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Clinical Communications: OB/GYN

VAGINAL BLEEDING BEFORE 20 WEEKS GESTATION DUE TO PLACENTAL ABRUPTION LEADING TO DISSEMINATED INTRAVASCULAR COAGULATION AND FETAL LOSS AFTER APPEARING TO SATISFY CRITERIA FOR ROUTINE THREATENED ABORTION: A CASE REPORT AND BRIEF REVIEW OF THE LITERATURE

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□ **Abstract**—We present a case of placental abruption with concomitant disseminated intravascular coagulation in a woman who presented with vaginal bleeding. A 32-year-old pregnant woman at 17 and 4/7 weeks gestation with a 1-month history of intermittent abdominal pain presented to our Emergency Department (ED) with 1 h of vaginal bleeding. Upon initial history, the patient reported that she was diagnosed with “blood behind the placenta” the day before and was discharged on pelvic precautions. An ED ultrasound confirmed the sub-amniotic hematoma with placental hematoma and a viable intrauterine fetus. A low fibrinogen level was suggested for disseminated intravascular coagulation and increasing hemorrhage necessitated dilation and evacuation and multiple units of blood products on an emergent basis. Only a few cases have been described in the literature demonstrating disseminated intravascular coagulation in patients at fewer than 20 weeks gestation with routine ultrasound findings of live intrauterine pregnancy and subchorionic hemorrhage. © 2007 Published by Elsevier Inc.

□ **Keywords**—Emergency ultrasound; DIC; vaginal bleeding; threatened abortion; subchorionic hemorrhage

INTRODUCTION

Vaginal bleeding ranks as one of the top 10 chief complaints for which patients seek care in the Emergency Department (ED) (1). The causes of vaginal bleeding before 20 weeks gestation are numerous, however, abortion (threatened, inevitable, incomplete, complete, septic, and missed) and ectopic pregnancy comprise > 95% of these (2). Several review articles and book chapters also exist at present concerned primarily with the evaluation, management, and treatment of threatened abortion (1–12). Evaluation algorithms and clinical policy statements state that when a sonogram demonstrates a viable intrauterine fetus in a case of threatened abortion, and the bleeding is less than one pad per hour, the mother can safely be sent home on pelvic precautions without an Obstetrics and Gynecology (OB/GYN) consult or coagulation studies while in-house (1,9,10). We demonstrate that rigid adherence to these algorithms would potentially have resulted in a poor outcome in this case.

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CASE REPORT

A 32-year-old G5P4004 gravid woman at 17 and 4/7 weeks gestation by 12-week sonogram and last menstrual period sought ED care for vaginal bleeding with passage of clots before Emergency Medical Services arrival. The pregnancy had been proceeding normally until approximately 1 month before presentation when she had the onset of mild abdominal pain. She sought treatment at a local ED 2 weeks later. A sonogram at that time showed “blood behind the placenta,” and the patient was sent home with instructions for bed rest. Two days before presentation, she again developed mild abdominal pain with pelvic pressure but without any vaginal bleeding. She was evaluated at another local ED, and she underwent another sonogram with similar results. Upon presentation to our ED, she was complaining of abdominal pain and mild lower back pain with vaginal bleeding less than one pad per hour and one episode of vomiting. She had been bleeding for 1–2 h before presentation, reported seeing some clots, but denied passing any tissue. She denied any fever, chills, dysuria, or nausea. She also denied any recent change in medications or the occurrence of any trauma. OB/GYN was consulted.

The obstetric history was notable for two normal vaginal deliveries followed by two cesarian sections at term for one breech malposition and one failed trial of labor. The patient denied any other past medical or surgical history. The gynecologic, family, and social histories were likewise unremarkable.

Initial vital signs included: temperature 36.4°C, pulse 105 beats/min, blood pressure 124/78 torr, respiratory rate 20 breaths/min, and O₂ saturation of 100% on room air. She appeared afebrile, non-toxic, comfortable, and in no acute distress. The lungs were clear to auscultation bilaterally and a regular rate and rhythm was noted on cardiovascular examination with a normal S₁ and S₂ and

no murmurs. The abdomen was gravid, soft, non-tender, and non-distended. Pelvic examination revealed approximately 75 mL of dark red blood obscuring the cervix in an otherwise atraumatic vaginal vault. No tenderness was revealed during the pelvic examination and the cervix was noted to be long and closed. The extremities were noted to be warm with no cyanosis clubbing or edema. She was alert and oriented throughout the examination with no focal neurologic deficits or appreciable muscle weakness.

The initial laboratory studies showed anemia with a hematocrit slightly lower than the 32–34% commonly cited as the range for dilutional anemia seen often in pregnancy. Likewise, an expected mild leukocytosis was noted. A low platelet count was shown as well. The liver panel was unremarkable and a toxicology screen was negative. Laboratory values are found in Table 1.

