Assessment and Management of Bleeding in the First Trimester of Pregnancy

B. J. Snell, CNM, PhD

Vaginal bleeding occurs in 15% to 25% of early pregnancies. While 50% of women who have vaginal bleeding in the first trimester of pregnancy will continue to have a viable pregnancy, the event creates significant anxiety for the woman and can be managed in a multitude of ways. The 3 main differential diagnoses associated with vaginal bleeding are spontaneous abortion, ectopic pregnancy, and gestational trophoblastic disease. This article reviews early pregnancy development, etiologies of vaginal bleeding in the first trimester, strategies for evaluation, and recognition and management of the main diagnostic considerations. Case study examples illustrating the complexity of the assessment and management of vaginal bleeding in early pregnancy are presented.


**keywords:** vaginal bleeding, pregnancy, ectopic pregnancy, gestational trophoblastic disease, spontaneous abortion

**INTRODUCTION**

Vaginal bleeding in the first trimester of pregnancy is associated with spontaneous abortion/miscarriage, ectopic implantation, hydatidiform mole, preterm delivery, and low birth weight. It has been reported that 50% of women presenting to an emergency room with vaginal bleeding will go on to have a normal pregnancy. Vaginal bleeding is a common event in the first trimester, reported to occur in 15% to 25% of all pregnancies. Bleeding can be a normal sign of implantation of the pregnancy, may herald the initiation of spontaneous abortion, or may be the sign of a pathologic condition, such as ectopic pregnancy or gestational trophoblastic disease (GTD). Vaginal bleeding after confirmation with a positive pregnancy test requires further assessment in order to identify normal or abnormal development of the pregnancy or a pathologic condition that requires intervention. The three main differential diagnoses associated with first-trimester vaginal bleeding are spontaneous abortion, ectopic pregnancy, and GTD. This article discusses early pregnancy development and implantation bleeding, etiologies of vaginal bleeding in the first trimester, including subchorionic hemorrhage, strategies for evaluation using quantitative β-human chorionic gonadotropin (βhCG) monitoring and early ultrasound, and management of the main considerations, with case studies that illustrate the complexity of this condition.

**EARLY PREGNANCY DEVELOPMENT: IMPLANTATION BLEEDING**

The process of implantation begins approximately 6 days after fertilization. Vaginal bleeding can occur as a result of the burrowing of the blastocyst into the uterine endometrium. During this preembryonic stage, blastocyst implantation causes a disruption of the endometrial extracellular environment. The resulting bleeding is generally a small amount but may be bright red in appearance. This “implantation” spotting or bleeding is sometimes believed to be the initiation of menses by the woman, and consequently she may not recognize her pregnancy until she begins to have other symptoms (e.g., breast tenderness, nausea, fatigue, etc.) or confirms her pregnancy with a home pregnancy test.

**VAGINAL BLEEDING IN THE FIRST TRIMESTER**

In addition to creating anxiety for the woman, vaginal bleeding can be a confusing clinical picture. Unusual vaginal bleeding in a woman who is sexually active, especially if she is not using contraception, must be considered pregnancy-related until proven otherwise. Although spontaneous abortion, ectopic pregnancy, and GTD are the key differential diagnoses, others should not be overlooked (e.g., cervicitis, cervical lesions, cervical polyps, cervical/vaginal trauma secondary to sexual activity, vaginitis/vaginosis, and sexually transmitted infections, including pelvic inflammatory disease).

Uterine fibroids are also associated with vaginal bleeding during pregnancy. Benson et al. selected 143 pregnant women who had fibroids documented sonographically in the first trimester from a large, prospectively collected database. Criteria for inclusion in the analysis were singleton pregnancies up to 13 weeks’ gestation with positive fetal heart motion. Outcomes of the selected group with fibroids were compared with a control group of 715 women without fibroids whose pregnancy was detected by early ultrasound from the same cohort. The rate of spontaneous abortion was 14% in the fibroid group versus 7.6% (P < .05) in the control group. Other increased risks associated with a pregnancy complicated with fibroids include preclampsia, placental abruption, premature rupture of membranes, intrauterine growth restriction, and preterm delivery.

