

## The Role of Colour Duplex in Antenatal Assessment of Placental Adhesive Disorders in Patients with Previous Cesarean Scar

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### Abstract

**Background:** Although relatively rare, placental adhesive disorders account for a large percentage of maternal morbidity and mortality in modern obstetrics. Hemorrhage is a major complication of abnormal placentation, and early diagnosis and intervention in these conditions can more readily enable the physician to minimize the risks to mother and fetus. The current widespread use of ultrasound in obstetrics has greatly advanced our ability to diagnose and manage abnormal obstetric bleeding.

**Aim of Study:** To test the role of gray scale and color Doppler in antenatal assessment of placental adhesive disorders in patients with previous cesarean scar and comparing data with operating room finding.

**Patients and Methods:** This was cross sectional study, was carried out in Radiology department, Gynecology and Obstetric Hospital at Ain Shams University, Gynecology and Obstetric Department at Dessouq hospital, Kafhr El Sheikh government, Egypt, on 26 pregnant women with placenta previa and previous cesarian scar during a period of 6 months.

**Results:** Twenty six pregnant females with previous history of CS were included. Ultrasound has an overall good diagnostic role in identifying each type of placental adhesive disorders as according to US findings for prediction of placental disorders from others, there were 14 of the studied sample had P. Accreta as 85.71% with Sensitivity, 100.00% with Specificity, There were 9 of the studied sample had P. Increta as 88.89% Sensitivity, 100.00% with Specificity. There were 3 of the studied sample had P. Percreta as 100.00% Sensitivity, 100.00% with Specificity, 100.00% with PPV, and 100.00% with NP. Compared to the operating room there were 14 (53.8%) of the studied cases had Accreta, 3 (11.5%) had Percreta and 9 (34.6%) had Increta.

**Conclusion:** US remains the primary screening modality of antenatal assessment of placental adhesive disorders or what is called Placenta Accreta Spectrum disorders (PAS). 2D Gray scale has higher sensitivity than color Doppler in diagnosis of placental adhesive disorders. The presence of Irregular retro-placental sono lucent zone had the highest sensitivity for detection of PAS.

**Key Words:** Cesarean delivery – Placenta accrete – Placenta previa – Prenatal diagnosis – Ultrasound.

### Introduction

**PLACENTA** previa was diagnosed by ultrasound and further divided into complete placenta previa (placenta completely covered the cervical internal os) and incomplete placenta previa (placenta margin reached or partially covered the cervical internal os) [1].

Placenta accreta spectrum (PAS) is a pathological condition of the placenta with abnormal adhesion or invasion of the placental villi to the uterine wall [2]. The diagnosis of PAS was based on the International Federation of Gynecology and Obstetrics (FIGO). According to the clinical and histologic criteria in FIGO, PAS was divided into placenta accreta (where chorionic villi directly implant on to the myometrium), increta (where chorionic villi invade into the myometrium) and percreta (where chorionic villi invade through the myometrium and may involve surrounding structures) [3].

In recent years, the prevalence of PAS has increased, which may be directly related to the increase in caesarean section rates in most high-income and middle-income countries [4]. The prevalence of PAS has increased about eight times since 1970s [5].

It is important to make the diagnosis of placenta accreta prenatally because this allows effective management planning to minimize maternal morbidity and mortality [6].

Recent population studies have shown that placenta accreta spectrum (PAS) disorders remain undiagnosed before delivery in half [7] to two-thirds of cases [4].

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*Aim of the work:*

To test the role of gray scale and color Doppler in antenatal assessment of placental adhesive disorders in patients with previous caesarean scar and comparing data with operating room finding.

**Patients and Methods**

This study was a cross sectional study carried at Gynecology and Obstetrics Hospital at Ain Shams University, Gynecology and Obstetrics Department at Dessouq hospital, Kafhr El Sheikh government, Egypt from January 2021 till June 2021 for 26 pregnant women with placenta previa and previous cesarian scar.

*Inclusion criteria:*

Previous caesarean scar/scars, pregnant women with persistent placenta previa (after 28 weeks of gestation), with implantation on the lower uterine segment and hemodynamically stable at the time of the ultrasound examination to determine the abnormal placentation.

*Exclusion criteria:*

Patients who are actively bleeding and other previous uterine surgeries.

*Methods:*

History taking, Personal history (age, parity and number of cesarean sections).

*Sonographic approach:*

*Transabdominal ultrasound:* All patients underwent routine obstetric ultrasound in addition to evaluation of the placenta after the 28<sup>th</sup> week of gestation.

*The examination scheme:* Gray-scale B-mode transabdominal sonography was first used to screen the placenta tissue in a systematic fashion. Color Doppler Ultrasound scans of the most suspicious regions was performed.

*The machine:* Most of the pregnant women underwent examination using mainly: GE logiq p7: USA 2016 - abdominal probe (convex probe 2-5 Mhz). Other machines including: (Philips IU 22 - Medison - Sonoscape - Toshiba).

*Preparation:* Assurance of the pregnant women about simplicity & benefits of the examination. The examined pregnant women were informed to have a semi-full urinary bladder during abdominal examination & avoidance of marked urine retention.

Transvaginal ultrasound was needed in full term baby if transabdominal ultrasound data unsatisfied unless there was placentalapreviatotalis.

*Data collected from the ultrasound:* The diagnostic accuracy of ultrasound in detection of placental adhesive disorders identified by the depth of placental invasions with different parameters and comparing it with the operating room finding during delivery. The spectrum includes placenta accreta (adhesion of the placenta to myometrium without intervening decidua), placenta increta (infiltration of the trophoblast into the myometrium layer), and placenta percreta (infiltration through the myometrium, serosa, and eventually contiguous organs) [8].

- Placenta accrete was diagnosed when placental villi were attached to the myometrium instead of decidua.
- Placenta Increta was diagnosed when placenta penetrate the myometrium whole layer reaching to the serosal hyperechoic layer with or without it's invasion.
- While placenta percreta when placenta extend beyond the serosal bladder interface even reaching the surrounding organs.