The bedside trans-abdominal sonogram showed a single live fetus (Figure 1B and 1C) with a normal heart rate. Additionally, a 1.9 × 1.1 × 0.5 cm hypoechoic avascular area was noted within the placenta suggestive of an intra-placental cyst or area of hemorrhage (Figure 1A and 1B). A 4.9 × 5.0 × 2.3 cm slightly hypoechoic mobile oval-shaped lesion that appeared to be intra-amniotic or sub-amniotic in location and that changed position from fundal to lower uterine segment with the mother’s positioning, was thought to be a sub-amniotic hematoma (Figure 1C and 1D). Intra-amniotic small floating debris was also shown and was read as possible minor amounts of hemorrhage, infection, or an unusual amount of sloughed cells (Figure 1A).

After obtaining the results of the confirmatory abdominal ultrasound, the consultant requested that additional laboratory studies be drawn. A fibrinogen returned a value of 88 mg/dL (normal 170–530). The prothrombin time was elevated at 17.9 s and a semi-quantitative D-dimer was elevated at > 8.0 mg/L. Further workup

Table 1. Laboratory Values*

Variable	Value	Variable	Value
White blood cell	10.8 (4.0–10.5)	Kleihauer Betke	No fetal cells
Red blood cell	3.24 (3.7–5.0)	Fibrinogen	88 (170–530)
Hemoglobin	11.4 (11.5–15.0)	Prothrombin time	17.9 (11.9–14.9)
Hematocrit	31.8 (34–44)	INR	1.47 (0.80–1.21)
Platelets	105 (150–400)	Partial thromboplastin time	38.7 (26.3–37.7)
Neutrophils	10.4 96% (2.0–7.5)	D-dimer	>8 (<0.50)
Lymphocytes	0.4 4.0% (0.9–3.3)	Protein total	5.9 (6.1–8.2)
Sodium	134 (135–145)	Albumin	3.0 (3.2–5.5)
Potassium	3.5 (3.3–4.8)	Total bilirubin	1.5 (0.0–1.4)
Carbon dioxide	22 (25–34)	Alkaline phosphatase	60 (26.0–110.0)
Calcium	8.1 (8.4–10.2)	Aspartate aminotransferase	28 (8.0–40.0)
BHcg (beta)	49,284 (5,000–50,000)	Alanine aminotransferase	14 (0.0–60.0)
A,B,O and Rh factor	O+	Toxicology	Negative

* Those drawn on initial presentation shown in first column.

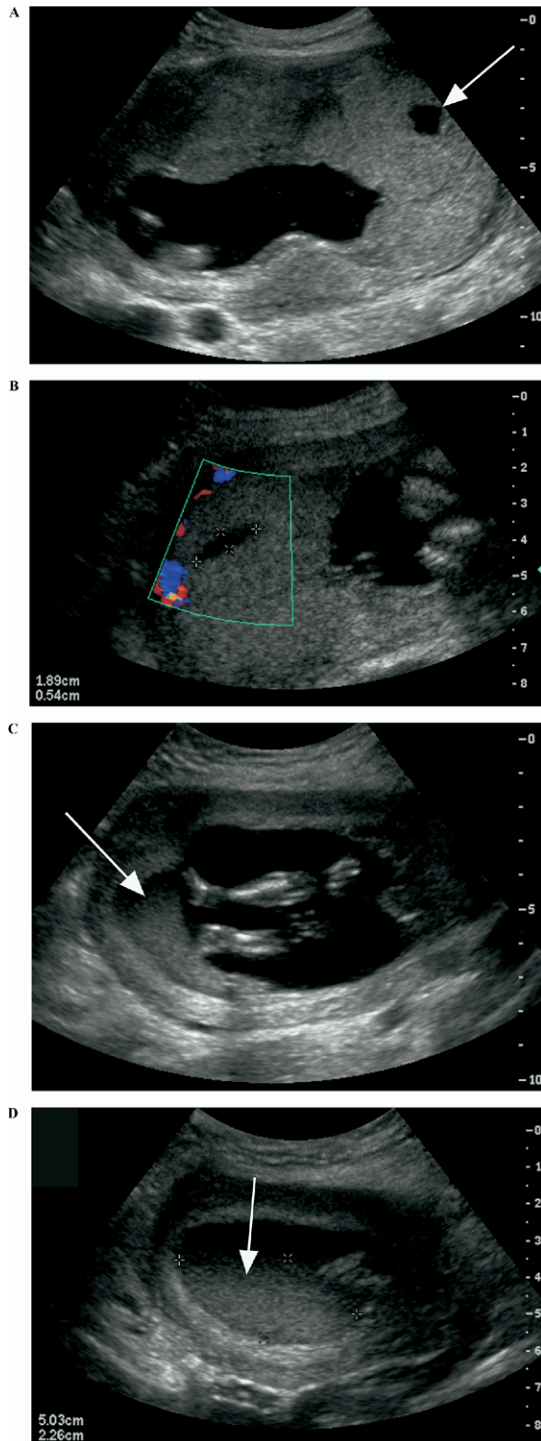


Figure 1. Placental abruption. The abdominal sonogram reveals the hypoechoic lesion (arrow) within the placenta (A, B) in transverse uterine window. Also shown is the hypoechoic lesion in subamniotic vs. intra-amniotic location (C, D) suspicious for subamniotic hematoma or intra-amniotic blood (arrows).

