

A Prospective Study on Placental Lateralisation in an Indian Rural Medical College

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ABSTRACT

BACKGROUND

An efficient utero placental vascular system is a prerequisite for successful pregnancy outcome. The site of placental attachment in the uterus may be an important determinant of placental blood flow. Centrally located placentas receive adequate blood flow from both the uterine arteries by virtue of their position. In contrast, laterally located placentas may depend on a high degree anastomosis between ipsilateral and contralateral uterine arteries. Therefore, any difficulty in collateral circulation could lead to decreased blood flow and hence thereby lead to poor obstetric outcomes. Hence this study was done to assess the obstetric outcomes and to see the association with age, parity and other demographic features.

METHODS

After ethical committee permission, this study was conducted in the Department of Gynaecology and Obstetrics with the help of Radiology Department of Malda Medical College. The study was carried out from 1st January 2016 to 31st December 2017. Two groups of pregnant women, one group as case and another group as control group were screened for placental localisation by USG. Fifty pregnant women with USG proved lateral placenta were included in the study group and another fifty pregnant women with central placentas in the control group. Those pregnant women who attended antenatal clinic at first trimester for registration were screened for placental localisation by USG after 24 weeks of pregnancy. All women of study group and control group were studied and followed up from 24 weeks till delivery and subsequently up to discharge of newborn babies from hospital.

RESULTS

Incidence of preeclampsia was high 16% (8/50) in the study group compared to control group 4% (2/50). Incidence of foetal intrauterine growth restriction (IUGR) in lateral placenta group is 20% (10/50); whereas, in central placenta group it is 6% (3/50). These are statistically significant $p=0.037$. In study group women, 76% were up to 25 years of age and 72% were primigravida. Socioeconomic status has little impact on placental lateralisation.

CONCLUSIONS

Preeclampsia and IUGR are commonly associated with lateral placental location. These two obstetric conditions may lead to poor obstetric outcomes i.e. intrauterine foetal death (IUFD), stillbirths and neonatal deaths and hence timely identification of laterally located placenta in uterus and early detection of pregnancy complications like IUGR and preeclampsia and initiation of careful prophylaxis and proper management may reduce foetal morbidity and mortality and may improve perinatal outcome and may reduce maternal morbidity and mortality.

KEYWORDS

Central Placenta, Lateral Placenta, IUGR, Preeclampsia

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BACKGROUND

Placenta is the sole channel for nutrition and oxygen supply to the foetus. Foetal growth is regulated at multiple levels and successful placentation is required for coordination of the key components within the maternal, placental and foetal compartments. Site of placental attachment in the uterus has been associated with perinatal outcome according to length of gestation.^{1,2} The site of placental attachment may be previously low lying (attachment in lower segment but not placenta previa), fundal, right lateral, left lateral wall, anterior or posterior wall of body of the uterus. Lateral placenta was stamped when placental position is non previa, non low lying but having 75% of placental mass situated on one side either left or right side of midline of the uterus. Central placenta was defined when placenta was equally distributed in the midline between left side and right side of the uterus irrespective of anterior, posterior or fundal. There are several methods of placental localisation but in the past two decades ultrasonography has been proved the safest, easiest, and most accurate method for assessing placental localisation.^{3,4} For a screening test to be of value, it should be sensitive, reliable, cheap and easy to perform. It should increase the predictive value and prophylactic measure must be effective.⁵ Uterine blood supply is not uniformly distributed, the site of implantation and resulting location of the placenta within the uterus are more likely important determinant of placental blood flow and therefore pregnancy success.⁶ The placenta located laterally in mostly of women is associated with abnormal flow velocity wave form and this indicate defective uterine perfusion when one uterine artery is the dominant supply of the intervillous flow.⁷ This study was conducted to assess obstetric outcome with lateral placenta and to see the association with age, parity and socioeconomic status with lateral placenta.

