ORIGINAL ARTICLE

Placenta Accreta: Clinical Risk Factors, Accuracy of Antenatal Diagnosis and Effect on Pregnancy Outcome

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SUMMARY

The aim of this study is to evaluate the clinical risk factors, accuracy of antenatal ultrasound for diagnosis, and the effect of these on pregnancy outcome. It is a retrospective study looking at cases which had hysterectomy following vaginal or caesarean section deliveries from 1993 to 2005. Data regarding the maternal demographic characteristics, number of previous CS, number of previous termination/curettage, antenatal scan findings (state features) and the gestation at which accreta was first suspected/diagnosed, MRI scan findings, pregnancy outcome (need for hysterectomy, amount of blood loss, amount of transfusion, length of ICU and hospital stay, other maternal complications, and neonatal outcome) were collected and evaluated. There were a total of 40 cases diagnosed to have abnormal placental attachment and majority of these were actually diagnosed antenatally by sonography. Visualisation of an absence or thinning of hypoechoic myometrial zone had the highest sensitivity to detect placenta accreta followed by intraplacental lacunae, focal mass tissue elevation and disruption of uterine serosal bladder wall.

KEY WORDS:
Accreta, Increta, Percreta, Placenta, Adherent placenta

INTRODUCTION

Placenta accreta is an abnormally firm attachment of placenta to the uterine wall collectively termed "placenta accreta". Accreta is when the placenta is attached directly to the muscle of the uterine wall, increta when the placenta extends into the uterine muscle when the placenta extends through the entire wall of the uterus it is termed placenta percreta.

The incidence of these abnormal placentation are rare, varies from 1 in 540 to 1 in 70 000 deliveries[1]. They are usually complicated by severe haemorrhage that often necessitates life saving surgical interventions such as hysterectomy or ligation of major pelvic vessels[2]. Prior uterine surgery, myomectomy and curettage have all been associated with placenta accreta, especially when the placenta implants to the previously scarred area [3-5]. Hence, in a patient with previous caesarean section and placenta praevia in the current pregnancy, the risk is significantly increased [1,6].

The diagnosis of placenta accreta is usually made based on clinical history, imaging findings and histological features[6-8]. Antenatal imaging assessment using ultrasonography or magnetic resonance imaging (MRI) in high risk patients is the main stay for antenatal diagnosis.

Early recognition of placenta accreta may improve the outcome by providing the obstetrician an opportunity to plan the surgery and potentially reducing maternal morbidity and mortality, the extent to which antenatal diagnosis affects outcome needs to be determined.

MATERIALS AND METHODS

The records of all patients who were delivered by caesarean section (CS) followed by hysterectomy during the last eleven years (1993-2005) at the Mater Mothers' Hospital were reviewed. Data regarding the maternal demographic characteristics, number of previous CS, number of previous termination/curettage, antenatal scan findings (state features) and the gestation at which accreta was first suspected/diagnosed, MRI scan findings, pregnancy outcome (need for hysterectomy, amount of blood loss, amount of transfusion, length of ICU and hospital stay, other maternal complications, and neonatal outcome) were collected.

Definition of placenta accreta was made based on clinical and histological criteria using the presence of the following:

1. Difficult manual or piecemeal removal of the placenta despite active management;
2. Heavy bleeding from implantation site after removing the placenta;
3. Histologic confirmation of a hysterectomy specimen.

RESULTS

There were a total 65,188 (1996-2005) deliveries at Mater Mothers Hospital (MMH) Brisbane during the study period. A total of 40 (93-2005) cases had the histological diagnosis of abnormal placental attachment. Among these, 58% were placenta accreta, 21% were placenta increta and 21% were placenta percreta. The overall incidence of confirmed placenta accreta was 1 in 2173 (1996-2005).

The mean age of women with placenta accreta was 35 years, gravidity 9, parity 4.5, number of previous caesarean deliveries 1.6 and number of previous curettage 1.07. Thirty one (77.5%) women with placenta accreta had coexisting placenta praevia, 14 (35%) had at least one previous caesarean section and 10 (25%) had at least one previous curettage. Only three (7.5%) women were nulliparous.

