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RESEARCH ARTICLE

Diagnosis of placenta Accreta in women with placenta previa using Gray scale and color Doppler ultrasonography.

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Abstract

Objective: to evaluate Diagnosis of placenta accrete in women e' placenta previa using Gray scale and color Doppler ultrasonography.

Material and methods: 50 pregnant patient in 2nd and 3rd trimester with confirmed anterior placenta previa in all forms. Were included prospectively into this study. Gray scale trans Abdominal examination was performed to detect loss of retro placental echo lucent zone and other abnormalities suggestive of placenta accrete.

Color Doppler few mapping was used to scan the whole placenta to detect Any newly formed vessels at the serosa- bladder border or the presence of abnormal lacuanae. The ultra sound findings were analyzed with reference to the diagnosis made during cesarean delivery.

Results: placenta accrete and its variants were confirmed in 16 patients at time of cesarean delivery. If we considered the presens of at least one criterion to be diagnostic when using each ultrasound then gray scale would have apositive predictive value (52.9%) followed by color Doppler (70.6%) The majority of patients with placenta accrete showed multiple characteristic features on ultrasound imaging

Conclusion: color dopler is useful as a complemantary technique to Gray. Scale in Early detection of placenta accrete.

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Introduction:-

The definition of placenta previa based on ultrasound findings is more practical, and the traditional definition (implantation of the placenta in the lower uterine segment) needs to be revised. The term 'placenta previa should only be used when the placental edge overlaps or is within 2 cm of the internal cervical orifice in late pregnancy. If the placental edge is located further than 2 cm but within 3.5 cm from the internal cervical orifice, the placenta should be termed low-lying. Unless the placental edge at least reaches the internal orifice at mid-trimester," symptomatic placenta previa in the third trimester will not be encountered (1)

The incidence of invasive placentation, such as placenta accrete, has progressively risen in the past 3 decades, possibly as a consequence of increasing caesarean section rates. Ultrasound has a sensitivity of 91% and a specificity of 97% for the identification of all forms of invasive placentation (1)

In the past, hysterectomy was often needed to control the bleeding and in cases of percreta, even hysterectomy might fail to control the bleeding. The maternal morbidity and mortality associated with these conditions are considerable. The availability of high-resolution grey-scale ultrasound with color Doppler study techniques in obstetric practice has enabled accurate antenatal diagnosis of placenta accreta and percreta. Management involving performance of a classical caesarean section to avoid the placental site, leaving the morbidly adherent placenta in situ, followed by hysterectomy 2 to 6 weeks after delivery, has reportedly achieved a possible decrease in maternal morbidity and mortality (2)

Due to the high morbidity associated with this condition. Accurate Preoperative diagnosis of placenta accreta plays a crucial role in the management of these situations. Antenatal sonography is used to support the diagnosis and guide clinical management leading probably to favorable outcomes (3)

The aim of this study to evaluate Diagnosis of placenta accrete in women with placenta previa using gray scale and color Doppler ultrasonography.

Material and methods:-

this study was carried out at Benha university hospital between November 2014 to november 2015. after approval of the ethical committee of obstetrics and gynecology. Where 50 pregnant women with persistent placenta previa (after 28 weeks gestation). Was enrolled prospectively into this study with the following inclusion criteria. Patient with prior cesarean delivery, previous uterine scar, pregnant women with persistent placenta previa in all forms at 2nd and 3rd trimester.

Ultrasound examination was performed using an ultrasound system equipped with a 4-8 MHZ Trans abdominal ultrasound transducer. With ultrasound machine model e.g voluson.

For each patient, the whole placenta was scanned in a systematic fashion using both grayscale ultrasound and color flow mapping. The placenta was imaged with a sufficient bladder volume to clearly visualize the serosa-bladder interface and the angle of insonation will be kept as low as possible, the resistance index of flow within the abnormal lacunae and any newly formed vessels over the serosa-bladder border will be measured in at least three different locations to obviate selection bias, with the lowest value being used for analysis.

On gray-scale ultrasound imaging, we considered the presence of at least one of the following characteristics to indicate placenta accreta (including its variants, placenta increta and placenta percreta):

1. Complete loss of the retroplacental sonolucent zone.
2. Irregular retroplacental sonolucent zone.
3. Thinning or disruption of the hyperechoic uterine serosa-bladder interface.
4. Presence of focal exophytic masses invading the urinary bladder.
5. Presence of abnormal placental lacunae .