METHODS

After Ethical Committee permission and informed consent, this study was conducted in the department of Obstetrics & Gynaecology with the help of Radiology of Malda Medical College. This study was carried out for two years from 1st January 2016 to 31st December 2017. Two groups of pregnant women were randomly selected. One group (study group) as cases and another group as control were screened for placental localisation by USG. Fifty (50) pregnant women with USG proved lateral placentas were included in the study group and another fifty (50) pregnant women with USG proved central placentas were included in the control group. Those pregnant women who attended antenatal clinic of Malda Medical College at first trimester of pregnancy were registered and after 24 weeks of pregnancy screened for placental localisation by USG. All fifty (n =50) cases and fifty (n =50) control group of same age, parity, gestational age with single tone pregnancy without any existing complications were studied and followed up from 24 week

of pregnancy till delivery and subsequently up to discharge of mother and newborn babies from hospital.

Exclusion Criteria

1. Placenta previa.
2. Multiple pregnancy.
3. Any medical disorders/ diseases.
4. Women delivered outside this Medical college hospital.
5. Women who were not scanned for placental localisation after 20 weeks of pregnancy (within 24 weeks to 36 weeks of gestation).
6. All structural abnormalities of foetus detected antenatally.

Statistical Analysis

Chi square test was applied for statistical analysis of quantitative data. P <.05 was taken as statistically significant. Two tailed Z test was used for identification of significance in quantitative data. Statistical analysis was performed by using analytical tool pack of Microsoft Excel 2010.

RESULTS

Most of the antenatal mothers in the present study were in the age group of 25 years. Table 1 shows among case and control group, maximum pregnant women were within 25 years of age (35 in control group and 38 in case group). From table 1, 70% of control group within 25 years and 76% of case within 25 years of age group. Only 8% cases and 10% of control group were above 30 years age. 24% of cases and 20% of control group women were within 20 years of age. 16% of case and 10% of control group women were above 30 years of age. Maximum percentage cases and control group women were within 25 years of age i.e. 76% and 70% respectively. Table 2 shows 72% (n=36) of case were prim gravid and among control group 70% (N=35) were primigravida. 16% women of study group and 20% women of control group were in 2nd gravida. Multigravida women found in 12% and 10% of study group and control group respectively.

Table 3 shows most of these women belonged to monthly family income between rupees 5000 to 10000. Among control group 76% and among study group 68% belonged to this status. Only 12% of control group and 14% study group women had monthly family income less than rupees 5000 per month.

In table 4 incidence of preeclampsia was seen in 16% (8/50) of women with lateral placenta group compared to 4% (2/50) women with central placenta group which was statistically significant (p= .045). Incidence of total growth restriction was 10/50 (20%) with lateral placenta group compared to 3/50 (6%) women with central placenta group

Age in Years	Case No. (n) = 50		Control No. (n) = 50	
	No.	(%)	No.	(%)
Up to 20 years	12	24	10	20
21 -25 years	26	52	25	50
26 – 30 years	08	16	10	20
>30 years	04	08	08	10
Total	50	100	50	100

Table 1. Distribution of Age of, Study Group Women, and Control Group Women

Parity	No. of Cases (n) = 50		No. of Control (n) = 50	
	No.	(%)	No.	(%)
Primigravida	36	72	35	70
2 nd gravida	08	16	10	20
Multigravida	06	12	05	10
Total	50	100	50	100

Table 2. Distribution of Case Group and Control Group Women According to Parity

Socioeconomic Status (Monthly Income in Rupee)	Total No. of Cases = 50		Total No. of Control = 50	
	No.	(%)	No.	(%)
< 5000	07	14	06	12
5000 - 10000	34	68	38	76
>10000	09	18	06	12
Total	50	100	50	100

Table 3. Distribution of Case and Control Group Women According to Socioeconomic Status

Effects	Study Group (n) = 50		Control Group (n) = 50		P Value
	No.	(%)	No.	(%)	
Preeclampsia	08	16	02	04	.045
IUGR	10	20	03	06	.037
Preeclampsia + IUGR	04	08	01	02	>.05

Table 4. Incidence of Preeclampsia and IUGR and Both (Preeclampsia and IUGR to Gather) in Case Group and Control Group Women

