

Placenta previa

A 13 years experience at a tertiary care center in Western Saudi Arabia

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ABSTRACT

الأهداف: استعراض جميع حالات المشيمة المتقدمة في الثلاث عشرة سنة الماضية في مستشفى تعليمي جامعي لتحديد عوامل خطورة اعتلال الأمهات.

الطريقة: تحليل جميع حالات المشيمة المتقدمة التي عولجت في مستشفى الملك عبد العزيز الجامعي، جدة، المملكة العربية السعودية اعتباراً من يناير 2001 إلى ديسمبر 2013.

النتائج: كان عدد إجمالي الولادات 55,862 ولادة وعدد العمليات القيصرية 11,412 بنسبة (20.3%) وقد استعرضت جميع الحالات في رسوم بيانیه، و جمع تشخيص المشيمة المتقدمة في 230 حالة جميع المتغيرات المختلفة و جرى تحليلها. و تحقق التشخيص في 94% منهم باستخدام الموجات فوق الصوتية. وكان معدل انتشار المشيمة المتقدمة 4.1 لكل 1000 ولادة. أجريت العملية القيصرية كإجراء طارئ في 130 (56.5%) واختيارية في 100 (43.5%) من النساء. نُقلت 26 مريضة إلى وحدة العناية المركزة للعلاج المكثف (11.3%) نُقل لهن دم أكثر من 6 وحدات، وكان منهم 22 بسبب نزف رحمي من الصعب السيطرة عليه.

الخاتمة: المشيمة المتقدمة واحدة من أهم الأسباب الرئيسية لوفيات واعتلال الأمهات ولا بد أن يكون هناك أنظمة وترتيبات مسبقة في كل مستشفى للتعامل مع هذه الحالات وقد تبين أن عوامل الخطورة لاعتلال الأمهات شملت؛ إن كانت المشيمة كاملة التقدم أو تعرض المريضة لعمليات قيصرية سابقة أو إذا ما أجريت العملية القيصرية كعملية طارئة أو كانت أكثر من ستة وثلاثين أسبوع أو النزف أكثر من 2000 مل.

Objectives: To review cases of placenta previa in the last 13 years in a tertiary teaching hospital to identify risk factors for maternal morbidity.

Methods: A retrospective analysis of all cases of placenta previa managed at King Abdulaziz University Hospital (KAUH), Jeddah, Kingdom of Saudi Arabia from January 2001 to December 2013.

Results: The total number of deliveries was 55,862 deliveries, and 11,412 (20.3%) delivered by cesarean section (C/S). The charts of 230 cases diagnosed with placenta previa was reviewed, and different variables were collected and analyzed. Diagnoses were achieved in 94% of them using ultrasound. The prevalence rate of placenta previa was 4.1 per 1000 births. Cesarean section was carried out as an emergency procedure in 130 (56.5%) women and as elective in 100 (43.5%) women. Of them, 26 patients were admitted to the intensive care unit (ICU) (11.3%), all of which received blood transfusion >6 units and 22 patients had a hysterectomy for uncontrollable bleeding.

Conclusion: Placenta previa is one of the leading causes of maternal morbidity and mortality. Every hospital must have a protocol, or algorithm for the management of placenta previa. Risk factors for maternal morbidity included complete previa, history of previous C/S, emergency C/S at a gestational age of <36 weeks, and estimated blood loss >2000 ml.

*Saudi Med J 2016; Vol. 37 (7): 752-766
doi: 10.15537/smj.2016.7.13259*

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Received 30th August 2016. Accepted 27th April 2016.

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Placenta Previa defined as a condition that occurs in pregnancy when the placenta abnormally implanted in the lower uterine segment, Partially or totally covering the internal cervical os.¹ Complete placenta previa is when it covers the internal os, partial is when the placenta partially covers the os, and

marginal is when the placenta approaches the border of the os.² The rising incidence of cesarean sections in the last 50 years is partially a causative factor to the increasing number of cases of placenta previa.³ The overall prevalence of placenta previa reported in the literature is approximately 4.0 per 1000 births. Risk factors associated with an increased risk of placenta previa were advanced maternal age, grand multiparity, history of previous C/S, previous abortion, and smoking during pregnancy.⁴ The aim of this study was to review all cases diagnosed with placenta previa in the last 13 years and identify risk factors for maternal morbidity.