In a prospective, cohort study of 2678 women, Hossain et al. examined the relationship between vaginal bleeding in early pregnancy and preterm delivery. Twenty-six percent of women reported vaginal bleeding during the
first or second trimester of their pregnancy. They found that vaginal bleeding in early pregnancy was associated with a 1.57-fold increased risk of preterm delivery. Vaginal bleeding had a stronger relationship with spontaneous preterm labor than with preterm premature rupture of membranes. The researchers also found that the most significant risk occurred when the vaginal bleeding persisted in the first and second trimesters.13

The amount of bleeding, along with other symptoms such as pain, identifies the urgency of the visit and contributes to the signs and symptoms that are considered part of a differential diagnosis. In a recent prospective study of 370 women with a positive pregnancy test and vaginal bleeding, the authors defined light bleeding as lighter than a period, moderate bleeding as similar to a period, and heavy bleeding as heavier than a period.3 Women reporting moderate to heavy bleeding had more than twice the rate of spontaneous abortion compared with those reporting light bleeding (24.1% versus 9%; \( P = .003 \)). They also reported, however, that 75% of women with heavy bleeding continued the pregnancy to viability.3

EVALUATION OF THE WOMAN WITH FIRST-TRIMESTER BLEEDING

It is common for a woman to present with a history of missed menses, a positive pregnancy test, an episode of vaginal bleeding, and a high level of anxiety. In evaluating women who have vaginal bleeding in early pregnancy, it is important to use a systematic approach so that an appropriate management strategy can be developed. Women who report heavy bleeding, abdominal pain, fever, or passage of tissue require immediate evaluation.2 The initial approach is to complete a thorough history, including patient age, previous pregnancy history, last menstrual period and last normal menstrual period (LMP/LNMP), regularity of menstrual cycles, past use of medications or current medication use, and most recent use of contraceptive methods, especially intrauterine devices (IUDs). Pregnancy that occurs with an IUD in place carries a risk of spontaneous abortion of 50% to 60% if the device is left in place.14 The IUD should be removed if the strings are visible.15 Exploration of the presenting complaint includes when the onset of bleeding occurred; the amount, color, and consistency of the blood and the clots in the blood; what was associated with the onset (e.g., sexual activity, flying, lifting, vomiting, etc.); and whether pain, cramping, or discomfort is associated with bleeding (Box 1).

After obtaining the history and reviewing the systems, a physical examination should be completed, including vital signs, deep palpation of the abdomen for tenderness, and a speculum examination. The speculum examination will identify the amount and characteristics of any bleeding that is visible. Visualization of the cervix and vagina is conducted to identify trauma or abnormalities, such as polyps, and allow sampling of the cervix for cultures as appropriate. Lastly, a bimanual examination is performed to appreciate the size and shape of the uterus, consistency and dilatation of the cervix, cervical motion tenderness, and to note any abnormalities in the adnexa. This evaluation can document the significance of the bleeding reported by the patient, identify any infectious agents or abnormalities, such as cervical polyps, that may predispose the woman to bleeding, and identify any masses in the adnexal region. A laboratory evaluation should be completed, including a complete blood cell count with differential, blood typing with Rh identification, quantitative hCG, and infection screening if indicated. In addition, an examination of thyroid-stimulating hormone and progesterone levels may be ordered as indicated.

The current availability of ultrasound, especially transvaginal imaging, has aided in the evaluation of the woman presenting with first-trimester vaginal bleeding. However, with the common availability of office ultrasound equipment, it is tempting to evaluate the complaint using ultrasound assessment and to forego the physical examination. This limits a thorough evaluation and may lead to an incomplete assessment, which could lead to missing other diagnoses that are important in managing the pregnancy.

Subchorionic Hemorrhage

In the case of J.S. (described in Box 1), she has a viable pregnancy despite significant vaginal bleeding and no obvious cause for the bleeding in her physical examination. Following the determination that there is an intrauterine pregnancy, a formal ultrasound is needed to determine the other sources of the bleeding, such as subchorionic hemorrhage. Subchorionic hemorrhage is defined as “bleeding resulting in marginal abruption with separation of the chorion from the endometrial lining.”16 The incidence of subchorionic hemorrhage has been reported to be between 3.1% and 9%,2,16,17 and there is a 2.2- to 3.0-fold increase in spontaneous abortion when a subchorionic hemorrhage occurs.3,18

The timing of this bleeding is generally in the late first trimester and unless the hemorrhage is large, the prognosis is good. Ultrasound can confirm fetal viability in the presence of bleeding, but the presence of cardiac activity does not ensure that the pregnancy will continue developing normally. A viable fetal heart rate does, however, reduce the likelihood of pregnancy loss. The management of subchorionic hemorrhage is pelvic rest, and some practitioners recommend that the woman be on bed rest until the bleeding has subsided for 24 hours, although there is no evidence that decreased activity reduces the incidence of spontaneous abortion. Subchorionic hemorrhage will generally resolve spontaneously.

