Evaluation of Placental Grade and its Correlation with Perinatal Outcome in Intrauterine Growth Retardation

Sanjay Kumari, Harjeet Sawhney, Kala Vasishta, Anil Narang

Department of Obstetrics & Gynaecology and Neonatology, Postgraduate Institute of Medical Education and Research, Chandigarh.

Summary

Ultrasonic assessment of placental grading was done in 50 pregnant women with intrauterine growth retardation and in 50 pregnancies with fetal growth appropriate for gestational age. The incidence of grade III placentae and its relation with perinatal outcome was assessed in both the groups. In growth retarded fetuses, incidence of grade III placenta was 58% and it was 36% in fetuses appropriate for gestational age. Placental grading had no correlation with incidence of fetal distress and meconium stained liquor in both the groups. Birth weight was significantly lower in grade III placenta (1482.3 ± 320.5 g) compared to grade II placenta (1766 ± 484.7gm) in growth retarded fetus. Grade III placenta was associated with higher incidence of perinatal death. In the control group, placental grading had no correlation with perinatal outcome.

Introduction

Intrauterine growth retardation complicates 10% of all pregnancies and is associated with 6 to 8 fold increase in perinatal mortality and morbidity. The association of premature appearance of Grade III changes in the placenta in pregnancies complicated by maternal diseases known to produce a decline in placental function, suggests that incidental finding of grade III placental changes at the time of ultrasound may indicate unrecognised pregnancy complications. Grannum et al (1979) and Kazi et al (1983) reported premature appearance of Grade III placenta in pregnancies complicated with intrauterine growth retardation. However, Hill et al (1983) and Monton et al (1986) did not observe such association. In the present study placental grade and its correlation with perinatal outcome was studied in pregnancies complicated with intrauterine growth retardation.

Material and Methods

The study group comprised of 50 pregnant women with diagnosis of intrauterine growth retardation (IUGR) and 50 women with fetal growth appropriate for gestational age were taken as controls. Diagnosis of IUGR was made by clinical examination and on ultrasonography when estimated fetal weight was < 2SD of the mean weight at a particular gestation. Inclusion criteria included singleton pregnancy with known gestational age and delivery within 7 days of last ultrasound examination. All the women were subjected to a detailed ultrasonographic examination with real time linear array and sector scanner of 3.5 MHz sonoline. Placenta was graded according to the system described by Grannum et al (1979) and amniotic fluid index was estimated by four quadrant technique as described by Phalen et al (1987). The pregnancy outcome was noted in terms of occurrence of fetal distress (abnormal heart rate,

meconium staining of liquor) type of delivery, fetal condition at birth, admission to intensive care unit, total duration of stay and neonatal mortality. Statistical analysis was done by applying student t test and Chi-square test.

Results

Maternal and fetal profile of the two groups are compared in Table I. Majority of the women in the control group were primigravidae (90%) and in the study group 23 (46%) women were multigravidae, of which 15 had previous bad obstetrical history. In the study group, 25 (50%) women had antenatal complications in the present pregnancy while in control group all pregnancies were uncomplicated.

Table I: Maternal and fetal demographic profile

Parameters (mean ± SD)	Study group n=50	Control group n=50
(i) Maternal age (yrs)	25.28 ± 4.3	24.34 ± 3.7*
(ii) Maternal weight (kg)	57.00 ± 7.7	56.48 ± 8.8*
(iii) Parity		
PGR	27 (54%)	45 (90%)
MGR	23 (46%)	5 (10%)
(iv) Antenatal complication		
Pregnancy induced hypertension	21 (42%)	-
Heart disease	2 (4%)	-
Toxoplasmosis	2 (4%)	-
(v) Gestational age (wks)	36.0 ± 2.10	38.14 ± 1.90**
(vi) Live born	45 (90%)	50
(vii) Still born	5 (10%)	
(viii) Birth weight (gms)	1.46 ± 0.36	2.77 ± 0.3**

*p>0.05, **p< 0.05

In the study group (growth retarded fetuses) 21 (42%) had grade II and 29 (58%) had grade III placenta. (Fig.1). Incidence of grade III placentae was significantly high in the study group (58%) compared to that in the control group (36%; $p < 0.05$). Distribution of grade II and III placentae was similar in idiopathic and nonidiopathic IUGR (Fig. 2). There was no significant correlation between amniotic fluid index, biparietal diameter and placental grades in both study and control group (Table II).