*The placental position:* Either anterior, posterior, fundal or combined. Grade: According to Grannum classification (Kay et al., 2011; Hill et al., 2009; Hills et al., 2004; Spirt et al., 2001). Relation of the lower edge of the placenta to the internal os is divided into four grades depending distance to it: Grade I: Low-lying placenta: Placenta lies in the lower uterine segment but its lower edge does not at the internal cervical os (i.e lower edge 0.5-2.0cm from internal os), grade II: Marginal previa: Placental tissue reaches the margin of the internal cervical os, but does not cover it, grade III: Partial previa: Placenta partially covers the internal cervical os, grade IV: Complete previa: Placenta completely covers the internal cervical os.

*The gray scale sonography criteria Suggestive of abnormal placental adhesions which have been assessed includes the following:*

- 1- Loss of the retroplacental sonolucent zone.
- 2- Irregular retroplacental sonolucent zone.
- 3- Thinning or disruption of the hyperechoic serosa-bladder interface.
- 4- Presence of focal exophytic masses invading the urinary bladder.
- 5- Abnormal placental lacunae [9].

*The color Doppler criteria Suggestive of placental adhesive disorders which have been assessed includes the following:*

- 1- Diffuse or focal lacunar flow.
- 2- Vascular lakes with turbulent flow (peak systolic velocity over 15cm/s).
- 3- Hypervascularity of serosa-bladder interface.
- 4- Markedly dilated vessels over peripheral subplacental zone [9].
- 5- The imaging played careful attention to: The echogenic patterns of the placenta, absence of normal subplacental various complex placental sonolucent lakes and/or irregularities of bladder uterine serosa was noted.

*Statistical analysis:* Analysis of data was done using Statistical Program for Social Science version 20 (SPSS Inc., Chicago, IL, USA). Quantitative variables were described in the form of mean and standard deviation. Qualitative variables were described as number and percent. In order to compare parametric quantitative variables between two

groups, Student *t*-test was performed. Qualitative variables were compared using chi-square ( $X^2$ ) test or Fisher's exact test when frequencies were below five. Pearson correlation coefficients were used to assess the association between two normally distributed variables. When a variable was not normally distributed, A *p*-value <0.05 is considered significant.

*Ethical committee:* Permission from the Faculty of Medicine ethical committee was also obtained and approval from institutional review board was taken.

**Results**

Our study was performed including 26 pregnant women at their third trimester with persistent placenta previa and previous cesarean section. The mean Previous CS of Percreta group was  $4.0 \pm 1.0$  SD with range (3.0-5.0) and the mean Previous CS of Increta group was  $3.0 \pm 0.71$  SD with range (2.0-4.0) as shown in Table (1).

Table (1): Descriptive analysis of the studied cases according to previous cesarean section and other demographic data.

|                     | Total<br>(n=26)   | Accreta<br>(n=14) | Percreta<br>(n=3) | Increta<br>(n=9) |
|---------------------|-------------------|-------------------|-------------------|------------------|
| <i>Age (years):</i> |                   |                   |                   |                  |
| Min. - Max.         | 28.0-41.0         | 28.0-39.0         | 35.0-41.0         | 28.0-41.0        |
| Mean $\pm$ SD.      | 33.54 $\pm$ 4.14  | 33.57 $\pm$ 3.55  | 38.67 $\pm$ 3.21  | 31.78 $\pm$ 4.15 |
| Median (IQR)        | 33.50 (30.0-36.0) | 34.50 (30.0-36.0) | 40.0 (37.5-40.5)  | 30.0 (29.0-33.0) |
| <i>Parity:</i>      |                   |                   |                   |                  |
| Min. - Max.         | 1.0-5.0           | 1.0-3.0           | 3.0-5.0           | 2.0-4.0          |
| Mean $\pm$ SD.      | 2.73 $\pm$ 0.87   | 2.29 $\pm$ 0.61   | 4.0 $\pm$ 1.0     | 3.0 $\pm$ 0.71   |
| Median (IQR)        | 3.0 (2.0-3.0)     | 2.0 (2.0-3.0)     | 4.0 (3.50-4.50)   | 3.0 (3.0-3.0)    |
| <i>Previous CS:</i> |                   |                   |                   |                  |
| Min. - Max.         | 1.0-5.0           | 1.0-3.0           | 3.0-5.0           | 2.0-4.0          |
| Mean $\pm$ SD.      | 2.73 $\pm$ 0.87   | 2.29 $\pm$ 0.61   | 4.0 $\pm$ 1.0     | 3.0 $\pm$ 0.71   |
| Median (IQR)        | 3.0 (2.0-3.0)     | 2.0 (2.0-3.0)     | 4.0 (3.50-4.50)   | 3.0 (3.0-3.0)    |
| <i>Gravity:</i>     |                   |                   |                   |                  |
| Min. - Max.         | 3.0-7.0           | 3.0-7.0           | 5.0-7.0           | 4.0-6.0          |
| Mean $\pm$ SD.      | 4.50 $\pm$ 1.10   | 4.0 $\pm$ 1.04    | 6.0 $\pm$ 1.0     | 4.78 $\pm$ 0.67  |
| Median (IQR)        | 4.0 (4.0-5.0)     | 4.0 (3.0-4.0)     | 6.0 (5.50-6.50)   | 5.0 (4.0-4.0)    |

In our study of total 26 pregnant women at their 3rd trimester with persistent placenta previa and previous cesarean sections underwent antenatal ultrasound assessment for signs of placental adhesive disorders, we found that all types of (PAS) show irregular retro placental sonolucent zone

while thinning or disruption of hyperechoic serosal bladder interface is seen only at 21 pregnant. The presence of exophytic mass is seen at only 4 pregnant with main percreta diagnosed type, also other ultrasound findings are expressed by % as detailed at Table (2).