Methods. Retrospective analysis of all cases of placenta previa managed at King Abdulaziz University Hospital (KAUH), Jeddah, Kingdom of Saudi Arabia from January 2001 until December 2013. The total number of deliveries per year, number and rate of cesarean sections were retrieved, and charts of all patients diagnosed with placenta previa (n=230) were reviewed. Variables collected and analyzed were; age in years, gravidity, number of antenatal visits, method of diagnosis and the gestational age of delivery. Ethical approval was obtained from King Abdulaziz University IRB and the methods were carried out in "accordance" with the approved guidelines. Inclusion criteria included, all woman admitted to the labor and delivery facility with a diagnosis of placenta previa and managed at KAUH. Patients are refusing to be treated or continue treatment at KAUH were excluded.

Statistical analysis. The Statistical Package for the Social Sciences Version 20.0 (IBM Corp., Armonk, NY, USA) was used to analyze data using chi-square test. The frequency of occurrence of different variables calculated *p*-value less than 0.01, odds ratio, and 95% confidence limits. Logistic Regression was used for the same variables.

Results. The Total number of deliveries at KAUH from January 2001 to December 2013 was 55,862 deliveries. From them, 11,412 (20.3%) were delivered by cesarean section. A total number of cases of placenta previa retrieved was 230 cases with a calculated prevalence rate of 4.1 per 1000 births. (Table 1) shows the total number of deliveries, the number of cases delivered by cesarean section, the rate of cesarean

section, the total number of cases of placenta previa, and the incidence of placenta previa in each year. Two hundred and thirty patients diagnosed with placenta previa were analyzed, the youngest was 18 years and the eldest 45-years-old (Table 2). Of those, 33 patients were primigravida (14.3%), 131 were multigravida (57%), and only 66 were grand multigravida (28.7%). Out of 230 patients, 191 (83%) were unbooked or had attended only one or 2 visits to the antenatal clinic. Also, 125 patients (54.3%) had no history of previous C/S, and 105 patients (45.7%) had a history of the previous cesarean section.

Diagnoses. Approximately 94% of patients were diagnosed using ultrasound (bedside, in the radiology department or fetal-maternal unit), and only 6% needed MRI to confirm the diagnosis. Clinically, 83% of patients presented with vaginal bleeding, and 17% discovered incidentally. Twelve patients (5.2%) had a history of previous placenta previa. Furthermore, 105 (45.7%) patients had a history of cesarean section and 47 (20.4%) had a history of dilatation and curettage.

Management and maternal outcome. In the management of our cases 100 (43.5%) patients had elective C/S, and 130 (56.5%) underwent emergency C/S. The majority of women 160 (69.6%) received general anesthesia and 70 (30.4%) received regional anesthesia. Moreover, most patients 204 (88.7%) did not receive any blood transfusion, and only 26 patients (11.3%) had received at least 6 units of packed red blood cells (PRBCS). Intraoperatively, 8 patients

Table 1 - The rate of cesarean section and the incidence of placenta previa (2001-2013).

Years	Total number of delivery	Number C/S	Rate C/S	Number PP	Incidence of PP
2001	3790	560	14.8	11	0.29
2002	4165	726	17.4	08	0.19
2003	4927	823	16.7	08	0.16
2004	4717	829	17.6	15	0.32
2005	3899	692	17.8	07	0.18
2006	3834	705	18.4	15	0.39
2007	3919	813	20.8	22	0.56
2008	4398	929	21.1	16	0.36
2009	4243	932	21.9	17	0.40
2010	4238	989	23.3	23	0.54
2011	4760	1158	24.3	31	0.65
2012	4599	1118	24.3	30	0.65
2013	4373	1138	26.0	27	0.62
	55862	11412	20.3	230	0.41

PP - placenta previa, C/S - cesarean section

Disclosure. Authors have no conflict of interest, and the work was not supported or funded by any drug company.

(3.5%) had hypogastric artery ligation, and only one (0.4%) had arterial embolization. Furthermore, 16 (6.5%) patients underwent a hysterectomy in the primary C/S, and a repeated laparotomy performed in 8 patients (3.5%), of which 6 more patients (2.6%) needed to have a hysterectomy. Maternal morbidity was defined if a patient was admitted to the ICU as a result of severe bleeding, hypovolemic shock, massive blood transfusion and its complications. A total of 26 (11.3%) women were admitted to the ICU. All these women had received a blood transfusion of more than 6 units of PRBCS, and a total of 22 women had undergone a hysterectomy due to uncontrollable bleeding.