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Box 1

J.S. is a 33-year-old gravida 3 para 2 who presented for pregnancy confirmation on August 18. Her last menstrual period was June 21 with removal of an intrauterine device on June 24 followed by no further menses. J.S. reported having a fainting episode and was taken to the emergency room where her pregnancy was confirmed on August 15, with a quantitative beta-human chorionic gonadotropin (βhCG) of 82787 mIU/mL. A second quantitative βhCG test was drawn on August 18 and found to be 119148 mIU/mL, with a progesterone level of 28.9 mIU/mL. A transvaginal ultrasound was performed, and it was determined that J.S. had an intrauterine pregnancy and a fetus with a crown-rump length of 12 mm, which is consistent with a gestational age of 7 weeks and 3 days (using the standard menstrual weeks); positive fetal heart motion was 150 beats per minute. On August 25, J.S. presented with spotting for 2 days. A physical examination was essentially normal without abdominal tenderness. A speculum examination found no blood in the vagina; the cervix was nonfriable without lesions, and no significant discharge was noted. The uterus was compatible with 8 to 9 weeks' gestation, and the adnexa were negative. Transvaginal ultrasound identified an intrauterine pregnancy with positive fetal heart motion at 187 beats per minute; positive fetal motion was noted; and the crown-rump length was 22 mm, which is consistent with a gestational age of 8 weeks and 5 days. J.S. was reassured by these findings and given instructions to “take it easy for a few days.”

On September 1, J.S. called with a description of heavy, bright red bleeding for 1 day with onset after sexual activity. The physical examination later that day revealed that her abdomen was nontender and her uterus was palpable at the symphysis; blood in the vaginal vault that appeared to come from the cervical os was noted on the speculum examination. On a bimanual examination, her cervix was long and closed and the size of her uterus was consistent with a 9- to 10-week gestational size; it was also nontender. Transvaginal ultrasound revealed an intrauterine pregnancy with the fetal crown-rump length of 30 mm, which was consistent with a gestational age of 9 weeks and 5 days; fetal heart motion was detected at 147 beats per minute; positive fetal movement was seen and fetal heart tones were detectable using Doppler ultrasound. The assessment was a viable intrauterine pregnancy at 10 weeks with adequate interval growth. A possible subchorionic hemorrhage was the putative etiology of the bleeding. J.S. was instructed to maintain pelvic rest, monitor the bleeding, and to have a formal ultrasound to identify any other abnormalities, such as subchorionic hemorrhage or early evidence of incompetent cervix.

β-Human Chorionic Gonadotropin or Ultrasound?

Pregnancy viability can be determined using a combination of quantitative βhCG and/or ultrasound assessments. The American College of Radiology Expert Panel on Women’s Imaging published a concise review of the literature with criteria for the use of laboratory and ultrasound evaluation in 2005. This document summarizes the most appropriate use of quantitative βhCG and ultrasound procedures for the management of first-trimester bleeding based on the evidence for efficacy.

βhCG is detectable after implantation of the blastocyst (8–9 days after ovulation or day 23 of a 28-day cycle) because it is produced in the placenta by the syncytiotrophoblast. The level of βhCG will double approximately every 2 days during early pregnancy and is an indicator of the normal development of the pregnancy.

In addition, multiple authors have correlated βhCG levels with sonographic findings in early pregnancy. βhCG levels can assist with the interpretation of ultrasound findings and help the provider recognize normal versus abnormal conditions. When βhCG is above a specified discriminatory level, structures identifying a normal pregnancy will be present. Discriminatory levels for βhCG that correlate with normal pregnancy development are listed in Table 1. These values are averages drawn from the published literature. Each ultrasound department will have individualized discriminatory levels based on their ultrasound equipment, experience, and institutional analysis.

βhCG levels are important for both initial and follow-up management of women presenting with first-trimester bleeding to confirm and identify normal versus abnormal development of a pregnancy. βhCG levels can be used to follow a woman in early pregnancy when ultrasound is not available or until an ultrasound will be of value (e.g., once βhCG levels reach 1000 mIU/mL for detection using transvaginal ultrasound or βhCG levels of 1800 mIU/mL for detection using abdominal ultrasound).

Ultrasound

Ultrasound has been available to evaluate early pregnancy since the 1980s, and standard criteria have been adopted for its use. With the widespread adoption of ultrasound technology, many providers have become familiar with and perform first-trimester scans, both transabdominally and transvaginally. If the gestational age is less than 8 or 9 weeks, a transvaginal approach should be used in order to adequately recognize the intrauterine structures.

