CM Lam 林翠苗
SF Wong 王紹宏

CME

Risk factors for preterm delivery in women with placenta praevia and antepartum haemorrhage: retrospective study

胎盤前置與產前出血的孕婦中不足月分娩的危險因素：回顧研究

Objective. To identify risk factors for preterm delivery in women with placenta praevia and antepartum haemorrhage.

Design. Retrospective study.

Setting. Regional obstetric unit, Hong Kong.

Subjects and methods. Women delivered at Princess Margaret Hospital between 1 January 1990 and 31 December 1997. Possible risk factors for preterm delivery among women with placenta praevia and antepartum haemorrhage including onset, pattern, and severity of vaginal bleeding; presence of uterine contractions on admission; and type of placenta were assessed.

Results. Three risk factors for preterm delivery were identified from univariate analysis. These included second trimester vaginal bleeding (odds ratio=4.19; 95% confidence interval, 1.29-13.66), the presence of uterine contractions on admission (odds ratio=4.00; 95% confidence interval, 1.57-10.19), and a haemoglobin decrease of more than 20 g/L (odds ratio=3.00; 95% confidence interval, 1.00-9.04). Using the logistic regression model, second trimester vaginal bleeding and the presence of uterine contractions were found to be independent risk factors for delivery before 36 weeks.

Conclusion. Preterm delivery is increased in women with placenta praevia and antepartum haemorrhage who have second trimester vaginal bleeding or the presence of uterine contractions. This high-risk group may benefit from close in-patient monitoring and more aggressive management.

目的：確定胎盤前置與產前出血的孕婦中不足月分娩的危險因素。

設計：回顧研究。

安排：地區醫院的產科部，香港。

患者與方法：1990年1月1日至1997年12月31日期間在瑪嘉烈醫院分娩的婦女。評定胎盤前置與產前出血的孕婦中不足月分娩的可能危險因素，包括陰道出血的發生、模式及嚴重程度、入院時出現子宮收縮、及胎盤類型。

結果：根據單變量分析確定了不足月分娩的三個危險因素，包括第二個妊娠期陰道出血(可能性比=4.19；95%置信區間，1.29-13.66)、入院時出現子宮收縮(可能性比=4.00；95%置信區間，1.57-10.19)、及血色素減少超過20 g/L(可能性比=3.00；95%置信區間，1.00-9.04)。使用邏輯斯蒂回歸模型，第二個妊娠期陰道出血和出現子宮收縮被認定為在36周前分娩的獨立危險因素。

結論：於第二個妊娠期出現陰道出血或子宮收縮的胎盤前置與產前出血的孕婦中，不足月分娩的情況增加。對這高危組孕婦進行住院密切監測和積極處理，可使她們受益。

Department of Obstetrics and Gynaecology, Princess Margaret Hospital, 2-10 Princess Margaret Hospital Road, Hong Kong
CM Lam, MB, ChB, MRCOG
SF Wong, FRCOG, FHKAM (Obstetrics and Gynaecology)

Correspondence to: Dr CM Lam

Introduction

Women with placenta praevia are at increased risk of antepartum haemorrhage and preterm delivery.[1] Perinatal outcome is poorer and morbidity increased in women with antepartum haemorrhage.[2] The increased adverse perinatal

outcome seen was related to the risk of prematurity.[3] The management of a woman with bleeding due to placenta praevia depends on two main factors—the degree of haemorrhage, and foetal maturity at the time of haemorrhage. Absolute indications for delivery include bleeding after 36 weeks of gestation, foetal distress at a viable gestation, and persistent haemorrhage causing maternal haemodynamic instability at any stage in the pregnancy.

The purpose of this study was to identify clinical risk factors associated with preterm delivery in women with antepartum haemorrhage and placenta praevia. Such infomation might assist in the future management of patients with antepartum haemorrhage and placenta praevia, in particular with regard to selecting those women who might benefit from close surveillance in hospital and more aggressive treatment, such as tocolytics or repeated blood transfusion.

Subjects and methods

The records of all women with placenta praevia at the time of delivery at Princess Margaret Hospital, a regional obstetric unit in Hong Kong, between 1990 and 1997 were reviewed. Multiple pregnancies and women with abruptio placentae were excluded. Transabdominal ultrasound scanning was used for the diagnosis of placenta praevia. In doubtful cases, transvaginal sonography had been used. The final diagnosis was based on the operative findings. Dewhurst's classification for placenta praevia was used in all cases.[4] Women with asymptomatic placenta praevia had been admitted at about 32 weeks for observation. Women presenting with antepartum haemorrhage had also been admitted for further management. Indications for immediate delivery were vaginal bleeding after 36 weeks, foetal distress at a viable gestation, persistent haemorrhage causing maternal haemodynamic instability at any stage in pregnancy despite blood transfusion, preterm labour, and at term, or when other obstetric complications arose.

