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EARLY ONSET FETAL GROWTH RESTRICTION AND PERINATAL OUTCOME - ONE YEAR CROSS SECTIONAL STUDY

Obstetrics & Gynaecology

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ABSTRACT

Background And Objectives: Early FGR is a fetal growth disorder that is associated with perinatal complication and maternal risk factors and is diagnosed _<32 weeks period of gestation with AC or EFW _<10th percentile on USG. Objective is to study perinatal outcome in early FGR and to determine maternal risk factors associated with it. **Methods:** One year cross sectional study was conducted on singleton pregnant women diagnosed with early FGR between 26 to 32 weeks with gestational age assigned by LMP or biometry who were admitted in labor room from Jan 2020-december 2021. Data were analyzed by Chi-square test. **Result:** Out of 1863 deliveries, 60 cases of true early FGR were enrolled. Out of 175 (86.6%) live born babies and 9 (13.33%) still born babies, 40 (65.57 %) babies had a pre term delivery. Causes of NICU admission were prematurity and LBW. The maternal risk factors studied were maternal age, maternal BMI, gravid statis -36 (60%) were primigravida , pregnancy associated risk factors like hypertensive disorders of pregnancy among 33 (54.09 %) among which 22 (36.06 %) had PE, 11 (18.33%) has history of LBW in prior pregnancy. **Conclusion:** Early FGR is associated with adverse perinatal outcome. The most common cause of perinatal morbidity and mortality was RDS. The most common maternal risk factor was hypertensive disorder of pregnancy.

KEYWORDS

INTRODUCTION

FGR is defined as failure of fetus to cope with the growth potential.[1] Identification of SGA fetuses as those AC/EFW <10th percentile on USG without any risk factors, with normal UA doppler studies, without neonatal complications and birth weight _<10th percentile for that gestational age is of paramount importance. FGR is a major cause of poor perinatal outcome .[2]

Globally 20.5 million babies are affected with LBW every year [3]. The burden of early onset FGR is seen in 20-30 % of the FGR babies [4]. India contributes 21 % of FGR low birth weight babies to the world[5]. The stillbirth rate due to FGR was 49 % contributing to a high neonatal mortality rate[6].

In 1977, Campbell and Thomas et al classified FGR babies as asymmetric and symmetric form based on HC/AC ratio on USG[7].

In 2014, Savchev S, Figueras, Gratacos et al defined FGR based on onset of placental disease as early onset and late onset FGR with cut off of 32 weeks gestational age [4].

Early onset FGR occurs in 20-30 % of FGR babies. Here the onset of the placental disease is severe and early with sequential doppler abnormalities and is also associated with pre-eclampsia. There is pronounced fetal hypoxia and cardiovascular adaptation. The fetus is immature with high tolerance to hypoxia. It is associated with a high perinatal mortality and morbidity. The prevalence of early FHR is low .

Fewer data available on early FGR in developing countries was the reason for which the present study was conducted.

Evidence shows timely delivery is the major obstetric challenge to prevent intrauterine demise and premature low birth weight babies. To curb stillbirth rate in early FGR will be the mainstay of management which accounts for preventable mortality when diagnosed early , followed up appropriately and intervened expeditiously .

The present study aims at studying the perinatal outcome and also in determining the maternal risk factors in early onset FGR fetuses.

OBJECTIVES

Primary – To study the perinatal outcome in early onset fetal growth restriction

Secondary – To determine the maternal risk factors in early onset fetal growth restriction.

METHODOLOGY

Source Of Data And Materials

All women who were diagnosed with early FGR between 26-32 weeks with AC_<10th percentile or estimated fetal birth weight _<10th percentile by USG with CRL dating upto 14 weeks or dating with BPD between 14-21 +6 weeks who were admitted in labor room[11] and delivered at any gestational age after diagnosis.

Method of collection of data

a) Study design – cross sectional
b) Study setting – Mahatma Gandhi hospital and college, Jaipur, Rajasthan
c) Study period -January 2020- December 2020
d) Study duration – 1 year
e) Study population

All pregnant women diagnosed with early FGR between 26-32 weeks with AC _<10th percentile or estimated fetal birth weight _<10th percentile by USG with gestational age assigned by LMP or CRL dating upto 14 weeks or dating with BPD between 14-21 +6 weeks who were admitted in labor room and delivered at any gestational age after diagnosis at Mahatma Gandhi Hospital, Jaipur, Rajasthan.

f) Selection criteria

Inclusion criteria:

All singleton pregnancies diagnosed with early onset FGR, from 26-32 weeks meeting the following criteria admitted in the labor room and delivering at any gestational age.
-Dating scan with CRL up to 14 weeks or BPD 14-21 +6 weeks
-Abdominal circumference _<10th percentile.
-Estimated fetal weight _<10th percentile.

