

A Comparative Study of Importance of AFI over Placental Grading In Predicting PERINATAL Outcome in IUGR Patients

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I. Introduction

The desire of every woman contemplating motherhood is that her pregnancy culminates in a healthy offspring who will achieve the highest possible physical and mental potential. Towards achieving this goal it remains the obstetricians responsibility to reduce the well-recognized implications and consequences of intrauterine growth retardation by early diagnosis and management. Most of IUGR patients have oligohydramnios and accelerated placental maturity. Growth restricted fetuses have 4 – 8 fold increased risk of perinatal mortality and morbidity as compared to appropriate weight foetuses¹.

AIM

To compare AFI and placental grading as predictors of perinatal outcome in IUGR patients.

OBJECTIVES

- To measure AFI in both study and control groups and comparing them.
- To note the APGAR scores in all newborns and comparing them in oligohydramnios with hypermature placenta (grade III).
- To measure birth weights of all newborns and comparing them in oligohydramnios with hypermature placenta.
- To compare the rate of LSCS among them.
- To measure the number of live births, still births, IUDS, early neonatal deaths and comparing these statistics among oligohydramnios with hypermature placenta.
- Comparing sensitivity of oligohydramnios with hypermature placenta in predicting perinatal outcome in IUGR patients.

II. Materials And Methods

PLACE OF STUDY:- Gandhi Hospital, Secunderabad

STUDY DESIGN:- Prospective Comparative study

SAMPLE SIZE:- 100 study group, 100 controls

STUDY DURATION:- 2016 July to 2017 December

SOURCE OF THE DATA:- All the Antenatal cases attending OPD or admitted under OBG department at Gandhi Hospital as per inclusion and exclusion criteria.

Inclusion Criteria:

1. Group 1 – Normal singleton pregnant women of > 34 weeks (controls)
2. Group 2 – Singleton pregnant women of > 34 weeks with IUGR with intact membranes (study group)
Study group is divided based on AFI into
 - a) AFI < 5 with hypermature placenta
 - b) AFI 5 – 8 with hypermature placenta
 - c) AFI > 8 with hypermature placentaBased on placental grading into
 - a) Grade 3 placenta
 - b) Non grade 3 placenta

Exclusion Criteria:

1. Patient refusal or inability to give informed consent
2. Pregnancies with multiple gestation
3. Pregnancies with evident fetal anomalies

4. Premature rupture of membranes
5. Those with medical disorders complicating pregnancy

III. Methodology

- The study is conducted on 100 IUGR patients (study group) and 100 normal patients(control group) as per the inclusion criteria.
- Amniotic fluid index and Placental grading were measured by ultrasound among study and control groups
- Study group is divided based on AFI and placental grading
- Mode of delivery, outcome of newborn, APGAR score at 5 minutes, birth weights of all newborns were observed in study and control groups

Outcomes Measured

- Comparing APGAR scores of IUGR with oligohydramnios and IUGR without oligohydramnios
- Comparing birth weights of IUGR with oligohydramnios and IUGR without oligohydramnios
- Comparing LSCS rates of IUGR with oligohydramnios and IUGR without oligohydramnios
- Comparing LSCS rates of IUGR with hypermature placenta and IUGR with non grade III placenta
- Comparing perinatal outcome in IUGR with oligohydramnios and IUGR without oligohydramnios
- Comparing perinatal outcome with IUGR with hypermature (grade III) placenta and with non grade III placenta
- Calculating the positive predictive value and sensitivity of oligohydramnios in determining perinatal outcome in IUGR
- Calculating the positive predictive value and sensitivity of hypermature (grade III) placenta determining perinatal outcome in IUGR
- Comparing positive predictive value and sensitivity of oligohydramnios with hypermature placenta
- Comparing AFI between study and control groups
- Comparing placental maturity between study and control groups
- Comparing birth weights of study and control groups
- Comparing LSCS rates among study and control groups

