JOURNAL OF FERTILITY AND REPRODUCTIVE HEALTH
Oct-Dec 2023, VOL. 1, ISSUE 1, pp. 9-12
https://doi.org/10.61577/jfrh.2023.100003

RESEAPRO JOURNALS

ORIGINAL ARTICLE

OPEN ACCESS

Burden of abnormal placentation: a prospective observational study from a tertiary center in Kerala

Yashna Vazhayil[1] and Muhammad Hassan[2]

[1]Department of Obstetrics and Gynecology, Government Medical College, Trivandrum, Kerala, India
[2]Department of Orthopedics, Aster MIMS- K Hospital, Kerala, India

ABSTRACT

Background: Placenta previa and placenta accrete spectrum disorders like placenta increta and placenta percreta are the major causes of postpartum haemorrhage. Furthermore, placental positions are seen associated with various maternal and neonatal outcomes. However, there is less evidence from low to middle-income countries.

Methods: This study was conducted among all the antenatal women admitted to antenatal wards of SAT Hospital Thiruvananthapuram, Kerala, with a gestation of more than 24 weeks with an ultrasound diagnosed with abnormal placentation. Those with placenta previa were divided into two groups: the group whose placenta was in the anterior portion of the uterus (anterior group) and the group whose placenta was in the posterior portion of the uterus (posterior group) for studying the association of various maternal and neonatal factors.

Results: The proportion of abnormal placentation among cesarean deliveries over a period of 1 year in the hospital was 3560. Out of them, 200 were confirmed to be abnormal placentation. Among the placental abnormalities, 187 (93.5%) were placenta previa, 7 (3.5%) were placenta accreta, 4 (2.0%) were placenta increta, and 2 (1.0%) were placenta percreta. The proportion of placenta previa among all registered pregnancies was 7%. Compared to anterior placenta previa, the posterior location is associated with gestational diabetes, obstetric hysterectomy, increased premature birth, and an increased rate of adverse neonatal outcomes.

Conclusions: To determine the effect of placental implantation position on maternal and neonatal outcomes, further studies with a larger sample size is needed. Identifying these conditions early is important for appropriate obstetric care and surgical treatment.

KEYWORDS

Placenta accreta; Placenta previa; Abnormal placentation; Gestational diabetes; Obstetric hysterectomy

ARTICLE HISTORY

Received 16 August 2023; Revised 19 September 2023; Accepted 26 September 2023

Introduction

Abnormal placentation is one of the major causes of postpartum hemorrhage, constituting placenta previa and placenta accreta spectrum disorders based on the depth of invasion such as placenta accreta, placenta increta, and placenta percreta [1]. Placenta previa is defined as the attachment of the placenta in the lower uterine segment within 20mm from internal os [2]. Placenta accreta is defined as a trophoblastic attachment to the myometrium without intervening decidua. Placenta increta refers to when the placenta implants solely into the myometrium, whereas placenta percreta refers to when it implants into the uterine serosa or adjacent abdominal organs [3].

Population studies have shown abnormally placentation was significantly associated with morbidity and mortality for mothers and infants [4]. The incidence of abnormal placentation has increased tremendously over the past four decades [5,6]. Placenta accreta spectrum disorders affect around 1 in every 500 pregnancies [7]. Several evidences suggest a strong association between a number of previous cesarean deliveries and the incidence of placental accreta spectrum disorders in future pregnancies [8]. Considering the increased cesarean delivery rates in low to middle-income countries, there is an urgent need to describe the associated clinico-social characteristics of placental accretes spectrum disorders [9].

