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ROLE OF USG VERSUS MRI IMAGING IN THE DIAGNOSIS OF ABNORMALLY ADHERENT LOW LYING PLACENTA AND THEREBY MODIFYING THE MANAGEMENT

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ABSTRACT

To compare the effectiveness of ultrasonography and magnetic resonance imaging in the diagnosis of placental a adherence disorders and to modify management for better outcome. **Method:** A Hospital – based prospective study of 100 cases, were diagnosed to have low lying placental with adherence disorders on the bases of clinical history and furthered study by ultrasonography and magnetic resonance imaging comparison was made between pre- and per- operative findings. **Results:** Amongst the 100 study subjects, majority (52%) belonged to age group of 26 to 30 years, with gestational age of 30 to 37 weeks. The sensitivity and specificity of ultrasonography was 53.35 and 90% respectively, whereas that of magnetic resonance imaging was 73.3% and 91.4% respectively. This was found crucial from the management point of view and reduced mortality. **Conclusions:** Pre-operative diagnosis of placental adherence disorders by ultrasound and magnetic resonance imaging is helpful to modify management and bring down mortality, demanding further research.

KEYWORDS: Placenta, placenta previa, placenta accreta, ultrasonography magnetic resonance imaging.

INTRODUCTION

The placenta is normally attached to the upper part of body of uterus encroaching to the fundus, adjacent to anterior or posterior wall with equal frequency. The attachment to uterine wall is effective due to encroaching villi connecting the chorionic plate with the based plate and also by fusion of decidua capsularis and vera with chorionic at the margin,[1] prenatal diagnosis of placental abnormalities has historically been difficulty. Earlier placentography was done after injecting a dye. At presell it is performed by gray scale solography, two dimensional three dimensional three dimensional ultrasonography, Colour Doppler and Power Doppler with varied accuracy. The sensitivity has been reported between 33% to 100%.[2] For those at high risk of placenta accreta, a two-step protocol using ultrasonography (USG) first, followed by magnetic resonance imaging (MRI) for cases with in conclusion ultrasonography features may optimize the diagnosis accuracy. we studied our population with aim of comparing effectiveness of USG and MRI in the diagnosis of placenta abnormalities in patients having low lying placenta, and to determine imaging features, that may help in predicting placental abnormalities in order to modify the management protocol thereby reducing material mortality and morbidity.

MATERIAL AND METHODS

The present study was conducted at the Government Medical college associated Lalla Ded Hospital – a Tertiary Care Centre of the State from august 2016 to march 2017. The study population included 100 admitted pregnant females with gestational age of 30 to 37 weeks with low lying placenta (Placenta previa) and past history of uterine surgeries like caesarean section and myomectomy. The other risk factors included high parity and increased material age. All the subjects were studied in stable condition after obtaining valid consents. After confirming gestational age and low lying placenta on USG (color Doppler), the detailed study was conducted by using 3.5 megahertz curved array transducer or probe (GE Medical Systems) to note the placental localization, grade of placenta previa, and evidence of any placental adhesive disorder like placenta accreta, placenta increate, and placenta percreta. The imaging features studied on USG included loss of retro placental hypoechoic clear zone, loss of bladder wall-uterine interface and presence of placental lacunae. All patients underwent MRI studied using a 3 Tesla MRI scanner (Siemens Medical system)

,the material pelvis was imaged in the axial, coronal and sagiltal planes with a 8- channel body matrix coil T2-weighted sequences used a 256x218 data matrix with slice thickness of 6mm. features of MRI to diagnose placental disorders like placenta previa, placenta accrete, uterine bulging, heterogeneous signal intensity within the placenta, dark intraplacental ands on T2- weighted images and focal interruption in myometrial wall. Other features included tenting of the bladder and direct visualization of the invasion of pelvic structures by the placental tissue.

All the patients diagnosed to have placenta adhesive disorders and their attendants were explained the nature and type of the disorder and councelled regarding the management. After diagnosis on MRI, patients were planned for elective surgery. Supportive treatment including blood transfusion was provided and peri-partum hysterectomy was performed after obtaining valid consent in every subject.

Statistical Analysis: Apart from the basic demographic parameters, proforma included sex of fetus, associated congenital anomalies, and need of postoperative intensive care management. Statistical analysis of the data was done by descriptive statistical procedure, including sensitivity, specificity, positive and negative predictive values of both USG and MRI studies. Student 't' test was performed and chi-square was used wherever needed. A p value of < 0.05 was considered significant.

RESULTS

Amongst 100 studied cases, majority (52%) belonged to age group of 26 to 30 years, followed by age group of 31 to 35 years (29%). Most of these (54%) belonged to middle class families. The occurrence of placental adhesive disorder (PAD) was more commonly found with advanced parity, with highest noted frequency in six gravidae. Among the 100 cases, USG reported 77% had focal placenta accreta, and 7% had placenta accreta whereas MRI picked up focal and placenta accrete in 20% and 8%, respectively. Among 30% patients confirmed as PAD at surgery only 16 were diagnosed by USG, showing sensitivity of 53.3% . Out of 70% cases who were negative for PAD at surgery, only 63% were diagnosed by USG as no PAD, showing a specificity of 90%. Similarly, only 22% of 30 cases confirmed as PAD at surgery were diagnosed by MRI, showing sensitivity of 73.3%.