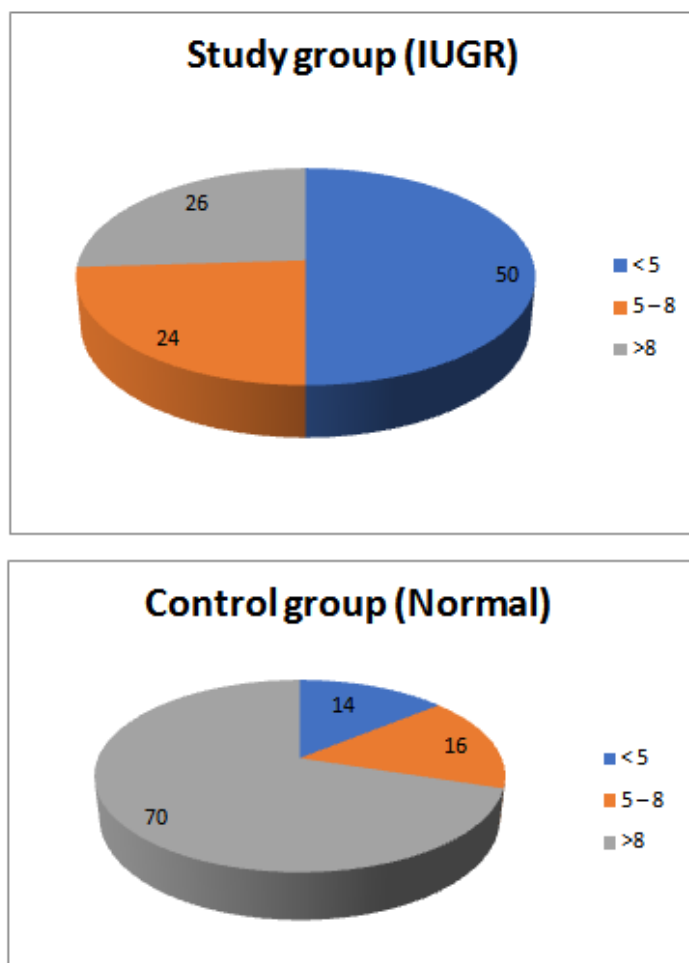
Observation And Results

It has been observed that most of the subjects were primigravida 78 % in study groups and 80% in control group were primigravida. Most of them were between 34 – 36 weeks of gestational age. 52% of study group were between 34 – 36 weeks as compared to 50% in control group. 36% of study group were between 36 – 38 weeks as compared to 46% in control group. 12% of study group were between 38 – 40 weeks as compared to 4% in control group. Most of the study group belong to low socio economic status 75% of study group belong to low socio economic status as compared to 40% of control group. 82% of study group were unbooked as compared to 20% in control group. 18% of study group were booked cases as compared to 80% in control group. 14% of study group had IUGR in previous pregnancy whereas in control group 2% had IUGR in previous pregnancy. Most of the study group have complications in present pregnancy. 40% of study group have PIH (Pregnancy induced Hypertension) as compared to 4% in control group. 4% of study group have GDM as compared to none in control group. 12% have anemia in study group as compared to 6% in control group. Most of the study group have oligohydramnios (AFI < 5) when compared to control group.

TABLE – 1 – COMPARING AFI BETWEEN STUDY GROUPS AND CONTROL GROUPS

AFI	Study group (IUGR)	Control group (Normal)
< 5	50	14
5 – 8	24	16
>8	26	70

Pie Diagram – 01 – Comparing Afi Between Study Groups And Control Groups

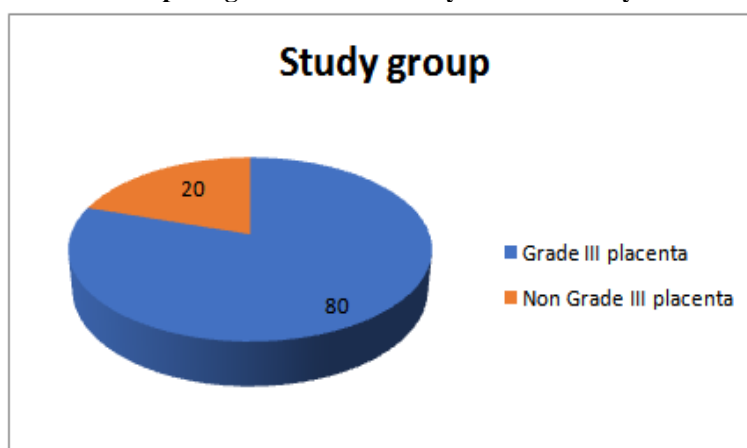


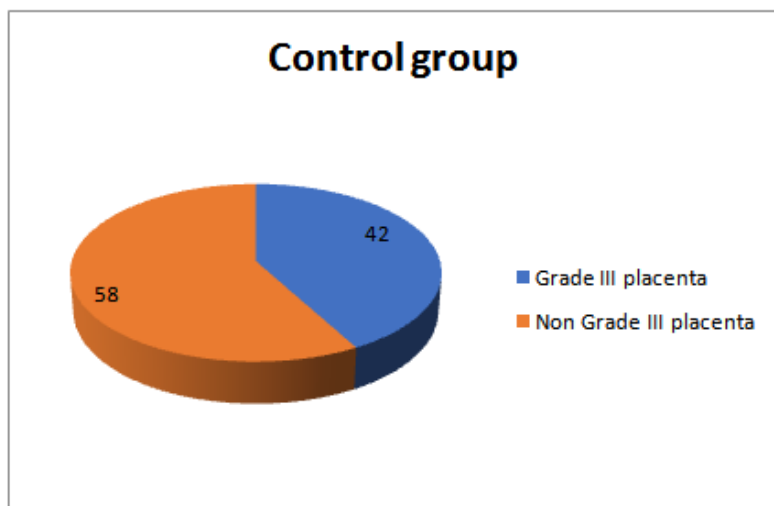
50% of study group have AFI < 5 as compared to 14% in control groups. 24% of study group have AFI between 5 – 8 as compared to 16% in control group. 26% of study group have AFI > 8 as compared to 70% in control group.