Among the patients who were diagnosed to have placenta accreta 44.7% of them were above 35 years of age and only 5.3% were less than 25 years. There were three women who had not had any previous caesarean section or placenta praevia. Two of them delivered vaginally but had retained placenta.

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Table I: Histopathological findings and ultrasound features

Patients	HPE	Thinning/absence of hypoechoic myometrial	Disruption of uterine serosabladder wall	Focal mass elevation of tissue	Intraplacental lacunae
1	accreta	+		+	
2	percreta			+	+
3	accreta			+	
4	accreta	+		+	+
5	increta	no scan	no scan	no scan	no scan
6	accreta	+	+		+
7	percreta				+
8	increta	+			+
9	percreta				
10	increta	+			+
11	accreta	no scan	no scan	no scan	no scan
12	accreta	+	+		
13	percreta	+	+	+	+
14	increta	no scan	no scan	no scan	no scan
15	increta	no scan	no scan	no scan	no scan
16	accreta	+			
17	accreta	+			
18	percreta	+	+	+	
19	accreta				+
20	accreta	+			
21	accreta	no scan	no scan	no scan	no scan
22	accreta	no scan	no scan	no scan	no scan
23	accreta				+
24	percreta	+			
25	accreta	no scan	no scan	no scan	no scan
26	increta	no scan	no scan	no scan	no scan
27	accreta	+	+	+	
28	increta				
29	accreta			+	
30	increta	no scan	no scan	no scan	no scan
31	accreta				
32	accreta	+			+
33	accreta	+			
34	accreta	+			+
35	accreta	no data	no data	no data	no data
36	accreta		+	+	
37	accreta		+		
38	percreta	+	+		+
39	percreta	+		+	
40	accreta				

Table II: Gestational age at diagnosis, delivery and histopathological confirmation of abnormal placentation

Patients	Gestational age at 1st diagnosis (weeks)	Gestational age at delivery (weeks)	Placenta accreta confirmed usingHPE
1	31	35	Yes
2	29	34	Yes
3	31	37	Yes
4	28	32	No
5	nil	30	Yes
6	27	36	Yes
7	26	28	Yes
8	20	23	No
9	34	38	Yes
10	nil	27	Yes
11	36	38	Yes
12	nil	37	Yes
13	19	37	Yes
14	27	37	Yes
15	nil	31	Yes
16	nil	26	Yes
17	32	37	Yes
18	35	38	Yes
19	22	25	Yes
20	15	29	Yes

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Patients	Gestational age at 1st diagnosis	Gestational age at delivery	Placenta accreta confirmed (HPE)
21	29	36	Yes
22	Nil	37	Yes
23	Nil	37	Yes
24	30	33	Yes
25	24	36	Yes
26	Nil	41	Yes
27	Nil	39	Yes
28	28	31	Yes
29	Nil	38	Yes
30	34	37	Yes
31	Nil	37	Yes
32	Nil	24	Yes
33	34	38	Yes
34	25	30	Yes
35	29	32	Yes
36	Nil	Nil	Nil
37	26	38	Yes
38	19	39	Yes
39	33	37	Yes
40	21	36	Yes

Table III: Mode of delivery and its indication and estimated intrapartum blood loss

patients	Mode of delivery	indication	EBL (ml)
1	LSCS	APH	4000
2	CCS	ELECTIVE	7000
3	CCS	ELECTIVE	5300
4	LSCS	APH	6000
5	LSCS	APH	1730
6	CCS	APH	3300
7	LSCS	APH	4000
8	CCS	APH	4000
9	CCS	ELECTIVE	5000
10	CCS	APH	6500
11	CCS	ELECTIVE	5500
12	LSCS	APH	6000
13	CCS	ELECTIVE	3500
14	CCS	ELECTIVE	3500
15	LSCS	APH	2200
16	CCS	APH	3000
17	CCS	ELECTIVE	1000
18	CCS	ELECTIVE	11000
19	CCS	ELECTIVE	15000
20	LSCS	APH	3000
21	LSCS	APH	600
22	SVD	PPH	1000
23	LSCS	ELECTIVE	1500
24	LSCS	APH	3000
25	CCS	APH	4000
26	LSCS	APH	15000
27	LSCS	ELECTIVE	1200
28	CCS	APH	6000
29	LSCS	ELECTIVE	7000
30	SVD	PPH	2000
31	LSCS	ELECTIVE	2500
32	CCS	APH	5000
33	CCS	ELECTIVE	2000
34	LSCS	APH	9000
35	LSCS	APH	2500
36	CCS	NIL	3000
37	CCS	ELECTIVE	1000
38	CCS	ELECTIVE	7300
39	LSCS	APH	4000
40	CCS	APH	3000