Table (2): Distribution of the studied cases according to US findings.

|   | Total (n=26) | Accreta (n=14) | Percreta (n=3) | Increta (n=9) |
|---|--------------|----------------|----------------|---------------|
| - Irregular retro placental sonolucent zone                       | 26 (100.0%)  | 14 (100.0%)    | 3 (100.0%)     | 9 (100.0%)    |
| - Thinning or disruption of hyper echoic serosa bladder interface | 21 (80.8%)   | 9 (64.3%)      | 3 (100.0%)     | 9 (100.0%)    |
| - Presence of focal exophytic mass invading UB                    | 4 (15.4%)    | 0 (0.0%)       | 3 (100.0%)     | 1 (11.1%)     |
| - Abnormal plcentallacunea  | 26 (100.0%)  | 14 (100.0%)    | 3 (100.0%)     | 9 (100.0%)    |
| - Diffuse or local lacunar flow                                   | 21 (80.8%)   | 9 (64.3%)      | 3 (100.0%)     | 9 (100.0%)    |
| - Vascular lakes turbulent flow                                   | 21 (80.8%)   | 9 (64.3%)      | 3 (100.0%)     | 9 (100.0%)    |
| - Hypervascularity of serosa bladder inter face                   | 20 (76.9%)   | 9 (64.3%)      | 3 (100.0%)     | 8 (88.9%)     |
| - Markedly dilated vessels over peripheral sub placental zone     | 19 (73.1%)   | 8 (57.1%)      | 3 (100.0%)     | 8 (88.9%)     |

According to US findings for prediction of placental disorders from others, there were 14 of the studied sample had P. Accreta as 85.71% with Sensitivity, 100.00% with Specificity, 100.00% with PPV, and 85.71% with NPV. There were 9 of the studied sample had P. Increta as 88.89% with Sensitivity, 100.00% with Specificity, 100.00% with PPV, and 94.44% with NPV. There were 3 of the studied sample had P. Percreta as 100.00% with Sensitivity, 100.00% with Specificity, 100.00% with PPV, and 100.00% with NPV. Table (3).

And according to operation room, we found that there were 14 (53.8%) of the studied cases had Accreta, 3 (11.5%) had Percreta and 9 (34.6%) had Increta. Table (4).

Table (3): Agreement (sensitivity, specificity and accuracy) for US findings for prediction each type of placental disorders from others.

| Type of placental disorders | No. of studied sample | Sen- sivity | Spe- cificity | PPV    | NPV    |
|-----------------------------|-----------------------|-------------|---------------|--------|--------|
| P. Accreta                  | 14                    | 85.71       | 100.00        | 100.00 | 85.71  |
| P. Increta                  | 9                     | 88.89       | 100.00        | 100.00 | 94.44  |
| P. Percreta                 | 3                     | 100.00      | 100.00        | 100.00 | 100.00 |

Table (4): Distribution of the studied cases according to operation room (n=26).

| Operation room | No. | %    |
|----------------|-----|------|
| Accreta        | 14  | 53.8 |
| Percreta       | 3   | 11.5 |
| Increta        | 9   | 34.6 |

Table (5): Agreement (sensitivity, specificity and accuracy) for US findings for prediction of Accreta.

|   | Sensitivity | Specificity | PPV   | NPV   | Accuracy |
|---|-------------|-------------|-------|-------|----------|
| - Irregular retro placental sonolucent zone                       | 100.0       | 0.0         | 53.85 | –     | 53.85    |
| - Thinning or disruption of hyper echoic serosa bladder interface | 64.29       | 0.0         | 42.86 | 0.0   | 34.62    |
| - Presence of focal exophytic mass invading UB                    | 0.0         | 66.67       | 0.0   | 36.36 | 30.77    |
| - Abnormal placental lacunae                                      | 100.0       | 0.0         | 53.85 |       | 53.85    |
| - Diffuse or local lacunar flow                                   | 64.29       | 0.0         | 42.86 | 0.0   | 34.62    |
| - Vascular lakes turbulent flow                                   | 64.29       | 0.0         | 42.86 | 0.0   | 34.62    |
| - Hypervascularity of serosa bladder inter face                   | 64.29       | 8.33        | 45.0  | 16.67 | 38.46    |
| - Markedly dilated vessels over peripheral sub placental zone     | 57.14       | 8.33        | 42.11 | 14.29 | 34.62    |

According to US findings for prediction of Accreta, there were 100.0% had Irregular retro placental sonolucent zone with sensitivity, 53.85% with PPV and 53.85% with Accuracy. There were

64.29% had Thinning or disruption of hyper echoic serosa bladder interface with sensitivity, 42.86% and 34.62% with Accuracy. There were 66.67% had Presence of focal exophytic mass and 30.77%

with Accuracy. There were 100.0% had abnormal placentallacunae with Sensitivity, 53.85% with PPV and 53.85% with Accuracy. There were 64.29% had Diffuse or local lacunar flow with Sensitivity, 42.86% and 34.62% with Accuracy. There were 64.29% had Vascular lakes turbulent flow with Sensitivity, 42.86% and 34.62% with Accuracy. There were 64.29% had Hypervascularity of serosa bladder inter face with Sensitivity, 8.33% with Specificity, 45.0% with PPV, 16.67% with NPV and 38.46% with Accuracy. There were 57.14% had Markedly dilated vessels over peripheral sub placental zone with Sensitivity, 8.33% with Specificity, 42.11% with PPV, 14.29% with NPV and 34.62% with Accuracy. Table (5).

According to US findings for prediction of Percreta, there were 100.0% had Irregular retro placental sonolucent zone with sensitivity, 11.54% with PPV and 11.54% with Accuracy. There were 100.0% had Thinning or disruption of hyper echoic serosa bladder interface with sensitivity, 21.74%

with Specificity, 14.29% with PPV, 100.0% with NPV and 30.77% with Accuracy. There were 100.0% had Presence of focal exophytic mass invading UB with sensitivity, 95.65% with Specificity, 75.0% with PPV, 100.0% with NPV and 96.15% with Accuracy. There were 100.0% had abnormal placentallacunae with Sensitivity, 11.54% with PPV and 11.54% with Accuracy. There were 100.0% had Diffuse or local lacunar flow with sensitivity, 21.74% with Specificity, 14.29% with PPV, 100.0% with NPV and 30.77% with Accuracy. There were 100.0% had Vascular lakes turbulent flow with sensitivity, 21.74% with Specificity, 14.29% with PPV, 100.0% with NPV and 30.77% with Accuracy. There were 100.0% had Hypervascularity of serosa bladder inter face with Sensitivity, 26.09% with Specificity, 15.0% with PPV, 100.0% with NPV and 34.62% with Accuracy. There were 100.0% had Markedly dilated vessels over peripheral sub placental zone with Sensitivity, 30.43% with Specificity, 15.79% with PPV, 100.0% with NPV and 38.46% with Accuracy. Table (6).

