

Diagnostic Role of Doppler Ultrasound in Morbidly Adherent Placenta (MAP)

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ABSTRACT

Introduction: The capability to diagnose pathologically morbid adherent placenta has transformed over the preceding era. Depending on the knowledge and availability of equipment, ultrasound (ultrasound), MRI or a combination of these methods are currently used. Ultrasound is popular for its low cost and availability, and is broadly used to detect location of placental and possible anomalous growth.

Place and Duration: In the Gynecology Department of Civil Hospital Quetta for six-months duration from March 2021 to September 2021

Methods: 72 total pregnant women booked on the third trimester of pregnancy (diagnosed with early ultrasound) with diagnosis of the placenta previa were selected. Women in the primigravid group and females with pregnancies complicated by heart disease, diabetes and hypertension were omitted from the analysis. Color Doppler ultrasound was performed in all patients and the absence or presence of morbidly adherent placenta previa was detected. The results of the color Doppler ultrasound examination were correlated with the results of the surgical treatment (concluding it as the gold standard).

Results: 28.21 ± 2.70 years was the mean age of the patients. Ultrasound revealed MAP in 9 (12.5%) females. The ultrasound positive patients had 08 true positives and 01 false positives. Of the 63 ultrasound negative patients, 61 were true negative ($P \leq 0.05$) and false negative patients were two patients. The calculated specificity, sensitivity, negative and positive predictive value and analytical accurateness of the color Doppler test in the prenatal MAP diagnosis were rated at 97.21%, 86.8%, 97.89%, 86.8% and 98.95%, respectively.

Conclusions: In this study, it was found that the diagnostic accurateness of color Doppler ultrasound is higher in the prenatal analysis of morbidly adherent placenta in pregnant women with placenta previa.

Keywords: Sensitivity, non-invasive imaging modality and Placenta accreta.

INTRODUCTION

A morbidly adherent placenta (MAP) is distinct as the anomalous adherence of all or some placental part to the underlying wall of the uterus¹⁻². The morbidly adherent placenta is an infrequent problem of the placenta, but has life-threatening and infertile complications, including placenta increta, percreta and accreta³. It has been supposed to be the utmost common signal for sudden obstetric hysterectomy after atony and uterine rupture in Pakistan. The frequency of MAP has augmented dramatically since the past 30 years. The incidence of an atypical placenta increases day by day, multiplying tenfold, particularly in females with placenta previa⁴. The percentage of placenta percreta corresponds to approximately 5% increase in MAP, 15% in increta and approximately 80% increase in accrete. The utmost well-recognized MAP risk factors are the preceding cesarean section and placenta previa⁵⁻⁶. Conferring to the American College of Obstetricians and Gynecologists, the MAP prevalence is one in 2,500 births. Current reports advocate an incidence between one in 2,500 deliveries and one in 1,100 deliveries. The related maternal mortality is in the range of ten percent⁷⁻⁸. The capability to diagnose pathologically morbid adherent placenta has transformed over the preceding era. Depending on the knowledge and availability of equipment, ultrasound (ultrasound), MRI or a combination of these methods are currently used⁹.

Ultrasound is readily available, inexpensive, and radiation-free, and is a choice for determination of placental location, abnormalities, and variants. Currently, magnetic resonance imaging of the placenta is used to determine its morphologic structure and topographic data, which is beneficial in the analysis and surgical treatment of placental abnormalities¹⁰⁻¹¹. Given that MAP is a life-endangering and fertility problem, this study was conducted to govern the diagnostic accurateness of color Doppler ultrasound in the prenatal analysis of morbid adherent placenta. This helps us to understand the role of this method in the timely diagnosis and subsequent treatment of patients.

MATERIAL AND METHODS

This cross-sectional descriptive study was performed in the Gynecology Department of Civil Hospital Quetta for six months duration from March 2021 to September 2021. 72 total pregnant women booked on the third trimester of pregnancy (diagnosed with early ultrasound) with diagnosis of the placenta previa were selected. Women in the primigravid group and females with pregnancies complicated by heart disease, diabetes and hypertension were omitted from the analysis. Later to the relevant history and informed consent of all patients, all cases done with a color Doppler ultrasound scan by a consultant Radiologist with minimum three years of experience and the results

were confirmed by consultant gynecologist with 3 years' experience after cesarian section. The diagnosis of the MAP was done by color Doppler ultrasound with either of these findings, namely comprehensive loss of the retroplacental sonolucent zone, disruption or thinning of hyperechoic of the uterine serosa bladder linking anomalous blood vessels with the bladder and placenta, Sonolucent vascular vessels with turbulent flow, clearly enlarged veins in the sub-placental area. The results of the color Doppler ultrasound examination were correlated with the results of the surgical treatment (including the gold standard). The gathered data were analyzed using the SPSS 20.0. The standard deviation and Mean were premeditated for quantitative variables. For qualitative variables, percentage and frequency were calculated. Table 2x2 was applied to determine the specificity, sensitivity, negative and positive predictive value and diagnostic accurateness of the color Doppler ultrasound and the prenatal diagnosis of the morbidly adherent placenta in pregnant women with placenta previa.

RESULTS

The age range was 18 to 35 years in this study, with 28.21 ± 2.70 years of mean age. Most of the patients, 58.33%, were 18–30 years old (Table I).

