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RESEARCH ARTICLE

PLACENTA PREVIA ACCRETA RISK FACTORS AND PRENATAL DIAGNOSIS BY COLOR.

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Abstract

Background: The incidence of placenta accreta has increased dramatically over the last three decades, in concern with the increase in the cesarean delivery rate. Optimal management requires accurate prenatal diagnosis.

Objectives: To identify the risk factors for the development of placenta previa accrete as compared to placenta noneaccrete and to evaluate the role of trans-abdominal color Doppler in diagnosis placenta previa accreta.

Methods: Prospective interventional study done at gynecology and obstetrics department, Baghdad teaching hospital, Nursing Home, Medical city, Baghdad, Iraq. During the twenty one month study period, 53 women all beyond 28 week and all with ultrasound diagnosis of placenta previa were included in the study.

Results: Of the 53 placenta previa cases, ten women exhibited characteristic color Doppler imaging patterns highly specific for placenta accreta. One of them had false positive color Doppler imaging, and nine confirmed at cesarean section to have placenta accreta. Seven of them underwent emergency hysterectomy.

Of the 43 women with negative color Doppler imaging results, two had placenta accreta required cesarean hysterectomy (false negative), and both were posterior placenta previa.

However, there were two cases of placenta previa non accreta required cesarean hysterectomy because of uncontrollable hemorrhage (inertia). The sensitivity of color Doppler imaging in the diagnosis of placenta previa accreta was 81.8%, specificity was 97.6%, the positive and negative predictive value were 90% and 95.3% respectively.

Conclusion: Previous C/S is a major risk factor for the development of placenta accreta mainly repeated uterine operation, although both gravidity and curettage increase the incidence they were not reach statistical significance.

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Introduction:-

Placenta accreta is a significant cause of maternal morbidity and mortality and is presently the most common reason for emergency postpartum hysterectomy. It is an abnormal attachment of the placenta to the myometrium. ^(1, 2)

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It is estimated that 140 000 women die of postpartum hemorrhage per year. Owing to the increasing rate of Cesarean delivery, there has been a 10-fold rise in the incidence of placenta accreta since the 1970s.⁽³⁾

An additional reported risk factors for placenta accreta include maternal age, multiparity, other prior uterine surgery, prior uterine curettage and uterine irradiation.⁽⁴⁾

If Placenta accreta was diagnosed or suspected before delivery, the optimum time for planned delivery is around 34–35 weeks, following a course of corticosteroids and multidisciplinary team care approach to avoid possible complications during delivery like massive vaginal bleeding, uterine wall rupture, uterine infection and uterine inversion secondary to attempted manual removal of placenta.^(5, 6, 7, 8)

Ultrasonography is used routinely for diagnosis of abnormal placentation, although diagnostic criteria and accuracy are still subject to debate.⁽⁹⁾ But color Doppler provide a higher specificity in the diagnosis of placenta accreta and in particular, the depth of invasion.⁽¹⁰⁾

Traditionally, patients with a prior cesarean delivery and placenta previa are screened for accreta with antenatal sonography, but the definitive diagnosis is made postpartum by pathologic demonstration of chorionic villi invading the myometrium and absence of decidua.

Overall, grayscale sonography is an excellent tool for the prenatal diagnosis of placenta accreta in women at risk for this abnormality.⁽¹²⁾ It should be the primary tool for the diagnosis of placenta accreta and should be used exclusively in most cases.⁽¹³⁾

The overall reported sensitivity of MRI is 80% to 85% with specificity of 65% to 100%.⁽¹⁴⁾ It is important to know that when MRI was used in conjunction with sonography for assessing patients for the diagnosis of placenta accreta, MRI was rarely helpful in changing surgical management. In one study, when MRI downgraded the sonographic diagnosis, in every case, the patient still underwent cesarean hysterectomy.⁽¹⁵⁾

Methodology:-

A prospective clinical study was carried out in Baghdad Teaching Hospital and the Nursing Home from the 1st of July 2014 to 30 of April 2016 on 59 pregnant women with an ultrasound diagnosis of placenta previa.