Table (6): Agreement (sensitivity, specificity and accuracy) for US findings for prediction of Percreta.

|   | Sensitivity | Specificity | PPV   | NPV   | Accuracy |
|---|-------------|-------------|-------|-------|----------|
| - Irregular retro placental sonolucent zone                       | 100.0       | 0.0         | 11.54 | -     | 11.54    |
| - Thinning or disruption of hyper echoic serosa bladder interface | 100.0       | 21.74       | 14.29 | 100.0 | 30.77    |
| - Presence of focal exophytic mass invading UB                    | 100.0       | 95.65       | 75.0  | 100.0 | 96.15    |
| - Abnormal placentallacunae                                       | 100.0       | 0.0         | 11.54 |       | 11.54    |
| - Diffuse or local lacunar flow                                   | 100.0       | 21.74       | 14.29 | 100.0 | 30.77    |
| - Vascular lakes turbulent flow                                   | 100.0       | 21.74       | 14.29 | 100.0 | 30.77    |
| - Hypervascularity of serosa bladder inter face                   | 100.0       | 26.09       | 15.0  | 100.0 | 34.62    |
| - Markedly dilated vessels over peripheral sub placental zone     | 100.0       | 30.43       | 15.79 | 100.0 | 38.46    |

Finally our US findings for prediction of Increta, there were 100.0% had Irregular retro placental sonolucent zone with sensitivity, 34.62% with PPV and 34.62% with Accuracy. There were 100.0% had Thinning or disruption of hyper echoic serosa bladder interface with sensitivity, 29.41% with Specificity, 42.86% with PPV, 100.0% with NPV and 53.85% with Accuracy. There were 11.11% had Presence of focal exophytic mass invading UB with sensitivity, 82.35% with Specificity, 25.0% with PPV, 63.64% with NPV and 57.69% with Accuracy. There were 100.0% had Abnormal placentallacunae with Sensitivity, 34.62% with PPV and 34.62% with Accuracy. There were 100.0%

had Diffuse or local lacunar flow with sensitivity, 29.41% with Specificity, 42.86% with PPV, 100.0% with NPV and 53.85% with Accuracy. There were 100.0% had Vascular lakes turbulent flow with sensitivity, 29.41% with Specificity, 42.86% with PPV, 100.0% with NPV and 53.85% with Accuracy. There were 88.89% had Hypervascularity of serosa bladder inter face with Sensitivity, 29.41% with Specificity, 40.0% with PPV, 83.33% with NPV and 50.0% with Accuracy. There were 88.89% had Markedly dilated vessels over peripheral sub placental zone with Sensitivity, 35.29% with Specificity, 42.11 % with PPV, 85.71 % with NPV and 53.85% with Accuracy. Table (7).

Table (7): Agreement (sensitivity, specificity and accuracy) for US findings for prediction of Increta.

|   | Sensitivity | Specificity | PPV   | NPV   | Accuracy |
|---|-------------|-------------|-------|-------|----------|
| - Irregular retro placental sonolucent zone                       | 100.0       | 0.0         | 34.62 | –     | 34.62    |
| - Thinning or disruption of hyper echoic serosa bladder interface | 100.0       | 29.41       | 42.86 | 100.0 | 53.85    |
| - Presence of focal exophytic mass invading UB                    | 11.11       | 82.35       | 25.0  | 63.64 | 57.69    |
| - Abnormal placental lacunae                                      | 100.0       | 0.0         | 34.62 |       | 34.62    |
| - Diffuse or local lacunar flow                                   | 100.0       | 29.41       | 42.86 | 100.0 | 53.85    |
| - Vascular lakes turbulent flow                                   | 100.0       | 29.41       | 42.86 | 100.0 | 53.85    |
| - Hypervascularity of serosa bladder interface                    | 88.89       | 29.41       | 40.0  | 83.33 | 50.0     |
| - Markedly dilated vessels over peripheral sub placental zone     | 88.89       | 35.29       | 42.11 | 85.71 | 53.85    |

Illustrative cases:

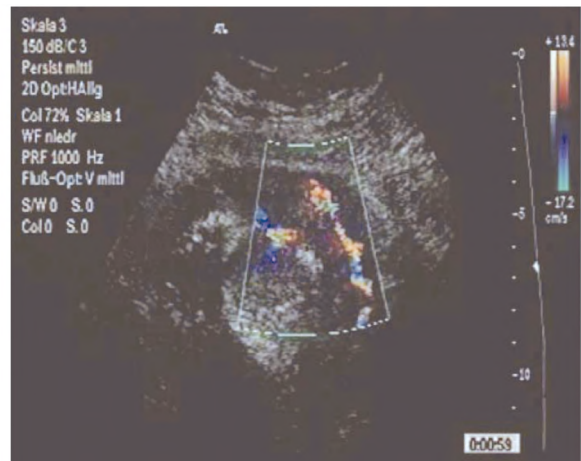
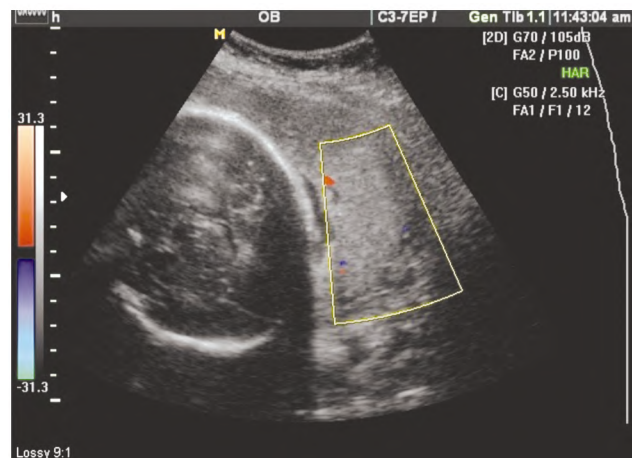


Fig. (1): 39 years old female patient seeking for routine antenatal care when she was discovered as placenta accrete.

- *Transabdominal Ultrasound*: Showed irregular retro placental sonolucent zone and disruption of hyper echoic serosa bladder interface.
- *The color Doppler*: Showed diffuse lacunar flow and Hypervascularity of serosa-bladder interface.
- Finally both uterine arteries were clamped; hysterectomy with preserving the ovaries was done without trial to separate the placenta. No blood was transfused, No urological complication, No ICU admission.

