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Detection of Placenta Acreta in the First Trimester by 2d Transvaginal Ultrasound and Colour Doppler

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Abstract:- The objective of this study was to analyze the accuracy of ultrasonography in diagnosing placenta accreta and its variations, and to assess the influence of prenatal diagnosis on our group of patients. Approaches: A total of 146 women with placenta previa were enrolled in the study. These ladies underwent both transabdominal and transvaginal ultrasound examinations. The ultrasound examination, utilizing grayscale and color/power Doppler imaging, specifically targeted placental attachment disorder (PAD) and followed a 'two-criteria system.' This system required the identification of at least two of the following signs: absence or abnormality of the clear space behind the placenta, weakening or disruption of the boundary between the uterus and bladder, turbulent blood-filled spaces in the placenta with fast flow, thickness of the uterine muscle less than 1 mm, increased blood supply to the boundary between the uterus and bladder, absence of a blood vessel arrangement parallel to the base of the placenta, and/or irregular blood flow within the placenta. The conclusive diagnosis was affirmed through Cesarean section at the time of childbirth. The maternal outcomes of cases diagnosed during pregnancy were compared to those diagnosed during childbirth.

Keywords:- *Placenta Accreta; Ultrasound; Disorders of Placental Attachment; Placenta Previa.*

I. INTRODUCTION

Placenta accreta is characterized by the atypical invasion of placental tissue into the myometrium. The term "placenta accreta spectrum" encompasses various forms of abnormal attachment of the placenta to the uterine or other tissues, including placenta accreta, placenta increta, and placenta percreta. The prevalence of Placenta Accreta Spectrum (PAS) has seen a significant rise in recent years, largely attributed to the increasing number of Cesarean sections. The upsurge in Cesarean section rates contributes directly as a separate risk factor and indirectly by heightening the likelihood of placenta previa and low-lying placenta in subsequent pregnancies [1-54].

Low-implantation pregnancy (LIP) found on first-trimester ultrasound is a significant risk factor for PAS. This discovery is also linked to an elevated risk for persistent placenta previa or low-lying placenta later in pregnancy [55]Preeclampsia and eclampsia (PAS) can result in significant maternal morbidity, such as admission to the critical care unit, severe bleeding necessitating blood transfusion, venous blood clot formation, abnormal blood clotting, and harm to the genitourinary tract. Earlier research has estimated that the maternal mortality rate related to PAS diseases is approximately 7%, but it can go up to 30% if antenatal diagnosis is not performed. PAS is associated with prenatal morbidity and mortality, mainly due to an increased risk of fetal growth restriction and premature delivery [56-72].

Color Doppler ultrasound enables the production of blood flow images, which offer the benefits of two-dimensional ultrasound structure images while also providing extensive information on hemodynamics. The term used in clinical practice to refer to this procedure is "non-invasive angiography". Color Doppler blood flow imaging technology utilizes color to display blood flow signals, with the pseudocolor coding consisting of the primary colors' red, blue, and green [73]. Assign the color red to indicate the direction of blood flow towards the probe and assign the color blue to indicate the direction of blood flow away from the probe [74]. The velocity of blood flow is directly correlated with the luminance of color, such that high velocity corresponds to strong color luminance, while low velocity corresponds to weak color luminance [75].

Color Doppler ultrasound is a medical instrument used for ultrasound evaluation of different body areas, particularly for diagnosing and examining the heart, limb blood vessels, superficial organs, abdomen, obstetrics, and gynecology. Doppler ultrasonography can be categorized into five distinct types: pulsed Doppler, continuous Doppler, high pulse repetition frequency Doppler, multipoint gated Doppler, and color Doppler flow imaging. Out of all the options, pulsed Doppler is the most commonly utilized [76].

Two-dimensional echocardiography placement relies on the Doppler principle and a set of electronic techniques. It allows for the real-time display of a spectrogram of blood flow volume at a specific point in the heart or major blood veins. This technique is non-traumatic and used to detect intracardiac shunts and regurgitation. Continuous Doppler is capable of emitting pulses in a continuous manner, allowing it to accurately detect fast blood flow. This feature provides clear benefits for quantitatively analyzing conditions such as stenosis, regurgitation, and shunt lesions in the cardiovascular system. The working principle of this technology is to incorporate color Doppler into high-definition black and white B ultrasound. The addition of color Doppler enhances the diagnostic accuracy of grey-scale ultrasound techniques

and should be used without restriction in cases where there is significant uncertainty regarding placenta accreta [77-85].