Women included in this study were beyond 28 weeks gestation, singleton pregnancy and their gestational age were assessed by last menstrual period and/or by U/S performed in the first half of pregnancy.

Those women either attended the hospital directly or they were referred from antenatal care centers, district hospitals, primary health centers and private clinics. Six women were excluded from the study because of lack of follow up. Each woman was interviewed personally taking full history, physical and obstetrical examination.

Special attention was paid for the recognized risk factors of placenta accrete. Age, gravidity, parity, number of previous cesarean section, history of gynecological operation of the uterus (myomectomy or metroplasty) history of curettage, history of APH and significant PPH. gender (sex) of fetus, severe hypotension, rapid pulse, shock, need blood transfusion.

Telephone contact was made to many patients who did not attend antenatal care regularly. The women were scanned with ultrasound real-time equipment utilizing 3.5 MHz, phase array transducer (STMENS-SONOLINE ELEGRA).

All women underwent a trans-abdominal B-mode sonography to screen the placental tissue in a systematic fashion, careful attention was paid to homogeneity and echogenicity patterns of the placenta. Then we evaluate the utero-placental vascular morphological manifestation for every patient with the use of trans-abdominal color Doppler U/S. Sonography was repeated every 2-3 week if possible to see if there is progressive thinning and disappearance of the retro-placental and to exclude any possibility for placental migration. Then the 53 women followed up until delivery to find how the pregnancy ended. We send the patients for investigations like blood group, hemoglobin. The group of women whose showed sign of accreta by Doppler sonography were followed up in the same mentioned route as those of suspected having of pl. pr. without accreta.

The diagnosis of placenta previa accreta was confirmed at the time of delivery depending on clinical judgment of the surgeon and histopathology when it is appropriate.

The outcome of pregnancy and the maternal morbidity were correlated with the antenatal ultrasonic results of this potentially life-threatening obstetric disorder. Severe bleeding, rupture uterus or injury to the bladder.

Statistical analysis:-

Data were translated into codes using a specially designed codingsheet, and then entered into a computerized database structure. An expert statistical advice was sought for. Statistical analyses were done using SPSS version 20 computer software (Statistical Package for Social Sciences).

Results:-

The results presented in this chapter were based on the analysis of 53 pregnant women with an established diagnosis of pl. pr. Those women were followed till delivery to ascertain placenta accreta as an outcome of interest. The age of the study sample ranged between 22-42 years with a median value of 33 years old. The gravidity ranged from 1 and 11, with a median value of 4. parity ranged between 0-8 with a median of 3, table 1.

Incidence of placenta accrete:-

As shown in table 2, the incidence rate of placenta accreta (documented at delivery) among cases of a known diagnosis of pl. pr. was 20.8% (11 out of 53). The expected incidence rate in the reference population (all possible cases with pl. pr.) would range between 10.8%-34.1 % with 95% confidence.

Factors affecting the risk of developing placenta accreta

Age

As shown in table 3, there was no statistically significant difference in the incidence of placenta accreta between young women (<35 years of age in which the incidence was 23.3%) and women 35 years of age and older (incidence was 17.4%). The slight increase in risk of having placenta accreta in the >34 women with an established diagnosis of pl. pr. Those women were followed till delivery to ascertain placenta accreta as an outcome of interest.

Younger age group (1.3 times compared to older group) was not significant statistically. Also there was no significant difference in median age between the group which eventually developed placenta accreta (34 years) and those remaining as previa only (33 years).

Gravidity

As shown in table 3, the group with higher gravidity (3+) was associated with an obviously higher incidence rate of placenta accreta (25%) compared to those with low gravidity (<3) in which none (0%) developed placenta accrete. The difference observed however failed to reach the level of statistical significance.

Parity

As shown in table 3, the group of higher parity (>2-) had a 1.8 times risk of developing placenta accreta compared to the group with lower parity (1-2). The observed risk together with the difference in incidence rate between the 2 groups was however not significant statistically.

Previous cesarean section

The incidence of positive history of cesarean section (C/S) in placenta accreta group was 39.3%, since none of the cases with a negative history developed placenta accreta this association was statistically significant. The incidence of placenta accreta was significantly associated with the number of previous C/S, it increased from 31.8% in those with 1-2 previous C/S to 66.7% in those with 3 and more C/S.

