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Research Article

Analytical study of 50 cases of fetal growth restriction

Vishwa G. Kanabar*, Megha S. Patel, Sushma R. Shah, Shashwat K. Jani

Department of Obstetrics and Gynaecology, Smt. N.H.L. Municipal Medical College, Ahmedabad, Gujarat, India

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***Correspondence:**
Dr. Vishwa G. Kanabar,
E-mail: dr.v.g.kanabar@gmail.com

ABSTRACT

Background: The objective of the study is to earlier diagnose the cases of FGR (Fetal growth restriction) and to identify the possible causes and management option to prevent further damage and to study the fetomaternal outcome and improve fetomaternal outcome in FGR cases.
Methods: This is an analytical study of 50 cases of FGR pregnancies done during the period of 1st April 2013 to 31st March 2014. Data was collected from the OPD books and indoor case papers of patients attending routine antenatal care and emergency services provided by obstetrics and gynaecology department of our institute.
Results: 50 cases of FGR were studied. Various possible etiological factors were studied like presence of anaemia, hypoproteinemia and PIH, maternal pre-pregnancy weight, and average weight gain during pregnancy. Among them, malnutrition (64%) was the commonest aetiology of FGR followed by PIH (44%). Ante partum surveillance was done by serial fundal height measurement, maternal weight gain monitoring and serial ultrasound. 40% patients were having severe oligoamnios and 30% were having altered Doppler waveforms. Operative interference was required in 44% cases. 30 babies out of 50 were admitted to NICU. And perinatal mortality was 13.72%.
Conclusion: Timely diagnosis, proper management at all levels in well-equipped centre can definitely prevent morbidity and mortality from FGR. Improving pre-pregnancy health, ensuring better antenatal care, effective use of contraception, preventing teenage pregnancies, stop smoking are some preventive measures.

Keywords: FGR, Diagnosis of FGR, Perinatal mortality and morbidity

INTRODUCTION

Fetal growth restriction is an important and particularly challenging problem for modern obstetricians and paediatricians. FGR refers to deviation and reduction in expected fetal growth pattern. It is defined as fetuses with sonographic estimated fetal weight below 10th percentile for the gestational age. SGA (small for gestational age) refers to new-borns with birth-weight <10th percentile for their gestational age.[1] Other definitions sometimes used for SGA includes birth-weight <3rd percentile for GA or >2SD below the mean.[2] FGR contributes to almost 2/3rd of LBW infants born in India. FGR is the 2nd leading contributor to perinatal morbidity and mortality- affects 23.8% new-borns around the world. In India, the prevalence of LBW has been reported to 26% while the proportion of FGR has been found to be 54%.[3,4]

The widespread use of ultrasound and other modern gadgets have increased the importance of prenatal diagnosis of FGR and its treatment. There are complications of FGR fetuses during pregnancy, labour and delivery which need treatment in a well-equipped NICU. So anticipation of this clinical entity starting from primary healthcare is utmost important to reduce perinatal mortality and morbidity.

The present study is to analyze the etiopathogenesis of FGR, monitoring the course of pregnancy and outcome of pregnancies in case of FGR at tertiary care centre.

METHODS

This is an analytical study of 50 cases of FGR pregnancies done during the period of 1st April 2013 to 31st March 2014. Data was collected from the OPD books and indoor case papers of patients attending routine antenatal care and emergency services provided by obstetrics and gynaecology department of our institute.

RESULTS

In this study of 50 cases of FGR pregnancies, 41 (82%) were registered and 9 (18%) were emergency cases. Registered cases included those patients having at least 1 antenatal visit. Emergency cases were not having any antenatal visits.

9 patients were from age group 19 years or less, 34 patients were in 20-35 year age group and 7 patients in more than 35 year age group.

24 patients were primipara, 10 patients were 2nd para and rest 16 patients were multipara. So there is increased incidence of FGR in primipara patients. PIH is more common in primiparous patients whereas multiparous patients have malnutrition as their etiology to FGR.

Table 1: Pre pregnancy maternal weight and FGR.

Maternal weight (kg)	No.	%	Average birth weight (kg)
<50	33	66	1.87
50-60	14	28	2.09
>60	3	6	2.36

In the context of socio-economic class, incidence of FGR was less in high socio-economic group and more in low socio-economic group. There is decrease in incidence of FGR with increase in maternal pre-pregnancy weight (Table 1).

Table 2: Anemia and FGR.