Prenatal diagnosis of pulmonary atresia with intact ventricular septum (PAS) typically involves the use of ultrasound during the second or third trimester of pregnancy. The stated sensitivity of this approach varies between 67% and 97% (with a mean of 86%), while the specificity varies between 50% to 98% (with a mean of 94%). The range of the positive predictive value (PPV) is between 65% and 89% with a mean of 74%, while the range of the negative predictive value (NPV) is between 40% and 99% with a mean of 97% [86].

The use of ultrasound (US) findings in the first trimester to predict placenta accreta spectrum (PAS) is becoming more popular, as it has important implications for morbidity and therapy. An early diagnosis of placenta accreta spectrum (PAS) facilitates better maternal outcomes by enabling comprehensive planning and delivery before the commencement of labor, hence reducing both maternal and fetal morbidity [87-92].

Nevertheless, there are also inconsistencies and limitations in the existing published literature that specifically examines ultrasonography features of first-trimester pregnancy of unknown location (PUL) and pregnancy of uncertain viability (PUV) [93].

The diagnostic capability of sonography for Placenta Accreta Spectrum (PAS) in the first trimester faces challenges due to inconsistent definitions of sonographic markers, limited sample sizes, diverse study groups, and the absence of a control group for comparative analysis. Due to these variations, there is a lack of knowledge regarding the usefulness of PAS ultrasonography indicators throughout the first trimester [94-100].

II. PATIENTS AND METHODS

We executed a prospective cohort study involving a cohort of 146 women diagnosed with low implantation during a first-trimester ultrasound, following the guidance of their healthcare providers.

The participants were chosen from the outpatient and inpatient obstetric departments at Benha University Hospitals and Tahta General Hospital, after receiving approval from the institutional ethical council.

All participants were required to submit informed written consent. They were given a detailed explanation of the study's aims and were assigned a unique and confidential code number. The research findings were solely employed for scientific objectives, and any unforeseen hazards that arose throughout the study were promptly conveyed to both participants and the ethics committee.

➢ *Inclusion Criteria:*

- Women aged between 18- 40.
- Patients with GS located close to the internal cervical os (up to 8 + 6 weeks gestation).
- Patients with placental implantation located over cervix or internal os (up to 13 + 6 weeks gestation).
- Patients with history of previa or accreta.

All the mentioned criteria were considered for inclusion if individuals were diagnosed with low implantation during a clinically indicated first-trimester ultrasound and subsequently underwent a transvaginal ultrasound study between 10 0/7 to 13 6/7 weeks' gestation, with the presence of an appropriate transverse transvaginal cine clip.

➢ *Exclusion Criteria:*

- Individuals suffering from psychiatric disorders and impaired cognitive function.
- Cases at late second or third trimester.
- Major congenital fetal anomalies.
- Heart, kidney and liver failure.
- Patients who refused to take part in the study.

➢ *Methods:*

- All patients were subjected to the following:
- History taking of the following:

✓ Personal history (name, age, file number)
✓ Obstetric history (number of C.S, abortion, placenta previa in previous pregnancy)
✓ Present history (complaint, gestational age, &history of threatened abortion)
✓ Past history of any systemic disease.

➢ *Ultrasound Evaluation:*

Ultrasound and color Doppler examinations will be done by 2D US in Benha University hospital obstetrics & gynecology department in Tahta general hospital.

➢ *Sonography Examination:*

The placenta was examined using the Mindray DC 70 expert sonography system and the transducer with a frequency range of 3.6-11.4 MHz. The placenta was assessed using gray scale and color Doppler criteria. Following cesarean surgery, the placenta was clinically and histologically confirmed to be free of placenta accreta [101-103].

- Fetal viability assessment was performed as part of the routine procedure.
- Patients were positioned lying on their backs and underwent a transvaginal ultrasound examination. The bladder was partially filled to improve visibility of the outer layer of the uterus and the bladder wall.
- The entire placenta was systematically examined using 2D power Doppler ultrasound to identify patients who might have advanced invasive placentation.