Exclusion Criteria

-Structural and chromosomal anomalies
-Intra uterine fetal demise

Detailed medical, past obstetric history of mother was taken from the medical records to know risk factors, After growth scan, growth chart was plotted and umbilical artery doppler was done and recorded.

Data regarding mode of delivery, indication for cesarean section and outcome of delivery was observed and recorded.

Following delivery, birth weight and APGAR score was recorded and plotted on Fenton's growth chart to diagnose true FGR.

The SGA and AGA babies were excluded.

Perinatal outcome observed like pre term delivery, live birth, still birth, APGAR score, LBW, NICU admission, neonatal complications like *respiratory distress syndrome, prematurity, meconium aspiration syndrome, hypoglycemia, sepsis, bronchopulmonary dysplasia, periventricular leukomalacia, necrotizing enterocolitis*, duration of NICU stay and neonatal deaths were recorded.

RESULT

A total of 1863 deliveries were conducted. Out of 1863 deliveries-175 cases were diagnosed to be FGR From 175 FGR cases 102 late FGR cases were excluded. Hence, 73 cases of early FGR were recruited out of which 4 cases (3 IUFD ,1 fetal anomalies) were excluded.

Of 69 cases recruited and 9 cases of SGA and AGA babies were excluded at birth and a total of 60 cases of true early onset FGR were enrolled and analyzed.

Table 1: Distribution According To Incidence Of FGR

Total number of deliveries	1863	Percentage (%)
Total number of FGR	175	9.39
Percentage of early FGR among total FGR	60/175	34.28
Percentage of early FGR among total deliveries	60/1863	3.22

Table 2: Distribution According To Antenatal Registration

	No. of early FGR N=60	Percentage (%)
Registered	10	16.6
Unregistered	50	83.33

Table 3: Distribution According To Maternal Age

	No of early FGR N=60	Percentage (%)
_<20 years	6	10
20-30 years	48	80
_>30 years	6	10

Table 4 : Distribution According To Gravid Status

	No. of early FGR N=60	Percentage (%)
Gravida 1	36	60
Gravida 2	10	16.66
Gravida 3	8	13.33
Gravida 4	3	5
Gravida 5	1	1.66
Gravida 6	2	3.33

Among those diagnosed with early onset FGR,36 mothers (60%) were primigravida

Table 5: Distribution According To Pre Pregnancy BMI

	No. of early FGR N=60	Percentage (%)
Underweight _<18.5	18	30
Normal 18.5-24.9	38	63.33
Overweight 25-29.9	2	3.33
Class 1 obesity 30-34.9	1	1.66
Class 2 obesity 35-39.9	1	1.66
Class 3 obesity _>40	-	

Table 6 : Distribution According To Maternal Risk Factors

	No. early FGR N=60	Percentage (%)
Hypertensive disorders of pregnancy	32	53.33
i-Preeclampsia	22	36.66
ii-Gestational hypertension	9	15
iii-Chronic hypertension	2	3.33
Previous LBW	11	18.33
Thyroid disorders	6	10
TORCH infection	5	8.33
Autoimmune disease-APLA	1	1.66

Table 7: Distribution According To Umbilical Artery Doppler Before Delivery

	No. early FGR N=60	Percentage (%)
Normal	35	58.33
Increased resistance	8	13.33
AEDF	12	20
REDF	3	5
Not done due to anhydramnios	2	3.33

Table 8: Distribution According To Mode Of Delivery

	No. of early FGR N=60	Percentage (%)
Vaginal	15	25
Spontaneous	5	8.33
Induced	10	16.66
LSCS	45	75

Table 9: Distribution According To Gestational Age At Delivery

	No . of Early FGR N=60	Percentage (%)
26-31+6 weeks	15	25
32-36+6weeks	24	40
37-42 weeks	21	35

Table 10: Distribution According To Living Status Of Babies

	No of early FGR N=60	Percentage (%)
Live birth	52	86.66
Stillbirth	8	13.33

All 8 still born babies were between 26-31+6 weeks POG. All 8 had severe FGR with AC<5TH percentile ,22 cases had severe Pre-eclampsia, 9 cases had gestational hypertension ,2 case had chronic HTN superimposed on PE, 2 cases had anhydramnios, 8 case had increased resistance on UA doppler, 12 cases had AEDF on UA doppler , 3 cases had REDF on UA doppler.