Table – 2 – Comparing Placental Maturity Between Study And Control Groups

	Study group	Control group
Grade III placenta	80	42
Non Grade III placenta	20	58

Pie Diagram – 02 – Comparing Placental Maturity Between Study And Control Groups





80% of study group have Grade III placenta as compared to 42% in control group. 20% of study group have non grade III placenta as compared to 58% in control group.

Table – 3 – Comparing Apgar Scores Among Iugr With Oligohydramnios And With Normal Afi

	AFI < 5 with hypermature placenta	AFI 5 – 8 with hypermature placenta	AFI > 8 with hypermature placenta
APGAR < 7	40	15	4
APGAR > 7	8	5	8

APGAR scores were measured at 5 minutes in all new borns and compared among those with oligohydramnios and those with normal AFI. In those with AFI < 5, 40 out of 8 (83%) APGAR scores < 7 and 8 out of 48 (16%) have APGAR scores > 7. In those with AFI 5 – 8, 15 out of 20 (75%) have APGAR scores < 7. 5 out of 20 (25%) have APGAR > 7. In those with AFI > 8, 4 out of 12 (33%) have APGAR < 7 and 8 out of 12 (66%) have APGAR > 7.

Graph – 01 – Comparing Apgar Scores Among Iugr With Oligohydramnios And With Normal Afi

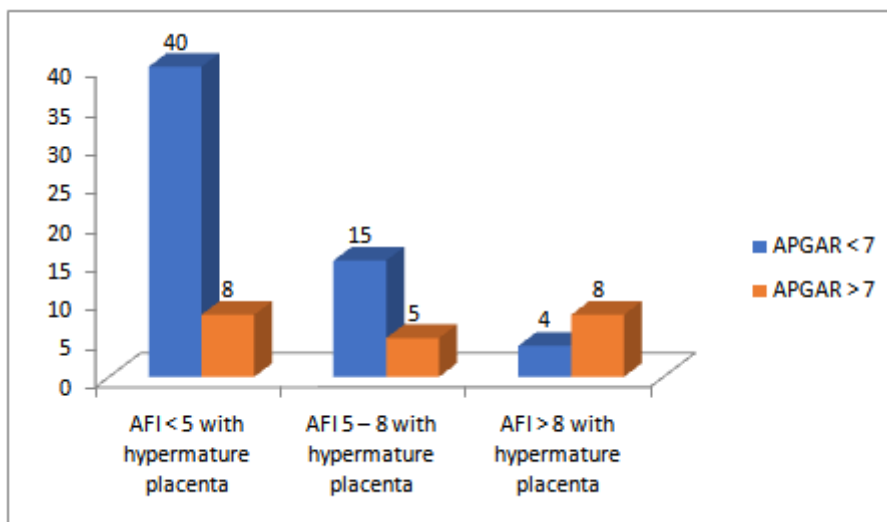


Table – 4 – Comparing Birth Weights Among Iugr With Oligohydramnios And With Normal Afi

	AFI < 5 with hypermature placenta	AFI 5 – 8 with hypermature placenta	AFI > 8 with hypermature placenta
< 1 kg	12	5	1
1 – 1.5 kg	26	10	1
1.5 – 2.5 kg	6	3	8
>2.5 kg	4	2	2

Birth weight among IUGR were compared between those with oligohydramnios and with normal AFI. In those with AFI < 5, 12 out of 48 (25%) have birth weight < 1 kg (ELBW) 26 out of 48 (54%) have birthweight 1 – 1.5 kg (VLBW) and 6 out of 48 (12%) have birth weight 1.5 – 2.5 kg (LBW) 4 out of 48 (8%) have birth weight > 2.5 kg. In those with AFI 5 – 8, 5 out of 20 (25%) have birthweight< 1 kg, 10 out of 20 (50%) have 1 – 1.5 kg, 3 out of 20 (15%) have 1.5 – 2.5 kg, 2 out of 20 (10%) have birth weight > 2.5 kg. In those with AFI > 8, 1 out of 12 (8%) have birthweight< 1 kg, 1 out of 12 (8%) have 1 – 1.5 kg, 8 out of 12 (66%) have 1.5 – 2.5 kg, 2 out of 12 (16%) have > 2.5 kg.