History of curettage

As shown in table 3, a positive history of uterine curettage increased the incidence rate of placenta accreta from 13.3% (in those with a negative history) to 30.4%. This observed difference and the associated increase risk of 2.3 times failed to reach the level of statistical significance. Although it is not statistically significant, there is positive trend for the effect of increasing of number of previous curettage on the risk of developing placenta accreta from 13.3% in those of negative history of curettage to 33.3 in those with curettage done to 3 or more times.

Association of placenta accreta with selected parameters

One case (9.1%) of placenta previa accreta group had history of APH (antepartum hemorrhage), compared to 17(40.5%) of placenta previa group. On the other hand, PPH (postpartum hemorrhage) as a complication was more frequent in the group of accreta (90.9%) compared to those remaining as previa (59.5%). Despite the above, difference did not show a statistical association.

No statistically significant differences were observed in the frequency of the 3 types of delivery (elective, emergency C/S and vaginal delivery) between the group which eventually developed placenta accreta and those remaining as previa. Similarly no obvious differences were observed regarding the survival of newborn between the 2 groups. Among the group which eventually developed placenta accreta 9.1% of newborn had adverse outcome regarding survival and well-being compared to 14.3% in the other group.

Male gender of the newborn was obviously (although not significant statistically) more frequent among the group which eventually developed placenta accreta (72.7%) compared to expected equal proportion observed in the other group (52.4%), and even in the same group (accreta) male is more incidence than female.

Diagnosis of placenta accreta

B-mode U/S and color Doppler U/S were both used to diagnose placenta accreta among the 53 cases with established diagnosis of placenta previa. As shown in table 5, 6 and the validity parameters of both U/S diagnostic modalities were compared. Both modalities had similar sensitivity (81.8%) and false negative rate (18.2%), i.e. if U/S was to be used as a screening procedure in cases with placenta previa to predict a possible diagnosis of placenta accreta it can detect up to 81.8% of possible cases with accreta missing (failing to detect) only 18.2% of cases. The comparability of the 2 modes in sensitivity resulted in almost equal (NPV) negative predictive value (95%), i.e. U/S can exclude a possible diagnosis of placenta accreta with 95% confidence in cases with placenta previa.

Color Doppler study had a higher specificity (97.6%) and therefore higher (PPV) positive predictive value (90%), i.e. Doppler U/S study can establish the diagnosis of placenta accreta with 90% confidence among cases with placenta previa. The rate of false positive diagnosis of placenta accreta is obviously higher in B-mode study (7.2% compared to 2.4% color Doppler study). In conclusion Doppler U/S study has a higher overall accuracy (94.3%) in the diagnosis of placenta accreta compared to B-mode U/S study (90.5%)

Discussion:-

Clinically important causes of bleeding in the second half of pregnancy and in labor include placenta previa, placenta accreta, and vasa previa. These conditions are associated with significant maternal and perinatal mortality and morbidity.⁽¹⁶⁾

In this study the maternal age above 35 had no effect on increase the incidence placenta accreta this agree with Morlando et al 2013.⁽¹⁷⁾

But this disagree with Comstock CH 2005 that showed the incidence of placenta accreta should rise steadily over the next century as advanced maternal age⁽¹⁸⁾, this may be explained by small number of patients in our study and the early age of marriage in our country with resultant complete family before 35 years of age.

In agreement with Sofiah S 2009 gravidity was higher in patients with placenta accreta however it failed to reach statistical significance. This association may reflect the increasing uterine insult with repeated pregnancies⁽¹⁹⁾.

This study fail to show a statistically significant relationship between parity and placenta accreta this agree with Sofiah S 2009 who show that higher parity is not associated with increased incidence of placenta accreta and disagree with Clark SL 1999 who showed that placenta accreta is associated positively with parity.⁽²⁰⁾ This may be explained that increase parity is not a risk factor but the interference that may occur with deliveries for example we need manual separation of placenta or postpartum curettage that may increase the incidence of accrete rather than parity alone.

