Original Article

Outcome of Pregnancies Complicated by Fetal Growth Restriction

Kavita Roy, Hemlata, Najma Bano Sheikh, Pushpa Goswami

ABSTRACT

OBJECTIVES: The purpose of this study is determine the perinatal outcome, mode of delivery and rate of emergency caesarean section in pregnancies complicated by fetal growth restriction (FGR).

STUDY DESIGN: Cross sectional study.

SETTING: Department of Obstetrics and Gynecology, Ziauddin Medical University Hospital, Karachi, from 1st December 2006 to 30th November 2007.

METHODOLOGY: During period of the study, all pregnant women with clinical suspicion of FGR were included in this study. Diagnosis was made by history, clinical examination and by sonographic evidence. Ante partum surveillance of fetal wellbeing was done by using the kick count chart, non-stress test and biophysical profile.

RESULTS: During period of the study 4212 deliveries were conducted, and 150 pregnancies were complicated by fetal growth restriction (FGR). Demographic characteristics of 150 pregnancies' complicated by FGR was recorded. The mean maternal age was 26.48 ± 4.06. The 91 (61%) women were nulliparous and 59 (39%) were multiparous. Gestational age at the time of delivery was less than 36 weeks in 23 (15.3%) women whereas 127 (84.7%) had more than 36 weeks. 72 (48%) patients were delivered with cesarean section while 78 (52%) were delivered vaginally. Neonatal weight was more than 1.5 kg in 147 cases while less than 1.5kg was seen in 03 cases. Total 6 / 150 (4%) perinatal mortalities were observed in FGR, Common neonatal morbidities identified were hyperbilirubinemia, respiratory distress syndrome, infections and necrotizing enterocolitis.

CONCLUSION: Our study showed that majority of fetal growth babies had weight more than 1.5 kg, with apgar score > 5.Most common neonatal morbidity seen was RDS and hyperbilirubinemia.

KEYWORDS: FGR, Gestational Age, Birth Weight, Mode of delivery.

INTRODUCTION

Fetal growth restriction (FGR) or Intrauterine growth restriction (IUGR) is the second leading cause of perinatal morbidity and mortality. The incidence of intrauterine growth restriction (IUGR) is approximately 5 percent in the general obstetric population, in Pakistan it's around 25%.[1] FGR is a term used for a fetus whose estimated weight is below the 10th percentile for its gestational age. The mortality rate of small for gestational age (SGA) newborns is 5 to 20 times greater than normal infants.[2,3] Short-term morbidities are also increased with FGR, which include meconium aspiration, hypoglycemia, metabolic acidosis, respiratory distress, neonatal sepsis, congenital anomalies, and birth asphyxia.[4,5]

In large number of cases etiology remain uncertain but there is known associations between fetal, placental, and/or maternal factors. Chromosomal abnormalities and congenital malformations have strong association with IUGR. Fetal infections in 1st or 2nd trimester by cytomegalovirus, malaria, parvovirus, and rubella may also contribute in IUGR. Among from chronic maternal vascular disease due to hypertension, diabetes mellitus, renal disease was one of the most common cause of IUGR .Maternal cigarette smoking reduces uterine blood flow, limiting fetal oxygenation and restrict fetal growth. Placental insufficiency, single umbilical artery, velamentous umbilical cord insertion, is also associated with FGR.[6,7]

Accurate diagnosis of FGR is crucial for obstetrician. Ultrasound biometry of the fetus is the gold standard technique in assessing fetal growth. Other tests are prenatal screening, symphysis -fundal height measurement, amniotic Fluid Index (AFI) and Doppler Velocimetry in which abnormal Doppler tests are diagnostic for FGR.[8]

Once FGR is diagnosed the management of the pregnancy is planned in a way to prolong pregnancy as for as it can be without risk.[9]

Despite numerous approaches to manage FGR, effective therapies that improve the growth pattern of the fetus are still not identified. Modalities that have been tested with little effect include bed rest, maternal nutritional supplementation, plasma volume expansion, maternal medications (low-dose aspirin), and oxygen

supplementation.[10] Frequency of re-evaluation of the FGR fetus depends on multiple factors. Timing of delivery must be individualized based on the gestational age of the fetus, maternal health, the severity of the FGR and fetal well-being. Early delivery is indicated if there is arrest of fetal growth and pulmonary maturity is satisfactory.[11]