Grade of anemia		No.	%
No anemia	HB >10 gm%	6	12
Mild anemia	HB 8.1-10 gm%	25	50
Moderate anemia	HB 6.1-8 gm%	15	30
Severe anemia	HB <6 gm%	4	8

Table 3: Hypoproteinemia and FGR.

Grade	Serum protein (gm%)	No.	%
No hypoproteinemia	>6	18	36
Mild hypoproteinemia	5-6	20	40
Moderate hypoproteinemia	4-5	8	16
Severe hypoproteinemia	< 4	4	8

Anemia was present in 44 out of 50 cases of FGR and 19 cases were having moderate to severe grades of anemia (Table 2, 3).

So, we can conclude that maternal malnutrition is associated with FGR and that improvement in pre-pregnancy and pregnancy nutritional status of mother can improve birth-weight.

Malnutrition is the most common cause of FGR in our country.

Table 4: Possible etiology of FGR.

Possible causative factors	No. of cases	%
Malnutrition	32	64
Pih	22	44
Twins	1	2
Epilepsy	1	2
Cardiac diseases	2	4
Pregnancy with gestational diabetes mellitus	2	4
Low lying placenta	3	6
Idiopathic	6	12

Out of 50 patients, 22 patients were having pregnancy induced hypertension. 14 patients were having severe PIH (BP >160/100 mmHg on admission) and 8 were having mild PIH (BP 140/90 TO 160/100 mmHg on admission). Out of 14 patients 5 were having eclampsia. These suggest that FGR is more common in group with severe PIH and eclampsia. In this study, malnutrition was the most common aetiology for FGR and PIH was the 2nd most common aetiology. In 6 patients, none of the etiological factors present, that is idiopathic FGR (Table 4).

Clinical evaluation of pregnancy with FGR includes maternal weight gain monitoring and serial fundal height measurements. Average weight gain was 0.48 kg/month in 2nd and 3rd trimester and average total weight gain was 6.8 kg in these cases, which was very less than expected.

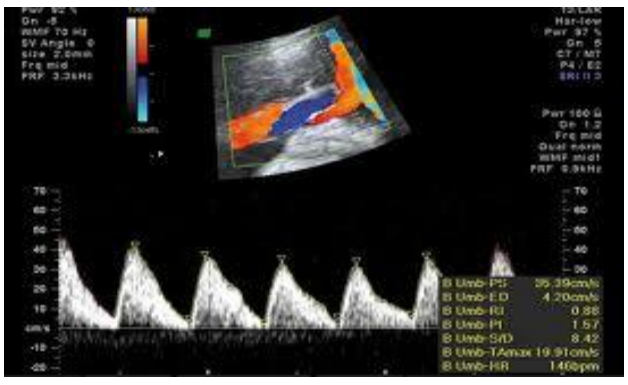

Figure 1: Absent diastolic flow in umbilical artery.

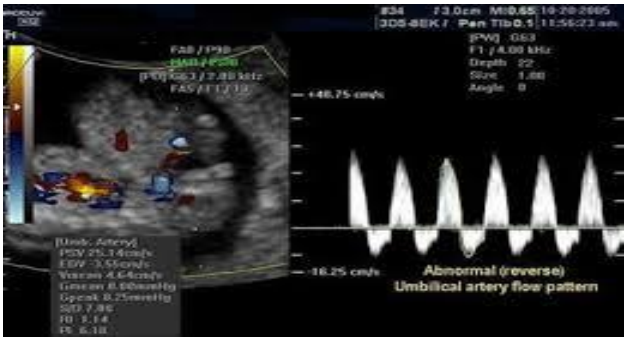

Figure 2: Reversed diastolic flow in umbilical artery.

Antenatal surveillance in FGR cases was done by serial ultrasound. In addition to fetal biometry, liquor and colour Doppler was analysed.[5]

FL and BPD are not individually good parameters for diagnosis of FGR. Ratio of HC/AC is a good predictor of FGR. Out of 50 cases 9 (18%) were symmetrical FGR, others (82%) were asymmetric FGR. HC/AC ratio was >95th percentile (>1) in asymmetrical FGR (Relative brain sparing effect). Out of 50, 20 cases were having oligoamnios (AFI <5 cm) at 36 weeks. Out of 20 cases having severe oligoamnios, 15 were having altered Doppler waveforms (Figure 1, 2).

Table 5: Mode of delivery in FGR babies.