III. MEASUREMENTS

- Patients' characteristics (age, race, parity, gestational age at first trimester US (weeks) and BMI (kg/m^2).
- First-trimester ultrasound can identify several markers of PAS, including placental lacunae, Finberg's grade, aberrant uteroplacental interface, retroplacental clear zone, retroplacental myometrium, and lower uterine segment (LUS) hypervascularity on color Doppler imaging.Evaluation of the effectiveness of ultrasound indicators in diagnosing the placenta accreta spectrum during second- or third-trimester examinations compared to our first-trimester study.

➢ *Sample Size:*

The determination of the sample size was derived from the study titled "Ultrasound detection of placenta accreta in the first trimester of pregnancy." According to this study, the incidence of placenta accreta among individuals with first-trimester ultrasound predictors of placenta accreta was 25%, while those without such predictors had an incidence of 3.4%. Employing the OpenEPI application with a confidence level of 95% and a power of 90%, a minimum total sample size of 124 participants, with 62 in each arm, was deemed appropriate.

IV. DISCUSSION

Placenta accreta is a highly dangerous disease that significantly contributes to maternal morbidity and mortality worldwide. Based on a study conducted in the UK, the estimated occurrence of placenta accreta/increta/percreta was 1.7 cases per 10,000 pregnancies in general, and 577 cases per 10,000 pregnancies in women who had both a previous cesarean birth and placenta previa [104].

Identifying high-risk patients with placenta accreta is crucial for managing the pregnancy and ensuring the surgeon is fully prepared for delivery, as this condition can result in life-threatening blood loss. Several research investigations have been conducted to identify placenta accreta during the third trimester using 2D ultrasound and color Doppler imaging [100-117].

As far as we know, there have been only a few numbers of research conducted on the early detection of placenta accreta during pregnancy. In a case report by Radhouane *et al.* [118] it was found that placenta accreta can be detected using ultrasonography by observing intraplacental lacunae and the absence of a hypo echogenic retro placental myometrial zone as early as 9 weeks into gestation. Furthermore, according to Ballas *et al.* [118,119] and Moretti *et al.* [120], sonographic indicators of placenta accreta can be detected as early as the initial trimester. A study conducted by Rac *et al.* [121] found that in cases of prior cesarean birth, first trimester implantations located less than 4cm from the external os are associated with a significant risk of placenta previa with accreta. Rac *et al.* [122] found a strong association between placenta accreta and smaller myometrial thickness as well as a higher number of prior cesarean deliveries.

Early detection and diagnosis of placenta accreta during the first trimester offers a significant chance to advise the patient about potential complications before and during childbirth, enable proper monitoring, and provide crucial information for the patient to make well-informed decisions for the rest of the pregnancy. If a miscarriage is likely to occur or if there is a decision to end the pregnancy, an early diagnosis can enhance patient safety by allowing doctors and staff to take necessary measures. This includes ensuring the availability of blood products, assembling the appropriate surgical team, and scheduling the surgery and surgical time accordingly [107]

The present study involved a prospective analysis of a cohort consisting of 146 pregnant women who were attending the antenatal outpatient clinic at Women Health University Hospital. These women willingly agreed to participate in the study after providing informed consent. The women possessed a minimum of one risk factor for the development of Placenta accreta. The researchers examined various ultrasound findings, including low implantation of the gestational sac, presence of placental lacunae, disruption of the placental-myometrial interface, and gestational sac or placenta overlapping a uterine scar. They also looked for specific Doppler ultrasound findings, such as intraplacental dilated vessels and significantly increased periplacental vascularity. The purpose of this study was to determine if these findings could be used to predict placenta accreta in early pregnancy.

In our investigation, we discovered that every instance of placental invasion exhibited at least one of the identified predicted indications of placental. Approximately 50% of instances without placental invasion had at least one of these symptoms, which was statistically significant. The findings align with the research conducted by Rahimi-Sharbaf *et al.* [123], which demonstrated a strong correlation between a gestational sac positioned at a low level and the presence of placenta accreta, as well as the overlapping of the gestational sac or placenta with a scar. These findings provide a strong predictive capability for placenta accreta [124-152].

