

Outcomes of pregnancies complicated by early vaginal bleeding

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نتائج الأحمال التي تتضاعف بنزف مهبلية مبكر
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خلاصة: تم بحث الترابط بين النزف الحملية المبكر وبين النتيجة غير الطبيعية للحمل. فأجريت مقابلات بعد الولادة مع النساء اللاتي وضعن في المستشفيات الرئيسيين للولادة في الإسكندرية، جمهورية مصر العربية، في المدة من كانون الثاني/يناير حتى تشرين الأول/أكتوبر 1998. وتبين أنه من بين 1503 سيدة وضعت كل منهن مولوداً مفرداً، ذكر 10.6% منهن أنهن نزفن. ومن هؤلاء 63.5% من نزف أثناء الأثلوث الأول بينما نزف 36.5% منهن خلال الأثلوث الثاني. وقد تبين لنا أن النزف كان أكثر حدوثاً بين النساء اللاتي تزيد أعمارهن عن 33 سنة، ممن سبق لهن وضع أطفال ناقصي الوزن أو سبق لهن الإجهاض. وحدثت النتائج غير الطبيعية بين النساء اللاتي ذكرن أنهن نزفن أكثر منها بين من لم يتزفن. وارتفعت احتمالات هذه النتائج بدرجة يعتد بها إحصائياً عند حدوث النزف في الأثلوث الثاني. ولوحظ أن احتمالات مولد طفل ناقص الوزن أو الولادة المبكرة أو وفيات ما حول الولادة قد انخفضت بدرجة يعتد بها إحصائياً مع زيادة الفترة الفاصلة بين الحملين لدى السيدات اللاتي نزفن خلال الأثلوث الأول أو الثاني.

ABSTRACT The association between early gestational bleeding and suboptimal pregnancy outcome was examined. Postpartum women were interviewed during January–October 1998 at the two main obstetric hospitals in Alexandria, Egypt. Of 1503 singleton deliveries, 10.6% reported bleeding; 63.5% and 36.5% during first and second trimesters respectively. Bleeding was more frequent among women of age >33 years, with history of low-birth-weight babies or previous miscarriage. Suboptimal outcomes occurred more often among women reporting bleeding than among those who never bled and the risk of such outcomes significantly increased with second trimester bleeding. Risk of a low-birth-weight baby, preterm delivery and perinatal death significantly decreased with increasing interpregnancy interval for women with first trimester or second trimester bleeding.

Résultats des grossesses compliquées par des saignements vaginaux en début de grossesse

RESUME L'association entre les saignements en début de grossesse et le résultat suboptimal de la grossesse a été examinée. Des femmes post-partum ont été interviewées entre janvier et octobre 1998 dans les deux principaux hôpitaux obstétriques d'Alexandrie (Egypte). Sur les 1503 accouchements uniques, 10,6% ont signalé des saignements; 63,5% et 36,5% au cours du premier et deuxième trimestre respectivement. Les saignements étaient plus fréquents chez les femmes dont l'âge était supérieur à 33 ans, qui avaient des antécédents de bébés à faible poids de naissance ou de fausses couches précédentes. Les résultats suboptimaux survenaient plus fréquemment chez les femmes signalant des saignements que chez celles qui n'ont jamais eu de saignements et le risque de tels résultats augmentait de manière significative avec les saignements du second trimestre. Le risque de bébé à faible poids de naissance, d'accouchement avant terme et de décès périnatal diminuait considérablement lorsque l'intervalle entre les grossesses augmentait pour les femmes ayant des saignements au cours du premier et du deuxième trimestre.

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Introduction

The incidence of early vaginal bleeding during pregnancy varies from less than 5% in some retrospective studies to more than 20% in others [1-4]. This disparity in incidence may be due to an underestimation of light bleeding in retrospective reviews of prenatal records. It has been estimated that nearly 50%-60% of pregnancies complicated by heavy bleeding terminate in spontaneous abortion. The incidence of pregnancies that continue despite bleeding varies from 1% to 20% [3,5-7]. The effect of such bleeding on the outcome remains unclear and raises the question of the effect on the newborn infant [8].