revealed a consumptive coagulopathy secondary to placental abruption necessitating admission for dilation and evacuation (D & E).

HOSPITAL COURSE

Despite receiving 3 L of 0.9% normal saline (NS) over the first 4 h in the ED, the patient's blood pressure was 84/68 mm Hg with tachycardia to 133 beats/min at the time of admission. After admission to labor and delivery (L & D), a Kleihauer Betke study showed no fetal cells, fibrinogen remained low, and the coagulation profile continued to worsen. The patient subsequently received two units of packed red blood cells, 10 units of cryoprecipitate, and one unit of platelets over the next 9 h with subsequent improvement of fibrinogen, platelets, hemoglobin, and hematocrit levels. After medical stabilization, D & E was performed for placental abruption and disseminated intravascular coagulation (DIC). The patient tolerated surgery well and was discharged on postoperative Day 1 after counseling and arrangement for continuing care.

DISCUSSION

Vaginal bleeding in pregnancy complicates 20–25% of known pregnancies, with roughly half of these ending in fetal loss (7,13–16). Threatened abortion is a common problem encountered in the evaluation of those presenting with vaginal bleeding in the ED. Traditionally, threatened abortion is defined as vaginal bleeding in the first 20 weeks of pregnancy without cervical dilatation or passage of the products of conception (2). Vaginal bleeding after the 20th week of pregnancy complicates approximately 4% of pregnancies and is caused by placental abruption in 30% of cases, and placenta previa in 20% (5). The majority of the remaining cases are thought to be due to pre-term labor and small marginal abruptions diagnosed predominantly upon postpartum inspection (5,17). Vaginal bleeding in the first 20 weeks of pregnancy is usually caused by abortion (threatened, inevitable, incomplete, complete, septic, and missed) and is a common diagnosis in the ED.

Although the incidence of vaginal bleeding in pregnant women at fewer than 20 weeks gestation represents a significant proportion of ED visits each year, search of the Emergency Medicine (EM) literature revealed a paucity of case reports of placental separation with concomitant DIC in a patient seeking care for a threatened abortion (18). However, a handful of similar case reports and short communications were published in the European obstetrics literature in the late 1980s (19–21). It is

interesting to note that, of the aforementioned cases, only one was severe enough to warrant D & E while each of the older obstetrics cases detailed cautious conservative management, thereby avoiding fetal demise and in fact concluding with healthy deliveries.

The relative scarcity of cases such as ours may be due to a varying definition of placental abruption, which is the premature separation of the placenta from the uterine wall after 20 weeks gestation (22). A placental separation in the first half of pregnancy is considered semantically by some to be a foreshadowing of likely spontaneous abortion and not a true placental abruption. However, the literature on the evaluation and management of spontaneous abortion rarely mentions the possibility of DIC as a complication, illustrating both the uniqueness of this case, and the dictum that abruption is usually seen at > 26 weeks gestation (22). Both DIC and death from threatened abortion are exceedingly rare. However, placental separations complicate approximately 1.0% of all pregnancies and there exists very little in the medical literature at present concerned with developing new evaluation algorithms to better reduce morbidity and mortality in cases occurring before the 20th week of pregnancy.

The evaluation and management of threatened abortion is consistent across the EM literature, and is nearly always concerned solely with the disease processes seen most commonly in the first 20 weeks of pregnancy (i.e., abortions, ectopics, and molar pregnancies). Several review articles and book chapters also exist at present concerned primarily with the evaluation, management, and treatment of threatened abortion (1–12). The American College of Emergency Physicians has begun to develop a clinical policy statement and evaluation algorithms to aid in the evaluation of threatened abortion (1,9–11). These will enable Emergency Physicians to treat these patients with improved diagnostic accuracy after observations in the past of falling well “short of reasonable standards” (23). These evaluation parameters insist that a history and physical examination, sonographic evaluation, and laboratory testing of maternal serum biochemistry be the mainstay of evaluation in these patients (8). On pelvic examination, if the os is open or products of conception are seen, the diagnosis of inevitable miscarriage is made, and after counseling the patient, OB/GYN consultation is scheduled while in-house or as an outpatient after discharge (9). Next, the pregnancy must be determined by sonogram to be either intra-uterine or extra-uterine. At this point, if fetal heart motion is observed, and the pregnancy is deemed an intra-uterine pregnancy, a diagnosis of threatened abortion is made and the patient can be discharged after counseling with OB/GYN follow-up for serial BHcg (beta human chorionic gonadotropin) measurements and continued care, which may include bed rest. Sending

these patients home is within the standard of care as normal fetal cardiac motion on sonogram can be used to predict successful outcome in 90–97% of pregnancies in which it is demonstrated (12,24).

