Importance of Placental Sonogram in the First Trimester for Early Detection of Abnormal Placentation

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ABSTRACT

Introduction: Placental sonography is the study of placental location, placental attachment, size, shape, and structure of placenta. Generally, placental sonography is carried out in second trimester and onward and is generally missed in the first trimester. However, looking at the placenta and finding any abnormality in the attachment is highly important in the first trimester itself. Abnormalities like morbidly adherent placenta, cesarean scar pregnancy, etc., can be picked up on first trimester placental sonogram which can help us decide the patient management better.

Aims and objectives: The purpose of this article is to establish the importance of diagnosis of abnormal placental attachment in the first trimester ultrasound so that:

- Termination of pregnancy can be discussed with the patient.
- To prepare for major complications like postpartum hemorrhage and peripartum hysterectomy if need arises.
- Patient counseling regarding a high-risk pregnancy can be started at an early gestation.

Materials and methods: In this retrospective study, we have discussed a few cases that visited IPD and OPD in GGS Medical College, where abnormal placental attachment and location was missed and which could have been diagnosed at an early scan to prevent such morbidity to the patient.

Conclusion: With first trimester ultrasound, we can view into the early intrauterine environment. Examination of the placental morphology in the first trimester ultrasound to rule out placenta accreta, especially in high-risk patients, should be encouraged to improve patient education and choice and limit morbidity of this rising iatrogenic placental disorder.

Keywords: Abnormal placentation, cesarean scar pregnancy, Placenta accreta, Placental sonogram.

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INTRODUCTION

In the routine evaluation of a normal gestation, the placenta is often overlooked. It receives attention only when an abnormality is detected.¹ Evaluation of the fetus is given more priority, and we do not give desired attention to the placenta, umbilical cord, and amniotic fluid.² If there is abnormal adherence of the placenta to the uterine wall, involving a defect in the decidua basalis, it is a potentially life-threatening obstetrical emergency.^{3,4} The placenta which invades the myometrium of the uterus is called placenta accreta. When there is more invasion into the myometrium, it is called placenta increta. But more extensive invasion through the uterine serosa, ureters, bladder, and bowel it is called placenta percreta.^{3,5} According to Miller et al.,⁶ the most common abnormal attachment is placenta accreta. This superficial invasion represents 75% of cases. The deeper invasion of placenta into myometrium (increta) represents 18% of cases, and placental invasion through the uterus and into surrounding structures (percreta) represents 7% of cases. It is found that there is 25–50% incidence of placenta accreta in patients with a placenta previa and previous cesarean delivery,⁶ and this incidence is on a rise because of increase in cesarean deliveries. In these cases, there is incomplete separation of the placenta from the uterus after delivery leading to significant postpartum hemorrhage.^{3,4} Also, placenta accreta is responsible for 33–50% of emergency peripartum hysterectomies.^{7–9} Thus, morbidity and mortality of obstetric patients are increased with abnormal placentation. If proper antenatal screening and diagnosis of placental location is done, it would reduce the risk of various complications and blood loss.^{10,11}

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The imaging in antenatal period should be performed in such a way that there is minimal risk to both the mother and the fetus. The noninvasive techniques such as ultrasonography and magnetic resonance imaging are preferred, and out of these two, ultrasonography is the mainstay of placental imaging in the antepartum period.¹² The placenta has an intermediate echogenicity with a deep hypoechoic band at the interface between the myometrium and the basilar decidual layer on an ultrasound.¹ Further, two-dimensional and three-dimensional sonography with power Doppler imaging can be used to assess placental adherence.¹³ A three-dimensional power Doppler imaging along with evaluation of placental vessel architecture may help to differentiate between placenta accreta and placenta percreta.¹⁴

Generally, diagnosis of abnormal placental location or attachment is achieved at a second or third-trimester ultrasound. But, placental disorders can be diagnosed even during first trimester

when an NT-NB scan is being performed. The sonographic findings that suggest placenta previa/accreta in the first trimester include the following: a gestational sac that is located in the lower uterine segment, multiple irregular vascular spaces, and cord insertion into the lower third of the uterus.^{15,16}

The ultrasound features associated with a high suspicion of placenta accreta include increased myometrial thickness, presence of placental lacunae, loss of the clear space between the placenta and myometrium, and anomalies of the interface of the bladder and myometrium.¹⁷

AIMS AND OBJECTIVES

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- Patient counseling regarding a high-risk pregnancy can be started at an early gestation.