Concerning the sociodemographic features of the population under study, we discovered that there was no notable correlation between the age of the mothers and the incidence of placental invasion. Contrary to the findings of Wu *et al.* [126], which suggested that maternal age beyond 35 years increases the risk of placental invasion, this study yielded different results. The discrepancy can be attributed to the younger average age of mothers in our sample population, with the invasion group having an average age of around 30 years and the non-invasion group having an average age of 27 years. Furthermore, residence did not have an impact on the occurrence of placenta accreta. In contrast, the occurrence of prior curettage was correlated with a higher frequency of placenta accreta. This phenomenon can be attributed to the extensive removal of tissue through aggressive curettage, which results in the destruction of sections of the basal endometrium and nitabuch layer, ultimately causing placenta accreta. This finding aligns with the research conducted by

Jauniaux *et al.* [130], which established a connection between some cases of placenta accreta and prior uterine curettage.

Furthermore, our research demonstrated that all instances of placental invasion were associated with low sac implantation and previous cesarean section, but there were no occurrences of placenta accreta among individuals with a sac in a normal position. The connection between a scarred uterus and placenta accreta can be explained by the findings of Silver *et al.* [153, 154]. They reported an elevated occurrence of placenta accreta with an increasing number of previous cesarean sections. Specifically, they found that placenta accreta was present in 15 (0.24%), 49 (0.31%), 36 (0.57%), 31 (2.13%), 6 (2.33%), and 6 (6.74%) women who underwent their first, second, third, fourth, fifth, and sixth or more cesarean deliveries, respectively. Since neither of our cases had an upper uterine segment scar, such as after a myomectomy, there were no instances of placenta accreta where the gestational sac was in its typical location. Another possible explanation is that a low sac position itself is a risk factor for placenta accreta. This is supported by several research [155-160] which have identified a substantial relationship between placenta accreta and a low sac position.

In addition, our study demonstrated that placental invasion had a significantly higher occurrence of placental lacunae (78%) compared to cases without invasion (29%). This finding aligns with the research conducted by Rac *et al.* [121] and Ballas *et al.* [122]. The individual who discovered a noteworthy correlation between physical activity (PA) and the presence of placental lacunae. However, there was no notable disparity in the disruption of the interface between the placenta and the myometrium in both groups. These findings contrast the results of a study conducted by Ballas *et al.* in 2011, which found a statistically significant connection between the rupture of the placental myometrial-interface and PA. This discrepancy can be accounted for by the limited quantity of first trimester ultrasound images accessible for examination in his research.

Regarding the presence of a gestational sac or placenta overlapping the uterine scar, our findings indicate that most cases of placental invasion involved the gestational sac or placenta being positioned over the uterine scar. Conversely, in most cases without invasion, the gestational sac or placenta was located away from the uterine scar. This further supports the evidence of a connection between the uterine scar and placental invasion, as stated by Silver *et al.* [23].

The occurrence of dilated vessels within the placenta was more frequent in cases with placental invasion compared to cases without invasion. This finding aligns with the study conducted by Yang *et al.* [161], which also found a connection between placental invasion and the existence of dilated vessels within the placenta. The level of preiplacental vascularity, which refers to the blood flow in the area before the placenta, did not show a significant difference between the two groups. This finding contradicts the results of a study by Yang *et al.* [161], which reported a link between a considerable rise in preiplacental vascularity detected by Doppler Ultrasound and PA.

Given that the low gestational sac indication was observed in all instances that developed into placenta accreta, we conducted a subgroup analysis only for the cohort with a low sac. The occurrence of two-dimensional ultrasonography and Doppler Parameters in the low sac cohort was identical between the group with placental invasion and the group without invasion, as well as the full cohort. The invasion group had considerably greater levels of placental lacunae, gestational sac or placenta overlaying the scar, and intraplacental dilated arteries. There were no significant differences observed in the disruption of the interface between the placenta and the uterine muscle, as well as the increased blood flow around the placenta, between the two groups. Moreover, there was a strong association between the number of CS ≥3 and the invasion group.