There is increasing evidence from retrospective and prospective studies that early gestational bleeding is associated with adverse pregnancy outcome, including low birth weight (LBW), prematurity, growth retardation, perinatal death and congenital anomalies [1-4,9-11]. Studies on the relation between gestational bleeding and pregnancy outcome in developing countries are few. In our study we distinguished between bleeding during the first trimester and bleeding during the second trimester and investigated the effects of such bleeding on the outcome of pregnancies in order to predict pregnancies at high risk.

Subjects and methods

Delivery data were collected at the two main governmental and university obstetric hospitals in Alexandria, Egypt from January to October 1998. A total of 1608 women participated in the study. Multiple births and gestations were excluded. Also excluded were those who experienced bleeding only in the third trimester and those for

whom there was confusion regarding spotting or missed abortion. The final study group comprised 1503 liveborn and stillborn singleton deliveries.

Women were interviewed during their postpartum stay in hospital. They were asked about current and past obstetric history, medical history, antenatal care and occurrence of gestational bleeding. Those who had experienced vaginal bleeding during pregnancy were questioned in detail about the timing and the severity of bleeding. Bleeding was classified as "light" when described as one episode of spotting lasting not more than 1 week. Bleeding was defined as "heavy" when described as

Table 1 Maternal characteristics by bleeding

Characteristic	No bleeding		Bleeding	
	No.	%	No.	%
<i>Age (years)</i>				
< 20	106	7.9	8	5.0
20-33	1061	79.9	117	73.6
>33	177	13.2	34	21.2
<i>History</i>				
Previous low-birth-weight baby	169	2.6	38	23.9
Previous abortion	295	21.9	51	32.1
Previous stillbirth	75	5.6	10	6.3
<i>Socioeconomic class</i>				
High	210	15.6	26	16.4
Middle	192	14.3	33	20.8
Low	942	70.1	100	62.9
<i>Parity</i>				
1	611	45.5	64	40.3
2	294	21.9	37	23.3
3	439	32.7	58	36.5
<i>Antenatal care</i>				
No care	367	27.3	24	15.1
First trimester	456	33.9	71	44.7
Second trimester	406	30.2	56	35.2
Third trimester	115	8.6	8	5.0
Total	1344		159	

haemorrhage, more than 1 teaspoonful in volume and lasting more than 1 week. However, severity was not used for further analysis of the outcome because of the small number of heavy bleeders.

The following pregnancy outcomes were assessed: low birth weight (< 2500 g), prematurity (< 37 weeks gestation), growth retardation (< 2500 g and > 37 weeks), congenital anomaly and perinatal death.

Contingency chi-squared test was used to assess the association between bleeding and outcome. Logistic regression models were then used to examine these associations in the presence of potential confounders in which five models were examined for each outcome.

Results

A total of 159 women (10.6%) reported vaginal bleeding during pregnancy; 101 cases (63.5%) occurred during the first trimester and 58 (36.5%) during the second trimester. Most bleeders (88.7%) were classified as light bleeders and only 18 (11.3%) were classified as heavy bleeders.

The characteristics of the women with and without bleeding are summarized in

Table 1. Women with bleeding were more likely to be older, to have had a history of a low-birth-weight baby (LBW) or previous abortion and to be of a lower socioeconomic class. Bleeders also were more likely to be multiparous and to have received early antenatal care.

Suboptimal pregnancy outcomes occurred in 25.8% of deliveries complicated by vaginal bleeding during the first trimester and in 49.0% of those complicated by bleeding during the second trimester. Among non-bleeders, suboptimal pregnancy outcomes occurred in only 11.7%. Pregnancy outcome also appeared to be associated with severity of bleeding as suboptimal outcomes occurred in 39.6% of the 141 deliveries preceded by light bleeding versus 14% of the 18 deliveries preceded by heavy bleeding. However, because the numbers were too small to fully evaluate the risk of reported heavy bleeding, both groups were included in the total 159 patients with early bleeding.