Table 1. Discriminatory Levels for β-Human Chorionic Gonadotropin

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Detection by Ultrasound (Approximate Weeks’ Gestation)</th>
<th>Quantitative βhCG (mIU/mL)</th>
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<tbody>
<tr>
<td>Gestational sac detection</td>
<td>Detectable at 4.5 wks when mean diameter is 2–3 mm</td>
<td>Detectable on TVUS at 1000 mIU/mL; detectable on abdominal ultrasound at 1800 mIU/mL</td>
</tr>
<tr>
<td>Yolk sac identification</td>
<td>5 wks at 5–6 mm</td>
<td>1000–7200 mIU/mL</td>
</tr>
<tr>
<td>Fetal pole identification</td>
<td>5–7 wks</td>
<td>7200–10,800 mIU/mL</td>
</tr>
<tr>
<td>Cardiac activity detection</td>
<td>6–7 wks</td>
<td>&gt;10,800 mIU/mL</td>
</tr>
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βhCG = beta-human chorionic gonadotropin; TVUS = transvaginal ultrasound.
Identifying early pregnancy structures can be difficult, but a knowledge of the presence and timing of structure development assists in the management and counseling of women with vaginal bleeding. The structures that correlate with a healthy pregnancy and developing fetus are identification of an intrauterine gestational sac, the presence of a yolk sac within the gestational sac, observation of a fetal pole, and fetal heart motion. Dighe et al. identified the discriminatory levels of $\beta$-hCG for early pregnancy that correlated with ultrasound findings. At a level of 1000 to 7200 mIU/mL, a gestational sac should be seen; at 7200 to 10,800 mIU/mL, a yolk sac should be visible; and at a level of >10,800 mIU/mL, a fetal pole with cardiac motion should be seen.

The gestational sac grows approximately 1 mm every day in a healthy pregnancy. The first structure seen within the gestational sac is the yolk sac, which confirms an intrauterine implantation. The yolk sac lies between the chorion and amnion, but the amnion can only rarely be seen with standard office equipment. The yolk sac can be seen when the gestational sac is 5 to 6 mm in diameter, which corresponds approximately to 5 weeks’ gestation. In addition, a yolk sac should always be present when the gestational sac is 8 mm in size. If it is not present, the normalcy of the pregnancy should be questioned. The yolk sac degenerates and is generally no longer visible by 10 weeks’ gestation. The fetal pole can be identified at 5 to 7 weeks’ gestation and should grow consistent with the gestational sac, at approximately 1 mm per day. Fetal heart motion is visible as early as 6 weeks’ gestation but may reveal a low heart rate of <100 beats per minute early. The absence of cardiac activity in a fetus that has a crown-rump length of >5 mm correlates with fetal demise. A correlation of quantitative $\beta$-hCG along with ultrasound findings provide the clinician with the best evidence of appropriate pregnancy development.

### Spontaneous Abortion/Miscarriage

The most common abnormal finding in a woman with a positive pregnancy test and vaginal bleeding is spontaneous abortion or miscarriage. Bleeding into the decidua with resulting necrosis disrupts placental integrity and usually precedes expulsion of the uterine contents. Categorizing the process of a spontaneous abortion assists with the strategies for management. For example, if the cervix is dilated and there has been a gush of fluid, inevitable abortion is diagnosed and the recommendation is to empty the uterus in order to prevent complication. If the classification is a missed abortion, expectant management may be an option for the woman. Terminology used to describe the varying conditions with spontaneous abortion is listed in Table 2.

The etiology of spontaneous abortion is varied, including genetic abnormalities (aneuploidy, monosomy, polyplody, trisomy, and translocations); uterine abnormalities (synechiae and leiomyoma, etc.); maternal disorders (progesterone deficiency, diabetes mellitus, and hypothyroidism); autoimmunity disorder (systemic lupus erythematosus and antiphospholipid syndrome, etc.); infections (sexually transmitted infections, toxoplasmosis, and listeria monocytogenes); or environmental hazards (smoking, drug use, alcohol, and radiation, etc.). In many instances, the etiology remains unknown.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Threatened abortion</td>
<td>History of pain and bleeding with live fetus identified</td>
</tr>
<tr>
<td>Inevitable abortion</td>
<td>Fluid expulsion with cervical dilatation</td>
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<tr>
<td>Missed abortion</td>
<td>Presence of gestational sac following death of embryo; may be asymptomatic</td>
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<tr>
<td>Anembryonic pregnancy</td>
<td>Gestational sac without identification of fetal pole; commonly referred to as “blighted ovum”</td>
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<tr>
<td>Incomplete abortion</td>
<td>Partial expulsion of tissue; associated with pain and bleeding; also referred to as pregnancy loss with retained products of conception</td>
</tr>
<tr>
<td>Complete abortion</td>
<td>Complete expulsion of products of conception</td>
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</table>

Management strategies include surgical evacuation of the uterus, expectant management, and medical management. Options for management should be discussed with the individual woman. Her personal feelings and cultural background will influence her preference. According to Ankum et al., “spontaneous miscarriage is a typical example of a condition where informed shared decision making should be put into practice thus replacing paternalism by partnership.” As long as no infection is evident, nor any significant medical history is present that would increase her risk for complications, then patient preference should be honored.

In addition to the preoperative, medical, or expectant management preparation, support of the woman during the time of pregnancy loss and arrangements for follow-up care is usually the responsibility of the clinician who first reports the diagnosis to the woman. A follow-up appointment 2 weeks after the loss is appropriate to evaluate the patient’s return to prepregnancy status; discuss any results found at the completion of the miscarriage whether surgical, medical, or expectant management was employed; and present options for future family planning. The case of P.B. illustrates a common presentation of a woman in early pregnancy with vaginal bleeding (Box 2).

