

Manual vacuum aspiration: A safe and effective treatment for early miscarriage

➔ Surgical management of early pregnancy loss has advantages over medical treatment. For one, patients benefit from a brief procedure using local anesthesia. Here, pearls for office-based surgery as well as other treatment options.

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CASE Miscarriage in a 29-year-old woman

A woman (G0P0) presents to her gynecologist with amenorrhea for 3 months and a positive home urine pregnancy test. She is 29 years of age. She denies any bleeding or pain and intends to continue the pregnancy, though it was unplanned. Results of office ultrasonography to assess fetal viability reveal an intrauterine gestation with an 8-mm fetal pole but no heartbeat. The diagnosis is miscarriage.

This case illustrates a typical miscarriage diagnosis; most women with miscarriage are asymptomatic and without serious bleeding requiring emergency

intervention. The management options include surgical, medical, and expectant. Women should be offered all 3 of these, and clinicians should explain the risks and benefits of each approach. But while each strategy can be safe, effective, and acceptable, many women, as well as their health care providers, will benefit from office-based uterine aspiration. In this article, we present the data available on office-based manual vacuum aspiration (MVA) as well as procedure pointers and urge you to consider MVA in your practice for your patients.

Surgical management

Surgical management of miscarriage offers several clear advantages over medical and expectant management. Perhaps the most important advantage to patients is that surgery offers rapid resolution of miscarriage with the shortest duration of bleeding.^{1,2} When skilled providers perform electric vacuum aspiration (EVA) or MVA in outpatient or emergency department settings, successful uterine evacuation is completed in a single medical encounter 99% of the time.¹ By comparison, several follow-up visits and additional ultrasounds may be required during medical or expectant management. Uterine aspiration rarely requires an operating

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room (OR). Such a setting should be limited to cases in which the clinical picture reflects:

- hemodynamic instability with active uterine bleeding
- serious uterine infection
- the presence of medical comorbidities in patients who may benefit from additional blood bank and anesthesia resources.

Office-based MVA

Office-based MVA is well tolerated when performed using a combination of verbal distraction and reassurance, oral nonsteroidal anti-inflammatory drugs (NSAIDs), and a paracervical block with or without intravenous sedation.

Evidence on managing pain at MVA.

Multiple studies have assessed preprocedure and postprocedure pain using NSAIDs, oral anxiolytics, and local anesthesia at the time of EVA or MVA.^{3,4} Renner and colleagues found that women who received a paracervical block prior to MVA or EVA reported moderate levels of pain, according to a 100-point visual analogue scale (VAS), at the time of cervical dilation (mean, 42) and uterine aspiration (mean, 63).⁴ In this same study, patients' willingness to treat a future pregnancy with EVA or MVA using local anesthesia and their overall satisfaction with the procedure was high (mean, 90 on 100-point VAS).

In-office advantages over the OR. Women and clinicians can avoid the extensive scheduling delays associated with ORs, as well as the complications associated with medical and expectant management, if office-based EVA and MVA services are readily available. Compared with surgical management of miscarriage in an OR, office-based EVA and MVA are faster to complete. For example, Dalton and colleagues compared patients undergoing first-trimester procedures in an office setting with those undergoing a procedure in an OR. The mean procedure time for women treated in an office was 10 minutes, compared with 19 minutes for women treated in the OR. In addition, women treated in an office setting spent a mean total of 97 minutes at the office; women treated in

an OR spent a mean total of 290 minutes at the hospital.⁵

Patients' satisfaction with care provided in the OR was comparable to patients' satisfaction with care provided in a medical office. In fact, the median total satisfaction score was high among women who had a procedure in either setting (office score, 19 of 20; OR score, 20 of 20).

Cost and equipment for in-office MVA

Office-based surgical management of miscarriage is more cost-effective than OR-based management. In 2006, Dalton and colleagues conducted a cost analysis and found that average charges for office-based MVA were less than half the cost of charges for a dilation and curettage (D&C) in the OR (\$968 vs \$1,965, respectively).⁵

More recently, these researchers found that usual care (expectant or OR management) was more costly than a model that also included medical and office-based surgical options. They found that the expanded care model—with use of the OR only when needed—cost \$1,033.29 per case. This was compared with \$1,247.58 per case when management options did not include medical and office-based surgical treatments.⁶

The cost of supplies needed to initiate MVA services within an established outpatient gynecologist's office is modest. Equipment includes manual vacuum aspirators; disposable cannulae of various sizes; reusable plastic or metal dilators; supplies for disinfection, allowing reuse of MVA aspirators; and supplies for examination of products of conception (POC; **FIGURE 1**, page 40).