MATERIALS AND METHODS

In this retrospective study, we discuss few cases who visited IPD and OPD in GGS Medical College, where abnormal placental attachment and location was missed and which could have been diagnosed at an early scan to prevent such morbidity to the patient.

Case 1

A 24-year-old patient G3 P2 L2 A0 presented with spotting P/V at 14 weeks in our OPD. Her first delivery was a normal vaginal delivery, and second was a cesarean section. An ultrasound was done which revealed a 14 week pregnancy with absent cardiac activity, and placenta was anterior. After informed consent induction of abortion was done as per protocol. A macerated 14 week baby was expelled after 10 hours of induction. She had massive hemorrhage after expulsion of fetus. Placenta was partially separated. Oxytocics were given, but the patient continued to bleed actively. Patient was shifted to operation theater, and emergency laparotomy was done. The placenta was found to be morbidly adherent anteriorly. Emergency hysterectomy had to be done as bleeding continued. During surgery, there was injury to urinary bladder which was repaired. Three blood transfusions were given during and after the surgery. Patient was discharged after 10 days in fit condition. The diagnosis of placenta accreta was missed on the first-trimester ultrasound.

Case 2

A 28-year-old patient G3 P2 L2 A0 with previous 2 LSCS presented at 34 weeks of pregnancy with bleeding P/V in our labor room. The patient did not have any first- or second-trimester ultrasounds. An ultrasound was done which revealed an alive baby with 34 weeks pregnancy, and placenta was anterior reaching up to the cervical os. MRI was done which revealed placenta accreta. Patient was given conservative management and bleeding subsided. The pregnancy was taken to 37 weeks, and cesarean section was done. Intraoperatively, there was thinning of lower segment, and placenta was reaching up to the outer wall of the uterus. There was profuse bleeding, and she ended up in peripartum hysterectomy. The patient was transfused 4 units of blood. Postoperative period

was uneventful, and the patient was discharged after 6 days. The diagnosis of placenta accrete was missed in first and second trimester.

Case 3

A 25-year-old patient G2 P1 L1 previous normal vaginal delivery presented with ultrasound showing missed abortion at 16 weeks in some private nursing home, where induction of abortion was done. After expulsion of fetus, she started bleeding profusely. Laparotomy was done in private hospital but on opening the abdomen uterus was normal. No further procedure was done, and only conservative management was given with Tranexamic acid following which bleeding reduced. Abdomen was closed, and she was referred to Gynae OPD of GGS Medical college after 7 days with the MRI scan showing 62 × 56 mm SOL in the cervical region. The patient was continuing to bleed minimally in the postoperative period. The β hCG levels were 980 mIU/mL. Injection Methotrexate was given after getting routine blood investigations followed by Inj. Leucovorin 0.1 mg/kg. Ultrasound was repeated after 7 days which revealed a slight decrease in the size of mass. Inj. Methotrexate and Inj. Leucovorin were repeated. In total 4 doses of Methotrexate were given and mass reduced in size after 15 days of last dose. During this period, she did not bleed and period was uneventful. The mass resolved completely after 2 months.

Diagnosis of placental attachment in cervical region was missed in antenatal period.

Case 4

A 32-year-old female P2 L2, previous 2 normal vaginal deliveries, was referred from some community health center with retained placenta. Her vitals were within normal range. Her hemoglobin was 7.0 g%. She did not have excessive bleeding P/V at the time of admission. An ultrasound was done which showed placenta accreta. Placental separation was not possible. The patient was transfused 2 units of PRBCs, and after she was medically fit, peripartum hysterectomy was done. Patient was discharged in fit condition after 7 days. The diagnosis of placenta accreta was missed on antenatal ultrasounds.

Case 5

A 35-year-old female G4 P3 L3 with previous 3 LSCS presented with bleeding P/V at 8 weeks following which she underwent dilatation and curettage in some private clinic, where there was profuse bleeding at the time of the procedure. She was given blood transfusion and referred to medical college. At the time of admission, she had normal vitals, and minimal bleeding was present. Ultrasonography showed a small gestational sac corresponding to 6 weeks gestation with no cardiac activity in the lower uterine segment anteriorly. A diagnosis of cesarean scar pregnancy was made. Routine investigations and β hCG were sent. Beta HCG was 847 mIU/mL. So medical treatment was started with Inj. Methotrexate and Inj. Leucovorin. She responded to the treatment, and the mass disappeared in 1 month time. The diagnosis of cesarean scar pregnancy was missed on first-trimester ultrasound.