Simple adherence to the published guidelines for the management of threatened abortion in this patient may have ended with her demise secondary to DIC (1–12). To our knowledge, no EM cases of threatened abortion have sought to examine the practice of making management decisions strongly based on whether or not the “half-way point” of pregnancy has yet been reached when bleeding occurs. None of the evaluation guidelines for threatened abortion require that fibrinogen, D-dimer, or coagulation studies be obtained unless the case is complicated by heavy bleeding or significant abnormalities on physical examination (1). The case we present had neither of these. The fibrinogen was drawn in this case by the consulting OB/GYN as he was concerned about abruption and DIC with the history of “blood behind the placenta,” and approximately 75 mL of blood noted in the vaginal vault on physical examination. Despite the fact that the incidence of first trimester sub-chorionic hematomas has been reported at 4–22% with undetermined significance, and the fact that our patient was bleeding less than one pad per hour, a fibrinogen proved lifesaving (25,26).

Of questionable significance is the elevated value of the semi-quantitative D-dimer. The normal value for this test in our institution is < 0.50 mg/L. It is an established fact that during pregnancy a physiologic hypercoagulable state exists. At the beginning of the second trimester, more than one-half of pregnant women have a D-dimer concentration that exceeds our institution’s standard cut-off. In a study by Kline et al., the mean quantitative D-dimer value of patients in the second trimester is 0.832 mg/L (27). Our patient’s measured D-dimer was well above any reasonable cut-off value but less than the value of 10 mg/L, a minimum value for D-dimer to provide diagnostic utility in acute obstetrical DIC (28). In our case, the semi-quantitative D-dimer laboratory result was not used to make any management decisions.

This case clearly demonstrates the importance of realizing the limitations inherent to evaluation algorithms and the dangers of evaluating first and second trimester bleeds in similar fashion without regard for the subtle nuances of presentation. The risk ratio of maternal death from spontaneous abortion presenting during weeks 16–19 when compared to a reference value from those presenting before 12 weeks gestation is substantially increased (reported at 13.7 weeks) (29). The same case fatality study also shows that many of the deaths due to infection, hemorrhage, and embolism are associated with DIC. Although management of bleeding in the second

trimester is usually supportive and expectant, rates of fetal loss have been reported at 31.8% with many of these occurring before 20 weeks (5,30). There have been sporadic case reports of placenta previa and placental abruption in patients at fewer than 20 weeks gestation with fetal and maternal fatalities. This illustrates the peril of evaluating bleeding women at 14–20 weeks by the EM guidelines that explicitly state that in threatened abortion, “if fetal cardiac activity is detected the stable patient should be followed expectantly” (2).

Second trimester bleeding is under-recognized and is worthy of a more lengthy evaluation owing to a higher rate of fetal loss and maternal morbidity than earlier presentations of vaginal bleeding. The obstetric literature clearly outlines the higher perinatal mortality rate associated with second trimester bleeding and emphasizes that evaluation should be similar to techniques used in later pregnancy, including both hospitalization and stabilization, as the case dictates (31). Although the algorithms and evaluation guidelines utilized in EM for these cases may enable us to efficiently and safely treat the vast majority of threatened abortions, further clarification is needed for the evaluation of second trimester vaginal bleeding. Positive fetal cardiac activity in the absence of substantial vaginal hemorrhage should be considered less important than a rigorous determination of the hemodynamic stability of the patient. We must remain vigilant in cases of second trimester bleeding and cognizant of the higher morbidity and potential consequences of rigid adherence to current evaluation guidelines.

SUMMARY

Threatened abortion can be safely and efficaciously evaluated in the vast majority of ED cases by strict adherence to the guidelines found throughout the EM literature. However, threatened abortion in a woman of second trimester dates should bring the possibility of more serious pathology to mind. Given the subjective nature of “heavy bleeding,” and the increased mortality in second trimester patients, a search for DIC seems warranted. A case of a fibrogenemia rather than DIC has been reported (32). The possibility of significant hemorrhage, coagulopathy, placental separation, and placenta previa should de-emphasize the importance of documented fetal cardiac activity and the absence of a history of heavy vaginal bleeding.

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