This study showed that previous C/S is the major risk factor for the placenta accreta and this risk had a significant relationship with number of C/S in our study the incidence of placenta accreta started from 0% in unscarred uterus to 31.8% to those with one or two C/S up to 66.7% in those having three or more C/S.

This agree with GarimiGali 2012 that show main risk factor for placenta accreta is a previous cesarean delivery and also with Nunes Carla et al 2014 that show The incidence of placenta accreta has increased and seems to be parallel to the increasing cesarean delivery rate.⁽²²⁾

Positive history of curettage and increase number of curettage increased the incidence of placenta accreta and is explained by the facts that repeated curettage increase the chance of endometrial defect. However it not reach statistical significance.

This agree with Nunes Carla et al 2014 that show The Prior uterine curettage have been strongly associated with abnormal placentation.⁽²²⁾

But dis agree with Beuker JM et al 2005 they observe in their study that endomyometrial injury is frequent at termination or dilatation and curettage after miscarriage, but the relation to subsequent placenta accreta remains unclear.⁽²³⁾

In agreement with Oyelese et al 2006 ,history of APH is not statistically significant between pl.pr acc. group and those remaining as previa

This is not the case with PPH as a complication in this study. Severe and serious PPH was significantly more frequent in accrete compared to previa group.⁽¹⁶⁾

In this study fetal outcome regarding preterm birth and neonatal survival showed no statistical significance difference between both group .this agree with Bahar A et al 2009 who suggested that the site of placental implantation rather than the degree of placental invasion may be the major determinant of risk of preterm delivery. Placenta previa-accreta is associated with higher maternal morbidity, but similar neonatal outcome compared with patients with an isolated placenta previa.^(24,25)

In this study fetal male gender was noticed as a risk factor for the development of pl.acc., although it is statistically not significance this agree with Köstü B et al 2015, but it is an unexplainable risk factor.⁽²⁶⁾

Regarding maternal complication fortunately there were no maternal death recorded in this study, although it is one of the recorded complication the result of our study agree with Chou et al 2000.⁽²⁷⁾

Placenta previa-accreta is associated with higher maternal morbidity, this is by Esta I M. et al 2005.⁽²⁵⁾

Lack of maternal death in our study may be due to multiple reason ;first of all is the small number of the sample ,second ,the study was performed in a tertiary center with ready access to blood bank service ,skilled surgeon and intensive care unit .

The antenatal diagnosis of placenta accretaby U/S(B mode and color Doppler)where both having the same sensitivity and NPV(81.8%&95%)respectively .But Doppler U/S had higher specificity and PPV(97.6%&90%)respectively),compared to B mode U/S(92.8%&75%)respectively

In this study the parameter of color Doppler agree with Chou et al 2000,⁽²⁷⁾ and woodringa T C et al 2011 they show that sonography coupled with color-flow Doppler appears helpful in allowing antenatal diagnosis of accreta.⁽²⁸⁾

In this study, only one case was false positive diagnosed as having placenta accretaby both B mode and color Doppler U/S.this woman admitted at 27weeks gestation because of repeated attack of vaginal bleeding .the woman had previous two C/S .Ultrasound showed anterior placenta previa reaching the Os .Both B-mode and Doppler showed no evidence of accrete U/S was repeated every two weeks, and the same result obtained .At 32weeks the patients had several attack of vaginal bleeding that necessitated antenatal blood transfusion .

At C/S there was uterine scar dehiscence with placental tissue visible through the scar opening. Removal of the placenta done with delivery of tired preterm baby then repair of the scar done.

Bowman ZS et al 2014 showed that ultrasound for the prediction of placenta accreta may not be as sensitive as previously described.⁽²⁹⁾

Two case were false negatively diagnosed by both modalities (B-mode and Doppler) both had posterior placenta previa and one of them had history of posterior wall myomectomy.

MRI is reported to be the best in evaluation of placenta located posteriorly and in patients with a scar in the posterior wall of the Uters.

In this study four cases of placenta accrete not sent to histopathological study because two case were treated conservatively and the uterus was preserved .The other two cases were not sent because of deficiency of facilities .

Conclusion:-

Previous C/S is a major risk factor for the development of placenta accretamainly repeated uterine operation, although both gravidity and curettage increase the incidence they were not reach statistical significance.