Overall, USG sensitivity of 73.3%, specificity, positive predictive value and negative predictive value of 53.3%, 90.0% and 81.8%, respectively. MRI showed the same among 73.3%, 91.4% and 78.6% and 88.89%, respectively ($\chi 2$=43.689 and p = 0.000). In 60% of cases, pregnancy was terminated before 37 weeks of gestation.

Among the 100 studied subjects, 53% had undergone lower segment caesarean section (LSCS), other procedures are depicted in Table 4. Among total of 12 caesarean hysterectomy procedures, 4 were done at less than 34 weeks of gestation. 7 patients required postoperative ICU admission, all had placenta accreta. Rest of the cases were managed conservatively, only 15 patients stayed for over 10 days postoperatively.

Table 1: Age distribution in the study cases.

Age	No. of Patients	Percentage
20-25	4	4
26-30	52	52
31-35	29	29
36-40	15	15
TOTAL	100	100

Table 2: Placental adhesive disorder (USG) * PAD at surgery Cross-tabulation.

Placental Adhesive Disorder (USG)		PAD at surgery		Total
		Yes	No	
Yes	No.	16	7	23
	% within PAD at surgery	53.3	10.0	23.0
No	No.	14	63	77
	% within PAD at surgery	46.7	90.0	77.0
Total	No.	30	70	100
	% within PAD at surgery	100	100	100
Chi-square Test		Value	Df	P
		22.26614	1	0.00

Table 3: Placental adhesive disorder (USG)* PAD at surgery.

Placental Adhesive Disorder (MRI)		PAD at surgery		Total
		Yes	No	
Yes	No.	22	6	28
	% within PAD at surgery	73.3	8.6	28.0
No	No.	8	64	72
	% within PAD at surgery	26.7	91.4	72.0
Total	No.	30	70	100
	% within PAD at surgery	100	100	100
Chi-square Test		Value	Df	P
		43.689	1	0.00

Table 4: Management of 100 studied cases.

	n	%	B lynch suture	Chaos suture	Isthemic-Cervical suture
LSCS	53	53	0	0	1
LSCS with bilateral uterine artery ligation	19	19	0	1	0
LSCS with intrauterine packing	5	5			
LSCS with bilateral uterine artery ligation & intrauterine packing	6	6			
LSCS with haemostatic sutures	4	4	1		1
Caesarean hysterectomy	12	12			1
			0	0	0
Total	100	100	1	1	3

DISCUSSION

The incidence of PAD has increased over the past few decades, in concert with the increase in rate of caesarean deliveries. Our study was designed to determine the sensitivity and specificity of both USG and MRI in diagnosing abnormal adherence of low lying placenta antenatally and to modify the management accordingly. Most of our cases belonged to age group of 26 to 30 years. The mean age was 30.8 years. Similar data were reported previously by Masselli G and co-workers,[3] Preen and co-workers,[4] reported an average age of 29.5 years that can be compared with the present study. In our study we found PAD in 15% patients in the age group of 36-40 years, showing that with increase in maternal age there is increase in the occurrence of placenta adhesive disorders, like placenta accreta. Tuzovic and co-workers in 2003,[5] reported various factors that were significantly associated with placenta previa. These also included advanced maternal age as the most prominent factor besides gravidity of 3 or more, more than one previous delivery, history of previous caesarean section, abortion and presence of uterine abnormalities. As most (54%) of our patients belonged to lower middle class, Usta and co-workers[6] also found patients of PAD belonging to the low socioeconomic class, we found highest percentage with gravidae six, and same was found by previous researchers[5] as well. The gestational age of our study population was taken as 30 to 37 weeks in order to diagnose any abnormal placentation correctly and to modify the management, that is also in accordance with the previously published studies.[3,7] In our studied cases, 41% were having previous history of dilatation and curettage with no previous caesarean delivery. Clark and co-workers,[8] reported data similar to our study. The sensitivity and specificity of USG and MRI in the diagnosis of PAD, among our cases is consistent with the previously published studies as well.[2,9,10] In the study of Warshak and co-authors,[10] the higher sensitivity and specificity compared to our study was because of use of gadolinium contrast, however, the risk to the fetus has to be weighed against the benefits. We managed bleeding in our cases meticulously, that is critical in the management of PAD. Joy and co-workers,[11] also reported that planning delivery and control of haemorrhage is crucial from the management point of view. Carri R and associates,[12] also reported that pre-delivery diagnosis of placenta accreta is associated with decreased haemorrhagic morbidity.

CONCLUSION

To conclude, large sample of the study population are required in future to study the parameters in a broader perspective.

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