Likewise, the diagnosis of placenta accreta was regarded as positive when any one of these color Doppler criteria is present:

1. Diffuse or focal lacunar flow pattern.
2. Sonolucent vascular lakes with turbulent flow typified by high velocity (peak systolic velocity >15cm/s) and low resistance waveform.
3. Hypervascularity of the uterine-bladder interface with abnormal blood vessels linking the placenta to the bladder.
4. Markedly dilated vessels over the peripheral subplacental region.

In this study all the pregnancies were delivered by cesarean section at our hospital with full availability of information on the delivery. Definitive diagnosis of placenta accreta was made at delivery when the myometrium was seen to be invaded by the placenta, and the pathological examination of the removed uterus showed the villi attached to the myometrium without intervening decidua (accreta), invading into the myometrium (increta) or reaching the serosa (percreta).

SPSS computer program (version 12 windows) was used for data analysis value less or equal to 0.05 was considered significant and less than 0.01 i was considered highly significant.

Results:-**Table (1):-** Demographic data of the studied group:

Variable	Cases(n=50)
Age : (year) <i>Mean \pm SD</i> <i>Range</i>	31.4 \pm 5.29 21 - 41
Parity: <i>Mean \pm SD</i> <i>Range</i>	4.2 \pm 1.4 0 - 4
Gravity: <i>Mean \pm SD</i> <i>Range</i>	2.12 \pm 1.26 2 - 7

Table (5): Doppler findings among the studied group:

Variable	No accrete(n=34)	
	No	%
Loss of the retroplacental sonolucent zone: <i>No</i> <i>Yes</i>	33 17	66 34
Irregular retroplacental sonolucent zone: <i>No</i> <i>Yes</i>	31 19	62 38
Thining of distrupcion of the hyprchoice serso-bladder interface: <i>No</i> <i>Yes</i>	36 14	72 28
Presence or focal exophytic mass invading urinary bladder: <i>No</i> <i>Yes</i>	39 11	78 22
Abnormal placental lacauna: <i>No</i> <i>Yes</i>	33 17	66 34
Diffuse or focal lacunar flow: <i>No</i> <i>Yes</i>	33 17	66 34
Vascular lackses with turbulent flow: <i>No</i> <i>Yes</i>	35 15	70 30
Hyper vasclularity of sersa bladder interface: <i>No</i> <i>Yes</i>	31 19	62 38
Markedly dilated vesseles over preipheral subplacental zone: <i>No</i> <i>Yes</i>	33 17	66 34

Table (8):- Comparison of gynecological history between cases of Accrete and non accrete cases:

Variable	No accrete(n=34)		Accrete(n=16)		Test	p
Abortion:						
Mean \pm SD	0.64 \pm 0.98		1.13 \pm 1.09		MW	0.09
Range	0 - 3		0 - 3		1.66	NS
CS:						
Mean \pm SD	1.24 \pm 0.82		2.38 \pm 1.02		MW	0.001**
Range	0 - 2		1 - 4		3.40	
NVD:						
Mean \pm SD	0.41 \pm 1.05		0		---	---
Range	0 - 4		0			
D& C:						
Mean \pm SD	0.65 \pm 0.98		0.86 \pm 0.86		MW	0.31
Range	0 - 3		0 - 2		1.02	NS
Variable	No	%	No	%	χ^2	P
Booked:						
No	2	5.9	0	0	0.98	0.32
Yes	32	94.1	16	100		NS
APP:						
No	6	17.6	0	0	3.21	0.07
Yes	28	82.4	16	100		NS
Previous delivery:						
CS	28	82.4	16	100	3.21	0.07
NVD	6	17.6	0	0		NS
PP:						
No	34	100	12	75	9.24	0.002*
Yes	0	0	4	25		

Table (9):- Comparison of present history between cases of Accrete and non accrete cases:

Variable	No accrete(<i>n</i> =34)		Accrete(<i>n</i> =16)		t	p	
Preoperative Hb:							
<i>Mean ± SD</i>	11.63 ± 1.2		12.09 ± 0.81		1.4	0.17	
<i>Range</i>	8.6 - 13		10.9 – 13.2			NS	
Postoperative Hb:							
<i>Mean ± SD</i>	10.81 ± 1.24		9.1 ± 1.18		4.61	<0.001**	
<i>Range</i>	7.2 – 12.5		6.8 – 10.7				
Paired t	8.18		8.85				
P	<0.001**		<0.001**				
Variable	No	%	No	%	χ^2	P	
Time of CS:							
<i>Emergency</i>	8	23.5	6	37.5	1.05	0.31	
<i>Elective</i>	26	76.5	10	62.5		NS	
PP type:							
<i>Low</i>	10	29.4	0	0	15.69	<0.001**	
<i>Marginalis</i>	10	29.4	0	0			
<i>Centralis</i>	14	41.2	16	100			

Table (10):- Comparison of complication between cases of Accrete and non accrete cases:

Variable	No accrete(n=34)		Accrete(n=16)		χ^2	P
	No	%	No	%		
Blood transfusion:						
No	34	100	2	12.5	41.32	<0.001**
Yes	0	0	14	87.5		
Hystrectomy:						
No	34	100	4	25	33.55	<0.001**
Yes	0	0	12	75		
Urologic:						
No	34	100	10	62.5	14.49	<0.001**
Yes	0	0	6	37.5		
ICU:						
No	34	100	8	50	20.24	<0.001**
Yes	0	0	8	50		
Preterm:						
No	34	100	2	12.5	41.32	<0.001**
Yes	0	0	14	87.5		
Prenatal mortality:						
No	34	100	14	87.5	4.43	0.03*
Yes	0	0	2	12.5		

Discussion:-

The term morbidly adherent placenta implies an abnormal implantation of the placenta into the uterine wall and has been used to describe placenta accreta, increta, and percreta. Placenta accreta is a placenta where the placental villi adhere directly to the myometrium; placenta increta is a placenta where the placental villi invade into the myometrium; and placenta percreta is a placenta where the placental villi invade through the myometrium and into the serosa. (4).

The term placenta accrete is often used as a general term to describe all of these condition (5).

Prenatal diagnosis of placenta accrete can reduce maternal | Fetal morbidity and mortality by arrangement the best time and place of birth (6).

Therefore, every effort should be done to optimize the diagnosis and minimize false positive and negative. Accuracy of sonographic criteria for PA (7).

Placenta accrete is becoming an increasingly common complication of pregnancy mainly due to increasing rate of C.S delivery over the past 50 year (8,9).

In this study the results revealed that the incidence of placenta previa in patients with previous C.S scar was 3.8% and reported that placenta previa accrete in patients e' previous C.S 32% this exactly nearly to (10) 'who reported the combination of placenta previa accrete with previous C.S was 38.2% , 35% reported by (11) 33% reported by (12) 43% reported by (13) Suggesting that this increase mainly the result of the increasing rate of C.S delivery (14) The incidence rate increase of 3% - 11% -40% -61% and 67% for the first, second, third, fourth and fifth or greater number of cesarean sections (14) That agree with this study revealed that the risk of placenta previa accrete increases proportionally with the number of prior cesarean deliveries.

this is consistent with (15) But (16) showed that one or multiple previous C.S are associated with similar increased Frequency of placenta previa.

In contrast (17) reported over all incidences in UK of 1.7: 10000 maternities.

The difference may lead to:-

1. Large portion of the population in our area were multi-gravida with many repeated C.S while another studies a single child per family was common.
2. We are tertiary hospital and most of normal delivers take place outside the hospital and most of complicating cases are referred to our hospital.
3. Differences in definition and study population may account for this wide range.
4. One limitation of this study is its single hospital – based nature makes it prone to over estimating the incidence as high risk and emergency cases tend to be referred into it from surrounding sites.
5. That reported (18,19,20) Found that prior cesarean section and placenta preiva are the most important risk factors for developing placenta accrete.
6. In this study 96% of MAP cases were associated with placenta previa. This is consistent with the findings of (21,22)
7. History of curettage and grand multiparity are also as other important risk factor (23,20)
8. In this study there were no statistically significant differences between patient with placenta accrete and cases without in age, parity and gravidty.
9. Several authors have attempted to make an antenatal diagnosis of placenta accrete accrete sanographically. (18,24,2,20,25,26) reported that conventional gray- scale ultrasongraphyic criteria for the diagnosis of adherent placenta can be useful in determing the patients clinical outcome as well as in preparing her for surgery.
10. **Finberg and Williams** Were one of the first few investigators who evaluated the role of ultrasound in the prenatal diagnosis of placenta previa accrete in patients with one or more C.S.
11. In this study gray scale abdomind u/s was used for screening patients and the color Doppler ultrasongraphy was then used to confine analysis for selected previa patients.