Graph – 02 – Comparing Birth Weights Among Iugr With Oligohydramnios And With Normal Afi

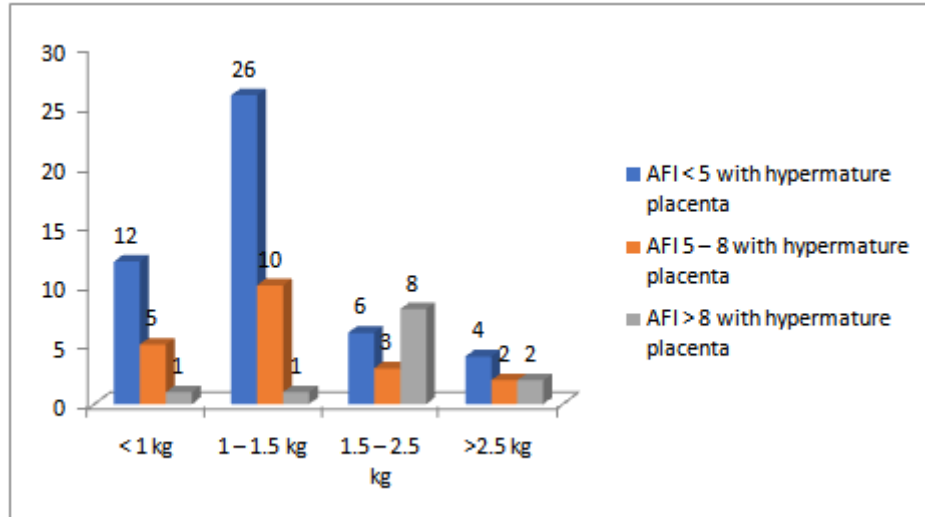


Table – 5 – Comparing Lscs Rates Among Iugr With Oligohydramnios And With Normal Afi

	AFI < 5 with hypermature placenta	AFI 5 – 8 with hypermature placenta	AFI > 8 with hypermature placenta
LSCS	36	15	8
Normal Vaginal delivery	12	5	4

Caesarean section rates were measured among IUGR with oligohydramnios and with normal AFI. In those with AFI < 5, 36 out of 48 (75%) delivered by LSCS and 12 (25%) delivered by normal vaginal delivery. In those with AFI 5 – 8, 15 out of 20 (75%) delivered by LSCS and 5 out of 20 (25%) delivered by vaginal delivery. In those with AFI > 8, 8 out of 12 (66%) delivered by LSCS, 4 out of 12 (33%) delivered by vaginal delivery.

Graph– 03 – Comparing Lscs Rates Among Iugr With Oligohydramnios And With Normal Afi

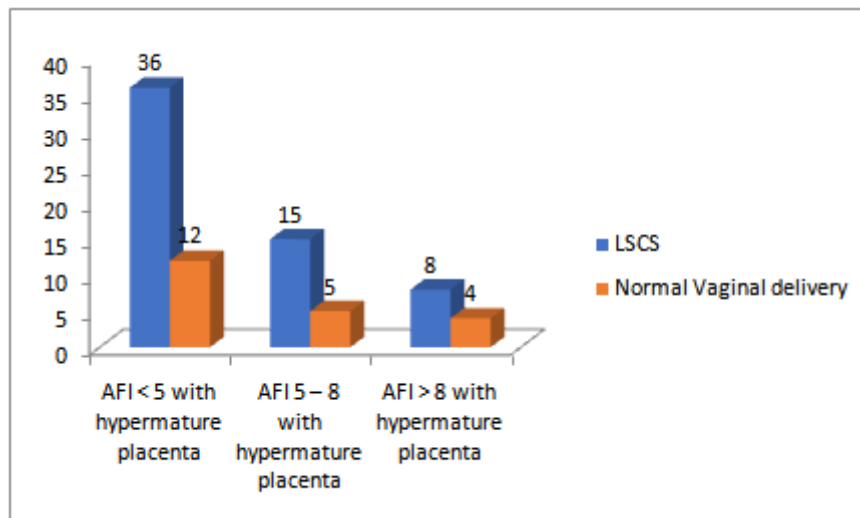


Table – 6 – Importance Of Afi In Predicting Perinatal Outcome In Iugr

	AFI < 5 with hypermature placenta	AFI 5 – 8 with hypermature placenta	AFI > 8 with hypermature placenta
Live births	8	4	7
Still births	18	6	2
IUD	8	5	1
Early neonatal deaths	14	5	2

Number of live births, still births, early neonatal deaths, IUDs were calculated and compared. In those with AFI < 5, 8 out of 48 have live births (16%), 18 out of 48 have still births (37%), 8 out of 48 have IUDs (16%) 14 out of 48 have early neonatal deaths (29%). In those with AFI 5 – 8, 4 out of 20 have live births (20%) 6 out of 20 have still births (30%) 5 out of 20 have IUD (25%) 5 out of 20 have early neonatal deaths (25%). In those with AFI > 8, 7 out of 12 have live births (58%), 2 out of 12 have still births (16%), 1 out of 12 have IUD (8%), 2 out of 12 have early neonatal deaths (16%).