A case-control design was used to assess for potential clinical risk factors associated with preterm delivery. Cases were defined as women who had delivered before 36 weeks' gestation, given that women presenting with antepartum haemorrhage after this gestation would normally be delivered. Women who delivered after 36 weeks comprised the control group.

Socio-demographic characteristics including maternal age, gravidity, parity, education level, working status, smoking habit, type of placenta praevia, and relevant obstetric history such as previous miscarriage, termination of pregnancy, dilatation and curettage, Caesarean section, and previous placenta praevia were retrieved. Data on potential predictors for preterm delivery were also retrieved—the onset, pattern, and severity of vaginal bleeding; presence of uterine contractions; and the type of placenta. The onset of vaginal bleeding was stratified into mid-trimester and third-trimester bleeding (ie <28 weeks and <32 weeks, respectively). The pattern of bleeding was classified as persistent or recurrent vaginal bleeding. Each episode of bleeding was defined as one occurring after more than a period of 48 hours free from bleeding. As this was a retrospective study, it was difficult to quantify the amount of bleeding accurately. Vaginal bleeding was classified into three grades: spotting, mild-to-moderate, and severe. Severe bleeding was defined as bleeding resulting in maternal haemodynamic instability (hypotension and tachycardia). Women with more than vaginal spotting but not severe bleeding were classified as having mild-to-moderate bleeding. More objective assessments such as a drop in haemoglobin of more than 20 g/L 24 hours after the onset of bleeding, and the need of blood transfusion were also used as a guideline. The presence of uterine contractions was defined as more than one uterine contraction in 10 minutes on admission tococardiograph.

Demographic data and potential clinical risk factors for the two groups of women were compared. Statistical analyses were performed using Statistical Package for Social Science (Windows version 9.0; SPSS Inc., Chicago, US). Chi squared test or the Fisher's exact test was used, where appropriate, to compare categorical variables. The unpaired Student's t test was used to compare continuous variables with a normal distribution. For continuous variables with non-parametric distribution, the Mann-Whitney U test was used. P values of less than 0.05 on two-tailed analyses were considered statistically significant. Stepwise binary logistic regression was performed to identify the independent predictor(s) for preterm delivery. Results of the analysis were reported as adjusted odds ratios (OR) with a 95% confidence interval (CI).

Results

There were 35 931 deliveries at Princess Margaret Hospital between 1990 and 1997. A total of 305 women with placenta praevia were identified during the study period. The incidence of placenta praevia was 0.85%. A total of 142 women with placenta praevia experienced antepartum haemorrhage before 36 weeks' gestation. Of these 142 women, 25 were excluded from the study because of twin pregnancy, abruptio placentae, missing records, or uncertain gestation. Fifty-nine women were delivered at or before 36 weeks and 58 women after 36 weeks' gestation.

The demographic data of the two groups are listed in Table 1. There was no difference in age, parity, working status, educational level attained, marital status, smoking status, history of drug abuse, or obstetric history. The indications for delivery in each case are summarised in Table 2. The majority of women in the preterm group were delivered because of antepartum haemorrhage (61%). The three most common indications for delivery included

Table 1. Demographic data comparing women with placenta praevia and antepartum haemorrhage who delivered before versus after 36 weeks of gestation

Maternal characteristics	Delivery at or before 36 weeks	Delivery after 36 weeks	P value
No. of patients	59	58	-
Age (mean, [SD]) [years]	31 (4.3)	31.8 (4.9)	NS*†
Teenager	0	0	NS‡
Parity (median)	1	1	NS§
Working (%)	42	39	NS‡
Tertiary education (%)	8	7	NS‡
Married (%)	97	97	NS‡
Smoker (%)	2	2	NS‡
Drug abuser	0	0	NS‡
Abortion (%)	19	21	NS
Termination of pregnancy (%)	31	36	NS
Dilatation and curettage (%)	42	52	NS
Previous placenta praevia (%)	2	2	NS‡
Previous Caesarean section (%)	19	11	NS
Haemoglobin level at booking (g/L)	118	119	NS†

* NS   not significant
† Unpaired Student's *t* test
‡ Fisher's exact test
§ Mann-Whitney *U* test

Table 2. Indications for delivery for women with placenta praevia and antepartum haemorrhage (n=117)

Indication	Percentage (%)
Massive antepartum haemorrhage	22.5
Labour	28.3
Term/matured	29.2
Persistent antepartum haemorrhage	9.2
Premature prelabour rupture of membranes	5.8
Other	4.9

massive antepartum haemorrhage, labour, and mature foetus. Other indications included persistent vaginal bleeding, and premature prelabour rupture of membranes.

Univariate analysis identified three risk factors that were significantly associated with preterm delivery (Table 3). These included second trimester vaginal bleeding, presence of uterine contractions on admission, and a haemoglobin decrease of >20 g/L. Women presenting with vaginal spotting only were at lower risk of being delivered prematurely. Type of placenta did not influence the risk of preterm delivery.