Age and parity were not a risk factor for the development of the placenta accrete.

Intra-partum and postpartum hemorrhage was a major complication of placenta accrete compared to previa alone.

Color Doppler provide an opportunity for early and accurate diagnosis of placenta accrete.

Recommendations:-

Patients at high risk of developing placenta accreta should be extensively examined by color Doppler and properly counseled and to consider performing elective hysterectomy at 34 weeks or even earlier to decrease the incidence of maternal morbidity and mortality.

Uses of the trans-vaginal,trans-labial, trans-rectal sonography and MRI as an altar.

Table 1:- Description of the study sample (cases with placenta previa) by age, gravidity and parity.

	Range	Median
Age in years	(22-42)	33
Gravida	(1-11)	4
Parity	(0-8)	3

Table 2:- The incidence rate of pi. acc. (and its 95% confidence interval) among a study sample of 53 pregnant women with established diagnosis of placenta accreta

Placental condition	N	%	95% confidence interval
Cases with placenta accretadelivery	11	20.8	(10.8%-34.1%)
Total cases with pl. pr.	53	100	

Table 3:- The incidence rate of placenta previa acc. by different variables.

Variable		Placental Condition				TotalL		P(X ²)
		Previa		accreta				
		N	%	N	%	N	%	
Age	<35	23	76.7	7	23.3	30	100	0.48
	35+	19	82.6	4	17.4	23	100	
Gravida	<3	9	90	0	0	9	100	0.35
	3+	33	75	11	25	44	100	
parity	<2	13	86.7	2	13.3	15	100	0.99
	2+	29	67.3	9	23.7	38	100	
Previous C/S	Non	25	100	0	0	25	100	<0.001 Sig.
	1-2	17	68.2	7	31.8	22	100	
	3+	2	33.3	4	66.7	6	100	
Previous curettage	Non	26	86.7	4	13.3	30	100	0.15
	1-2	12	70.6	5	29.4	17	100	
	2+	4	66.7	2	33.3	6	100	

Table 4:- Difference in rate of selected variable between patients ending with placenta accreta and those remaining as previa

		Placental condition				P(x ²)
		Previa		Previa accrete		
		N	%	N	%	
History of hemorrhage	Antepartum Hemorrhage	17	40.5	1	9.1	0.05
	Post-partum Hemorrhage	25	59.5	10	90.9	
Type of delivery	Elective C/S	28	66.7	7	63.6	0.57
	Emergency C/S	12	28.6	4	36.4	
	Vaginal delivery	2	4.8	0	0.0	
Sex of new born	Female	20	47.6	3	27.3	0.22
	Male	22	52.4	8	72.7	
Outcome of the fetus	Alive	36	85.7	10	90.9	0.81
	Neonatal death	4	9.5	1	9.1	
	IUGR	1	2.4	0	0.0	
	Intrauterine death	1	2.4	0	0.0	
Total		42	100	11	100	

Table 5:- Validity parameter of B-mode U/S diagnosis of placenta previa accreta among 53 cases with placenta previa

Placenta accreta diagnosed B-mode U/S study	Placental condition		Total	Sensitivity =81.8% Specificity=92.8% PPV =75% NPV =95.1% False+ ve =7.2% False-ve =18.2% Accuracy=90.5%
	Previa	Accreta		
Negative	39	2	41	
Positive	3	9	12	
Total	42	11	53	

Table 6: Validity parameter of Doppler U/S diagnosis of placenta previa accreta among 53 cases with placenta previa

Placenta accreta diagnosed by Doppler U/S study	Placental condition		Total	Sen.=81.8% Spec. =97.6% PPV =90 % NPV =95.3% False+ ve=2.4% False-ve =18.2% Accuracy=94.3%
	Previa	Accreta		
Negative	41	2	43	
Positive	1	9	10	
Total	42	11	53	

Table 7:- Frequency distribution of cases with an established diagnosis of placenta previa accreta by method of establishing the diagnosis.

Method of establishing the diagnosis of placenta accreta	N	%
Clinical and histopathology	7	63.6
Clinical (observation)	4	36.4
Total	11	100

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