In addition, our study discovered a robust correlation between the quantity of prior cesarean sections and the occurrence of placenta accreta in instances of low sac implantation. Approximately 20% of cases with a history of two previous cesarean sections and a low sac (placenta accreta) developed placenta accreta (PA), while 57% of cases with three or more previous cesarean sections and a low sac resulted in placenta accreta. The results were in line with the findings of Rac *et al.* [122], which showed a higher rate of physical activity with an increasing number of previous cesarean sections. Moreover, our findings indicate that 54% of instances of low sac advanced to placenta previa by the third trimester. The observed value exceeded the one reported by Hasegawa *et al.* [162] by approximately 39%. This discrepancy can be attributed to the inclusion of cases with one or more risk factors for placenta accreta, which were not considered in their investigation.

We formulated a scoring model for the early prediction of placenta accreta in pregnancy, akin to the third-trimester prediction scoring model introduced by Rac *et al.* in 2014 [122]. Our objective was to establish a standardized approach for placenta accreta prediction, moving beyond reliance on individual indicators. The scoring model was developed by integrating statistically significant findings from two-dimensional transvaginal (2D) ultrasound parameters and Doppler ultrasound parameters in the first trimester. Notable parameters included the presence of a gestational sac or placenta overlapping the scar, intraplacental dilated vessels, placental lacunae, and the number of cesarean sections exceeding three. Scores were assigned based on the presence or absence of these findings, with a threshold set at >4.5. The model exhibited a specificity of 95% and a sensitivity of 77%, demonstrating robust predictive capabilities for early placental invasion in pregnancies at elevated risk for placenta accreta (PA) with low sac implantation.

Applying this scoring model in early pregnancy enables the identification of pregnant women at heightened risk for developing placenta accreta. For example, referencing table 17, if a woman with a history of 3 previous cesarean deliveries and a low-implanted sac presents with a gestational sac or placenta overlapping the scar, along with placental lacunae, she would accumulate 2 points for prior cesarean deliveries, 1 point for placental lacunae, and 2.5 points for a

gestational sac or placenta overlapping the scar. This results in a total score of 5.5, surpassing the threshold of 4.5, indicating a significant likelihood of placenta accreta. Conversely, a woman with 2 previous cesarean deliveries (0 points), placental lacunae (1 point), intraplacental dilated vessels (1.5 points), and a gestational sac or placenta located away from the scar (0 points) would score just 2.5, below the 4.5 threshold, signifying a low risk of placenta accreta. Our scoring index serves as a valuable tool for guidance and decision-making regarding referrals in cases of a high likelihood of PA, taking into account local resource availability and the provision of multidisciplinary care.

Table 1 Weighted Value of Each Parameter of Placenta Accreta Scoring Model

Item	Score
Number of CS ≥3[a]	2
Placental lacunae[b]	1
Gestational sac or placenta overlapping the scar[b]	2.5
Intraplacental dilated vessels[b]	1.5

a: If less than 3 CS take score 0 , b: If no take score 0

A crucial consideration in advising women at a heightened risk of developing placenta accreta (with a score exceeding 4.5) is the potential option of early termination of pregnancy. This proactive measure can mitigate numerous risks that pose threats to both maternal and fetal well-being later in pregnancy or during labor. Additionally, such risk assessment can be instrumental in counseling and preoperative planning, particularly in cases of missed abortion during early pregnancy. By raising awareness for morbidly adherent placenta or providing reassurance, this approach aids in identifying women who may benefit from referral to a tertiary center equipped with adequate blood bank capacity and multidisciplinary services. Our model introduces a scoring system for a standardized ultrasound evaluation, encompassing all variables, in high-risk women with a low-sac position.

Notably, this study represents the first prospective investigation establishing a predictive scoring index for placenta accreta in early pregnancy. Previous investigators predominantly relied on individual ultrasound variables, often drawing from retrospective studies, with only a few prospective studies available, as referenced [163-169]

Regarding the third trimester, we found a very strong association between placenta accreta and previa where all cases of placenta accreta were placenta previa and neither of cases of placenta accreta won't placenta previa. This could be explained by the fact that all cases of placenta accreta were low sac which had developed later on into placenta previa accreta. Another explanation may be the association between the scarred uterus and placenta accreta [23], where neither of our cases was having upper uterine segment scar (e.g. myomectomy) and so there were no cases of placenta accreta with placenta in its normal position.