Mode of delivery			No. of cases	Total No.	%
Vaginal	Spontaneous		22	29	58
	Induced		7		
Caesarean section	Elective	Severe PIH with IUGR	2	10	20
		Twins with IUGR	1		
		Abnormal Doppler	5		
		Other obstetric indication	2		
	Emergency	Severe oligoamnios	2	11	22
		Fetal distress	2		
		Eclampsia	4		
		Accidental hemorrhage	1		
		Abnormal Doppler	2		

Out of 50 patients in our study, 29 patients delivered vaginally, whereas 21 patients delivered by caesarean section. The CS rate in the study was very high as compared to CS rate at our institute. Operative interference was required in PIH cases and those with abnormal Doppler. The incidence of emergency CS was more (Table 5).

Table 6: APGAR score.

APGAR score	8 to 10	5 to 7	<4
After 1 min.	25	19	6
After 5 min.	30	16	4

Table 7: Birth weight and perinatal mortality.

Birth weight (kg)	No. of babies	Perinatal mortality	Percent
<1	1	1	100
1 to 1.55	6	3	50
1.56 to 1.75	4	1	25
1.76 to 2	15	1	7.1
>2	25	1	4
Total	51	7	13.72

Table 8: Neonatal complications.

Neonatal complications	No. of babies	No. of death
Birth asphyxia	10	2
Septicemia	2	1
Convulsion	3	0
Hyperbillirubinemia	5	0
RDS	2	1
Congenital malformation	1	1
Meconium aspiration syndrome	4	1

APGAR scores of these babies were taken at 1 and 5 minutes. All the babies having APGAR score less than 7 at 5 minute and those having birth-weight <1.75 kg were admitted to NICU. Out of 50, 25 babies were having birth-weight less than 2 kg. Perinatal mortality was 13.72%. Total 30 babies were admitted to NICU, of them 22 developed neonatal complications (Table 6, 7, 8).

DISCUSSION

This is a study of 50 cases of pregnancies with FGR. Many factors are present singly or simultaneously as

etiological or associated factors in cases of FGR. Out of these, in this study moderate to severe malnutrition (64%) and moderate to severe PIH (44%) are found to be commonest factors. Moderate to severe malnutrition are seen in multiparous groups and in uncared pregnancies. Poor socioeconomic class are more prone to have FGR babies with malnutrition as a common cause. If pre-pregnancy maternal weight is >50 kg, there is decrease in incidence of FGR.

Regular antenatal visits with appropriate clinical approach like serial fundal height measurement, fetal weight estimation, maternal weight gain and DFMC is highly valuable in suspecting, diagnosing and managing FGR, especially in rural obstetrics practice.

Serial USG is non-invasive, relatively cheap, convenient and reliable method of monitoring fetal growth pattern and fetal well-being. Though BPD & FL are not that much informative for FGR, HC/AC ratio, approximate fetal weight, AFI and placental grading are much more reliable in diagnosing FGR.[9] The introduction of colour Doppler imaging has enabled more detailed examination of fetal circulation and thereby allowing a greater knowledge of the physiological and pathological changes in the fetus during pregnancy. It helps in determining the FGR fetus that needs to be delivered rather than remain in adverse condition in utero. Persistence of diastolic notch in uterine arteries >24 weeks, decreased, absent, or reversed diastolic flow in umbilical artery, increased resistance in MCA and ductus venosus Doppler are the parameters taken into account to manage FGR cases. In this study, 15/20 patients with oligoamnios were having altered Doppler waveforms. Altered Doppler was the indication for caesarean section in 7 out of 21 CS. Overall there was increased operative interference (42% CS rate) causing increased maternal morbidity.

Perinatal mortality was 13.72% in FGR babies. Amongst 30 babies admitted to NICU, 22 developed neonatal complications. These neonates required intensive neonatal care and complications are best avoided by careful supervision.

CONCLUSION

Timely diagnosis, proper management at all levels in well-equipped centre can definitely prevent morbidity and mortality from FGR. Improving pre-pregnancy health, ensuring better antenatal care, effective use of contraception, preventing teenage pregnancies, stop smoking are some preventive measures.

Abbreviations

FGR - Fetal growth restriction
PIH - Pregnancy induced hypertension
NICU - Neonatal intensive care unit
OPD - Outdoor patient department
GA - Gestational age
SD - Standard deviation
LBW - Low birth weight
BPD - Bi-Parietal diameter
FL - Femur length
AC - Abdominal circumference
HC - Head circumference
EFW - Estimated fetal weight
AFI - Amniotic fluid index
CS - Caesarean section
DFMC - Daily fetal movement count
MCA - Middle cerebral artery
USG - Ultra sonography

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Ethical approval: The study was approved by the institutional ethics committee

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