The detailed management strategy for each option is beyond the scope of this article, but a brief discussion follows. While the procedural components are discussed along with the risks and benefits, the clinician must recognize that the emotional aspects of the diagnosis will influence the readiness of the patient to accept certain strategies. For example, a woman with a missed abortion may not be willing to consider either the surgical or medical approach because of a concern that “What if the tests...
are wrong and the pregnancy is okay?” The surgical and medical approaches will definitely bring finality to the pregnancy that some women may not be ready to confront. This part of the management can be difficult, but the woman’s agreement with the management strategy is an essential step in helping her accept the loss.

Evacuation of the Uterus

For many years, the standard of management has been surgical removal of the uterine contents with D&C once a nonviable pregnancy has been confirmed. Surgical intervention has been argued to be a safer alternative, but serious complications have been described with surgical procedures, such as risks of anesthesia, uterine perforation, cervical trauma, intrauterine adhesions, and hemorrhage. In addition, higher infection rates are experienced with D&C when compared to expectant or medical management.

Women should be counseled about both the benefits and risks of D&C. While the risks or potential complications are described above, many women find that the ability to schedule the procedure without delay is beneficial. Candidates for scheduled surgical intervention are women that have low anesthesia risk, including having nothing to eat or drink for a period of time before the procedure. D&C is generally performed with vacuum aspiration. A preoperative history and physical examination should be completed, and a laboratory evaluation, including a complete blood cell count with differential, blood type, and Rh needs to be documented before the procedure is performed.

Preoperative teaching about the procedure includes a review of anesthesia options. General anesthesia may be offered in some settings for women who are concerned about being awake during D&C. Conscious sedation or a paracervical block is also used when procedures are completed in the office setting. The procedure will be a same-day surgery with discharge home. Pain management with ibuprofen 600 mg every 6 hours or 800 mg every 8 hours for a few days at most is generally sufficient. Women are usually instructed that bleeding may be similar to a period; however, many describe very light bleeding after a D&C.

New information has emerged about using manual vacuum aspiration (MVA) of uterine contents as an alternative to D&C. MVA was initially described for use with incomplete miscarriage and has since been expanded as a strategy for missed miscarriage. Milingos et al. assessed the efficacy of MVA after early fetal loss or incomplete miscarriage and found it to be a safe option with a reduced financial cost. In addition, the procedure was well tolerated by women. The retrospective, observational study was completed on 245 women who were <91 days’ gestation. The procedure was completed in an outpatient treatment facility using cervical ripening with misoprostol followed by local anesthesia to the cervix. There were no major complications reported, and the efficacy was reported to be 94.7%. Advantages of the procedure include lower risks, because the woman is not exposed to general anesthesia, and a decreased need for the operating room. For centers or practices where MVA is available, it is an additional option for women, especially those who do not want to wait for completion.

Expectant Management

Expectant management is a term applied when a woman desires to wait for her body to normally expel the products of conception. Expectant management is the initial choice of 50% to 70% of women with a diagnosis of early pregnancy loss. For some, however, the uncertainty of when the passage will occur along with the emotional aspect of continuing to carry a “lost” pregnancy may increase the stress for the woman. The interval to spontaneous expulsion of uterine contents is unpredictable.

The natural course of first-trimester loss depends on the classification of the miscarriage as incomplete, missed, or

Box 2

P.B. is 37-year-old gravida 4 para 2 sab 1 who had her last menstrual period (LMP) on June 19 and who used a home pregnancy test on August 9. The result was positive, and P.B. presented August 13 for confirmation of pregnancy. She denied any symptoms of pregnancy and, based on her last experience of miscarriage 4 months earlier, felt that this was not a viable pregnancy. She reported some light spotting during the previous night and denied any recent sexual activity.

The pregnancy dating was 7 weeks and 6 days by LMP. The examination revealed normal vital signs; a nontender abdomen without a palpable uterus at the symphysis; no blood was noted in the vault; the cervix was >3 cm long and closed on bimanual examination; the uterus was retroflexed, and was the appropriate size for 6 to 7 weeks’ gestation; and there was no tenderness or masses palpable in the adnexal region. Transvaginal ultrasound revealed an intrauterine pregnancy with a gestational sac of 21 mm, consistent with a gestational age of 6 weeks and 4 days. A positive decidual reaction was noted and the yolk sac was visualized, but no fetal pole was noted. In this case, the inability to identify a fetal pole during the ultrasound is likely because the yolk sac was masking the structure. Initial quantitative beta-human chorionic gonadotropin (βhCG) was 23,545 mIU/mL; 48 hours later, it was 26,415 mIU/mL. P.B. was unable to return for 2 weeks, and was counseled about the danger signs and need for medical care for both spontaneous abortion and ectopic pregnancy.