15 cases delivered by vaginal route after induction and 45 underwent LSCS and 1 had true knot in umblical cord.

Table 11 : Distribution According To The APGAR Score Of Babies At 5 Minutes

	No of early FGR N=60	Percentage (%)
0-4	16	26.66
5-7	10	16.66
_>7	34	56.66

Table 12: Distribution According To Birth Weight Of Babies

	No of early FGR N=60	Percentage (%)
_< 1 kg (extremely low birth weight)	12	20
1-1.5 kg (very low birth weight)	18	30
1.6-2.4 kg (low birth weight)	30	50

Table 13: Distribution According To Neonatal Complications

	No of early FGR in NICU N=60	Percentage (%)
Low birth weight	60	100
Prematurity	22	36.66
RDS without ventilatory support	9	15
Hyperbilirubinemia	5	8.33
RDS with ventilatory support	5	8.33
Hypoglycemia`	1	1.66
Retinopathy of prematurity	1	1.66
Neonatal death	3	5

DISCUSSION

In present study sample size was 60. This sample size was similar to other studies on FGR by Heera Shenoy et al (82), Oya Demirci et al (86), Friederike Hoellen et al (92).

The incidence of early FGR in present study was 3.22% which was consistent with PORTO study by Julia Unterscheider et al (2.18 %)[8].

In present study 83.33% of early onset FGR were referred from health care facilities outside Mahatma Gandhi Hospital. The study by Surbhi et al[9] showed antenatal registration of 96 % which signified women had regular antenatal visits in Maharashtra.

The present study showed 80 %of women belonged to 20-30 yrs age group which was consistent with the PORTO study and 60 % of women were primigravida consistent with TRUFFLE study by C.Lees et al (63 .41 %).

63.33 % of women in present study had normal pre pregnancy BMI consistent with PORTO study (24.1 +/- 4.7 mean BMI).

53.33% of women had hypertensive disorder of pregnancy which was consistent with TRUFFLE study (60 %).

The present study showed 41.66 % of abnormal umbilical artery doppler studies which was compared with GRIT study by Walker Dawn et al (26 %)

The present study has 75 LSCS rate consistent with study by Heera Shenoy et al [10](75 .6%)

The present study showed mean gestational age at delivery of 34 +3 weeks consistent with study by Heera Shenoy et al[10] i.e. 36 weeks.

The present study showed 56.66 % of babies with APGAR score _>7 at 5 minutes which was similar to study by Friederike Hoellen et al [11]where APGAR score __>8

The present study showed 86.6 % of live born babies and 13.33 % stillbirth compared to study by Surbhi Sinha et al [9] showing live born babies -95 % and stillbirth -5 %.

The present study showed 50 % of babies with birth weight 1.6 to 2.4 kg which was less compared to PORTO study by Julia Unterscheider et al [12].

The overall most common complication seen in FGR was low birth weight which was seen in 100 % of babies and consistent with study by Heera Shenoy et al [10]which was 93.9 %.

The most common neonatal complication being prematurity -36.66% while in TRUFFLE study by C.Lees at al [12]it was sepsis (18 %).

The adverse perinatal outcome can be reduced by early diagnosis of early FGR, identification of maternal risk factors with good antenatal care and use of modalities like UA doppler, CPR, DV doppler, CTG in predicting adverse perinatal outcome.

CONCLUSION

Early FGR is associated with adverse perinatal outcomes like stillbirth, low APGAR score, low birth weight, NICU admission, NICU stay, neonatal complications, neonatal deaths was directly proportional to increased severity of early FGR.

The most common cause of morbidity and perinatal mortality was RDS.

The most common maternal risk factor associated was hypertensive disorder of pregnancy.

Early diagnosis, detection of maternal risk factors and use of umblical artery doppler, MCA doppler, ductus venosus doppler, CPR, CTG for fetal surveillance and prediction of the adverse perinatal outcome can improve management of early FGR.

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