LSCS - Lower segment Caesarean section
CCS - Classical Caesarean section
SVD - Spontaneous vaginal delivery
APH - Antepartum haemorrhage
PPH - Post partum haemorrhage
EBL - Estimated blood loss

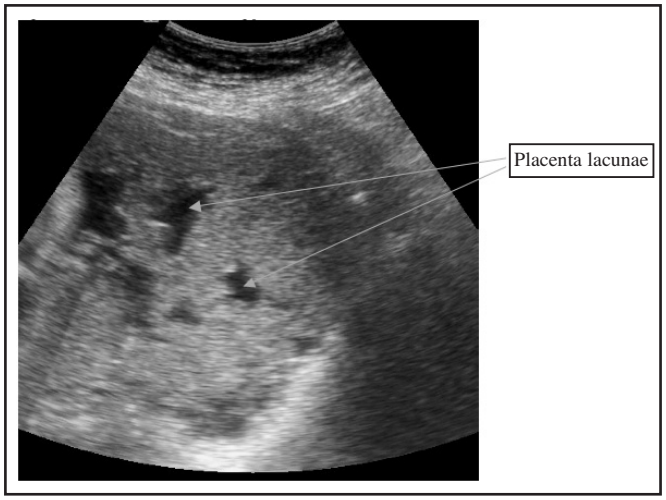

Fig. 1: Transabdominal scan showing placenta lacunae

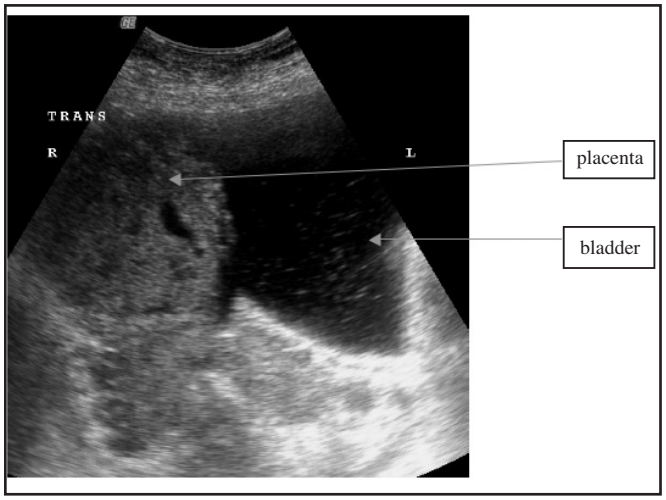

Fig. 2: Placental bulging into the bladder

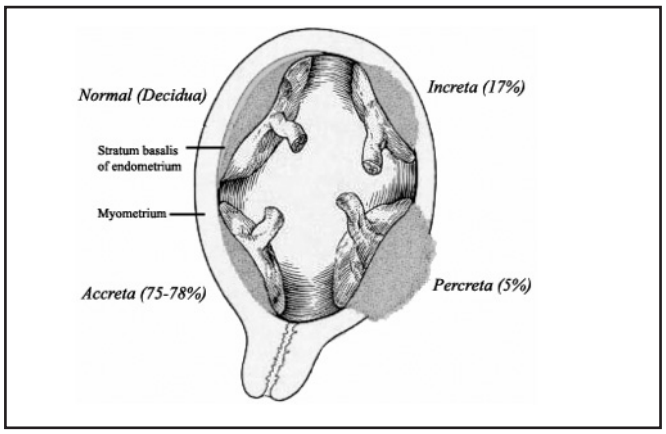

Fig. 3: Illustration of abnormal placentation

Thirty one patients had antenatal ultrasound done in MMH and twenty six (83.8%) of these were recognised antenatally by ultrasound to have abnormal placentation. The mean gestation at first suspected diagnosis was 28.3 weeks and the earliest was at 19 weeks. Multiple scan findings (n=15) were more common than a single (n=9) isolated finding. Visualisation of an absence or thinning of hypoechoic myometrial zone had the highest sensitivity to detect placenta accreta (72% <18/25 patients>) followed by intraplacental lacunae (48% <12/25 patients>), focal mass tissue elevation (40% <10/25 patients>) and disruption of uterine serosalbladder wall (32% <8/25 patients>).