Fig. (2): 29 years old female patient seeking for routine antenatal care when she was discovered as placenta accreta.

- *Transabdominal Ultrasound*: Showed irregular retro placental sonolucent zone.
- *The color Doppler*: Showed diffuse lacunar flow and hypervascularity of serosa-bladder interface.
- Finally the both uterine arteries were ligated. Compression on placental bed was done by inflating foley's catheter by 60cc saline. Tubal ligation was done as written consent was taken upon admission. No urological complications, no ICU admission.



## Discussion

Our study findings showed that ultrasound has a good diagnostic role in recognizing the three major variants of adherent placentation which can be distinguished by identifying the degree of Placental villi extension through the uterine wall layers of myometrium and the uterine serosa. As Farquhar, et al., show that the three major variants for adherent placentation can be distinguished as stated by those degree for trophoblastic Attack through those myometrium and the uterine serosa: Placenta accreta, placenta increta What's more placenta percreta [8].

Placenta accreta most likely normal variant about abnormally follower placenta, What's more the sum varieties of abnormal placentation need aid connected with a critical build for maternal morbidity, particularly because of blood loss, harm on nearby organs, compelling reason necessitate hysterectomy [3].

The aim of this study is to test the role of gray scale and color Doppler in antenatal assessment of placental adhesive disorders in patients with previous caesarean scar and comparing data with operating room finding.

Hong et al., study was approved that the overall vascular pattern in the myometrium became more complex when the myometrial involvement was more extensive. There was bulging of the uterine wall together with vessels crossing the interface between the bladder and the placenta/uterine wall complex in the case of placenta percreta [10].

The most sever type of placental adhesive disorders is placenta percreta which necessitate hysterectomy with high incidence of maternal morbidity or even mortality, Our study reveals a good diagnostic accuracy for predicting percreta type about (96.15%) with positive predictive value of (75%), the most sensitive and specific ultrasound finding for percreta is presence of exophytic mass (100% and 95.65% respectively).

In agreement with our study Hong et al., [10] reported that This findings were similar in previous reports of placenta percreta where heterogeneous and exophytic subplacental areas with multiple hypoechoic areas crossing the boundaries of the myometrium were shown. These hypoechoic areas were demonstrated to be vessels moving perpendicular to the line through the myometrium on Doppler examination [10].

Saad et al., [9] illustrated that there were 32 cases diagnosed accreta according to color doppler

and 24 cases were diagnosed accretaintraoperatively with significant difference ( $p$ -value=0.001) [9].

In agreement with our results, Japaraj et al., [11] reported that the majority of patients were diagnosed to have total placenta previa (20/21). Out of the 21 patients that underwent ultrasound examination of the placenta, seven (33%) had at least one feature of placenta accreta on ultrasound examination and all seven were later confirmed to have placenta accreta during delivery [11].

In our study we found that regarding ultrasound findings for prediction of Accreta expressed as (%). According to Irregular retro placental sonolucent zone sensitivity was 100.0, PPV was 53.85, and Accuracy was 53.85. According to Thinning or disruption of hyper echoic serosa bladder interface Sensitivity was 64.29, PPV was 42.86, Accuracy was 34.62. According to Presence of focal exophytic mass invading UB Specificity was 66.67, NPV was 36.36, and Accuracy was 30.77. According to Abnormal placental lacunae Sensitivity was 100.0, PPV was 53.85, Accuracy was 53.85. According to Diffuse or local lacunar flow Sensitivity was 64.29, PPV was 42.86, and Accuracy was 34.62. According to Vascular lakes turbulent flow Sensitivity was 64.29, PPV was 42.86, Accuracy was 34.62. According to Hypervascularity of serosa bladder inter face Sensitivity was 64.29, Specificity was 8.33, PPV was 45.0, NPV was 16.67, and Accuracy was 38.46. According to Markedly dilated vessels over peripheral sub placental zone Sensitivity was 57.14, Specificity was 8.33, PPV was 42.11, NPV was 14.29, and Accuracy was 34.62.

So Our study reveals that the most sensitive ultrasound feature for placenta accrete is presence of irregular retroplacental sonolucent zone together with presence of abnormal placental lacunae by colored duplex although there is no more specific ultrasound finding for accrete, these two sensitive finding are in going with accrete diagnosis unless there is no presence of exophytic mass lesion nor thinning or disruption of the hyperechoic serosal layer to distinguish this accrete type from percreta and increta respectively.

Saad et al., [9] documented that sensitivity, specificity, PPV and NPV of Doppler US were 88.2%, 75%, 69.8%, 87% respectively for placenta accreta diagnosis.

Nawab et al., [12] reported that a prospective consider starting with pakistan news person that the sensitivity, specificity, PPV, NPV, ultrasonic were 85.7%, 83.3%, 66.7%, 93.8% and 84% separately.



Clark et al., [13] reported that other uterine scars such as myomectomy scars can also increase the risk of placenta accreta. The incidence of placenta accretain the presence of placenta previa increases from 24% after one cesarean section to 67% after four or more cesarean sections.

Hence, the antenatal diagnosis of placenta accreta in patient with placenta previa and previous caesarean section is crucial for appropriate counseling and surgical planning to be carried out.

In the present study we found that regarding US findings for prediction of Increta. According to Irregular retro placental sonolucent zone Sensitivity was 100.0, PPV was 34.62, Accuracy was 34.62. According to Thinning or disruption of hyper echoic serosa bladder interface Sensitivity was 100.0, Specificity was 29.41, PPV was 42.86, NPV was 100.0, and Accuracy was 53.85. According to Presence of focal exophytic mass invading UB Sensitivity was 11.11, Specificity was 82.35, PPV was 25.0, NPV was 63.64 and Accuracy was 57.69. According to Abnormal placental lacunae sensitivity was 100.0, PPV was 34.62, and Accuracy was 34.62. According to Diffuse or local lacunar flow sensitivity was 100.0, Specificity was 29.41, PPV was 42.86, NPV was 100.0 and Accuracy was 53.85. According to Vascular lakes turbulent flow Sensitivity was 100.0, Specificity was 29.41, PPV was 42.86, NPV was 100.0 and Accuracy was 53.85. According to Hypervascularity of serosa bladder inter face Sensitivity was 88.89, Specificity was 29.41, PPV was 40.0, NPV was 83.33, and Accuracy was 50.0. According to Markedly dilated vessels over peripheral sub placental zone Sensitivity was 88.89, Specificity was 35.29, PPV was 42.11, NPV was 85.71 and Accuracy was 53.85.