MATERIALS AND METHODS

This cross sectional study was carried out at Department of Obstetrics and Gynecology, Ziauddin Medical Hospital, Karachi from November 2006 to December 2007. Total number of patients included in this study were 150 through non probability sampling. Data was collected on specially designed questionnaire. Diagnosis of FGR was made by menstrual history, clinical examination and by sonographic evidence. First trimester scan was used for confirmation of exact gestational age on antenatal checkup and patients were examined for measurements of symphysio-fundal height, assessment of liquor and maternal weight gain. Ante partum surveillance of fetal wellbeing was done by using the kick count chart, non-stress test and biophysical profile, Doppler flow studies of uterine and fetal blood flow to detect fetus at risk. Variables, which were taken into account were gestational age, mode of delivery, at birth weight and Apgar score, perinatal deaths and morbidity at one week.

Inclusion Criteria

Singleton booked pregnancies, in which gestational age was determined by last menstrual period and ultrasound scan prior to 20 week of gestation, suggestive of intrauterine FGR.

Exclusion Criteria

Appropriate for gestational age (AGA) and Pregnancies with fetal malformation or congenital abnormalities.

Statistical Analysis

Data was analyzed by using SPSS version-20. Descriptive statistics were used for data presentation. Frequencies and percentages will be calculated for nominal and categorical variables, gestational age, and mode of delivery, birth weight, Apgar score, perinatal deaths, and neonatal complications.

RESULTS

Among 4212 deliveries conducted during period of this study, 150 (3.5%) pregnancies were complicated by fetal growth restriction (FGR).

Demographic characteristics of the patients

The mean maternal age was 26.48 ± 4.06 (ranging from 17 to 45) years. The predominant age group in study was 23-35 years. Histogram of age distribution is presented in Figure I. Parity status was recorded; 91 (61%) were nulliparous and 59 (39%) were multiparous (Table I), the highest parity was 7 observed in only two women. Gestational age at the time of delivery was less than 36 weeks in 23 (15.3%) women, while in 127 (84.7%) patients gestation age at the time of delivery was more than 36 weeks (Table I). Out of total 150 women, 72 (48%) were delivered with Cesarean section while 78 (52%) were delivered with vaginal delivery.

Neonatal weight was more than 1.5 kg in 147 cases while less than 1.5kg was seen in 03 cases. Total 6 / 150 (4%) perinatal mortalities were observed in FGR; of these 1 was IUD and 5 neonatal deaths (Table II). Fetal Apgar score and neonatal morbidities at 1 week are presented in Table II. Common neonatal morbidities identified were hyperbilirubinemia, respiratory distress syndrome, infections and necrotizing enterocolitis. FGR neonates required more neonatal care unit (NCU) admissions.

TABLE I: SHOWING PARITY, GESTATIONAL AGE AND MODE OF DELIVERY (n=150)

Parity		
Nulliparous	91	61%
Multiparous	59	39%
Gestational age		
Less than 36 weeks	23	15.3%
More than 36 weeks	127	84.7%
Mode of delivery		
Cesarean section	72	48%
Vaginal delivery	78	52%

FIGURE I: SHOWING AGE DISTRIBUTION (n = 150)

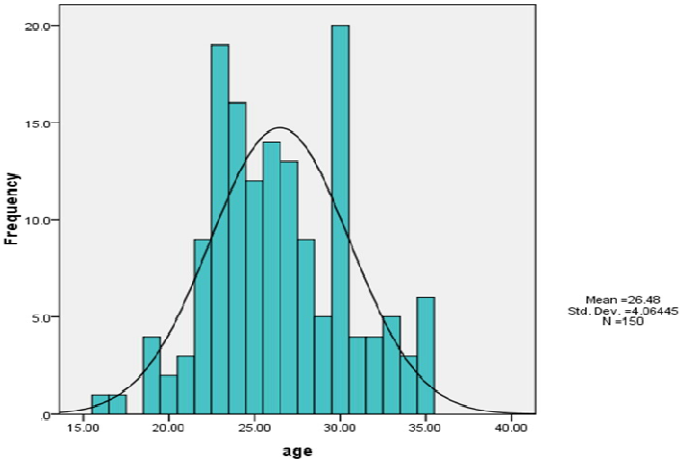

TABLE II: NEONATAL WEIGHT, PERINATAL MORTALITY AND APGAR SCORE AT BIRTH AND MORBIDITIES AT ONE WEEK (n = 150)