On August 25 (9 weeks and 4 days by dates), no further bleeding was noted; P.B. continued to report no pregnancy symptoms. Transvaginal ultrasound revealed a 28-mm gestational sac that was consistent with a pregnancy of 7 weeks and 4 days. The fetal pole measured 8 mm, consistent with a gestational age of 6 weeks and 4 days, and no yolk sac was visible. Only after the yolk sac deteriorated was the fetal pole able to be identified. The quantitative βhCG was 18,925 mIU/mL. P.B. was sent for formal ultrasound and the office ultrasound findings were confirmed. The conclusion was that there was an intrauterine pregnancy with fetal demise, which is consistent with the diagnosis of missed abortion. P.B. received information about her options, which included expectant management, dilation and curettage, or medical management with misoprostol. After discussion with her husband, she elected to undergo surgical management.

P.B. continued to report no pregnancy symptoms. On August 28, quantitative hCG was 48,106 mIU/mL. A repeat ultrasound was completed in an outpatient treatment facility using cervical ripening with misoprostol followed by local anesthesia to the cervix. The quantitative βhCG was 18,925 mIU/mL. P.B. was sent for formal ultrasound and found it to be a safe option with a reduced financial cost. In addition, the procedure was well tolerated by women. The retrospective, observational study was completed on 245 women who were <91 days’ gestation. The procedure was completed in an outpatient treatment facility using cervical ripening with misoprostol followed by local anesthesia to the cervix. There were no major complications reported, and the efficacy was reported to be 94.7%. Advantages of the procedure include lower risks, because the woman is not exposed to general anesthesia, and a decreased need for the operating room. For centers or practices where MVA is available, it is an additional option for women, especially those who do not want to wait for completion.
anembryonic based on diagnostic ultrasound. Luise et al.\textsuperscript{6} followed 1096 consecutive women with the diagnosis of first-trimester loss. Two had molar pregnancies, and the 408 who were diagnosed with complete miscarriage were excluded. Data were available for 451 women who chose expectant management. Of the women who chose expectant management, 81% had a natural completion of the miscarriage without surgical intervention. Successful completion varied by initial classification. Six weeks after enrollment, 91% who were originally classified as “incomplete” had passed all tissue and were no longer pregnant; of those originally diagnosed with a missed abortion, 76% were complete at 4 weeks, and of those diagnosed with an anembryonic miscarriage, 66% were complete at 4 weeks. The authors observed that women prefer expectant management and that the majority of women complete the process without difficulty.\textsuperscript{9}

A meta-analysis by the Cochrane Collaboration compared the safety and efficacy of expectant management with surgical treatment for early pregnancy loss.\textsuperscript{25} There were a total of 689 participants in five randomized trials that were reviewed. The conclusion of the review was that neither management strategy was superior to the other, but expectant management was confirmed to be a safe option. The observation period for expectant management ranged from 2 to 6 weeks without any complications associated with a prolonged waiting period. There was an increased need for unplanned surgical evacuation in the expectant management group (relative risk, 4.78; 95% confidence interval, 1.99–11.48). The women in the expectant management group had more days of bleeding, but there was no difference between the two groups in risk of hemorrhage. The risk of pelvic infection was decreased with expectant management when compared to surgical evacuation.\textsuperscript{6}

While the Cochrane review had limited data on psychosocial outcomes, there were no differences found between expectant management and surgical treatment. Women should be allowed to choose the option that will be best for them. Expectant management lowers the need for surgical intervention and prevents serious complications that may result from surgery. According to Wierenga-de Waard et al.,\textsuperscript{26} up to 40% of surgical procedures can be avoided by awaiting natural completion of the miscarriage.

If expectant management is chosen, women should be counseled about expected heavy bleeding and cramping as well as danger signs that require medical assistance. Although complications are rare, fever or very heavy bleeding are possible and, if present, require surgical and/or medical intervention. Weekly follow-up can be offered while awaiting completion, and a final evaluation 2 weeks after expulsion of the uterine contents is the standard recommendation.

**Medical Management**

Lastly, the woman can be counseled about medical management with a prostaglandin E1 analogue. Zhang et al.\textsuperscript{10} compared medical management using misoprostol with surgical evacuation assessing the efficacy, safety, and patient acceptability of the treatment received. Of the 491 women treated with misoprostol, 71% had complete expulsion by day 3 and 84% had complete expulsion by day 8. There was a 16% failure rate that required surgical intervention. A high percentage (78%) of women treated reported that they would use the treatment again if needed, demonstrating a high acceptance of the management strategy.\textsuperscript{10}