Graph – 04 – Importance Of Afi In Predicting Perinatal Outcome In Iugr

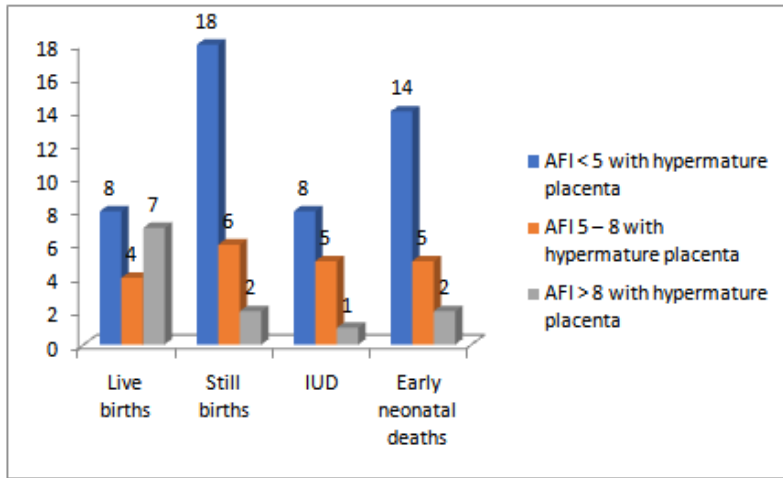


Table – 7 – Comparing Apgar Scores Among Iugr With Hypermature Placenta (Grade Iii) And Non Grade Iii Placenta

	Grade III placenta (without oligo)	Non Grade III placenta (without oligo)
APGAR < 7	4	4
APGAR > 7	8	9

APGAR scores of IUGR patients with Grade III placenta compared with those with non grade III placenta. Among 12 patients with grade III placenta, 4 have APGAR < 7 (33%), 8 have APGAR > 7 (66%). Among 13 patients with non grade III placenta 4 have APGAR < 7 (30%) and 9 have APGAR > 7 (69%).

Graph – 05 – Comparing Apgar Scores Among Iugr With Hypermature Placenta (Grade Iii) And Non Grade Iii Placenta

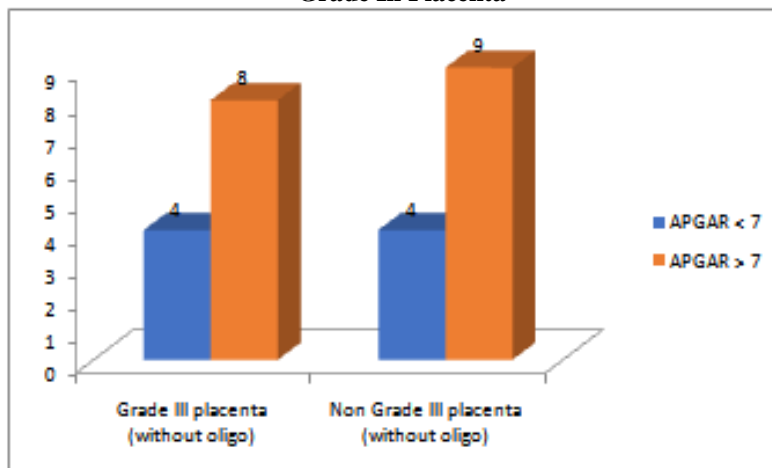


Table – 8 – Comparing Birth Weights Among Iugr With Hypermature Placenta And Non Grade Iii Placenta

	Grade III placenta (without oligo)	Non Grade III placenta (without oligo)
< 1 kg	1	1
1 – 1.5 kg	1	7
1.5 – 2.5 kg	8	3
>2.5 kg	2	2

Birthweights were compared between Grade III and non grade III placenta. Among 12 patients with grade III placenta 1 have birth weight < 1 kg (8%), 1 have birth weight 1 – 1.5 kg (8%), 8 have birth weight 1.5 – 2.5 kg (66%) 2 have birth weight > 2.5 kg (16%). Among 13 patients with non grade III placenta, 1 have birth weight of < 1 kg (7%) 7 have birth weight of 1 – 1.5 kg (54%) 3 have birth weight of 1.5 – 2.5 kg (23%) 2 have birth weight of > 2.5 kg (15%).

