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A STUDY OF PLACENTAL GRADING AND AMNIOTIC FLUID INDEX BY SONAR IN RELATION TO PERINATAL OUTCOME.

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ABSTRACT

Placental maturational changes occurred at earlier gestational age in PIH, IUGR whereas they were delayed in Diabetes. RDS and perinatal mortality was high in placenta grade 0 and grade I. Amniotic Fluid Index was low in PIH, IUGR and postdated pregnancy and perinatal mortality high. AFI was high in Diabetes Mellitus and non imminised Rh-ve pregnancy.

AIM OF THE STUDY:

To study amniotic fluid index and placental grading by sonar from 28 weeks of gestation to till delivery in relation to mode of delivery and perinatal outcome.

MATERIAL AND METHODS :

The present study was conducted at Tertiary Care centre South India during the period from March 2017 to March 2018 .

100 patients including 25 normal and 75 high risk pregnancies were selected for study.

Criteria For Selection:

1. Singleton pregnancy.
2. Gestational age from 28 weeks to till delivery.
3. No cord complications.
4. Patients with a definitely known last menstrual period or an early scan report showing gestational age.

A careful clinical history was taken particularly about age, previous obstetric history, obstetric complications, last menstrual period and previous menstrual cycles.

A thorough clinical examination was done. Blood pressure, presence of oedema, gestational age, presenting part, amount of liquor and foetal heart rate were noted.

All preliminary and base line investigations like Hb% estimation, blood grouping and typing, complete urine examination, blood sugar are done.

Patients were subjected to base line utrasonographic study at three intervals.

1st at (28-32 weeks of gestation)
2nd at (32-36 weeks of gestation)
3rd after 36 weeks of gestation.

These patients were followed up for the mode of delivery, 5 minute apgar score, and perinatal outcome and findings were correlated with placental grading and amniotic fluid index.

Ultrasonic instrument utilised for the study purpose
The following machine was used for carrying out the present study: LOGIQ 100.

Frequency of transducer - 3.5 Mega Hertz.

METHOD: all the patients were subjected to a base line ultrasonographic study which included:
1. Biparietal diameter measurement.
2. Femur length measurement
3. Placental grading, localisation.
4. Amniotic fluid index.

Patient was placed in supine position. Acoustic gel was applied to the probe and on the patient. The imaging controls were adjusted to produce a high quality image.

1. Biparietal diameter : measurement was taken at the level of thalami and cavum septi pellucid. The callipers were placed at the outer edge of the skull and the inner edge of the skull, on the opposite side. The distance between the two was taken as BPD measurement.
2. Femur length: measurement was taken at the level of ossified diaphyses excluding the epiphyscal cartilages.
3. Placental grading was done, using the guidelines of Grannum and Berkowitz.
4. Amniotic fluid index: AFI was calculated by four quadrant technique as described by J.P phelan & colleagues.

Observation and analysis of 100 cases of complicated and uncomplicated pregnancy from 28 weeks of gestation to till delivery were included in the study. Placental grading and A.F.I. by sonar were correlated with preinatal outcome.

In some of the cases, pregnancy was terminated at an earlier date, before reaching term as the patients were having uncontrolled PIH, or IUGR not responding to treatment.

In this study patients after A.F.I measurement have been grouped into four categories.

(according to Phool chandra & satinder Pal Kaur study).
Group – I : A.F.I. < 5 cm (oligohydramnios)
Group – II : A.F.I. 5-8 cm (borderline Oligohydramnios)
Group – III : A.F.I. 8-20 cm (normal)
Group – IV : A.F.I. > 20cm (poly hydramnios)

The following results were obtained.

Distribution Of Normal And High Risk Cases

group	No. Of cases
Normal pregnancy	25
P.I.H.	25
I.U.G.R	20
Post dated preg	20
Rh-ve pregnancy	9
diabetes	1
total	100

Placental grading correlation with gestational age in 25 normal pregnancies.

In the present study,
In 28-31 weeks group, placenta is Grade O .
In 32-37 weeks group, out of 7 pts.
one is grade o
Two pts placenta grade 1,

Three patients grade II,
One patient grade III.
Above 37 weeks group, out of 17
normal term pregnancy cases, one had grade I, 2
two patients had grade II
fourteen patients had grade III
placenta.

Placenta showed maturational changes with increasing gestational age.

Placental grading correlation with gestational age in 75 high risk groups.

In 28-31wks pregnancy placental grading is O in two cases and grade I in two cases.

In 32-37 wks placental grading is
Grade O in 4 cases,
Grade I in 6 cases,
Grade II in 15 cases,
Grade III in 18 cases.
Above 37 wks, placenta is
Grade II in 5 cases,
Grade III in 23 cases.

In high risk groups higher number of grade II and grade III placentae were seen as compared to normal pregnancy of corresponding gestational ages.