The relationship between individual adverse outcome by trimester of bleeding is given in Table 2. Bleeding in both trimesters was associated with a sizeable increase in adverse outcome. This association was

Table 2 Percentage of deliveries with adverse outcomes by trimester of bleeding

Adverse outcome	No bleeding (n = 1344)		First trimester (n = 101)		Second trimester (n = 58)	
	No.	%	No.	%	No.	%
Low birth weight	632	47.0	62	61.4	44	75.9
Preterm delivery	352	26.2	38	37.6	41	70.7
Growth retardation at term	462	34.4	49	48.5	25	43.1
Congenital anomalies	4	0.3	3	3.0	0	—
Perinatal death	94	7.0	14	13.9	20	34.5

more evident for LBW, premature deliveries and perinatal death when bleeding occurred in the second trimester. A large increase in the prevalence of growth retardation at term deliveries and congenital malformation was seen in deliveries with first trimester bleeding compared with those with second trimester bleeding.

The crude association between second trimester bleeding and adverse outcome (Table 3) showed a more than threefold increase in the incidence of LBW, a sixfold increase in the proportion of preterm deliveries and a sevenfold increase in the pro-

portion of perinatal death. A striking increase was observed in the crude association of congenital anomalies and first trimester bleeding. However, the number of women with malformed infants was too small to produce reliable estimates of the risk of bleeding. Since many of the factors associated with early vaginal bleeding (Table 1) were found to be important predictors of pregnancy outcome, logistic regression analyses were used to control for those factors which might confound the association between adverse pregnancy outcome and early vaginal bleeding.

Table 3 Unadjusted and adjusted odds ratio of adverse outcomes

Adverse outcome	First trimester bleeding			Second trimester bleeding		
	Odds ratio		95% CI	Odds ratio		95% CI
	Unadjusted	Adjusted		Unadjusted	Adjusted	
Low birth weight	1.7 ^a	1.9	1.1–3.5	3.5 ^b	3.9	1.7–8.9
Growth retardation at term	1.8 ^a	2.2	1.2–4.3	1.5	1.4	0.46–4.5
Preterm delivery	1.6	1.6	0.75–3.2	6.4 ^b	7.3	3.1–17.1
Congenital anomaly	10.0 ^a	8.2	1.16–58.5	– ^c	–	–
Perinatal death	2.1 ^a	2.3	0.97–5.1	7.2 ^b	8.2	3.8–18.5

^a $P < 0.05$

^b $P < 0.01$

^cOdds ratio could not be calculated because of the singular matrix (zero count in one cell).

CI = confidence intervals

Table 4 Odds ratios of adverse outcome by interaction of pregnancy interval and bleeding

Adverse outcome	First trimester bleeding		Second trimester bleeding	
	Odds ratio	95% CI	Odds ratio	95% CI
Low birth weight	1.38	1.1–1.7	1.44	1.1–1.8
Growth retardation at term	1.48	1.1–1.9	1.18	0.8–1.7
Preterm delivery	1.20	0.8–1.7	1.70	1.3–2.2
Congenital anomaly	0.28	0.1–2.6	–	–
Perinatal death	1.18	0.8–1.6	2.02	1.5–2.8

CI = confidence intervals

Table 3 shows the results of the final five models created for each undesirable outcome. The model began with the variable under study, i.e. first and second trimester bleeding; then all possible confounders were added hierarchically to adjust for their effect, i.e. age, parity, socio-economic status, antenatal care, anaemia, pre-eclampsia, previous abortion, previous LBW and perinatal death. Adjustment of the confounding variables for first-term bleeding increased the odds ratio (OR) of LBW, growth retardation and perinatal death but decreased the OR of congenital malformation. The figure for second trimester bleeding was the same where adjustment increased the OR of LBW, preterm deliveries and perinatal death.

Logistic regression revealed a significant interaction between bleeding, inter-pregnancy interval and some pregnancy outcomes (Table 4). OR of the interaction term (bleeding \times pregnancy interval) decreased for all pregnancy outcomes whether for first or second trimester bleeding. This should focus attention on the importance of pregnancy spacing in relation to the effects of vaginal bleeding on the outcome of pregnancy.

Discussion

Bleeding occurred in 10.6% of the studied sample. Other studies have reported various figures: Funderburk et al., 1% [1]; Sipila, 9.3% [4]; Strobino, 22% [1]; and Williams, 10.2% [12]. The wide variation in reported rates of vaginal bleeding during pregnancy is a consequence of differences in research design and the samples studied.