Table 2 - The frequency and percentage of different variable. in total 230 patients

Variable	Frequency	%
<i>Age in years</i>		
18-25	34	14.8
26-35	117	50.9
36-45	79	34.3
<i>Gravidity</i>		
Prim gravida	33	14.3
Multi	131	57.0
Grand multi	66	28.7
<i>Antenatal visit</i>		
None	104	45.2
1-3 visit	87	37.4
4-6 visit	36	15.7
>6 visit	3	13.0
<i>GA@ diagnosis</i>		
<28 weeks	40	17.4
29-32	61	26.5
33-37	90	39.1
>37 weeks	39	17.0
<i>H/O previous C/S</i>		
Yes	105	45.7
No	125	54.3
<i>Number of C/S</i>		
0	125	54.3
1	45	19.6
2	31	13.5
3	13	7.5
4	8	3.5
5	3	1.3
Total	230	100

GA@ diagnosis - gestational age at diagnosis in weeks, C/S - cesarean section, H/O- history of

Fetal outcome. There were 117 boys (50.9%) and 113 girls (49.1%) born to these women. The delivered Fetal weight minimum was 700 grams, and the maximum was 3750 grams with a mean of 2565 (SD \pm 650) grams. Thirty babies had an Apgar score \leq 3 or less at one minute. However, at 5 minutes, only 14 babies continued to have a low Apgar score of 3 or less. Admissions to the neonatal intensive care unit encompassed 34 (14.8%) babies and from them, 14 babies died of severe prematurity (6.1%). **Table 3**

Table 3 - Factors associated with severe maternal morbidity as defined with admission to ICU 26 patients out of 230.

Variables	Maternal yes	Mortality no	Total	X2 test P-value
<i>Age</i>				
>35	11	68	79	0.243
<35	15	136	151	
<i>Grandmulti</i>				
Yes	4	31	35	0.584
No	22	173	195	
<i>Ga @ Diag</i>				
<32 Weeks	15	86	101	0.098
>32 Weeks	11	118	129	
<i>Type</i>				
Complete	16	94	110	0.050
Not	10	110	120	
<i>H/O Plc. Pre</i>				
Yes	2	21	23	0.503
No	24	183	207	
<i>Prev C/S</i>				
Yes	25	80	105	0.001
No	1	124	125	
<i>Prev D&C</i>				
Yes	12	35	47	0.001
No	14	169	183	
<i>C/S</i>				
Emergency	16	114	130	0.037
Elective	10	90	100	
<i>Ga@ Delive</i>				
>36 Weeks	8	107	115	0.030
<36 Weeks	18	97	115	
<i>B.T. Before OR</i>				
Yes	7	32	39	0.125
No	19	172	191	
<i>Type of anaseth</i>				
Regional	4	66	70	0.065
GA	22	138	160	
<i>FETAL WT</i>				
<2500	10	81	91	0.541
>2500	16	123	139	
<i>Gender</i>				
Female	13	100	113	0.545
Male	13	104	107	
<i>Perinatal death</i>				
Yes	2	12	14	0.486
No	24	192	216	

Ga @ Diag - gestational age when diagnosed, H/O - history of, C/S - cesarean section, Ga@ Delive - gestational age at delivery, B.T - blood transfusion, GA - general anesthesia, FETAL WT - fetal weight, OR - operating room

Table 4 - Factors affect maternal morbidity in patients with placenta previa (odds ratio [OR] and 95% confidence interval [CI]).

Variables	Significant	O.R 95% CI	Lower	Upper
Age >35	0.398	1.604	0.536	4.804
Grand multipar	0.535	0.630	0.147	2.709
Unbooked	0.805	1.150	0.380	3.485
GA@ Diag <32	0.145	2.369	0.743	7.553
Complete PP	0.029	3.102	1.122	8.578
H/O of C/S	0.001	10.393	2.956	36.539
Emergency/elective	0.012	2.13	1.100	6.665
GA@ Deliv <36	0.046	2.90	1.111	2.154
Birth weight <2500	0.041	0.573	0.336	0.978
Gender	0.724	0.923	0.593	1.438
NICU+	0.705	0.862	0.399	1.1860
EBL >2000 ml.	0.042	3.493	1.880	4.570