Medical management can be offered if the woman has a pregnancy loss of <11 weeks’ gestation that is confirmed by ultrasound. Increased bleeding has been encountered using this method when older gestations are managed medically.\textsuperscript{20} Medical management is not recommended in women who are anemic (hemoglobin <9.5 g/dL), hemodynamically unstable, have a clotting disorder, use anticoagulants, or are allergic to nonsteroidal antiinflammatory drugs or prostaglandins. Women should have access to immediate transportation if she needs to seek treatment for a complication. Finally, evaluation of the availability of help at home is paramount, not only for transportation but also for care of children while the woman is completing the process.\textsuperscript{27}

Evaluation of the woman is important to ensure that she is a candidate for medical management both physically and emotionally. After evaluation and informed consent, the recommended management includes a prescription for 600 to 800 mcg of misoprostol. The woman is instructed to place the tablets (3 or 4 200-mcg tablets) deep into the vagina. Cramping and bleeding generally begin within 8 hours of misoprostol placement. A repeat dose can be given if no results occur after 8 to 12 hours. The majority of patients will completely pass the products of conception after 1 or 2 doses of misoprostol. Side effects of the treatment include nausea, vomiting, and diarrhea. Some clinicians provide an antiemetic before medical management to reduce the side effect of nausea.\textsuperscript{10,27}

Follow-up includes monitoring the level of quantitative βhCG. Initially, the level of hCG should drop precipitously in the first 48 hours and continue to decline to pre-pregnancy levels in 2 to 3 weeks.\textsuperscript{28} Follow-up with ultrasound has been described by some but is not felt to be necessary as long as the hCG levels are declining appropriately. Final evaluation is scheduled 2 to 3 weeks after the passage of the products of conception.

**Ectopic Pregnancy**

Ectopic pregnancy is one diagnosis that cannot be missed without potential life-threatening outcome. This condition continues to be the leading cause of maternal death in the United States in the first trimester of pregnancy and accounts for 10% to 15% of overall maternal mortality.\textsuperscript{29} Because of advances in diagnosis and management in outpatient settings and with multiple visits, establishing a current reliable incidence rate of ectopic pregnancy is...
The incidence of ectopic pregnancy has increased since the evolution of assisted reproductive technologies. Diagnosis of this condition remains a challenge for any obstetric provider. Although appropriate history-taking and the physical examination are the foundation for accurate and timely diagnosis, the incidence of ectopic pregnancy can present with a very confusing clinical picture (Box 3).

A general rule of thumb is if a woman has missed her period, has a positive pregnancy test, and is bleeding, it is essential that the location of the pregnancy be identified as part of the initial evaluation. Bleeding and pain are associated with ectopic pregnancy but are not always present. The presence of bleeding and pain with a positive pregnancy test necessitates immediate evaluation.

Generally speaking, $\beta$-hCG levels in an ectopic pregnancy are lower than expected for gestational age and do not have the normal doubling pattern seen in an intrauterine pregnancy. Lack of visualization of an intrauterine gestational sac on ultrasound is an important finding, especially when the quantitative $\beta$-hCG is above the discriminatory level of 1000 mIU/mL. This finding may indicate that the pregnancy is extraterine. Women who present with these findings are referred to an obstetrician–gynecologist for management.

The determination of hemodynamic stability is an early assessment strategy. After the identification of stability, a medical history and a physical examination may give insight to the diagnosis if there is significant cervical motion tenderness or an adnexal mass is palpated. Laboratory evaluation includes quantitative $\beta$-hCG (with an immediate result requested), complete blood cell count with differential, and blood typing with Rh. Knowing a woman’s serum progesterone level is not helpful when she presents with acute symptoms.

A correlation of $\beta$-hCG levels and ultrasound findings are key to the evaluation of an ectopic pregnancy. Early diagnosis can prevent the morbidity and potential mortality of ectopic pregnancy. When a patient is asymptomatic, has a quantitative $\beta$-hCG $\geq 1500$ mIU/mL, and when a transvaginal ultrasound does not reveal an intrauterine gestational sac, an ectopic pregnancy is probable. This is not absolute, however, because there can be a higher $\beta$-hCG and no visualized fetus in early multiple gestations.

Expectant management is only feasible if the quantitative $\beta$-hCG level is low ($<1000$ mIU), an intrauterine gestational sac is not present, and no adnexal mass is seen, because this clinical situation may actually develop into a viable pregnancy. Of course, expectant management would only be recommended when the woman has ready access to care and no abdominal pain. If expectant management is chosen, a repeat quantitative $\beta$-hCG assessment in 2 days along with repeat ultrasound (based on the findings of the quantitative $\beta$-hCG assessment) will be needed to determine if there is a viable pregnancy.

Ectopic pregnancy can be treated either surgically or medically. Medical intervention using methotrexate showed an overall success rate of 89% in a meta-analysis by Barnhart et al. Success is improved with medical management when the gestational age is <6 weeks, the fetus is not alive, and the adnexal mass is <3.5 cm. Candidates for medical management must be hemodynamically stable with no signs of active bleeding, free of immunodeficiency syndromes, hepatic or kidney impairment, blood dyscrasias, active gastrointestinal or respiratory disease, not breastfeeding, or with no known sensitivity to the medication. In addition, she must be considered compliant and able to return for follow-up.

