

## CLINICAL SIGNIFICANCE OF GRADE III PLACENTAL CHANGES

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### SUMMARY

Ultrasonic architectural changes in placenta have been suggested as potential markers of fetal pulmonary development. On 307 ultrasound examinations placenta was graded according to the Grannum's criteria. A total of 26 pregnancies which showed Grade III placental changes were reviewed. A high incidence (73%) of high risk factors were found in association with Grade III placental changes. These changes were found to be accelerated in complicated pregnancy and occurred at a significantly lower gestational age.

A 100% correlation was observed with Grade III changes and favourable neonatal outcome. Thus the appearance of Grade III changes in placenta suggest a mature lung profile.

### Introduction

Proper antenatal assessment of fetal pulmonary maturation play an important role in determining the final outcome in high risk pregnancies. Although, various methods of assessing the biochemical and biophysical composition of lung surfactant have been described over the past decade, the procedure of amniocentesis has its own maternal and fetal risk.

The use of noninvasive gray scale ultrasound in the recent years has allowed the evaluation of placental structure during pregnancy and thus the grading of placenta. Previously published Grannum *et al* 1979 and Petrucha *et al* 1982 studies have suggested a close relationship between fetal lung maturity and placental

ultrasonic findings. However, the clinical relevance was shown to be highest with Grade III placenta in predicting the fetal lung maturity.

This study will review the occurrence of Grade III maturational changes in normal and complicated pregnancies, details of pregnancies in which these changes were found and its correlation to neonatal outcome.

### Material and Methods

A total of 307 placental gradings were done on pregnant women selected from obstetric services of All India Institute of Medical Sciences, New Delhi.

The scanner used was B mode, real time gray scale linear accelerator and operated at 3.5 MHZ. The placenta was graded according to the scheme proposed by Grannum *et al* in 1979, by two independent workers and the results were

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then collaborated and rechecked. Grade III placenta showed the following features in different placental layers.

**Basal layer:** showed large and somewhat confluent basal echo genicities casting acoustic shadows.

**Placental substance:** Demonstrated circular densities with echospared areas in the centre.

**Chorionic Plate:** The indentation arising from chorionic plate traversed the placental substance to reach the basal layers.

All the patients showing Grade III placental maturation were evaluated in relation to pregnancy complication and neonatal outcome.

### Results

Out of 307 ultrasonic placental gradings done, Grade III changes were noted in 26 cases, an incidence of 8.15%. Seven out of 26 cases had normal pregnancy while 19 (73%) of them were associated with various pregnancy complications. Intrauterine growth retardation was the commonest complication and was seen in 43.7% of women. The hypertensive disorder of pregnancy was present in 36.8%. The severe anaemia in one case, postdatism in two of them. Multiple complication were found in some pregnancies.

The appearance of Grade III placenta in high risk group had a mean gestational period of 36.1 weeks as against 39.0 weeks in normal pregnancies. This difference had a statistical significance with a P value of less than 0.05. In two of the pregnant pregnancy induced hypertension, Grade III changes were noted as early as 34 weeks of gestation and it preceded the clinical onset of hypertension by 2 weeks. In the high risk pregnancies the time interval between the appearance of Grade III

placenta and delivery ranged between 1 day to 5 weeks. However, the normal pregnant women all delivered within a week of appearance of Grade III changes.

On correlating the placental grade with neonatal outcome it was seen that pregnant women who showed Grade III changes, whether normal or complicated were associated with 100% good neonatal outcome in terms of good Apgar score and absence of respiratory distress syndrome.

### Discussion

Careful antenatal monitoring of high risk pregnancy is essential in order to achieve the desired result. One of the most important parameter to be assessed is the fetal lung maturity. Examination of amniotic fluid is a standard method but amniocentesis has got its own maternal and fetal risks.

Grannum and associates (1979) classified the placental maturation in three grades and noted that at term only 5-10% of uncomplicated pregnancies showed Grade III changes. However, the finding of Grade III maturation was associated with mature fetal lung in 100% of cases.

Golde *et al* (1982) found Grade III placental maturity in 23% of their cases within 5 days of delivery. Petrucha *et al* (1982) studied 100 non-diabetic pregnant women and noted Grade III changes in only 15 cases. All cases had a mature L/S ratio and the neonates were free of respiratory distress syndrome. In a retrospective review of Harnam *et al* (1982), 130 Grade III placenta were identified of which 93.1% were associated with mature L/S ratio.

Only 7% of patients in Quinlan *et al* (1982) study had changes of fully mature placenta and it falsely predicted the

fetal pulmonary maturity in 42% of cases. Kazzi *et al* (1984) did the ultrasonic placental grading in various high risk pregnancies and showed that 34.9% of cases delivered with Grade III changes had the paediatric estimate of gestational age as  $38.4 \pm 2.2$  weeks. In the present study a total of 26 Grade III changes were observed in 307 scans. The majority (73%) of these women had the associated pregnancy complications like intrauterine growth retardation, and hypertensive disorder of pregnancy. The appearance of Grade III changes occurred at significantly lesser gestational age in complicated as compared to normal pregnancies. The Grade III maturation predicted lung maturity in all the cases studied.

The observation of Grade III changes in placenta on ultrasonic examination of the normal and at risk pregnancy may be clinically useful in predicting the fetal

lung maturity. However, larger experience is required before accepting this method as a predictor of fetal pulmonary maturation.

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