The results of our study confirm previous investigations that found that early gestational bleeding was associated with an increased risk of suboptimal pregnancy

outcome. Berkowitz found that adverse outcomes occurred in 19% of deliveries complicated by light bleeding and in 23% of those associated with heavy bleeding [13]. Funderburk et al. reported suboptimal outcome in 30% and 19% of deliveries preceded by heavy and light bleeding respectively [1]. These figures vary from those observed in our study because vaginal bleeding was recorded in our study according to trimester and not severity and all subsequent analyses were based on the timing of the bleeding.

Second trimester bleeding was associated with an increased risk of adverse pregnancy outcome. The findings from multivariate analysis indicate that second trimester bleeding had the highest odds ratio (OR) for LBW, perinatal death and preterm deliveries. The risk of delivering a small-for-date baby, however, increased significantly only with first trimester bleeding. Berkowitz [13], Karim [14] and Batzofin [15] found that the adjusted OR for LBW and premature delivery significantly increased with second trimester haemorrhage. Signore [16] and Rodrigues [17] reported a highly significant association between second trimester bleeding and prematurity and perinatal death. A study conducted by Sipila in Finland of 8718 singleton deliveries indicated poor pregnancy outcome and increased risk of LBW, preterm deliveries and congenital malformations among second trimester bleeders [4]. Similarly, in the analysis of 5139 cases, Mau found that time and frequency of bleeding in pregnancy influenced the risk of premature delivery and that every additional bleeding increased the risk, especially if bleeding occurred during the second trimester [9]. The results of our study indicate a significant increased risk of perinatal mortality and second trimester bleeding.

This supports a study by Neilson, who found that bleeding during the second trimester was associated with a high perinatal mortality rate (22% overall, ranging from 7.4%–36.6%) [18].

Williams found that women who experienced vaginal bleeding limited to the first term had double the risk of delivering a preterm infant and that bleeding was associated with a 1.6-fold risk of delivering a term LBW infant [12]. Stobino reported that first trimester bleeding of any severity was marginally associated with congenital malformation in the offspring (OR = 1.7, 95% CI 1.0–2.9) but recorded no association with perinatal death [3]. Our results indicate a significant association between first trimester bleeding and LBW term infants. Although we observed an association between first trimester bleeding and congenital malformation, we failed to find any convincing association between second trimester bleeding and malformation.

Our results were inconclusive as to whether bleeding was part of the pathologic process that led to adverse outcome or whether it was a symptom of a completed pathologic process and the resulting abnormal conceptus. This question could be solved by conducting a large prospective study with early ultrasound detection of malformation.

The significant interaction between bleeding, interpregnancy interval and suboptimal outcome in our study suggests the

importance of pregnancy spacing for protection against an increased incidence of LBW, term and preterm deliveries, and also against perinatal death. The adjusted OR of adverse outcomes significantly decreased with incremental increase in the interpregnancy interval for both first and second trimester bleeding. The most significant and detectable decrease was observed for preterm deliveries in second trimester bleeding where OR decreased from 7.3 to 1.7. Recent studies have concluded that a short interval between pregnancies is associated with adverse perinatal outcome, particularly LBW and prematurity [19–21]. Increasing the length of interpregnancy interval would substantially reduce rates of adverse pregnancy outcomes.

From the present study it can be concluded that gestational vaginal bleeding in general, and second trimester bleeding in particular, is associated with adverse pregnancy outcome. Recognition of these associations may be useful for detecting pregnancies at high risk.

A final issue that should be considered is that discrepancies in the reported risk of vaginal bleeding and the magnitude of association between bleeding and adverse reproductive outcomes in different studies may be attributed to inconsistent definitions of timing and severity of bleeding. This suggests a need for more standardized definitions of bleeding and reproductive end-points in future studies [22].

References

1. Funderburk SJ, Guthrie D, Meldrum D. Outcome of pregnancy complicated by early vaginal bleeding. *British journal of obstetrics and gynaecology*, 1980, 87:100–5.
2. Fedrick J, Anderson AB. Factors associated with spontaneous preterm birth. *British journal of obstetrics and gynaecology*, 1976, 83:342–50.