Graph – 06 – Comparing Birth Weights Among Iugr With Hypermature Placenta And Non Grade Iii Placenta

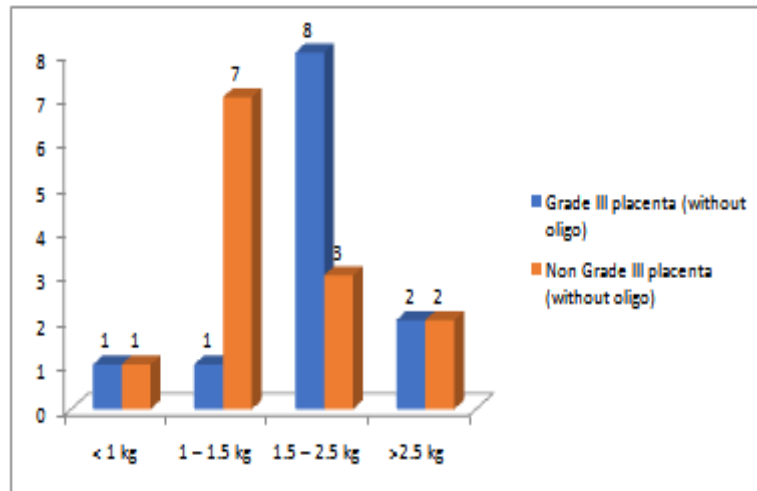


Table – 9 – Comparing Lscs Rates Among Iugr With Hypermature Placenta And Non Grade Iii Placenta

	Grade III placenta	Non Grade III placenta
LSCS	8	6
Normal vaginal delivery	4	7

LSCS rates compared between Grade III and non grade III placenta. Among 12 patients with grade III placenta, 8 delivered by LSCS (67%), 4 delivered by vaginal delivery (33%). Among 13 patients with non grade III placenta 6 delivered by LSCS (46%), 7 delivered by vaginal delivery (54%).

Graph – 07 – Comparing Lscs Rates Among Iugr With Hypermature Placenta And Non Grade Iii Placenta

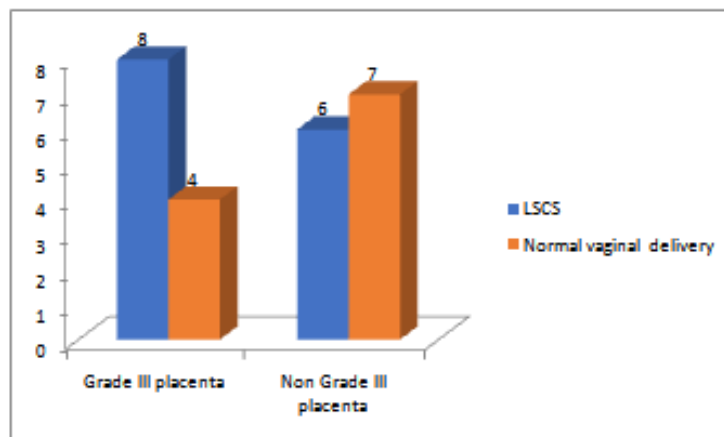


Table – 10 – Importance Of Placental Maturity In Predicting Perinatal Outcome In Iugr

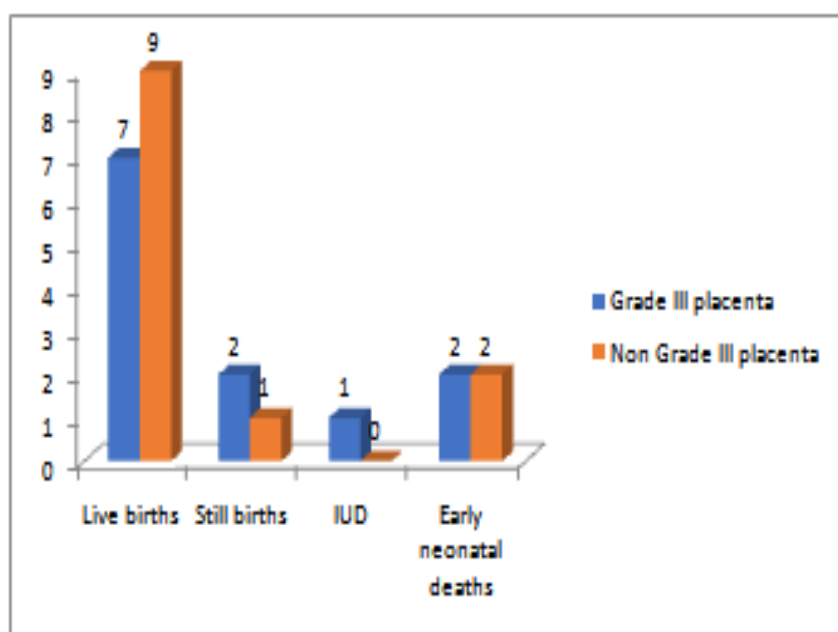
	Grade III placenta	Non Grade III placenta
Live births	7	9
Still births	2	1
IUD	1	0
Early neonatal deaths	2	2

Perinatal outcome compared between Grade III and non grade III placenta.