U/s finding in placenta accrete:-

- 1- loss of retro – placenta sonolucont zone.
- 2- Irregular retro – placental sonolucent zone.
- 3- Thining or disruption of the hyperchoice uterine serosa bladder interface.
- 4- Focal exophytic masses invading the urincry bladder.
- 5- Abnormal placental lacuane

This diagnostic criteria agrees with (19,27,2,20):-

- ❖ In this study the uls criteria for diagnosis of placenta accrete in that order. Abnormal placenta Lacauna (87.5%), thinning of distrupction of hyper- choice serosa bladder interface (62.5%) Followed by loss of the retro-placental sonolucent zone (56.3%) and disruption of uterine serosa bladder wall (25%) as in table (11) (28,29)
 - ❖ concluded that visualization of Lacunae has the highest sensitivity in diagnosis of placenta accrete.
 - ❖ This agrees with (19) where both distrupcted bladder mucosa and exophytic placenta invading bladder had low sensetivites for detecting placenta accrete 18% and 10% respectively.
 - ❖ In this study It was found that gray scale uls 87.5% sensitivity and 91.2% specificity in diagnosing placenta previa accrete.
 - ❖ This study agree with (30) reported similar high sensitivity and specificity with gray scale ultra sound.
 - ❖ The main gray scale ultrasound features, which was confirmed accrete cases, was the presence of abnormal placental Lacunae with highest NPV (93.3%) that agrees with (31)
 - ❖ Like wise, the diagnosis of placenta accrete was regarded as positive when any one of these color Doppler criteria was present.
1. Diffuse or focal lacunar flow pattern.
 2. Vascular lackses with turbulent flow.
 3. Hyper vascularity of serosa bladder interface.
 4. Markedly dilated vessels over peripheral sub-placental zone.

This agrees with diagnostic critena of (19,2,32,20):-

In this study. it was found that color doppler had 90% sensitivity, Accuracy86% and specificity 85.3% and positive predictive value 73.7% and negative predictive value 92% for diagnosis of placenta accerta that agree with (33) high false results in that study were explained by the fact that 16 patients had more than one prior CS with the formation of bladder varices and neovascularized vessels mistaken as abnormal bladder- uterine serosa interface hypervascularity which was assumed to be placenta accrete.

❖ placenta accreta is associated e' intraoperative and postoperative morbidity caused by massive Blood transfusion, infection and adjacent organ damage (34)

❖ Massive Blood loss was the prominent features in this study as (41.3%) of women e' amean postoperative Hb. 10.81 ± 1.24 ml. An average of 6 units of whole blood (range 7-12) and Ffp4. 86 ± 2.11 An average of four units of fresh frozen plasma (FFp) range 2-6 were transfused.

❖ In some recent series, placenta accrete has emerged as the major indication for peripartum hysterectomy accounting for 38-76% of cases.

(31,12)

❖ emergency peripartum hysterectomy was done in 24% of cases. Bladder was injured in 6 patients (12%) in this study and both of them received primary repaire during the operation. 16% of women had to be shifted to ICU with an average stay of 2.5 days. No cases of maternal death in our study.

❖ The principle newborn complication in this study was prematurity. The mean gestational age at delivery was 35-25 weeks.

❖ Range: 32-37 weeks 41.32% of the newborns were preterm with an average birth weight of 2841gm. The perinatal mortality was 4.43%

❖ This results agree with (12) reported almost similar result where the average gestational age in was 35.2 weeks-55% of newborns were preterm with average birth weight 2.25kg. The prenatal mortality 33.3%.

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