As regard Irregular or loss of retroplacental sonolucent zone, there was a significant incidence of this sign among cases of placenta accreta (about 55%) if compared to cases without invasion (about 10%). This significant association was found also by many studies which had results quite similar to ours [55, 112, 169] while study done by (Comstock 2005) [38] found its sensitivity about 7%. For placental lacunae, we found that incidence of placental invasion was high in presence of this sign, and this is consistent with many studies [23, 52, 121-123] which reported significant association presence of placental lacunae and PA.

In addition to the previously mentioned third trimester signs, thinning or disruption of the hyperechoic serosa bladder interface also had an association with placental invasion (about 67%) if compared to its presence among cases without placental invasion (about 1.5%). This association comes in agreement with (Comstock 2005, Shih *et al.*, 2009) [38, 98] [who reported the relation between PA and thinning or disruption of the hyperechoic serosa bladder interface. The last significant third trimester sign for prediction of placenta accreta we had investigated was hypervascularity of serosa bladder interface by Doppler ultrasound (about 56%) in comparison to non-placental invasion (about 20%). This was mostly due to high vascularity associated with placenta accreta which was in keeping with study of (Chou *et al.*, 2000) [31] which resulted in association between PA and hypervascularity of serosa bladder interface. On the opposite side, there was no significant association between placental invasion and presence of vascular lacunae with turbulent flow within the placenta (PSV≥ 15 cm/sec) which come in agreement with (Chou *et al.*, 2000) [31].

Our study has certain limitations, notably the small number of placenta accreta cases, potentially resulting in the absence of a significant association between placental invasion and certain signs. Furthermore, our model was specifically developed for pregnancies in the late first trimester with a low sac or low-lying placenta, representing those at the highest risk for placental invasion. Consequently, its applicability to lower-risk pregnancies or cases outside the lower uterine segment remains unknown. Further investigations in these populations are essential to refine the antenatal diagnosis of morbidly adherent placenta.

Despite these limitations, our model serves as a foundation for future research. The strengths of our study lie in its prospective design, mitigating recall bias, and the involvement of a blinded surgeon assessing early pregnancy ultrasound and Doppler scan findings. Consequently, our model is tailored to identify patients with clinically significant placental invasion. In conclusion, our study underscores that a standardized risk assessment based on the number of previous cesarean deliveries and ultrasound findings effectively identifies women at the highest risk for morbidly adherent placenta. With validation through a larger dataset of placental invasion cases, the assignment of a scoring index for predicting placenta accreta in early pregnancy may prove beneficial for patient counseling and early pregnancy planning, ultimately enhancing pregnancy outcomes for women with morbidly adherent placenta [170,171].

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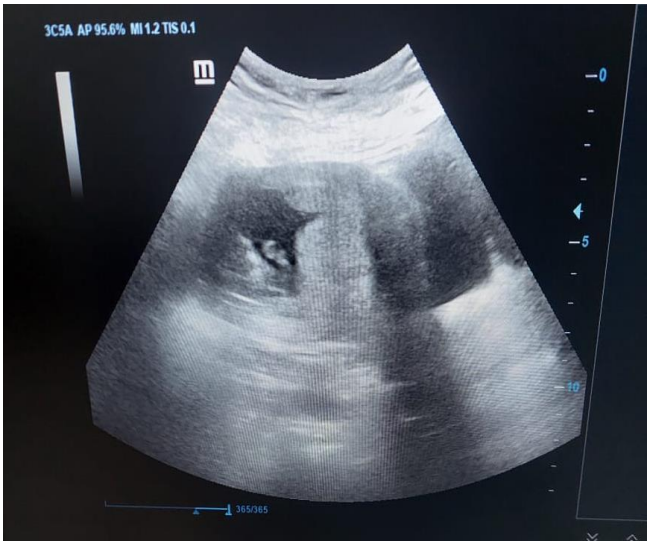