Even though the morbidity associated with abnormal placentation can be antepartum, intrapartum, or postpartum, most occur during the intrapartum stage. Uterine atony can cause postpartum haemorrhage, leading to disseminated intravascular coagulopathy, renal failure, or hysterectomy. Abnormal placental implantation may lead to hysterectomy in 5.3% of the patients after cesarean delivery, with a relative risk of 33 compared to normal pregnancy [10]. Mortality rates are directly proportional to the degree of placenta invasion and are reported as high as 7% [11]. Data from several studies suggest that anemia due to considerable blood loss, infections, and obstetric hysterectomy are associated with abnormal placentation [12,13]. Preterm birth and respiratory distress syndrome are some of the neonatal outcomes [14]. So far, however, there has been limited information on maternal and fetal outcomes of abnormal placentation, especially in low to middle-income settings. Therefore, this study is undertaken to study the maternal and fetal outcomes of placental disorders,

*Correspondence: Yashna Vazhayil, Resident, Department of Obstetrics and Gynecology, Government Medical College, Trivandrum, Kerala, India, e-mail: dr.yashnahassan@gmail.com

which helps enhance care delivery and improve outcomes for patients with abnormal placentation in pregnancy. In addition, the study explores the various risk factors associated with the position of placentation.

Methods

The study was performed at the Department of Obstetrics and Gynaecology SAT Hospital Thiruvananthapuram. This was a prospective observational study with convenient sampling. The eligibility was assessed among all the antenatal women with gestation more than 24 weeks admitted to antenatal wards with an ultrasound diagnosed abnormal placentation were considered for the study. The duration of the study was 18 months, from 2019 to 2021. The study was approved by the Regional Ethics Committee, and all ethical standards were met by the 1964 Helsinki Declaration and its later amendments. The study's inclusion criteria were any pregnant women >24 weeks gestation with abnormal placentation diagnosed by antenatal B mode ultrasonography and MRI pelvis for placenta accreta, placenta increta, and placenta percreta. We used ultrasound (the gold standard for prenatal diagnosis) and MRI for detecting complicated parametrial involvement in placenta accretes to reduce potential sources of measurement bias. Any USG scans showing confirmed fetal gross anomalies or non-consent were excluded from the study. Abnormal placentation is broadly defined here to include a spectrum of disorders, including abnormal implantation (Placenta previa), abnormal adherence (placenta accreta), and abnormal invasion (placenta increta and placenta percreta).

Maternal morbidity was assessed using the following indicators: age (in years), history of gestational diabetes (in mg/dL), gestational hypertension (in mmHg), bronchial asthma, etc. Advanced maternal age was defined as age>35 years. The type of placentation was confirmed intraoperatively. The placenta was defined as anterior when most of the placenta was on the anterior wall of the uterus and posterior when most of the placenta was on the posterior wall of the uterus.

Outcomes

Neonatal outcome was based on prematurity (in weeks), APGAR score, and fetal growth restriction-birth weight (in g or lb). Maternal outcomes were defined by the postpartum hemorrhage (in ml), massive blood transfusions (number of blood units transfused for blood loss=5), Obstetric Hysterectomy, amount of blood loss (in ml), and duration of ICU stay (in days). According to the 2015 American College of Obstetricians and Gynaecologists (ACOG) guidelines, intraoperative bleeding > 1000 mL is the diagnostic criterion for postpartum haemorrhage [15]. Massive transfusion was the transfusion of more than 5 packs of Packed Red Cells or whole blood intra or post-operatively.

Data collection

After enrolment, the participants were followed up till pregnancy to capture various maternal socio-demographic factors such as age, gestational age, and morbidities like gestational diabetes mellitus (GDM), gestational hypertension, and anemia. In all cases, gestational age was confirmed by the first or second-trimester ultrasound scan. After birth, pediatricians examined all neonates to capture birthweight and assess APGAR score at 1 and 5 minutes.

Statistical analysis

Descriptive analysis was carried out by mean and standard deviation for quantitative variables and frequency and proportion for categorical variables. Data was analyzed by using Stata 16.1 software. Neonatal outcomes, maternal outcomes-ICU stay, mode of delivery, blood loss, etc., were considered as primary outcome variables. Demographic and clinical parameters were considered as primary explanatory variables. A chi-square test was performed to identify independent associations of various maternal and neonatal factors with the position of placentation. A statistically significant p-value of $p<0.05$ was defined.