Table 1: Age distribution of the patients

Age (in years)	n	%age
18-30	42	58.33
31-35	30	41.67
Total	72	100

The patient's distribution according to the parity is as follows, 35 (48.61%) had 1-3 parity and 37 (51.39%) > 3. Color Doppler ultrasound was performed in all patients. Ultrasound revealed a MAP in 9 (12.5%) females. Surgical results confirmed morbid adherent placenta in 9 (12.5%) cases, but confirmed that 63 (87.5%) women did not have MAP. The ultrasound positive patients had 08 true positives and 01 false positives. Of the 63 ultrasound negative patients, 61 were true negative (P≤0.05) and false negative patients were two patients as shown in Table II (P≤0.05).

Table-2: Summary of Results

	+Ve results on USG	-Ve result on USG
+ve on operative findings	08 (TP)	01 (FN)
-ve on operative findings	02 (FP)	62 (TN)

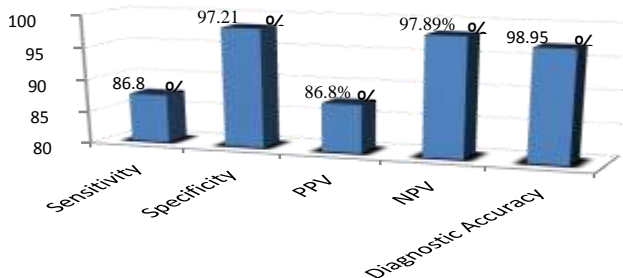


Fig. 1: Diagnostic accurateness of color Doppler ultrasound in antenatal analysis of morbidly adherent placenta in gravid females having placenta previa

The calculated specificity, sensitivity, negative and positive predictive value and analytical accurateness of the color Doppler test in the prenatal MAP diagnosis were rated at 97.21%,86.8%, 97.89%, 86.8%% and 98.95%, respectively. (Figure 1).

DISCUSSION

The introduction of the Doppler ultrasound in contemporary obstetrics facilitated in the primary recognition and treatment of the adherent placenta. With such success, these inexpensive methods can completely replace MRI in the analysis of MAP¹². The necessity for this analysis, the fact that MAP is a life-endangering obstacle, and the color Doppler ultrasound diagnostic accurateness can help us understand the importance of this method in primary analysis and subsequent timely patient treatment. The calculated specificity, sensitivity, negative and positive predictive value and analytical accurateness of the color Doppler test in the prenatal MAP diagnosis were rated at 97.21%,86.8%, 97.89%, 86.8%% and 98.95%, respectively. These results are reinforced by various studies in which the color Doppler US has 82.4% to 100% sensitivity and a specificity of 91.2% between 92% and 96.8%. The expected ultrasound frequency for MAP detection was 82%. Wong HS and Warshak CR note that the anterior segment of the lower uterus is the communal place of the placenta accrete, and because of its superficial position, the color Doppler US is valuable for representing placental blood flow to the interface of bladder¹³⁻¹⁴. According to Cali G et al. Color Doppler diagnostic accuracy was established in patients with MAP and criteria for distinguishing accreta from percreta were defined¹⁵⁻¹⁶. The placental lacunae, first defined by Williams and Finberg in 1992, was the predictive discovery of the PA by ultrasound. Intra-placental lacunae are parallel, linear vascular channels that vary in shape and size. They are located in the parenchyma of the placenta, extend from the parenchyma to the myometrium, and give the placenta appearance of Swiss cheese or moth-eaten. Rendering to the literature, the occurrence of placental lacunae is significant for the analysis of PA, particularly when visualized in week 15, their sensitivity is 78-93% and specificity is 78.6%. The greater the number of lacunae, the greater the risk of PA. Tt least four lacunae in the placenta are noted in all cases of PA in one analysis. AP case reports show turbulent flow and color Doppler imaging results in placental lacunae¹⁷⁻¹⁹. Twickler and colleagues mapped the color flow in the placental lacunae in PA patients. 20 PA lacunae cases were analyzed to assess the turbulent flow in the by US²⁰⁻²¹. Using this method, he determined that turbulent flow transpires in all PA cases, which does not take into account the combined specificity and sensitivity of Grayscale and color Doppler images. Though, Doppler ultrasound precisely forecast placenta accreta, i.e., abnormal placental attachment to the myometrium in 76.2% of cases and MRI in 66.7% of cases (the variance was not significant)²². According to research, the Doppler ultrasound sensitivity varies from 85% to 100% with 35% to 96% specificity. Three newly available systematic reviews have demonstrated the ultrasound diagnostic accuracy, the use of magnetic resonance imaging, and a comparison of ultrasound and magnetic

resonance imaging in invasive placental diagnostics. D. Antonio et al study of meta-analyzes of invasive placental diagnosis with 90.7% sensitivity and 96.9% specificity for USG and 94.4% sensitivity and 84% specificity for MRI²³. These meta-analyzes have shown good accuracy of USG and MRI in the diagnosis of invasive placenta. Color Doppler ultrasound images are popular because they are inexpensive, readily available, readily available, and widely used for placental localization and abnormal detection. Color Doppler ultrasound is characterized by high sensitivity and specificity in the diagnosis of the adjacent pathological bed, especially with specific diagnostic criteria. Based²⁴. The diagnosis of adherent morbid placenta is much higher in pregnant women with placenta previa, and this method can be used more frequently and in early treatment.

CONCLUSION

This study showed that the diagnostic accuracy of color Doppler ultrasound was higher in the prenatal diagnosis of morbid adherent placenta in pregnant women with placenta previa. It is suggested that high-risk patients, in particular, undergo prenatal screening so that appropriate treatment protocols can be followed.

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