Fig 1 Weeks Embryo with low Lying Chorion by 2d Transabdominal Ultrasound

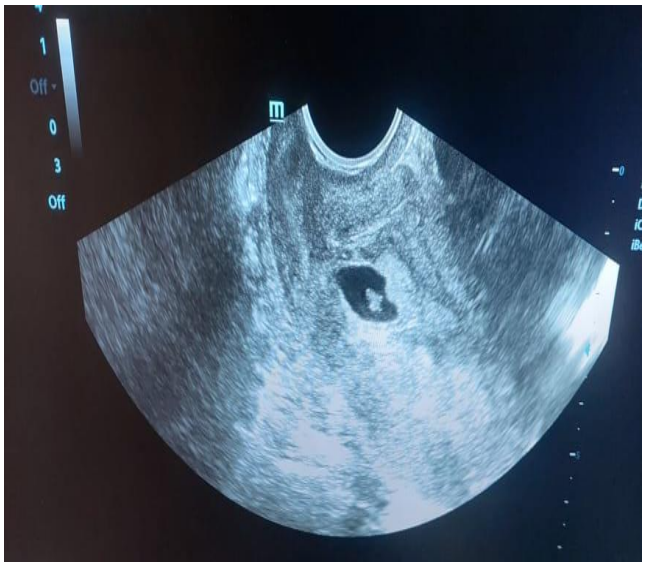
Fig 2 Weeks Embryo with low Lying Chorion by 2d Transvaginal Ultrasound

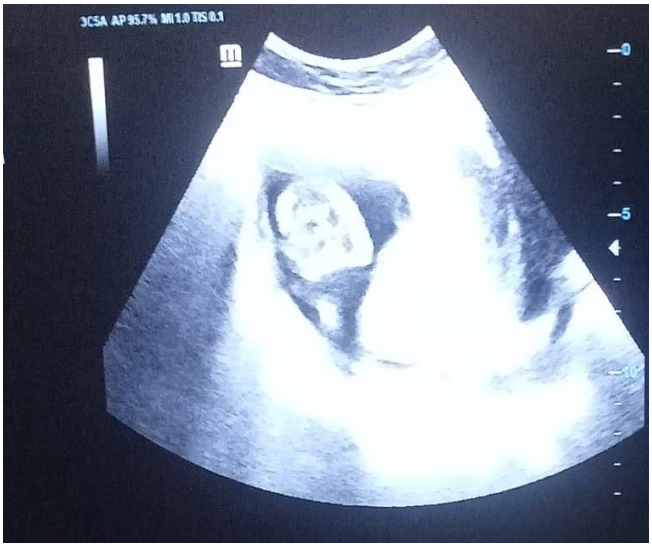

Fig 3 Weeks Embryo with low Lying Placenta by 2d Transabdominal Ultrasound

V. RESULTS

In our current prospective study, we meticulously examined a cohort of 146 pregnant women attending the antenatal outpatient clinic at Women's Health Hospital, University Hospital. These individuals willingly participated in the study after providing informed consent, possessing at least one risk factor for the development of placenta accreta. Notably, there were 5 cases lost to follow-up (1 from the exposed group and 4 from the non-exposed group), constituting approximately 3.4% of all cases. Among the outcomes, 21 cases developed placenta previa, with 9 cases progressing to placental invasion, resulting in peripartal hysterectomy for uncontrollable bleeding in two instances. Within the exposed group, 9 cases experienced placenta accreta, while 63 cases exhibited no invasion. Remarkably, there were no occurrences of placenta accreta in the non-exposed group. Cases with clinical evidence of invasion were categorized as cases, whereas those without clinical evidence were designated as the control group.

VI. CONCLUSION

In summary, our study establishes the feasibility of predicting placenta accreta in early pregnancy. The implementation of a standardized risk assessment model, incorporating the number of previous cesarean deliveries, ultrasound findings, and Doppler findings, effectively identifies women at the highest risk for morbidly adherent placenta during early pregnancy. With validation through a more extensive dataset of placental invasion cases, this model holds potential for utilization in counseling and preoperative planning, particularly in cases of missed abortion during early pregnancy. By raising awareness for morbidly adherent placenta or providing reassurance to women desiring future fertility, this model serves a valuable role. Furthermore, it aids in identifying women who could benefit from referral to a tertiary center equipped with adequate blood bank capacity and multidisciplinary services. Ultimately, the application of this model may contribute to improved pregnancy outcomes for women with morbidly adherent placenta.

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