Before prescribing methotrexate, the American College of Obstetricians and Gynecologists (ACOG) recommends...
obtaining laboratory results that demonstrate a normal serum creatinine level, normal liver function, and no evidence of anemia, leukopenia, or thrombocytopenia. Single-dose, 2-dose, and multidose regimens are described in an ACOG practice bulletin. The single-dose regimen is simple and has fewer side effects, but it may not be as effective as the multidose regimen based on a recent meta-analysis. Patient counseling is an important facet of medical management because of the need for intramuscular injection of methotrexate (50.0 mg/m²) and close follow-up monitoring of quantitative βhCG.

For the single-dose regimen, an intramuscular injection of methotrexate (50.0 mg/m²) is administered followed by monitoring of quantitative βhCG (days 4 and 7). The βhCG level should decrease by 15% between days 4 and 7 and should continue to decline until nonpregnant levels are reached. The multidose regimen includes repeated injections of methotrexate (1.0 mg/kg) intramuscularly on days 1, 3, 5, and 7 with adjuvant therapy of folic acid (citrovorum factor) 0.1 mg/kg intramuscularly on days 2, 4, 6, and 8 to prevent liver and renal adverse effects of the methotrexate. Medical management requires close follow-up because some cases do not resolve and surgical intervention is needed. Surgical evaluation is required if the quantitative βhCG does not decrease after the initiation of therapy or the adnexal mass does not regress. Finally, a Cochrane review comparing medical management versus surgical management of ectopic pregnancy found no differences between the two with regard to future fertility or the incidence of recurrence.

A woman who presents with a positive pregnancy test, light spotting, lower abdominal pain, and a slowly rising βhCG must be investigated as having an ectopic pregnancy until it is ruled out. However, women with findings suggestive of ectopic pregnancy may not always have an ectopic pregnancy. The case of C.C. illustrates how the assessment and use of technology can provide a picture that is not reflective of the actual clinical condition (Box 3).

GESTATIONAL TROPHOBLASTIC DISEASE

GTD refers to a wide spectrum of disorders arising from the trophoblastic tissue in pregnancy. GTD is the term used to describe abnormalities of the trophoblastic tissue that is associated with pregnancy, and this group of disorders shares certain characteristics with malignant neoplasms. Hydatidiform mole, choriocarcinoma, and placental-site trophoblastic tumors are classified as GTDs.

Hydatidiform mole, the most common type of GTD, is a chromosomal anomaly. This condition develops from abnormal fertilization and development of placental tissue. The reported incidence of hydatidiform mole has wide variation with estimation in the United States of 1 in 1500 to 2000 pregnancies. Higher rates of hydatidiform mole are reported in Asian countries.

Hydatidiform mole has distinct morphologic appearances. Three characteristics are present: distended villi that have grapelike dilations; reduced or absent fetal blood vessels; and significant hyperplasia of the syncytiotrophoblastic and cytotrophoblastic tissue. There is a “grape-like” appearance in the intrauterine cavity on ultrasound. The tissue tends to be hemorrhagic and necrotic, leading to vaginal bleeding. In addition, because of the rapid growth of the tissue, the uterus enlarges at an accelerated rate, which can affect dating of the pregnancy.

A common clinical presentation of molar pregnancy is bleeding in the first trimester. The medical history and physical examination can be very revealing in the workup for this condition. Rapid uterine enlargement, significant nausea and vomiting, and an abnormally high quantitative βhCG level are the classic findings associated with this disorder. Because of the malignant potential of this condition, evacuation of the uterus is the recommended management. After evacuation of the uterus, the woman should have serial monitoring of βhCG levels weekly until there are 3 consecutive values that are normal; βhCG monitoring should then be performed monthly for the next 6 to 12 months. The failure of βhCG levels to decline may indicate the presence of GTD that needs further treatment with chemotherapeutic agents. Joint management with oncology providers can provide excellent continuity of care for long-term follow-up.

CONCLUSION

Vaginal bleeding in the first trimester of pregnancy can be a confusing picture requiring diligence and the continued accrual of knowledge and skills for management. The most common etiologies of vaginal bleeding in the first trimester are spontaneous abortion, ectopic pregnancy, and GTD. The use of diagnostic modalities such as ultrasound as an adjunct to care is appropriate but cannot be substituted for a thorough medical history and an appropriate physical examination. Spontaneous abortion is the most prevalent of these conditions. Expectant management is widely preferred by women, and evidence shows that it poses the least risk. The ability to differentiate between these conditions allows the provider to recommend the appropriate management strategy and provide adequate counseling for the patient.

REFERENCES