Results

The proportion of abnormal placentation among cesarean deliveries over 1 year in the hospital was 3560. Out of them, 200 were confirmed to be abnormal placentation. Among the abnormal placental presentations, 187 (93.5%) were placenta previa, 7 (3.5%) were placenta accreta, 4 (2.0%) were placenta increta, and 2 (1.0%) were placenta percreta. Our study found the percentage of placenta previa among all registered pregnancies was 7%. The study samples' maternal and neonatal demographic characteristics are presented in Table 1.

Table 1. Characterization of socio-demographic profile of 200 patients with abnormal placentation.

Characteristics	Mean ± SD/n (%)
Mean Age (in years)	28 ± 5.8
Area of residence	
Rural	115 (57.5)
Urban	85 (42.5)
Booked/Referred	
Booked	110 (55.0)
Referred	90 (45.0)
Gestational age (in weeks)	36.1 ± 2.7
Morbidities	
Gestational diabetes	47 (23.5)
Gestational hypertension	14 (7)
Hypothyroidism	29 (14.5)
Anemia	24 (12)
Bronchial asthma	2 (1)
Others	15 (7.5)
Placental abnormalities	
Placenta previa	187 (93.5)
Placenta accrete	7 (3.5)
Placenta increta	4 (2.0)
Placenta percreta	2 (1.0)
History of antepartum heamorrage	
No APH	143 (71.5)
1 episode	36 (18)
2-3 episodes	12 (6)
>3 episodes	9 (4.5)

Values are given as mean ± SD; N (%) as appropriate

https://doi.org/10.61577/jfrh.2023.100003

The mean age of the participants was 28 ± 5.8 years, and the mean gestational age was 36.1 ± 2.7 weeks. Gestational diabetes was the most common. Almost 60% of the participants were residing in rural areas.

Table 2 shows the association of the two groups with various maternal and neonatal characteristics. As compared to the anterior placenta group, the posterior group was characterized by an increased rate of gestational diabetes 35 (30.7%) *vs.* 12 (17.9%), p-value=0.001; and preterm birth 56 (49.12%) *vs.* 34 (50.75), p=0.04. There were five cases of cesarean hysterectomy in the anterior placental group, p-value=0.02. The rates of previous curettage, antepartum haemorrhage, and other maternal morbidities were not significantly different between the two groups. Hemoglobin levels before or after surgery were not significantly different between those two groups. As compared to the anterior placental group, neonates of the posterior placental group were more likely to have low birth weight 39 (58.21%) *vs.* 67 (58.77%), p-value=0.005; poor APGAR score 2 (2.9%) *vs.* 11 (9.6%), p value=0.006.

Table 2. Association of various maternal and neonatal factors with two groups.

	Anterior Placenta (N=67)	Posterior Placenta (N=114)	P value
Mean age (in years)			
<25 years	26 (38.81)	36 (31.58)	
26-35 years	34 (50.75)	64 (56.14)	
>35 years	7 (10.45)	14 (12.28)	0.6
Maternal morbidity			
GDM	12 (17.9)	35 (30.7)	0.001
GHTN	5 (7.46)	7 (6.14)	0.11
Anaemia	9 (13.43)	11(9.65)	0.43
History of Antepartum haemorrhage (>3 episodes)	22 (32.84)	34 (29.82)	0.62
History of curettage	4	2	0.6
Neonatal Outcomes			
Prematurity	34 (50.75)	56 (49.12)	0.04
LBW	39 (58.21)	67 (58.77)	0.005
APGAR output (Bad)	2 (2.9)	11 (9.6)	0.006
Maternal Outcomes			
Hysterectomy	5	1	0.02
Blood loss (>1000ml)	3 (4.48)	1 (0.88)	0.11
Massive blood transfusion (>5)	19	25	0.3
Duration of ICU stay (in days)	4 (5.97)	3 (2.63)	0.26

All data are shown as number (%), Mean ± standard deviation as appropriate.