Placental Grading Correlation With Gestational Age In 25 Cases Of Pih.

Placental grading	26-31 wks	32-37 wks	>37 wks	total
0	1	0	0	1
I	0	2	0	2
II	0	7	2	9
III	0	10	3	13
	1	19	5	25

Placental Grading Correlation With Gestational Age In 20 Cases Of Iugr.

Placental grading	28-31 wks	32-37 wks	>37 wks	total
0	1	0	0	1
I	0	1	0	1
II	0	6	1	7
III	0	9	2	11
	1	16	3	20

From the above two tables it was observed that placental maturational changes occurred at an earlier gestational age in PIH & IUGR where as they were delayed in diabetes. In post-dated and Rh-ve pregnancies placental changes were similar to that of normal pregnancy.

Correlation Of Placental Grading With Apgar Score At 5 Min Interval.

In placental
grade 0, 75% had apgar 0-3,
25% had apgar 4-6.

Grade I , 54% had apgar 0-3,
36% had apgar 4-6,
9% had apar 7-10.

Grade II, 4% had apgar 0-3,
8% had apgar 4-6,
87% had apgar 7-10.

Grade III, 3% had apgar 0-3,
3% had apgar 4-6,
93% had apgar 7-10.

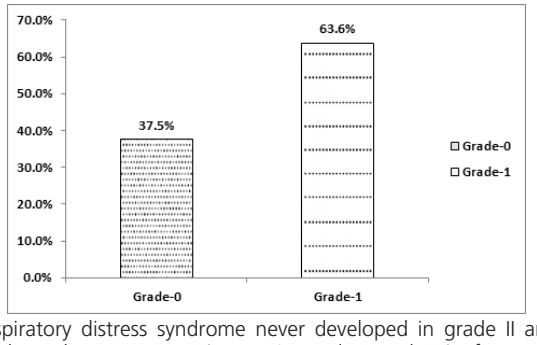
From the above data it is clear that most of the cases with apgar score >7 at 5 min interval have placental grading II or III.

Placental Grading Correlation With Birth Weights.

Low birth weights were seen in lower grades of placenta.
In grade II placenta (23cases),
2 cases were <2 kgs,
16 cases were 2-2.5kg
15 cases were >2.5kg.

In grade III placenta (58 cases),
2 cases were < 2kg,
20cases were 2-2.5kg,
36cases were >2.5kg.

Placental Grading Correlation With Development Of Respiratory Distress Syndrome.



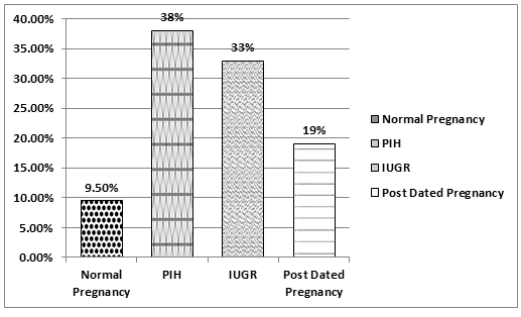
Respiratory distress syndrome never developed in grade II and grade III placentae. 37.5% cases in grade 0 and 9% of cases in grade I developed RDS. In grade 0 and grade I placenta perinatal mortality was 100%.

Case Distribution Depending Upon Afi

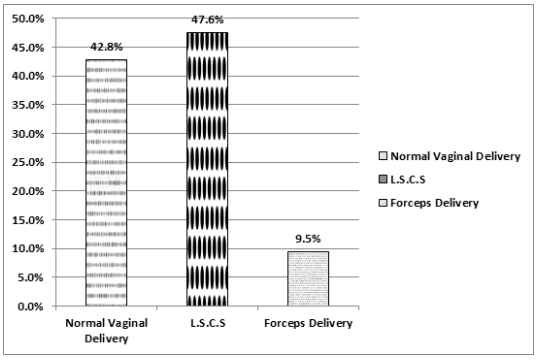
In the present study, cases were distributed into 4 groups depending upon AFI.

Out of 100 cases,
21 cases were in group I, AFI < 5.
23 cases were in group II, AFI 5-8.
52 cases were in group III,AFI 8-20.
4 cases were in group IV , AFI >20.

Afi In Normal And High Risk Pregnancies



Mode Of Delivery In Different Groups Of Afi



Group III cases with normal AFI consisted of more number of vaginal deliveries, 37 out of 52 cases.

LSCS predominated in oligo hydramnios (group I).

Incidence Of Meconium Staining Of Liquor.
Meconuim stained liquor :
Group I – 38%
Group II – 21%
Group III – 9.6%

Clear liquor :
Group I – 61.9%
Group II- 78.2%
Group III – 90%.

Incidence of meconium stained liquor was high in group I (oligo hydramnios) and group II compared to group III(normal AFI).