Variables	Number of Neonates	Percentage%
Neonatal Birth weight		
More than 1.5 kg	147	98
Less than 1.5 kg	03	2
Perinatal mortality	06	4
Intrauterine death	01	0.66
Neonatal death	05	3.33
Apgar score at birth		
< 5	9	6
> 5	141	94
Neonatal morbidity		
Respiratory Distress Syndrome	65	43.3
Infection	6	4
Hyperbilirubinemia	55	36.6
Necrotizing enterocolitis	3	2
Circulatory failure	1	0.6

DISCUSSION

Every year about 130 million babies are born. Out of those 8 million before their first, and 10 million infants die before their fifth birthday. The highest number of neonatal deaths occurs in Asia. Low birth weight is major cause of neonatal deaths. Around 15% of newborn infants weigh less than 2500 grams. Data shows that 50% of the world's malnourished children are found in 3 countries, namely Bangladesh, India and Pakistan and prevalence in Pakistan is around 25%. [12, 1]

The proportion of FGR in current study is 3.5% in singleton booked pregnancies; gestational age was determined by last menstrual period and ultrasound scan before 20 wks of gestation. Out of 150 FGR cases, 72 (48%) were delivered by Cesarean section while 78 (52%) patients had vaginal delivery; whereas the overall Cesarean rate was only 27%, these results are in agreement with that of Munawar Jannat Rana from Military hospital Rawalpindi in 2000. The increased rate of cesarean delivery in FGR is also consistent with other studies.[13,14] In this study, lower vaginal delivery rate was seen in FGR cases with abnormal umbilical artery Doppler velocimetry compared with AGA cases, as seen in study of HuiLi et al.[15,16] The mode of delivery can be decided based on the gestational age, cervical suitability and severity of the growth restriction judged by Doppler studies of fetal circulation and computerized CTG. If the uterine artery Doppler studies show absent or reversed end-diastolic flow then cesarean section is preferred mode of delivery. We achieved a success rate of 96% in terms of perinatal outcome with early detection, close surveillance and timely delivery, fetal mortality was reduced to only 4%. Recent data have suggested that there is either no change or a significant increase in the risk of RDS associated with FGR. The analysis of piper et al demonstrated an increase in perinatal mortality associated with FGR and no difference in the incidence of RDS.[17] In our study common perinatal morbidities were seen as respiratory distress syndrome in 63 (42%), hyperbilirubinemia 57 cases (38%), infections 10 cases (6.6%)' necrotizing enterocolitis 3 cases (2%) and circulatory failure 1 case(0.6%). These babies had poorer Apgar score, higher rate of birth asphyxia resulting in emergency Cesarean sections as found in previous studies. Apgar score was less than 5 in 9 cases (6%) and more than 5 in 141(94%) cases. Likewise Soregaroli et al[18], and Munawar Jannat[15] Rana study, these babies required more need of admissions to NCU, as in this study.

In this study we examined the data to detect gestational age at delivery, mode of delivery and association of FGR with increased neonatal morbidity and mortality within one week of delivery, Cesarean section was performed for fetal distress depending upon the findings of cardiotocography as the facility of fetal blood sampling is not available in our setup. According to M de Onis, FGR is a major public health problem worldwide, which contributes to closing the intergenerational cycle of poverty; disease and malnutrition. A large proportion of newborns in most developing countries suffer some degree of FGR. This paper quantifies the magnitude and describes the geographical distribution of FGR in developing countries. At least an estimated 13.7 million infants are born annually at term with low birth weight (LBW), 11% of all newborns in developing countries. This rate is approximately 6 times higher than that experienced in developed countries. In our study the birth weight was less than 1.5 kg in only 3 cases, while in 147 cases birth weight was more than 1.5 kg. A prevalence of FGR in excess of 20% has been recommended as the cutoff point for triggering public health action. The prevalence in Pakistan is around 25% so a dire need for an immediate intervention is imperative.[19, 1]

CONCLUSION

This study shows that careful detection and close

surveillance of FGR complicated pregnancies leads to increase rate of Cesarean section but favorable outcome in terms of perinatal morbidity and mortality.

