

Diagnostic Accuracy of Ultrasound and MRI in Pregnant Women at Risk for Placenta Accreta

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ABSTRACT

Aim: To determine the diagnostic accuracy of ultrasound and in pregnant women at risk for placenta accrete.

Methodology: A cohort study was performed in radiological department of General Hospital, Lahore. Record from June, 2019 to September, 2019 was reviewed to identify patients with a diagnosis of placenta accreta to determine the accuracy of pelvic ultrasonography and MRI in the diagnosis of placenta accreta.

Results: 18 women confirmed placenta accreta by ultrasound. 15 were not confirmed with this analysis. 18 women with confirmation of placenta accreta by ultrasound were sent for MRI confirmation. Of these 18 women, 15 women were confirmed with placenta accreta by MRI. The sensitivity of MRI in this study was 100%.

Conclusion: Two modalities were used to confirm the diagnostic accuracy of pregnant women at risk of Placenta accreta.

Keywords: PA (Placenta accreta), US (Ultrasonography), MRI (Magnetic Resonance Imaging),

INTRODUCTION

Clinical findings like difficulty in removing the placenta manually, removal of placenta surgically, massive bleeding after placental separation in a well-contracted uterus are generally used to determine the presence of PA. Two recent large studies conducted in the United States suggest incidence of one in 2500 deliveries, using clinical as well as pathologic diagnoses^{1,3}.

Placenta accreta (PA) occurs when a defect of the decidua basalis allows the invasion of chorionic villi into the myometrium. PA is classified into three types:

1. Placenta accreta vera: Villi are attached to the myometrium but do not invade the muscle.
2. Placenta increta: Villi partially invade the myometrium.
3. Placenta percreta: Villi penetrate through the entire myometrial thickness or beyond the serosa².

The clinical consequence of PA is massive hemorrhage at the time of placental separation. Blood loss averages 3–5L and can lead to disseminated intravascular coagulopathy, adult respiratory distress syndrome, renal failure, and even death. Hysterectomy is often required, leading to serious comorbidities such as cystotomy (15.4% of cases), ureteral injury (2.1%), and pulmonary embolus (2.1%), with 26.6% of patients admitted to the intensive care unit^{4,5,6}.

US Findings in PA are: Placenta previa, Placental lacunae with turbulent flow, Irregular bladder wall with extensive associated vascularity, Loss of retroplacental clear space, Myometrial thickness <1mm or loss of visualization of the myometrium, Gap in the retroplacental blood flow.

MR Imaging Findings in PA are: Placenta previa, Uterine bulging, Heterogeneous signal intensity within the placenta, Dark intraplacental bands on T2-weighted images, Focal interruptions in the myometrial wall, Tenting of the bladder, Direct visualization of the invasion of pelvic structures by placental tissue⁵.

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Fig 1: Placenta accrete and MRI

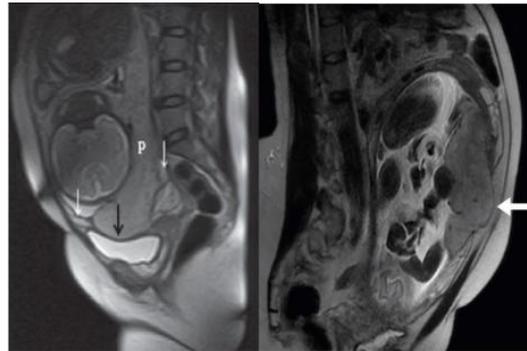


Fig 2: Placenta accrete and US



METHODOLOGY

A cross sectional study done in radiological department of General Hospital, Lahore. Records from June to September 2019 studied to classify patients by analysis of placenta accreta to regulate the correctness of pelvic ultrasonography and MRI in the analysis of placenta accreta. Patients were advised to partially fill their urinary bladder for proper evaluation of uterine serosa and bladder partition border. First, placenta remained assessed for homogeneity. MRI examination was performed using Philips 1.5 Tesla machine mode I 2006.

RESULTS

From the general hospital, we collected data of the pregnant women who had the suspicion of placenta accreta. Age range was 19-41 yrs. In 33 patients, maximum gravidity was found to be 5. From July to September 2019, 18 women confirmed placenta accreta by ultrasound. 15 were not confirmed with this analysis. 18 women with confirmation of placenta accreta were sent for MRI and 15 were confirmed. Of these 33 women, 24 women were presented with caesarean. The sensitivity of MRI in this study was 100%.

Table 1: Ultrasound findings

Total cases	33
Suspicion of placenta accrete on USG	33
Confirmed placenta accrete on USG	18
Not confirmed placenta accrete on USG	15

Table 2: MRI findings

Total cases	33
Confirmed on USG	18 (54.5%)
Confirmed on MRI	15 (45.5%)

Table 3: Sensitivity and Specificity of USG and MRI

USG	MRI		Total
	Confirmed	Not confirmed	
Confirmed	TP(15)	FP(03)	18
Not confirmed	FN(nil)	TN(15)	15
Total	15	18	33

Sensitivity=TP/TP+FNx100=100%,
Specificity=TN/FP+TNx100=83.3%

DISCUSSION

In our study, 18 women confirmed placenta accreta by ultrasound. 15 were not confirmed with this analysis. 18 women with confirmation of placenta accreta by ultrasound were sent for MRI confirmation. Of these 18 women, 15 women were confirmed with placenta accreta by MRI. The sensitivity of MRI in this study was 100%. Two modalities were used to confirm the diagnostic accuracy of pregnant women at risk of Placenta accrete.

Many studies have reported the performance of MRI in placenta accrete detection. Although some have involved small cohorts and include wide variation in the frequency of abnormal placentation (range, 20–95%), and they indicate that MRI is highly sensitive and moderately specific^{7,8}.

A meta-analysis identified 18 studies involving 1010 pregnancies at risk for invasive placentation and reported a

sensitivity of 94.4% and specificity of 84%. The same analysis compared ultrasound and MRI and showed no statistically significant difference in either the sensitivity ($p=0.24$) or the specificity ($p=0.91$). It is important to note that, although the literature indicates a high level of accuracy with MRI, false-negative diagnoses are still a possibility and the test cannot be used to exclude placenta accreta⁹.

CONCLUSION

US remain the primary screening modality and can help detect PA in 50%–80% of cases. In our experience, lacunae and an abnormal color Doppler imaging pattern are the most helpful findings. Subplacental clear space and myometrial thickness are less helpful and should be used in conjunction with other findings as evidence for PA. MR imaging is most clearly indicated when US findings are ambiguous or there is a posterior placenta.

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