So far our study reveals that the ultrasound role for predilection of increta is more difficult than the other two types unless there are combined finding are present together and absence of other finding to distinguish increta from accrete and percreta like disruption of serosa-bladder hyperechoic interface with presence of abnormal placental lacunae and turbulent flow vascular lakes by colored duplex to distinguish it from accrete and absence of exophytic mass invading the urinary bladder to distinguish it from percreta.

In our study we found that regarding US findings for prediction each type of placental disorders from others. According to P. Accreta Sensitivity was 85.71, Specificity was 100.00, PPV was 100.00, NPV was 85.71. According to P. Increta Sensitivity was 88.89, Specificity was 100.00, PPV

was 100.00 and NPV was 94.44. According to P. Percreta Sensitivity was 100.00, Specificity was 100.00, PPV was 100.00 and NPV was 100.00. These finding are on going with Valentina et al., [14] which reveals scoring system for predicting PAS showed sensitivity of 100%, specificity of 89% and accuracy of 92%.

Finally, although the ultrasound has great sensitivity and specificity for diagnosis of placental adhesive disorder, the ultrasound criteria used to diagnose the different types of (PAS) were not totally specific.

Despite presence of some limitations in practice we use comprehensive assessment for ultrasound diagnostic role in detecting the three different types of (PAS).

Another investigation by McLean et al., [13] including gravid patients toward hazard to placenta accreta neglected with exhibit the incremental utilization of doppler us to placenta accreta progressions conveyance mode over an stratified Investigation. Such An investigation needed performed Doppler us clinched alongside a little extent of the companion that might have been main 28.7% (n=40/139), also constantly a review ponder handles a rate of us inclination in regards explanatory information.

And to be more concise we compare o findings regarding the operation room which revealed that there were 14 (53.8%) Accreta, 3 (11.5%) Percreta and 9 (34.6%) Increta.

The main limitations of our study were the small sample size and another concept that the US diagnostic signs are operator dependent and need comprehensive assessment to reach the final opinion which in our study was extremely conclusive to the finding.

#### Conclusions:

In conclusion, the prevalence of placental Accrete spectrum disorders (PAS) is increasing, and practitioners should be aware of this entity and its imaging features. Placenta previa and a prior history of cesarean section are the most significant risk factors for PAS. Ultrasound remain the primary screening modality of abnormal placentation. 2D Gray scale has higher sensitivity than color Doppler in diagnosis of placenta accreta. The ultrasound predictive accuracy is high and it's role is significantly increases together with comprehensive assessment in order to improve maternal out comes and decrease maternal morbidities by the most safe, cheap and fast technique.



**Declarations:**

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## دور الموجات فوق الصوتية العادية والدوبلر الملون فى تقييم ما قبل الولادة للمشيمة المنزاحة التراكمية فى المرضى الذين يعانون من ولادة قيصرية سابقة ومقارنتها بما سيتم إيجاده أثناء الولادة

تعتبر المشيمة المنزاحة من المضاعفات الخطيرة للحمل والسبب الأكثر شيوعاً لنزيف ما بعد الولادة، والذي غالباً ما يعرض حياة النساء الحوامل للخطر. أشارت الدراسات السابقة إلى أن المشيمة المنزاحة غالباً ما تكون عامل خطر للإصابة بالمشيمة الملتصقة والتي يتم تقسيمها إلى المشيمة الملتصقة accreta حيث يتم اختراق عل الرحم بواسطة الزغابات المشيمية، percreta التي تغزو فيها الزغابات المشيمية عضل الرحم وقد تشمل الأعضاء المحيطة، و increta التي تكون فيها الزغابات المشيمية على اتصال مع عضل الرحم.

يتم تشخيص المشيمة المنزاحة الملتحمة باستخدام الموجات فوق الصوتية فى الأسبوع ٢٠-١٨ من الحمل ويرفر فرصة مثالية للكشف عن الاضطراب. يبدو أن الدوبلر الملون يحسن الدقة التشخيصية لتقنيات الموجات فوق الصوتية ذات المقياس الرمادى ويجب استخدامه فى المواقف التي يوجد فيها دليل كبير للشك فى هبوط المشيمة. ستزداد دقتها، عند دمجها مع الموجات فوق الصوتية ثنائية الأبعاد، وتوفر أفضل طريقة متاحة لتشخيص المشيمة الملتصقة.

قد يكون دوبرل ذو القدرة ثلاثى الأبعاد ذا قيمة كطريقة تكميلية للتشخيص السابق للولادة أو التخلص من المشيمة الملتصقة. يسمح التحديد الدقيق قبل الولادة لحالات الحمل المتأثرة بالعلاج الأمثل لأنه يمكن الترتيب مسبقاً لتوقيت وموقع الولادة، وتوافر منتجات الدم، وتوظيف فريق تخدير ماهر وفريق جراحى.

كان الهدف من الدراسة هو معرفة دور الموجات فوق الصوتية العادية والدوبلر الملون فى تقييم ما قبل الولادة للمشيمة المنزاحة التراكمية فى المرضى الذين يعانون من ولادة قيصرية سابقة ومقارنتها بما سيتم إيجاده أثناء الولادة.

كانت هذه دراسة مقطعية (مستقبلية) أجريت فى مستشفى أمراض النساء والتوليد بجامعة عين شمس، قسم أمراض النساء والتوليد بمستشفى دسوق، محافظة كفر الشيخ، مصر، على ٢٦ سيدة حامل مصابة بانزياح المشيمة وندبة قيصرية سابقة خلال فترة ٦ أشهر.

أظهرت النتائج الرئيسية للدراسة ما يلى:

وفقاً لغرفة العمليات، كان هناك ١٤ (٥٣.٨٪) من الحالات المدروسة accreta، ٣ (١١.٥٪) لديهم percreta و ٩ (٣٤.٦٪) لديهم increta.