Two independent risk factors were identified after stepwise logistic regression analysis. These were second trimester vaginal bleeding (OR=4.80; 95% CI, 1.09-21.10) and the presence of uterine contractions on admission (OR=9.54; 95% CI, 3.34-27.20).

Discussion

The use of expectant management was first advocated by Macafee[5] in an attempt to reduce the number of premature births and allow the pregnancy to continue until the baby had grown to a size and age that would give a reasonable chance of survival. According to the initial Macafee regimen, women were confined to a fully equipped and staffed maternity hospital from the time of the initial diagnosis of placenta praevia until delivery. Preterm birth continued to be a major problem even when expectant management was employed. The poor perinatal outcome seen in women with placenta praevia mainly reflected prematurity. Brenner et al[6] found that approximately 40% of women with placenta praevia also experienced premature rupture of membranes, spontaneous labour, haemorrhage, or other problems that resulted in delivery before 37 weeks' gestation. Women with placenta praevia without antepartum haemorrhage however, do not appear to have an increased risk of preterm delivery.[2] We had previously shown that risk of preterm birth was mainly associated with antepartum haemorrhage and threatened preterm delivery.[2] In the current study, two risk factors for preterm delivery were identified in women presenting with antepartum haemorrhage—second trimester bleeding and the presence of uterine contractions on admission.

This was a retrospective case-control study and one might argue that the observed risk factors simply reflected the indications for delivery. This might be true for women presenting with uterine contractions, although it was difficult to differentiate a cause-effect relationship. On the other hand, this study failed to demonstrate that the pattern and severity of vaginal bleeding had any influence on preterm delivery. Women with placenta praevia presenting with mid-trimester vaginal bleeding had a higher risk of preterm delivery. This appears to be an unequivocal risk factor, as most obstetricians were reluctant to deliver these women until a more advanced gestation.

In the US, many obstetricians have adopted a policy of permitting selected women with placenta praevia and antepartum haemorrhage to return home as part of expectant management.[7,8] Most of the studies supporting this approach have shown a reduction in hospitalisation and cost.[9,10] However, these small studies had insufficient power to assess the safety issue. The group at high risk for preterm deliveries identified in this study, namely those with second trimester bleeding or the presence of uterine contractions, should not be offered such a choice. Moreover, in this high-risk group more aggressive treatment may reduce the risk of preterm delivery.

Table 3. Risk factors associated with delivery before 36 weeks in women with antepartum haemorrhage

Risk factors	Delivery at or before 36 weeks (%)	Delivery after 36 weeks (%)	Odds ratio (95% confidence interval)
Severity of bleeding			
Spotting only*	2	33	0.05 (0.01-0.40)
Severe	8	3	2.62 (0.53-14.00)
Haemoglobin drop (>20 g/L)*	22	9	3.00 (1.00-9.04)
Presence of uterine contractions*	61	31	4.00 (1.57-10.19)
Major placenta praevia	61	50	1.25 (0.90-1.70)
Bleeding pattern			
>4 days	58	45	1.34 (0.90-1.88)
>7 days	37	26	1.45 (0.84-2.50)
>10 days	27	19	1.42 (0.70-2.83)
Recurrent	78	71	1.13 (0.93-1.42)
Onset of bleeding			
<28 weeks*	23.7	5.2	4.19 (1.29-13.66)
<32 weeks	64.4	56.9	1.13 (0.81-1.52)
Need for blood transfusion	10.17	1.72	6.45 (0.75-55.39)

* Significant risk factors

Various reports have shown that aggressive management of placenta praevia, including tocolytic therapy, repeated blood transfusion, and prolonged hospital stay leads to improved outcomes.[7,11-18] Besinger et al[12] demonstrated that tocolytic use delayed delivery and was associated with an increase in birth weight. Towers et al[13] have shown that there was no increase in morbidity and mortality associated with an aggressive management approach in a tertiary setting. Cervical cerclage has been shown to prolong pregnancy in women with second trimester vaginal bleeding but there is currently insufficient evidence to recommend this practice outside of a clinical trial.[17,18] Results from retrospective studies to date indicate that women with clinical risk factors of second trimester bleeding or the presence of uterine contractions may benefit from close surveillance in hospital, tocolytic therapy, and repeated blood transfusion. Further studies in this group of patients, particularly those with second trimester bleeding, will help to define the role of such treatment in decreasing preterm delivery and improving clinical outcome. In addition, knowing that these women are at increased risk of preterm delivery, the option of more aggressive treatment should be discussed and offered to this patient group.

Conclusion

Women with placenta praevia and antepartum haemorrhage who have second trimester vaginal bleeding or the presence of uterine contractions were shown to be at higher risk of preterm delivery in this study. These women should receive close in-patient monitoring. Further studies investigating the effect of more aggressive treatment, such as the use of tocolytics and repeated blood transfusion, are indicated.

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