Baby Birth Weight in Grams	Study Group (n) = 50		Control Group (n) = 50	
	No.	(%)	No.	(%)
<1500	01	02	00	00
1500 - 1999	06	12	02	04
2000 - 2499	12	24	07	14
2500 - 3000	26	52	34	68
>3000	05	10	07	14

Table 5. Distribution of Baby Birth Weight between Study Group and Control Group

$\chi^2 = 5.88, p = .015, d.f. = 1$

*Apgar Score	No of Cases (n) = 50		No of Control (n) = 50	
	No.	(%)	No.	(%)
< 5 in 1 minute	07	14	03	06
<5 in 5 minute	03	06	01	02

Table 6. Apgar Score in Study Group and Control Group

*Total Apgar Score = 10, Apgar score 4-6 = mild depression, Apgar score 0-3 = severe depression

which was also statistically significant (p=.037). In this study both preeclampsia and IUGR (together in one woman) was present in 1/50 (2%) of control group and 4/50 (8%) of lateral placenta group which was not statistically significant (p value is >.05).

From analysis of data by Chi square test (χ^2) test, it was clearly found that incidence of IUGR was 3.3 times more common when placenta is laterally situated in comparison with central placenta group. Again, preeclampsia was four times more common in lateral placenta than centrally located placenta.

Table 5 shows that in study group 38% (19/50) babies were born underweight (<2500 grams), 52% (26/50) babies were born normal weight (2500-2999 grams) and 10% babies were born above 3000 grams. In control group only

18% (9/50) babies were born underweight (<2500 grams), 68% babies were born between 2500-3000 grams and 14% babies (7/50) were born above 3000 grams. Data of this table 5 is statistically significant (p= .015).

Table 6 shows that 14% babies (7/50) of study group were born with birth asphyxia (Apgar Score <5 in 1 minute) and 6% babies (3/50) remained in Apgar Score <5 in 5 minutes. In contrast in control group 6% (3/50) babies were born with birth asphyxia (Apgar Score <5 in 1 minute) and 2% babies (1/50) remained in <5 Apgar Score in 5 minutes.

DISCUSSION

Blood supply of the uterus is not uniformly distributed and placental location is an important determinant of placental blood flow as measured by uterine artery Doppler velocimetry. Kofinas et al reported that pregnancies with growth restriction and /or preeclampsia were more likely than normal pregnancies to have had unilateral placentas compared with central (i.e., anterior or posterior) placentas. In another study showed that lateral placenta is associated with IUGR (intrauterine growth restriction).⁸ Our findings showed that IUGR is 3.3 times (20% in lateral placenta group and 6% in central placenta group) more common in study group women, which is consistent with this study (table 4), but in other study did not support our finding.⁹

Hadley et al¹⁰ reported that central placenta carries a significantly higher risk of premature rupture of membranes. They presumed that central placentas have the weakest point of membranes over the cervical os and thus predisposes the women to premature rupture of membranes. Our study showed no such association. In the present study 16% women of lateral placenta developed preeclampsia, compared to 4% women with central placenta (table 4). The results of the present study were comparable to there of Muralidhar et al.¹¹ Our study showed that preeclampsia was four times more common in lateral placenta than central placenta. When considering both preeclampsia and IUGR together four foetuses (8%) developed IUGR and preeclampsia both (of the same mother) in study group and only one (2%) developed both IUGR and preeclampsia in control group. This data did not satisfy chi-square Test (p > 0.05), perhaps due to small number of cases in this study.

Results of our study were close to the study done by Bhalerao AV et al. who stated that ultrasonography in pregnant women during 20-24 weeks gestation can be a ease, non-invasive, useful and cost effective tool as a predictor of preeclampsia.¹²

CONCLUSIONS

Preeclampsia and IUGR are commonly associated with lateral placenta. These two obstetric conditions may lead to poor obstetric outcome and hence every obstetrician should

be aware of the importance of the lateral placenta and should take early appropriate prophylactic measures to reduce foetal morbidity and perinatal mortality and simultaneously to reduce maternal morbidity.

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