Out of 12 patients with Grade III placenta 7 have live births (58%), 2 have still births (16%) 1 have IUD (8%) 2 have early neonatal deaths (16%).

Out of 13 patients with non grade III placenta 9 have live births (69%), 1 have still birth (7%), 1 have IUD (7%), 2 have early neonatal death (15%). IN those with AFI < 5, 8 out of 48 have live births (16%) 18 out of 48 have still births (37%) 8 out of 48 have IUDs (16%) 14 out of 48 have early neonatal deaths (29%).

Graph – 08 – Importance Of Placental Maturity In Predicting Perinatal Outcome In Iugr

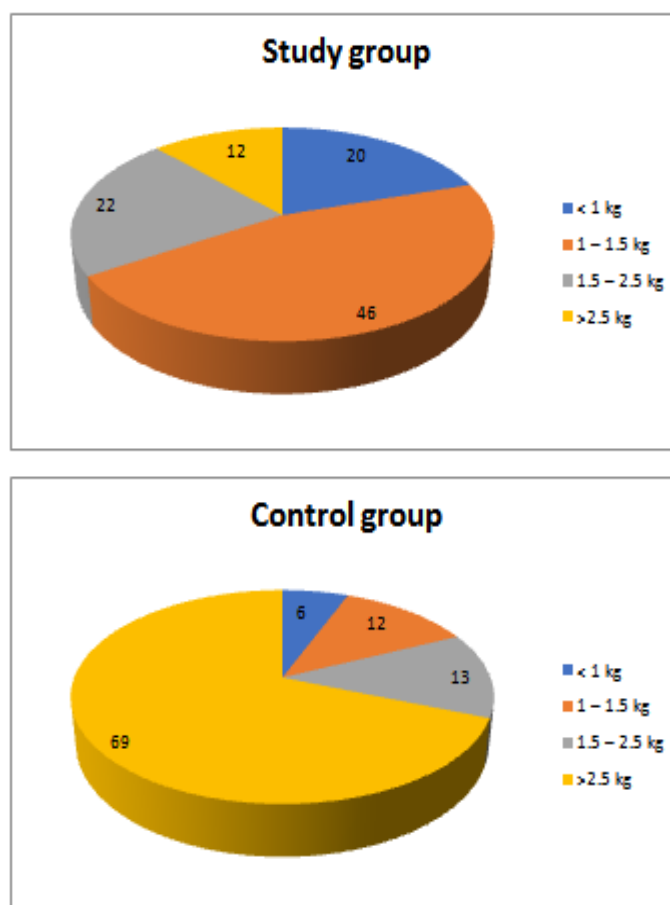


.Table – 11 – Comparing Birth Weights Of Study And Control Groups

	Study group	Control group
< 1 kg	20	6
1 – 1.5 kg	46	12
1.5 – 2.5 kg	22	13
>2.5 kg	12	69

20% of newborn in study group were extremely low birth weight i.e., < 1 kg as compared to 6% in control group. 46% of newborn in study group have very low birth weight i.e., 1 to 1.5 kg as compared to 12% in control group. 22% of newborn in study group have low birth weight i.e., between 1.5 to 2.5 kgs as compared to 13% in control group. 12% of newborn in study group have birth weight > 2.5 kgs as compared to 69% in control group.

Pie Diagram – 03 – Comparing Birth Weights Of Study And Control Groups



- 64% of study group were delivered by LSCS as compared to 22% of control group. 36% of study group were delivered by normal vaginal delivery as compared to 78% of control group.
- Sensitivity of oligohydramnios (AFI < 8) in predicting perinatal deaths = 78%
- Positive predictive value of oligohydramnios = 91%
- Sensitivity of Grade 3 placenta in predicting perinatal deaths = 36%
- Positive predictive value of Grade 3 placenta = 57%
- Oligohydramnios is more important predictor of Perinatal outcome than Placental grading with a 'P' value of < 0.0001

IV. Discussion

In the present study conducted at Gandhi Hospital including 100 study group (IUGR) and 100 control group (normal patients).