Discussion

The present study was designed to find the proportion of abnormal placentation in a tertiary care unit in Kerala. Most cases were placenta previa, and the least were placenta percreta. The study also finds the association between various socio-demographic, maternal, and neonatal factors with the position of placentation. Posterior placental previa were more associated with gestational diabetes and premature birth compared to those with anterior placenta previa. A systematic review has found that the overall prevalence of placenta praevia was 5.2 per 1000 pregnancies and the highest among the Asian reproductive population, 12.2 per 1000 pregnancies [16]. This is in accordance with our study findings. Placenta praevia is not uncommon and may have been subject to substantial under-reporting depending on the available health facility. Even though facility-based studies may not truly represent the prevalence, very few studies from low- and middle-income countries have studied the prevalence of abnormal placentation. Consistent with the literature, this study found that participants with posterior placentation were associated with gestational diabetes. It is possible to hypothesize that gestational diabetes may profoundly affect placental development and position [17]. More mechanistic studies are needed to identify the specific biological effects underlying them.

In our study, posterior placentation was associated with adverse neonatal and maternal outcomes. Prematurity, poor APGAR score, and low birth weight were associated with posterior placentation. A recent systematic review has found that neonates from pregnancies with placenta previa have a mild but significant increase in intrauterine growth restriction/SGA risk [18]. A noting implication of the finding is a regular prenatal screening of placental position may be desirable to reduce the risk of IUGR/ SGA, considering the long-term effect of IUGR on the child's health outcome. A population-based U.S. cohort noted nearly one-fourth of the total women with placenta previa delivered between 34 and 37 weeks of gestation and one-fifth delivered less than 34 weeks [19]. Contrary to the

https://doi.org/10.61577/jfrh.2023.100003

evidence, our study could not prove that anterior placentation is associated with an increased risk of post-partum haemorrhage [20]. However, the hysterectomy procedure is more common in the anterior placental group. This finding broadly supports the work of other studies in this area [21]. Our study did not associate increased maternal age with the position of placenta previa. This is contrary to earlier findings in the western settings [22].

These findings may be limited because the sample size is smaller than earlier similar studies. The generalizability may be less since the study was conducted in a tertiary care center. Also, some of the variables related to the history of previous pregnancies could not be captured in detail. As no control groups (those with no abnormal placentation) were available, a logistic regression could not be performed to identify the risk factors. This study's shortcomings are the few cases recruited, being a single-center study, and demographic details are not considered broadly.

Conclusions

In conclusion, compared to anterior placenta previa, the posterior location is associated with gestational diabetes, obstetric hysterectomy, increased premature birth, and increased adverse neonatal outcomes. Early detection of these abnormalities in pregnancy may help in early detection and appropriate referral of those neonates. These differences based on placenta location could help improve diagnosis and reduce the morbidity of cesarean hysterectomy in women. Further studies with larger sample sizes are needed to see the effect of the position of placental implantation on maternal and neonatal outcomes. Managing a placenta previa accreta spectrum is challenging for an obstetrician as there is an increased risk of maternal and perinatal mortality and morbidity. As a result, good and timely antenatal treatment with early diagnosis, correction of anemia in the first and second trimesters, ultrasonography, and antenatal care in a tertiary care facility with blood transfusion and ICU care will reduce perinatal and maternal difficulties. Future studies should explore modalities to protect the fetus from the adverse outcomes of poor placentation by developing new prenatal interventions. Few studies have investigated the association between placental position and maternal and neonatal outcomes in low to middle-income settings. Exploring this knowledge gap helps to give optimal management of each of these conditions by giving appropriate obstetric care, the timing of delivery, and surgical management.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