Prematurity was the primary neonatal complication associated with placenta accreta. Among 40 cases of placenta accreta the mean gestational age at delivery was 35 weeks. Gestational age was <37 weeks in 19 cases (47.5%), <34 weeks in 14 cases (35%) and <30 weeks in six cases (15%). The mean birth weight was 2375g. Birth weight was <2500gm in 18 (42.8%) neonates and <1500gm in 10 (23.8%).

Placenta accreta was associated with substantial maternal morbidity. The average estimated blood loss was 4588mls. Estimated blood loss exceeded 2000ml in 34 cases (85%), 5000ml in 15 (37.5%) and 10000 ml in 3 (7.5%). Thirty seven women (92.5%) required blood transfusions. Mean estimated blood loss in women with antenatal suspicion of placenta accreta was 4388ml and 4959ml in women with no ultrasound scan done or no antenatal suspicion (p=0.60). Twenty women (50%) had classical Caesarean section and seventeen (85%) of those were women who had antenatal suspicion of placenta accreta. Two women had vaginal delivery followed by retained placenta and hysterectomy. The mean estimated blood loss for classical caesarean section was 4000ml, 5196ml for lower segment caesarean section and 5000 ml for vaginal delivery. Five of the patients needed relaparotomy and one of them had three relaparotomy. Other morbidities include bladder injury in two patients, vault hematoma in one patient and intestinal obstruction in one patient.

The number of caesarean sections in MMH had increased from 25% in 1996 to 40.3% in 2005 and the rate of placenta accreta had also increased from 0.01% to 0.1% during that period of time.

DISCUSSION

Placenta accreta is a rare condition which could be potentially life threatening in obstetric practice. The reported incidence varies from 1:540 to 1:70000 deliveries[1]. The optimal management of a patient with placenta accreta should begin antenatally by assessing risk factors, diagnosing the condition if possible and having a multidisciplinary involvement involving senior obstetrician, anaesthetist and urology team.

There are differences in definition of placenta accreta in many studies. Some studies were based on clinical criteria while others on histopathological examination. Clinical criteria for definition maybe more appropriate as placenta accreta is a clinical obstetrical emergency and its management is based on early clinical diagnosis. However, clinical suspicion of placenta accreta was an unreliable predictor of histologic findings[1] and using clinical criteria alone may result in over diagnosing placenta accreta.

A presumptive diagnosis of placenta accreta could be made on ultrasonographic suspicion in combination with clinical suspicion and would be confirmed by histopathological examination. All the women in our series had hysterectomy

performed and the diagnosis of accreta were confirmed by histopathological study. None of them had B-Lynch procedure prior to decision for hysterectomy. We recognised that exclusion of unconfirmed cases may underestimate the true incidence of placenta accreta.

The ability to detect placenta accreta and to assess the extent of myometrial involvement before delivery could decrease patient morbidity and increase obstetrician preparedness for a potentially difficult operation.

The value of ultrasonographic examination in the antenatal period in diagnosing placenta accreta is still unresolved. The diagnosis often cannot be made with certainty antenatally. In our series, ultrasound succeeded in diagnosing placenta accreta in 83.3 per cent of cases and this rate of detection was found to be higher than one of the earlier studies[2]. An earlier study in our centre reported a sensitivity of 90 per cent and specificity of 100 per cent for ultrasound diagnosis of placenta accreta.

It has been reported that the sensitivity and specificity of ultrasonography in detecting placenta accreta were in order of 90% and 80% respectively[8] but other sources reported a much lower sensitivity of just over 30%[9], showing that there is probably still a widely discrepant experience in the diagnosis of this condition.

MRI has also been proposed as one of the diagnostic tool for placenta accreta but there was no additive advantage over ultrasonography particularly in cases of anteriorly placed placenta. There was also very limited information describing the use of MRI for antenatal diagnosis of placenta accreta. The use of MRI would optimise the diagnostic accuracy of accreta and was suggested to be used when there were inconclusive signs from ultrasonography findings[10].