كان متوسط عمر مجموعة Accreta 33.57±3.55 مع النطاق (٢٨.٠-٣٩.٠)، وكان متوسط عمر مجموعة Percreta 38.67±3.12 مع النطاق (٣٥.٠-٤١.٠) وكان متوسط عمر مجموعة Increta 31.78±4.15 مع النطاق (٢٨.٠-٤١.٠). كان متوسط الانجاب لمجموعة 2.29±0.61 مع النطاق (١.٠-٣.٠)، وكان متوسط الانجاب لمجموعة Accreta 4.0±1.0 مع النطاق (٣.٠-٥.٠) وكان متوسط الانجاب لمجموعة Increta 3.0±0.71 مع النطاق (٢.٠-٤.٠). كان متوسط الولادة القيصرية السابقة لمجموعة Accreta 2.29±0.61 مع النطاق (١.٠-٣.٠)، وكان متوسط الولادة القيصرية السابقة لمجموعة Percreta 4.0±1.0 مع النطاق (٣.٠-٥.٠) وكان متوسط الولادة القيصرية السابقة لمجموعة Increta 3.0±0.71 مع مدى (٢.٠-٤.٠). كان متوسط مرات الحمل لمجموعة Accreta 4.0±1.04 بنطاق (٣.٠-٧.٠)، وكان متوسط مرات الحمل لمجموعة Percreta 6.04±1.0 مع النطاق (٥.٠-٧.٠) وكان متوسط مرات الحمل لمجموعة Increta 4.78±0.67 مع النطاق (٤.٠-٦.٠).

كان هناك ١٢ (٨٥.٧٪) خضعوا لعملية استئصال الرحم فى مجموعة Accreta، و ٣ (١٠.٠٪) فى مجموعة Percreta، و ٩ (١٠٠.٠٪) فى مجموعة Increta. لم يكن هناك أى شخص مصاب بإصابة المثانة المصاحبة فى مجموعة Accreta، ٣ (١٠٠.٠٪) فى مجموعة Percreta، و ٨ (٨٨.٩٪) فى مجموعة Increta. لم يكن هناك أى شخص مصاب بفقدان منطقة ريترو المشيمة فى مجموعة Accreta، ٣ (١٠٠.٠٪) فى مجموعة Percreta، و ٨ (٨٨.٩٪) فى مجموعة Increta.

كان هناك ١٤ (١٠٠٠٪) لديهم منطقة مشيمة رجعية غير منتظمة في مجموعة Accreta، ٣ (١٠٠٠٪) في مجموعة Percreta، و ٩ (١٠٠٠٪) في مجموعة Increta. كان هناك ٩ (٦٤.٣٪) لديهم ترقق أو اضطراب في واجهة المثانة المصلية المفرطة الصدى في مجموعة Accreta، ٣ (١٠٠٠٪) في مجموعة Percreta، و ٩ (١٠٠٠٪) في مجموعة Increta. لم يكن هناك أى شخص لديه وجود بؤدى غزو جماعى ل UB في مجموعة Accreta، ٣ (١٠٠٠٪) في مجموعة Percreta، و ١ (١١.١٪) في مجموعة Increta. كان هناك ١٤ (١٠٠٠٪) مصابين بمرض plcentallacunea غير طبيعى في مجموعة Accreta، و ٣ (١٠٠٠٪) في مجموعة Percreta، و ٩ (١٠٠٠٪) في مجموعة Increta. كان هناك ٩ (٦٤.٣٪) لديهم تدفق جوى منتشر أو محلى في مجموعة Accreta، و ٣ (١٠٠٠٪) في مجموعة Percreta، و ٩ (١٠٠٠٪) في مجموعة Increta. كان هناك ٩ (٦٤.٣٪) لديهم تدفق مضطرب فى بحيرات الأوعية الدموية فى مجموعة Accreta، و ٣ (١٠٠٠٪) فى مجموعة Percreta، و ٩ (١٠٠٠٪) فى مجموعة Increta. كان هناك ٨ (٨٨.٩٪) فى مجموعة Percreta، و ٨ (٨٨.٩٪) فى مجموعة Increta. كان هناك ٨ (٥٧.١٪) لديهم أوعية متوسعة بشكل ملحوظ فوق منطقة المشيمة الفرعية الطرفية فى مجموعة Accreta، و ٣ (١٠٠٠٪) فى مجموعة Percreta، و ٨ (٨٨.٩٪) فى مجموعة Increta.

وفقاً لنتائج التصوير بالموجات فوق الصوتية للتنبؤ ب Accreta، كان هناك ١٠٠٠٪ لديهم منطقة مشيمة رجعية غير منتظمة مع حساسية، و ٥٣.٨٥٪ مع PPV و ٥٣.٨٥٪ بدقة. كان هناك ٦٤.٢٩٪ ترقق أو تمزق فى واجهة المثانة المصلية المفرطة الصدى مع الحساسية، و ٤٢.٨٦٪ مع PPV و ٣٤.٦٢٪ مع الدقة. كان هناك ٦٦.٦٧٪ وجود كتلة خارجية بؤرية تغزو UB مع التحديد، و ٣٦.٣٦٪ مع NPV و ٣٠.٧٧٪ بدقة. كان هناك ١٠٠٠٪ مصابين بالحساسية اللاكونية غير الطبيعية، و ٥٣.٨٥٪ لديهم PPV و ٥٣.٨٥٪ بدقة. كان هناك ٦٤.٢٩٪ لديهم تدفق منتشر أو موضعى مع حساسية، و ٤٢.٨٦٪ مع PPV و ٣٤.٦٢٪ بدقة. كان هناك ٦٤.٢٩٪ من البحيرات الوعائية ذات التدفق المضطرب مع الحساسية، و ٤٢.٨٦٪ مع PPV و ٣٤.٦٢٪ بدقة. كان هناك ٦٤.٢٩٪ فرط انتفاخ للوجه الداخلى للمصانة المصلية مع حساسية، و ٨.٣٣٪ مع التحديد، و ٤٥.٠٪ مع PPV، و ١٦.٦٧٪ مع NPV و ٣٨.٤٦٪ بدقة. كان هناك ٥٧.١٤٪ لديهم أوعية متوسعة بشكل ملحوظ فوق منطقة المشيمة الفرعية الطرفية ذات الحساسية، و ٨.٣٣٪ مع التحديد، و ٤٢.١١٪ مع PPV، و ١٤.٢٩٪ مع NPV و ٣٤.٦٢٪ بدقة.