1. Obstetrical hemorrhage. Williams Obstetrics, 25e, McGraw Hill Access Medicine. https://accessmedicine.mhmedical.com/content.aspx?bookid=1918&sectionid=185083809. Accessed by September 01 2022.
2. Jauniaux ER, Alfirevic Z, Bhide AG, Belfort MA, Burton GJ, Collins SL, et al. Placenta praevia and placenta accreta: diagnosis and management: green-top guideline no. 27a. BJOG. 2018;126(1):e1-e48.
3. Silver RM. Abnormal placentation: placenta previa, vasa previa, and placenta accreta. Obstet Gynecol. 2015;126(3):654-668.
4. Baldwin HJ, Patterson JA, Nippita TA, Torvaldsen S, Ibiebele I, Simpson JM, et al. Maternal and neonatal outcomes following abnormally invasive placenta: a population-based record linkage study. Acta Obstet Gynecol Scand. 2017;96(11):1373-1381.
5. Miller DA, Chollet JA, Goodwin TM. Clinical risk factors for placenta previa-placenta accreta. Am J Obstet Gynecol. 1997;177(1):210-214.
6. Read JA, Cotton DB, MILLER FC. Placenta accreta: changing clinical aspects and outcome. Obstet Gynecol. 1980;56(1):31-34.
7. Fitzpatrick KE, Sellers S, Spark P, Kurinczuk JJ, Brocklehurst P, Knight M. Incidence and risk factors for placenta accreta/increta/percreta in the UK: a national case-control study. PloS One. 2012;7(12):e52893.
8. Keag OE, Norman JE, Stock SJ. Long-term risks and benefits associated with cesarean delivery for mother, baby, and subsequent pregnancies: systematic review and meta-analysis. PLoS Med. 2018;15(1):e1002494.
9. Harrison MS, Goldenberg RL. Making cesarean delivery SAFE in low- and middle-income countries. Semin Perinatol. 2019;43(5):260-266.
10. Crane JM, Van den Hof MC, Dodds L, Armson BA, Liston R. Maternal complications with placenta previa. Am J Perinatol. 2000;17(02):101-106.
11. O'Brien JM, Barton JR, Donaldson ES. The management of placenta percreta: conservative and operative strategies. Am J Obstet Gynecol. 1996;175(6):1632-1638.
12. Ghidini A, Gratacos E. Can prenatal screening reduce the adverse obstetric outcomes related to abnormal placentation?. Prenat Diagn. 2014;34(7):613-617.
13. Moeini R, Dalili H, Kavyani Z, Shariat M, Charousaei H, Akhondzadeh A, et al. Maternal and neonatal outcomes of abnormal placentation: a case–control study. J Matern Fetal Neonatal Med. 2021;34(19):3097-3103.
14. Crane JM, Van den Hof MC, Dodds L, Armson BA, Liston R. Neonatal outcomes with placenta previa. Obstet Gynecol. 1999;93(4):541-544.
15. Main EK, Goffman D, Scavone BM, Low LK, Bingham D, Fontaine PL, et al. National partnership for maternal safety consensus bundle on obstetric hemorrhage. J Midwifery Womens Health. 2015;60(4):458-464.
16. Cresswell JA, Ronsmans C, Calvert C, Filippi V. Prevalence of placenta praevia by world region: a systematic review and meta-analysis. Trop Med Int Health. 2013;18(6):712-724.
17. Desoye G, Hauguel-de Mouzon S. The human placenta in gestational diabetes mellitus: the insulin and cytokine network. Diabetes Care. 2007;30(Supplement_2):S120-S126.
18. Balayla J, Desilets J, Shrem G. Placenta previa and the risk of intrauterine growth restriction (IUGR): a systematic review and meta-analysis. J Perinat Med. 2019;47(6):577-584.
19. Ananth CV, Demissie K, Smulian JC, Vintzileos AM. Placenta previa in singleton and twin births in the United States, 1989 through 1998: a comparison of risk factor profiles and associated conditions. Am J Obstet Gynecol. 2003;188(1):275-281.
20. Jang DG, We JS, Shin JU, Choi YJ, Ko HS, Park IY, et al. Maternal outcomes according to placental position in placental previa. Int J Med Sci. 2011;8(5):439.
21. Hasegawa J, Matsuoka R, Ichizuka K, Mimura T, Sekizawa A, Farina A, et al. Predisposing factors for massive hemorrhage during Cesarean section in patients with placenta previa. Ultrasound Obstet Gynecol. 2009;34(1):80-84.
22. Rao KP, Belogolovkin V, Yankowitz J, Spinnato JA. Abnormal placentation: evidence-based diagnosis and management of placenta previa, placenta accreta, and vasa previa. Obstet Gynecol Surv. 2012;67(8):503-519.

https://doi.org/10.61577/jfrh.2023.100003