Table II: Correlation of placental grade with amniotic fluid index (AFI) and biparietal diameter (BPD) in study and control group

Placental grade	Study group		Control group	
Placental Grade	AFI (mm) (mean ± SD)	BPD (mm) (mean ± SD)	AFI (mm) (mean ± SD)	BPD (mm) (mean ± SD)
Grade II	43.4 ± 3.17	79.66 ± 31.7	110.7 ± 29.8	89.06 ± 4.07
Grade III	56.1 ± 34.1	79.72 ± 4.81	167.3 ± 22.2	89.83 ± 2.68

P value > 0.05

Fig 1 Placental grade in study and control group

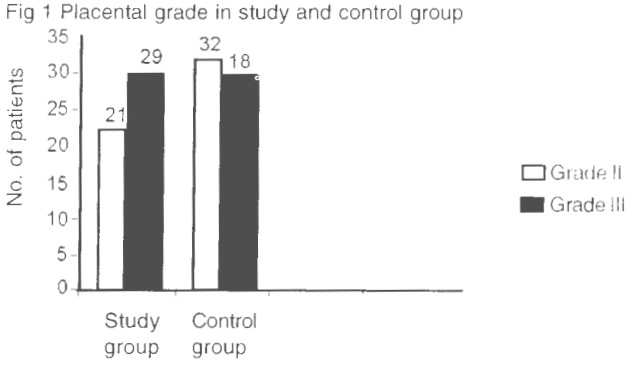
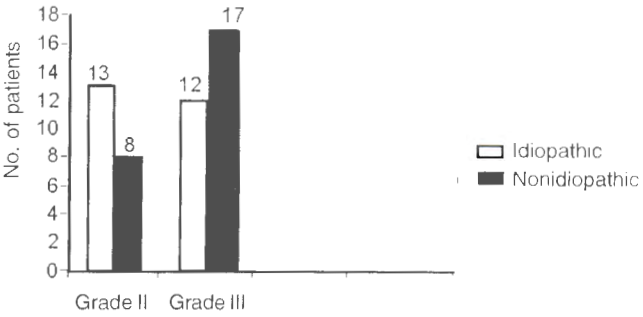


Fig II Comparison of Placental grade in idiopathic and non-idiopathic intrauterine growth retardation



Incidence of fetal distress in labour was similar in grade II and grade III placentae in both the groups (Table III). In growth retarded fetuses, birth weight was significantly lower in grade III placentae (1482.3±32.05) compared to grade II placentae 1766±484.7; $p<0.05$) (Table IV). Incidence of perinatal death rate and duration of stay in neonatal intensive care unit was higher in grade III placentae. In control group, placental grading had no correlation with perinatal outcome.

Table III: Placental grade and fetal distress

	Placental grade							
	Study Group				Control group			
	II		III		II		III	
Fetal distress	n=21		n=29		n=32		n=18	
	No.	%	No.	%	No.	%	No.	%
Present	14	66.7%	20	68.96	6	17.5	1	6.33
FHR abnormality	9		12		5		1	
Meconium	5		8		1			
Caesarean section for fetal distress	8		11		2		1	

p>0.05

Discussion

In the present study incidence of grade III placentae was significantly higher in growth retarded fetuses compared to the group where fetuses were appropriate for gestational age. Our findings are in accordance to the observations of Grannum et al (1985) and Fisher et al (1976).

Table IV: Correlation of placental grade with perinatal outcome in study and control group

Parameters (mean ±SD)	Placental grade			
	Study group		Control group	
	II n=21	III n=29	II n=32	III n=18
Gestational age (wks)	36.5±2.1	36.1 ± 2.1	38.9 ± 0.7	38.9 ± 0.9
Birth weight (gm)	1766 ± 484.7	1482.3 ± 320.5*	2704 ± 396.7	2748 ± 667.5
Live born	19	26	32	18
Still born	2	3	-	-
Apgar score				
1 min	7 ± 1	6.6 ± 1.9	7.5 ± 1.3	8.1 + .3
5 min	8.5 ± 0.6	8.1 ± 1.6	8.8 ± 0.7	9.3 ± .4
Cord blood pH	7.2 ± 0.1	7.1 ± 0.09	7.2 ± 0.1	7.2 ± 0.1
Neonatal death	3	6	-	-
Stay in NICU (days)	8.8 ± 8.3	12.4 ± 8.4	2.9 ± 2.2	3.6 ± 4.1
Perinatal death	5/21 (24%)	9/29 (31%)	-	-

*p<0.05

A higher incidence of perinatal problems has been associated with premature appearance of grade III placentae. (Quinlain et al 1982 and Kamla et al 1989). On the contrary, Montan et al (1980) observed no correlation between the mean birth weight and different placental grades and reported that grade III placenta was not predictor of adverse outcome. Patterson et al (1983) also did not find any correlation of early placental maturation with poor perinatal outcome. They observed that sensitivity of early placental maturation as a marker of small for gestational age infant was 46% with a predictive value of 16.7%.

In the present analysis, grade III placenta had no correlation with incidence of meconium staining of liquor and fetal distress in labour. However grade III placenta was associated with lower birth weight, increased duration of stay in neonatal intensive care area and increased perinatal mortality in the growth retarded fetuses. In conclusion growth retarded fetuses had higher incidence of grade III placenta which is associated with poor perinatal outcome.

References

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