GA@ Diag - gestational age at diagnosis, GA@ Deliv - gestational age at delivery, PP - placenta previa, H/O - history of, C/S - cesarean section, NICU - neonatal intensive care unit, EBL- estimated blood loss

demonstrates the analysis of factors affecting maternal morbidity in patients with placenta previa. When the group of patients who have maternal morbidity 26 was compared with 204 patients who no morbidity, it was found that age more than 35, grand multipara, and early diagnosis less than 32 weeks, history of placenta previa, history of blood transfusion before operating room, type of anesthesia, fetal weight less than 2500 grams, fetal gender, and perinatal death all were not statistically significant as a risk factor for maternal morbidity. (Risk factor for maternal morbidity that, statistically significant were if placenta covering the os (0.050) or have history of previous C/S (0.001), or previous D&C (0.001) if the C/S performed as emergency C/S (0.037) if performed before 36 weeks of gestation (0.030) with a *p*-value of 0.002) by using Logistic Regression (Table 4), the variables used were age >35 years/<35 years, grand-multipara/prim gravida, unbooked/booked, gestational age at the time of diagnosis in weeks <32 / >32. Type placenta previa complete/not complete, past history of C/S, Emergency C/S / Elective, GA. At the time of delivery in weeks <36 / >36, Fetal weight in grams <2500 / >2500, gender female/male, NICU. Admission yes /no and Estimated blood loss in mls >2000 / <2000. Significant risk factors for maternal morbidity include: if the placenta covering the os “complete” (*p*=0.029), history of previous C/S (*p*=0.001), if performed as emergency C/S (*p*=0.012) at gestational age of <36 (*p*=0.046), the birth weight <2500 (*p*=0.041) and estimated blood loss >2000 ml (*p*=0.042).

Discussion. The prevalence rate of placenta previa at KAUH was 4.1 per 1000 births. When comparing with other countries, in 58 observational studies of placenta previa, the prevalence ranged from 3.5 to 4.6 per 1000 births.⁵ In the last 13 years, cesarean section rates increased from 14.6% to 26% at our center. Globally, there is an increase in cesarean section rate reported with a rate of 30% of all birth reported in Australia.⁶ It was found in the current study population based on limited available data, uncomplicated cases of placenta previa should be delivered by elective cesarean section between 36 and 37 weeks.⁷ Reported risk factors for placenta previa in the literature include the history of the previous cesarean section, termination of pregnancy, advanced maternal age, high parity, previous intrauterine surgery, smoking, and multiple pregnancies. Also, the placenta previa is a risk of delivering a small-for-gestational-age.⁸ Ultrasonography is the diagnostic modality of choice for diagnosis of placenta previa.⁹ Severe hemorrhage can occur during surgery while separating the placenta. In these cases, hysterectomy is considered the treatment of choice although conservative management has recently been proposed.⁹ Despite vast improvement in obstetric management and modern transfusion service, antepartum hemorrhage continues to be one of the leading causes of maternal morbidity and mortality. An accurate diagnosis and prompt resuscitation are the first steps in the management of antepartum hemorrhage.¹⁰ Cases of placenta previa and placenta accreta are increasing in numbers with the rising rate of cesarean section. It is found that higher

morbidity associated with different types of placenta previa, such as complete or partial placenta previa and it is more than marginal placenta previa or low-lying placenta.¹¹ Every institution should have a clear plan and structure a protocol for the management of cases of massive hemorrhage.¹² This precise protocol should be regularly updated, and steps and procedures should be rehearsed.¹³ The main causes of massive obstetrical hemorrhage are placenta previa, placental abruption, and postpartum hemorrhage. These can cause serious maternal morbidity and mortality if there is a delay in the diagnosis of hypovolemia and coagulation defects. Maintaining effective circulation by more than one intravenous line to adequately and promptly pump blood products, fresh frozen plasma replacement-using crystalloids, in addition to invasive monitoring of the pulse rate and the blood pressure. Other available treatment modalities include using oxytocin and prostaglandins to keep the uterus contracted, and surgical procedures to stop bleeding by performing ligation of the uterine, ovarian or internal iliac arteries, or embolization by radiological assistance, or finally hysterectomy when indicated.¹³

There is an association between cesarean section delivery and the occurrence of placenta previa and placental abruption in subsequent pregnancies. This association is increased with a shorter interval between pregnancies, and the higher number of repeat cesarean section.^{14,15} A meta-analysis concluded that 359 deliveries by C/S at first birth are needed to result in one additional case of placenta previa in the next pregnancy.¹⁶ A multidisciplinary checklist for management of suspected placenta accrete was published by Canadian group to alert the primary physicians regarding the preparation of these cases.¹⁷ The limitations of the study are it is a retrospective study and cases were managed by a different obstetrician.

In conclusion, placenta previa is one of the major causes of maternal morbidity and mortality. Every hospital must have a protocol or algorithm for the management of placenta previa. Significant risk factors for maternal morbidity include if the placenta is covering the os "complete placenta previa", history of previous C/S, emergency.

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