DISCUSSION

In most cases, placenta accreta is only discovered during or after vaginal delivery, cesarean section, or after abortion, when profuse hemorrhage occurs or when there is retained placenta.¹⁸ However,

it is very important to diagnose placenta accreta prior to delivery and that also as early in the pregnancy as possible. This will allow reduction in maternal morbidity and mortality due to massive hemorrhage.¹⁹ Also, diagnosing abnormal attachment of placenta in early pregnancy helps us for counseling the patient about the complications, and the patient can even choose to terminate pregnancy, if she is willing to do so. Placenta accreta remains the leading cause of peripartum hysterectomy²⁰ with a maternal mortality rate of approximately 6%. Also, maternal morbidity is very high. This high morbidity is due to massive blood loss which requires multiple blood and blood products transfusion to the tune of 70%.²¹ There can be prolonged admission to intensive care units, coagulopathy, ureteric, and bladder injury. Late complications include infection, hospital readmission, and multiple surgeries.²² Other than these postpartum complications, antenatal complications like preterm birth and intrauterine growth restriction are also increased with placenta accreta.²³

In all the above cases, antenatal ultrasonography regarding placental pathology was missed. Also, there were lot of intraoperative complications, and postoperative morbidity was very high.

If this condition is diagnosed early, then we can do extensive counseling of the patient and guide them for therapeutic options, like hysterectomy or conservative treatment (leaving placenta *in situ*), based on the patients' desire for future childbearing. We can advise the need for close follow-up in case of conservative management. Also, we can do planning before surgery, and consultation with interventional radiologist, anesthetist, neonatologist, blood bank, urologist, etc., can be done. Also, the patient can be given option of early termination of pregnancy if she is willing for the same after discussing all the complications. It is estimated that antepartum diagnosis of placenta accreta reduces the need for large blood transfusions amounting to ≥ 4 units.²⁴

Thus, with early antepartum diagnosis of this condition, the patient outcomes can be improved, and we can prevent maternal mortalities. The diagnosis of placental accreta is definitely difficult during the first trimester, when compared to that in the third trimester. A recent study by Ballas et al.²⁵ suggests that sonographic findings of abnormal placentation in the first trimester included an irregular placental-myometrial interface, anechoic placental areas, low implantation of the gestational sac.¹⁷ Chen et al.²⁶ reported a case in which the diagnosis of placental adhesion was made at a gestational age of 9 weeks after detection of placental lacunae on 2D sonography and color Doppler imaging, and hysterectomy was performed at 15 weeks owing to hemorrhage. Shih et al.²⁷ reported the detection of diffuse dilatation of the subplacental vessels traversing the lower uterine corpus at a gestational age of 8 weeks using power Doppler imaging in a case that was later diagnosed with placenta accreta at 15 weeks after detection of Grade 3+ placental lacunae on color doppler imaging. They also had to perform hysterectomy at 15 weeks owing to heavy bleeding. These two cases show that the finding of intraplacental lacunae might also be a useful indicator in the diagnosis of placenta accreta in the first trimester of pregnancy.

The rising prevalence of placental invasion and increasing use of first-trimester sonography have led to recognition of placenta accreta in first trimester. Identification of suspected first-trimester invasion poses challenges regarding patient counseling. Regardless of whether a woman decides to continue or terminate the pregnancy, she is at a significant risk of hemorrhage and hysterectomy. If she continues the pregnancy, she will require close surveillance and

coordination of delivery planning. If she opts for termination, local injection of methotrexate and hysteroscopic-guided procedures have been reported to have lowest complication rates.

CONCLUSION

Over the last several decades, the incidence of placenta previa and accreta are increasing with rapidly rising rates of cesarean section. With first-trimester ultrasound, we can view into the early intrauterine environment. Examination of the placental morphology in the first-trimester ultrasound to rule out placenta accreta, especially in high-risk patients, should be encouraged to improve patient education and choice and limit morbidity of this rising iatrogenic placental disorder.

RECOMMENDATION

Patients with a prior cesarean delivery and placenta previa are recommended to be screened for accreta with antenatal sonography starting from first trimester. Overall, gray scale sonography is an excellent tool for the prenatal diagnosis of placenta accreta in women at risk for this abnormality.

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