Perinatal mortality was high in group I and group II when compared to group III.

DISCUSSION

In the present study AFI and placental grading by sonar were carried out in 25 normal and 75 high risk pregnancies, from 28 weeks of gestation to till delivery.

Placental grading :
In normal pregnancy placental grading had a definite correlation with gestational age, being higher with advancing pregnancy. The gestational age for appearance of different placental grades was significantly earlier in IUGR and Pre eclampsia, whereas delayed in Diabetes. In cases of post dated pregnancy & Rh-ve pregnancy gestational age for appearance of different placental grades was similar to that of normal pregnancy.

Placental maturity showed a direct correlation with pulmonary maturity. 37.5% of cases with grade 0 placenta & 63.6% of cases with grade I placenta developed Respiratory distress syndrome (RDS). Cases with grade II and grade III placenta never developed RDS.

In a study by Bula Roy and Shanti Roy 45.4% cases of grade 0 and 45% of grade I placenta developed RDS. None of the case with grade II & grade III placenta developed RDS.

None of the cases with grade 0 placenta had 5 minute APGAR score above 7. Eventhough one case of grade I placenta showed 5 minute APGAR score 7 it could not be saved because of RDS.

The incidence of perinatal deaths was high in cases of grade 0 and grade I placenta, almost 100% cases with grade II and grade III placenta shoed better foetal outcome. The incidence of perinatal deaths was 17.3% in cases with grade II and 1.3% in cases with grade III placenta.

A.F.I.
In the present study low AFI values (oligo hydramnios, borderline oligohydraminios) were found in PIH, IUGR and post-dated pregnancies. High AFI values were foung in Diabetes and non-immnised Rh-ve pregnancies.

The incidence LSCS for fetal distress, forceps delivery was high in group I & group cases, when compared to group III cases.

Out of 21 cases of group I induction of labour was done in 76.1% of cases, meconium stained liquor was present in 38% of cases. Forceps delivery was conducted in 9.5% of cases. 28.6 % cases underwent LSCS delivery was conducted in 9.5% of cases. 28.6% cases underwent LSCS for fetal distress. 33.3% of cases had low APGAR values (<7 at 5 min interval). 76.1% of cases had low birth weight babies (< 2.5 kgs) perinatal mortality was high in group I & group II cases, low in group III cases.

Ruther ford et al showed maximum incidence of LSCS for fetal distress(11%), meconuim stained liquor (56%), APGAR score <n 7 at 5 minute interval (11%) in patients with AFI values <5, in their study in 1987.

According to phool chandra & satinder paul Kaur (23.7%) of cases had meconium stained liquor, (76.92%) of cases underwent LSCS for fetal distress, (23.7%) showed 5 minute APGAR score <7, (61.53%) of cases had low birth weight babies in cases with oligohydramnios.

Pratak kuumar and Suma Iyer reported (66.7%) incidence of LSCS for foetal distress in cases with oligohydraminios.

Summary

1. Ultra Sound examination of gravid uterus was done for AFI and placenta maturational study.
2. Placental maturational changes occurred at earlier gestational age in PIH & IUGR, where as they were delayed in diabetes.
3. Incidence of respiratory distress syndrome was maximum in cases of grade 0 (37.5%) and grade I placenta (63.6%).
4. Perinatal mortality was high in cases of grade 0 & grade I placenta (100%).
5. Maximum incidence low AFI values (38%), IUGR (33%) and post dated pregnancy (19%).
6. High AFI values (>20) were found in Diabetes (25%) and non-immunised Rh-ve pregnancies (50%).
7. Incidence of induction of labour (76.1%) meconium stained liquor (38%), LSCS for foetal distress (28.6%) was high in oligohydraminios.
8. Perinatal mortality was high in group I cases (oligohydramnios).

CONCLUSION

Amniotic fluid volume has been proved to be a measure of assessing foetal health and predicting certain perinatal disorders. Of the various semi-quantitative methods, the four quadrant assessment of amniotic fluid volume – Amniotic fluid index provides a convenient ad reproducible method of evaluating amniotic fluid volume. The risks of meconium staining of liquor, operative delivery, intrapartum fetal distress & perinatal mortality were significantly higher in oligohydramnios. It is concluded that AFI is one of the important adjunct in antepartum foetal surveillance for timely intervention thereby reducing perinatal morbidity and mortality.

Placental maturity showed a direct correlation with pulmonary maturity. Grade 0 & grade I placentae showed high incidence of RDS when compared with grade II & grade III placentae. It is concluded that placental grading by sonar is safe, non invasive and highly reliable index of functional maturity of the foetus. AFI predicts the well being of foetus and perinatal outcome.

Timely intervention in high risk pregnancies depending upon these parameters leads to improved perinatal outcome.