- Most of the IUGR patients have oligohydramnios and Grade III placenta.
- 64% of study group delivered by LSCS and 36% by vaginal delivery.
- 20% of newborn in study group were extremely low birth weight, 46% were very low birth weight, 22% were low birth weight, 12% were > 2.5 kg.
- 28% of study group have live births, 28% have still births, 30% have early neonatal deaths 14% have IUDs.
- Most of the newborns in IUGR have low APGAR scores (< 7) at 5 mins compared to study group.
- In study conducted by Voxmanet al² Oligohydramnios (AFI ≤ 5) was significantly associated with increased risk of Fetal Heart Rate abnormalities and increased rate of caesarean section. Similarly in the present study there is increased rate of LSCS in IUGR patients associated with oligohydramnios (AFI < 5).
- In study conducted by Chauhanet al³, oligohydramnios (AFI < 5) is associated with low APGAR scores at 5 mins. Similarly in the present study, IUGR patients with oligohydramnios (AFI < 5) have low APGAR scores at 5 mins.
- In study conducted by Morris et al⁴ sensitivity of oligohydramnios as predictor of adverse perinatal outcome is 28%. In the present study, sensitivity of oligohydramnios as predictor of adverse perinatal outcome is 78%.

- In the study conducted by Locatelli⁵, oligohydramnios is associated with low birth weight centile and increased rate of caesarean deliveries. Similarly in present study, in IUGR with oligohydramnios most of them have new borns with very low birth weight (46%) and low birth weight (22%).
- In the study conducted by Sonia Madaan⁶, oligohydramnios is associated with increased rate of low birth weight and perinatal mortality. Sensitivity of AFI in predicting perinatal outcome is 71%

Comparison Of Sensitivity Of Oligohydramnios With Other Studies

Study	Sensitivity of Oligohydramnios
Sonia Madaan et al	71%
Morris et al	28%
Present Study	78%

AFI is more sensitive in predicting mortality and morbidity in IUGR as well as in predicting presence of IUGR⁷. There is no significant difference in placental grade distribution in normal and high risk pregnancies at term but in contrast a grade III placenta in preterm fetus had clinical significance⁸. Caesarean Section rates were more in those with oligohydramnios when compared with those with normal AFI⁹.

Summary

Present study is to compare importance of AFI over placental grading in predicting perinatal outcome in IUGR.

Most of the study group were primigravida, unbooked cases and between 34 – 36 weeks gestation belonging to low socio economic status. 50% of study group have AFI < 5 and 24% have AFI 5 – 8. 80% of study group have grade III placental maturity, 20% have non grade III placenta.

In IUGR patients with oligohydramnios those with AFI < 8 are associated with increased rate of LSCS and low APGAR scores at birth and more perinatal deaths when compared with IUGR patients with grade III placental maturity.

- In those with AFI < 5: 75% delivered by LSCS, in those with AFI 5-8 : 75% delivered by LSCS
- In those with grade III placenta 67% delivered by LSCS
- In those with AFI < 5: 83% have newborns with APGAR < 7, in those with AFI 5-8 : 75% have APGAR < 7
- In those with Grade III placenta 33% have APGAR < 7
- In those with AFI <5 : 37% have still births, 29% have early neonatal deaths
In those with AFI 5 – 8: 30% have still births, 25% have early neonatal deaths
- In those with grade III placenta 16 % have still births and 16% have early neonatal deaths

Sensitivity of oligohydramnios in predicting perinatal outcome is 78% where as sensitivity of placental grading is 36%.

So AFI is more important predictor of perinatal outcome than placental grading as per present study with ‘P’ value of <0.0001.

V. Conclusion

Most of IUGR patients have oligohydramnios and placental hypermaturity. Identifying the IUGR patients by clinical and radiological methods during antenatal checkups is important. Risk factors for IUGR should be identified and managed accordingly. Most of IUGR patients have oligohydramnios because of uteroplacental insufficiency. AFI is measured by sum of deepest vertical pockets in four quadrants of uterus by ultrasound. Placental maturity is measured by ultrasound. Both oligohydramnios and hypermature placenta are associated with increased risk of perinatal morbidity and mortality. But oligohydramnios is the more important predictor of perinatal outcome than placental grading.

Oligohydramnios in IUGR is because of uteroplacental insufficiency so leads to low birth weight ,fetal distress, increased need for caesarean delivery and poor perinatal outcome. So in IUGR oligohydramnios should be diagnosed early and managed accordingly for better perinatal outcome.

- Conclusion of the present study is AFI is more important predictor of perinatal outcome than Placental grading in predicting perinatal outcome in IUGR patients with a ‘P’ value of < 0.0001

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