Previous studies have established several ultrasound signs for abnormal placentation in at risk patients in third trimester. They include thinning or absence of myometrial zone, visualisation of placenta lacunae, focal mass tissue elevation and disruption / interruption of the posterior bladder wall uterine interface[11].

Women with placenta praevia who have had a previous caesarean section are at high risk of having a morbidly adherent placenta and should have been imaged antenatally[11]. When placenta accreta is thought to be likely, consultant anaesthetic and obstetric input are vital in planning and conducting the delivery. Crossed matched blood should be available and colleagues from other specialties/subspecialties may be alerted to be on standby to attend as needed.

Among the 40 patients in this study, sixteen of them had elective caesarean section and twenty one patients had emergency caesarean section. Two of them delivered vaginally and subsequently had post partum haemorrhage.

There was no maternal mortality however there were three early neonatal deaths. One was born at 23 weeks with birth weight of 600 grams and another one was born at 24 weeks gestation with birth weight of 723 grams. The lady had no ultrasound scan done at MMH but presented with antepartum hemorrhage leading to hysterectomy and the hisopathological examination showed placenta accreta. The other neonatal death was a Gravida 10 para 8 + 1 lady who had elective caesarean section at 37 weeks gestation for two previous caesarean section and placenta praevia. Antenatal ultrasound done had suspected placenta accreta.

There were also two cases of intrauterine death, one was for a set of twins at 25 weeks gestation of which an elective caesarean was performed for placenta praevia type 4 and the other one was at 36 weeks. This lady was suspected to have placenta accreta antenatally but she presented with antepartum hemorrhage and was found to have uterine rupture intra-operatively. The hysterectomy specimen showed placenta accreta.

CONCLUSION

The rising trend of Caesarean section deliveries could lead to more cases of abnormal placentation which causes high morbidity to patients. The ability to detect placenta accreta and to assess the extent of myometrial involvement before delivery could decrease patient morbidity and increase obstetrician preparedness for a potentially difficult operation. All patients undergoing Caesarean deliveries should be counselled regarding risk of abnormal placentation.

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REFERENCES

1. Miller DA, Chollet JA, Goodwin TM. Clinical risk factors for placenta previa- placenta accreta. Am J Obstet Gynecol. 1997; 177: 210-4.
2. Gielchinsky Y, Rojansky N, Fasouliotis SJ, Ezra Y. Placenta accreta--summary of 10 years: A survey of 310 cases. Placenta 2002; 210-4.
3. Zaki MS, Zaki AMB, Mohamaded EA. Risk factors and morbidity in patients with placenta previa accreta compared to placenta previa non-accreta. Acta obstetricia et gynecologica Scandinavica 1998; 77: 391-94.
4. Serena Wu MK, Judith U. Hibbard. Abnormal placentation: twenty year analysis. Am J Obstet Gynecol 2005; 192: 1458-61.
5. Armstrong CA, Harding S, Matthews T, Dickinson JE. Is placenta accreta catching up with us? Aus N Z J Obstet Gynaecol. 2004; 44: 210-3.
6. Irving FC, Hertig AT. A study of placenta accreta. Surg Gynecol Obstet 1937; 64: 178-200.
7. Fox H. Placenta accreta 1945-1969. Obstet Gynecol Surv 1972; 27: 475-9.
8. Comstock CH, Love JJ Jr, Bronsteen RA *et al.* Sonographic detection of placenta accreta in the second and third trimesters of pregnancy. Am J Obstet Gynecol 2004; 190: 1135-40.
9. Finberg HJ, Williams JW. Placenta accreta: prospective sonographic diagnosis in patients with placenta previa and prior cesarean section. J Ultrasound Med 1992; 11: 333-43.
10. Warshak CR, Eskander R, Hull D *et al.* Accuracy of ultrasonography and magnetic resonance imaing in the diagnosis of placenta accreta. Obstet Gynecol. 2006; 108: 573-81.
11. Wong HS, Zuccollo J, Tait J *et al.* Antenatal topographical assessment of placenta accreta with ultrasound. Aust N Z J Obstet Gynaecol. 2004; 44: 210-3.