3. Strobino B, Pantel-Silverman J. Gestational vaginal bleeding and pregnancy outcome. *American journal of epidemiology*, 1989, 129(4):606-15.
4. Sipilä P et al. Perinatal outcome of pregnancy complicated by vaginal bleeding. *British journal of obstetrics and gynaecology*, 1992, 99(12):959-63.
5. Garoff L, Sepalo M. Prediction of fetal outcome in threatened abortion by maternal serum lactogen and fetoprotein. *American journal of obstetrics and gynecology*, 1975, 121:257-61.
6. Everett C. Incidence and outcome of bleeding before the 20th week of pregnancy: prospective study from general practice. *British medical journal*, 1997, 30:32-4.
7. Dantas ZN et al. Vaginal bleeding and early pregnancy outcome in an infertile population. *Journal of assisted reproductive genetics*, 1996, 19:212-5.
8. Fourn L, Takpare I, Zohoun T. Grossesses compliquées d'hémorragie et naissances d'enfants de faible poids à Cotonou (Benin). [Pregnancies complicated by haemorrhage and birth of low-birth-weight infants in Cotonou (Benin).] *Santé*, 1994, 4(6):407-11.
9. Mau G. Frungeburtsrisiko bei rezidivierenden Schwangerschaftsblutungen. [Risk of prematurity and reported bleeding in pregnancy.] *Zeitschrift für geburtshilfe perinatalogie*, 1977, 181(1):17-9.
10. Peckham CH. Uterine bleeding during pregnancy. I. When not followed by immediate termination of pregnancy. *Obstetrics and gynecology*, 1970, 35:937-41.
11. Niswander K, Gordon M. *Women and their pregnancies: the collaborative perinatal study of the National Institute of Neurological Diseases and Stroke*. Philadelphia, WB Saunders Company, 1972.
12. Williams MA et al. Adverse infant outcomes associated with first trimester vaginal bleeding. *Obstetrics and gynecology*, 1991, 78(1):14-8.
13. Berkowitz G et al. Early gestational bleeding and pregnancy outcome: a multivariate analysis. *International journal of epidemiology*, 1983, 12(2): 165-72.
14. Karim SA et al. Effect of first and second trimester bleeding on pregnancy outcome. *Journal of the Pakistani Medical Association*, 1998, 48(2):40-2.
15. Batzofin JH, Fielding WL, Friedman EA. Effect of vaginal bleeding in early pregnancy outcome. *Obstetrics and gynecology*, 1984, 63(4):515-8.
16. Signore CC, Sood AK, Richard DS. Second trimester vaginal bleeding: correlation of ultrasonographic findings with perinatal outcome. *American journal of obstetrics and gynecology*, 1998, 178(2):336-40.
17. Rodrigues T, Barros H. Factores de risco para trabalho de parto pre-termo. [Risk factors for preterm labour.] *Acta medica portuguesa*, 1998, 11(10):901-5.
18. Neilson EC, Varner MW, Scott JR. The outcome of pregnancies complicated by bleeding during the second trimester. *Surgical gynecology and obstetrics*, 1991, 173(5):371-4.
19. Adams MM et al. The relationship of interpregnancy interval to infant birth weight and length of gestation among low-risk women, Georgia. *Paediatric and perinatal epidemiology*, 1997, 11(suppl. 1):48-62.
20. Rawlings JS, Rawlings VB, Read JA. Prevalence of low birth weight and preterm delivery in relation to interval between pregnancies among white and black women. *New England journal of medicine*, 1995, 332(2):69-74.

21. Zhu BP et al. Effect of interval between pregnancies on perinatal outcome. *New England journal of medicine*, 1999, 340(8):589-94.
22. Ananth CV, Savitz DA. Vaginal bleeding and adverse reproductive outcome: a meta-analysis. *Pediatric and perinatal epidemiology*, 1994, 8(1):62-76.

Note from the Editor

We wish to inform our readers that the next issue (Volume 6 No. 4) of the EMHJ, will be a special issue on the subject of Health for All.