REFERENCES

1. Shamim A, Khan H, Rana J, Ahmed K. Intrauterine growth restriction: a perspective for Pakistan. J Pak Med Assoc .1999;49:50-2.
2. Peleg D, Kennedy CM, Hunter SK. Intrauterine growth restriction: identification and management. Am Fam Physician. 1998;58:453-60.
3. Cnattingius S, Haglund B, Kramer MS. Differences in late fetal death rates in association with determinants of small for gestational age fetuses: population based cohort study. BMJ. 1998;16;316:1483-7.
4. Briana DD, Malamitsi-Puchner A. Intrauterine growth restriction and adult disease: the role of adipocytokines. Eur J Endocrinol. 2009;160:337-47.
5. McIntire DD1, Bloom SL, Casey BM, Leveno KJ. Birth weight in relation to morbidity and mortality among newborn infants. Engl J Med. 1999;340:1234-8.
6. Snijders RJ1, Sherrod C, Gosden CM, Nicolaides KH. Fetal growth retardation: associated malformations and chromosomal abnormalities. Am J Obstet Gynecol. 1993;168:547-558.
7. Bernstein PS1, Divon MY. Etiologies of fetal growth restriction. Clin Obstet Gynecol. 1997;40:723-9.
8. Militello M1, Pappalardo EM, Ermito S, Dinatale A, Cavaliere A, Carrara S. Obstetric management of IUGR. J Prenat Med. 2009;3:6-9.
9. Lausman A1, McCarthy FP, Walker M, Kingdom J. Screening, diagnosis, and management of intrauterine growth restriction. J Obstet Gynaecol Can. 2012;34:17-28.
10. Nicolaides KH, Campbell S, Bradley RJ, Bilardo CM, Soothill PW, Gibb D. Maternal oxygen therapy for intrauterine growth retardation. Lancet. 1987;25;1:942-5.
11. Mandruzzato G1, Meir YJ, Natale R, Maso G. Antepartal assessment of IUGR fetuses. J Perinat Med. 2001;29:222-9.
12. The World Health Report 2006. Neonatal and perinatal mortality Country, Regional and Global Estimates World Health Department of Reproductive Health and Research (RHR), World Health Organization.
13. Research into mechnism of fetal growth restriction release date : April 7, 2003 RFA: HD-03-018 NICHD (http://www.nichd.nih.gov/).
14. Walkinshaw SA, Cochrane L. Investigation and Management of the small fetus. In: Bonnar J, Dunlop W, Recent Advances in obstretrics and gynecology 22, London, Royal Society of Medicine; 2003:41-55.
15. De Onis M, Blossner M, VillarJLevels and patterns of intrauterine growth retardation in developing countries. Eur J Clin Nutr. 1998; 52:S1:S5-15.
16. Rana MJ, Amanullah A, Farooq O.The role of umbilical artery Doppler in detection and management of fetal growth retardation. Biomedica. 2005;21:4-7.
17. Li H, Gudmundsson S, Olofsson P. Prospect for vaginal delivery of growth restricted fetuses with abnormal umbilical artery blood flow. Acta Obstet Gynecol Scand. 2003;82:828-33.
18. Piper JM, Xenakis EM, McFarland M, Elliott BD, Berkus MD, Langer O. Do growth-retarded premature infants have different rates of perinatal morbidity and mortality than appropriately grown premature infants? Obstet Gynecol. 1996;87:169-74.
19. Soregaroli M, Bonera R, Danti L, Dinolfo D, Taddei F, Valcamonico A, Frusca T. Prognostic role of umbilical artery Doppler velocimetry in growth-restricted fetuses. J Matern Fetal Neonatal Med. 2002;11:199-203.

AUTHOR AFFILIATION:

Dr. Kavita Roy
Registrar, Department of Obstetrics and Gynecology
Ziauddin Medical University Karachi, Sindh-Pakistan.

Dr. Hemlata
Associate Professor of Obstetrics and Gynecology
Muhammad Medical College Mirpurkhas, Sindh-Pakistan.

Dr. Najma Bano Sheikh
Assistant Professor of Obstetrics and Gynecology
Peoples University of Medical & Health Sciences for women
Nawabshah, Sindh-Pakistan.

Dr. Pushpa Goswami *(Corresponding Author)*
Assistant Professor, Department of Anatomy
Liaquat University of Medical & Health Sciences
Jamshoro, Sindh-Pakistan.
Email: drpushparamesh1998@gmail.com