56-1.75	3	1	33.3%
1.76-2	14	1	7.14 %
>2	25	1	4%
<b>Total</b>	<b>51</b>	<b>7</b>	<b>13.72 %</b>

Table 6 shows that as the birthweight decreases, perinatal mortality increases.

Table 7 shows that PIH is a major fatal factor for Perinatal mortality.

IUGR. Ratio of HC/AC is good predictor for IUGR in this study. Also AFI and Placental Grading are valuable in diagnosis of growth restriction.<sup>9</sup>

**DOPPLER STUDY:** Umbilical artery, uterine artery and MCA waveforms are included in this study. Doppler was done in 41 cases. According to our study results, 23 cases i.e. 56.09% of study group showed abnormal doppler indices in either of the three studied arteries. Comparison of Doppler indices of IUGR pregnancies in various high risk situations (n=23) shows that 78.26% high risk pregnancies with IUGR had abnormality in umbilical artery flow, 65.21% had abnormal uterine artery flow and 47.8% abnormality in both arteries. Suggesting that umbilical artery is a crucial component of fetal circulation acting as the lifeline. 65.21% patients of IUGR with abnormal diastolic flow had AFI < 5cm. Thus Oligohydramnios is a common USG finding in IUGR. 13 out of 23 with patients with abnormal diastolic flow were delivered by emergency/elective CS.<sup>7,10</sup>

Table 7 shows that Doppler examination is most accurate prognostic factor for IUGR.

Perinatal mortality is 13.72% in IUGR babies. Amongst 33 babies admitted to NICU, 27 developed neonatal complications. Neonatal mortality was 22.22% in these babies.<sup>10-12</sup>

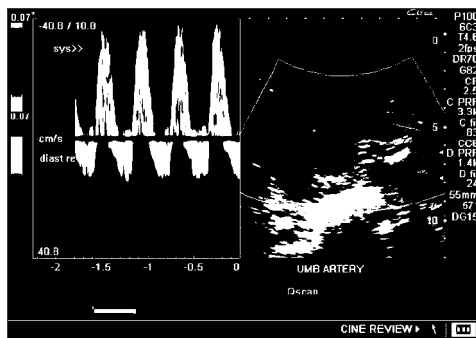
**Table- 7 Common Maternal Factor and Perinatal Mortality**

Meternal Factor	No. of babies expired	Percent of IUGR cases
PIH	5	22.72 %
Malnutrition	2	6.25 %

**CONCLUSION:**

IUGR is multifactorial in origin with hidden degrees of overlapping of causative factors. PIH is responsible for 44% and Malnutrition for 64% cases of IUGR. Simple

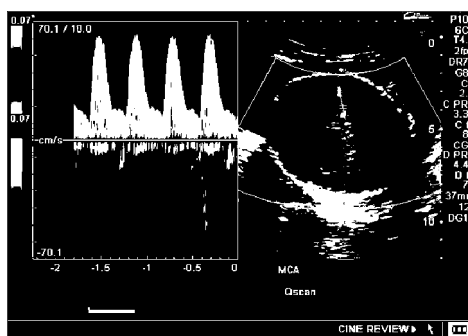
clinical methods like maternal weight gain, fundal height measure may suspect IUGR and serial USG can confirm the diagnosis. HC, HC/AC ratio, Approx Fetal wt, AFI and Placental grading are more valuable than FL and BPD. For detection of IUGR by colour doppler study, state of Umbilical artery is more important than Uterine artery. Increased operative interference to lessen birth asphyxia. Birth wt is single best indicator to asses past in-utero events and future trajectory of life. Improving pre-pregnancy health, better antenatal care, contraception, cessation of smoking and low dose aspirin may be the preventive measures. To conclude **“If well interpreted and aided with other modalities, IUGR can well be diagnosed, earlier salvage can be planned and rate of perinatal mortality can be brought down.”**



Reversal of Diastolic Flow in Umbilical artery in IUGR



Persistence of Notching in uterine artery waveform beyond 24 wks



Increase in MCA flow on doppler in fetal hypoxia

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