وفقاً لنتائج التصوير بالموجات فوق الصوتية للتنبؤ ب Percreta، كان هناك ١٠٠٠٪ لديهم منطقة مشيمة رجعية غير منتظمة مع حساسية، و ١١.٥٤٪ مع PPV و ١١.٥٤٪ بدقة. كان هناك ١٠٠٠٪ ترقق أو تطل واجهة المثانة المصلية عالية الصدى مع حساسية، و ٢١.٧٤٪ مع الدقة، و ١٤.٢٩٪ مع PPV، و ١٠٠٠٪ مع NPV و ٣٠.٧٧٪ بدقة. كان هناك ١٠٠٠٪ وجود كتلة خارجية بؤرية تغزو UB بحساسية، و ٩٥.٦٥٪ مع خصوصية، و ٧٥.٠٪ مع PPV، و ١٠٠٠٪ مع NPV و ٩٦.١٥٪ بدقة. كان هناك ١٠٠٠٪ مصابون بحساسية ملطخة غير طبيعية و ١١.٥٤٪ لديهم PPV و ١١.٥٤٪ لديهم دقة. كان هناك ١٠٠٠٪ لديهم تدفق جوى منتشر أو محلى نو حساسية، و ٢١.٧٤٪ مع خصوصية، و ١٤.٢٩٪ مع PPV، و ١٠٠٠٪ مع NPV و ٣٠.٧٧٪ بدقة. كان هناك ١٠٠٠٪ بحيرات وعائية مضطربة مع حساسية، و ٢١.٧٤٪ مع خصوصية، و ١٤.٢٩٪ مع PPV، و ١٠٠٠٪ مع NPV، و ٣٠.٧٧٪ مع دقة. كان هناك ١٠٠٠٪ فرط انتفاخ للوجه الداخلى للمثانة المصلية مع حساسية، و ٢٦.٠٩٪ مع خصوصية، و ١٥.٠٪ مع PPV، و ١٠٠٠٪ مع NPV و ٣٤.٦٢٪ بدقة. كان هناك ١٠٠٠٪ لديهم أوعية متوسعة بشكل ملحوظ فوق منطقة المشيمة الفرعية الطرفية ذات الحساسية، و ٣٠.٤٣٪ بالخصوصية، و ١٥.٧٩٪ مع PPV، و ١٠٠٠٪ مع NPV و ٣٨.٤٦٪ بدقة.

وفقاً لنتائج التصوير بالموجات فوق الصوتية للتنبؤ ب Increta، كان هناك ١٠٠٠٪ لديهم منطقة مشيمة رجعية غير منتظمة مع حساسية، و ٣٤.٦٢٪ مع PPV و ٣٤.٦٢٪ بدقة. كان هناك ١٠٠٠٪ ترقق أو تمزق فى واجهة المثانة المصلية عالية الصدى مع الحساسية، و ٢٩.٤١٪ مع التحديد، و ٤٢.٨٦٪ مع PPV، و ١٠٠٠٪ مع NPV و ٥٣.٨٥٪ مع الدقة. كان هناك ١١.١١٪ وجود بؤرى لكتلة خارجية غزو UB بحساسية، و ٨٢.٣٥٪ مع خصوصية، و ٢٥.٠٪ مع PPV، و ٦٣.٦٤٪ مع NPV و ٥٧.٦٩٪ بدقة. كان هناك ١٠٠٠٪ مصابون بحساسية ملطخة غير طبيعية و ٣٤.٦٢٪ لديهم PPV و ٣٤.٦٢٪ لديهم دقة. كان هناك ١٠٠٠٪ لديهم تدفق جوى منتشر أو محلى نو حساسية، و ٢٩.٤١٪ مع خصوصية، و ٤٢.٨٦٪ مع PPV، و ١٠٠٠٪ مع NPV و ٥٣.٨٥٪ بدقة. كان هناك ١٠٠٠٪ من البحيرات الوعائية ذات الجريان المضطرب مع الحساسية، و ٢٩.٤١٪ بالخصوصية، و ٤٢.٨٦٪ مع PPV، و ١٠٠٠٪ مع NPV و ٥٣.٨٥٪ بدقة. كان هناك ٨٨.٨٩٪ لديهم فرط انتفاخ للوجه الداخلى للمثانة المصلية مع حساسية، و ٢٩.٤١٪ مع خصوصية، و ٤٠.٠٪ مع PPV، و ٨٣.٣٣٪ مع NPV و ٥٠.٠٪ بدقة. كان هناك ٨٨.٨٩٪ لديهم أوعية متوسعة بشكل ملحوظ فوق منطقة المشيمة الفرعية الطرفية ذات الحساسية، و ٣٥.٢٩٪ مع التحديد، و ٤٢.١١٪ مع PPV، و ٨٥.٧١٪ مع NPV و ٥٣.٨٥٪ بدقة.

وفقاً لنتائج التصوير بالموجات فوق الصوتية للتنبؤ باضطرابات المشيمة من الآخرين، كان هناك ١٤ من العينة المدروسة لديهم Percreta P. بنسبة ٨٥.٧١٪ مع حساسية، و ١٠٠٠٪ مع خصوصية، و ١٠٠٠٪ مع PPV، و ٨٥.٧١٪ مع NPV، كان هناك ٩ من أفراد العينة المدروسة لديهم Increta P. بنسبة ٨٨.٨٩٪ مع حساسية، و ١٠٠٠٪ مع خصوصية، و ١٠٠٠٪ مع PPV، و ٩٤.٤٤٪ مع NPV، كان هناك ٣ من أفراد العينة المدروسة لديهم Percreta P. بنسبة ١٠٠٠٪ مع حساسية، و ١٠٠٠٪ مع خصوصية، و ١٠٠٠٪ مع PPV، و ١٠٠٠٪ مع NPV.

بناءً على نتائجنا، نوصى بإجراء مزيد من الدراسات على المرضى الأكبر حجماً وفترة المتابعة الأطول للتأكيد على استنتاجنا.