According to WomanCare Global, manufacturer of the IPAS MVA Plus, equipment should be sterilized after each use with soap and water, medical cleaning solution (such as Cidex, SPOROX II, etc.), or autoclaving.⁷ If 2 reusable aspirators are purchased along with dilators, disposable cannulae, and tools for tissue assessment, the price of supplies is estimated at US \$500.⁸ WomanCare Global also offers prepackaged, single-use aspirator kits, which may be ideal for the emergency department setting.⁹



Office-based MVA can be performed with local anesthesia and is faster than surgical management in an OR

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FIGURE 1 MVA equipment



The required equipment for office-based MVA includes a reusable vacuum aspirator (with disinfection supplies), reusable plastic or metal dilators, and supplies for examination of products of conception.

The procedure

To view a video on the MVA device and procedure, including step-by-step technique (**FIGURE 2**), local anesthesia administration, choosing cannula size, and cervical dilation, visit the Managing Early Pregnancy Loss Web site (<http://www.earlypregnancylossresources.org>) and access “Videos.” The video “Uterine aspiration for EPL” is available under password protection and broken into chapters for viewing ease.

The risk of endometritis after surgical management of miscarriage is low. Antibiotic prophylaxis prior to MVA or EVA should be considered. Experts recommend giving a single dose of doxycycline 200 mg orally at least 1 hour prior to uterine aspiration.^{2,10}

Use of EVA or MVA for outpatient management of miscarriage yields the opportunity to conduct immediate gross examination of the evacuated tissue and to verify the presence of complete POC. The process is simple: rinse the specimen through a sieve with water or saline, placed in a clear glass container under a small water bath and backlit on a light box. This allows clinicians to separate uterine decidua and pregnancy tissues. “Floating” tissue in this manner is especially useful in patients with pregnancy of unknown location, as immediate confirmation of a gestational sac rules out ectopic pregnancy.

Examine evacuated tissue for macroscopic evidence of pregnancy. Chorionic villi, which arise from syncytiotrophoblasts, can be seen with the naked eye. Immediate evaluation of POC is also useful for patients who desire diagnostic testing to ascertain a cause of their miscarriage because evacuated tissue stored in saline may be sent to a laboratory for cytogenetic analysis.

FIGURE 2 MVA procedure



If the cannula is already inside the uterus, suction should be created in the syringe and then the syringe should be attached to the cannula. Suction is generated when the valves are released. Once the vacuum is activated, the cannula is maneuvered in the uterus with a combination of rotation and in and out movements between the fundus and internal os.

Medical management

Management of miscarriage with misoprostol is also safe and acceptable to women, though it has a lower success rate than surgical management.

Comparing efficacy: Medical vs surgical management. The Management of Early Pregnancy Failure Trial (MEPF) is the largest randomized controlled trial comparing medical management of miscarriage to surgical management. This multicenter study compared treatment with office-based EVA or MVA to vaginal misoprostol 800 µg. A repeat dose of vaginal misoprostol was offered 48 hours after the initial dose if a gestational sac was present on ultrasound.

Findings from the MEPF trial revealed a 71% complete uterine evacuation rate after

1 dose of misoprostol and an 84% rate after 2 doses.¹ The average (SD) reported pain score documented within 48 hours of treatment with misoprostol or MVA/EVA was moderate (5.7 cm [2.4] on 10-cm VAS). The rate of infection or hospitalization was less than 1% in both treatment groups.

These data should provide patients who are clinically stable and who wish to avoid an invasive procedure reassurance that using medication for the management of miscarriage is a reasonable option.

Misoprostol. Use of misoprostol is associated with a longer median duration of bleeding compared with suction aspiration. After misoprostol, bleeding usually begins after several hours and may continue for weeks.¹¹ Based on 2-week prospective bleeding diary entries from the MEPF trial, women who

used misoprostol for management of miscarriage were more likely to have any bleeding during the 2 weeks after initiation of treatment, compared with women who had suction aspiration.¹²

Clinically significant changes in hemoglobin levels are more common in women treated with misoprostol than in those who choose EVA or MVA; however, these differences rarely require hospitalization or transfusion.¹ Women who are considering use of misoprostol should be aware of common adverse effects, including nausea, vomiting, diarrhea, and low-grade temperature.

Medical management of miscarriage requires multiple office visits with repeat ultrasounds or serum beta-human chorionic gonadotropin (β -hCG) levels to confirm treatment success. In cases of medication

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failure (persistent gestational sac with or without bleeding) or suspected retained POC (endometrial stripe greater than 30 mm measured on ultrasound or persistent vaginal bleeding remote from treatment), women should be prepared for surgical resolution of pregnancy and clinicians should be able to perform an office-based procedure.

Expectant management

Women who choose the “watch and wait” approach should be advised that the process is unpredictable and occasionally requires urgent surgical intervention. Successful resolution of pregnancies that are expectantly managed depends on the type of miscarriage diagnosed at initial presentation. Luise and colleagues conducted a prospective study of 451 women with miscarriage who declined medical and surgical management. They found that the watch-and-wait approach was successful in 91% of women with an incomplete abortion, 76% of women with missed abortion, and 66% of women with anembryonic pregnancies.¹³ Success was defined by the absence of vaginal bleeding and an anterior-posterior endometrial stripe measuring less than 15 mm 4 weeks after initial diagnosis of miscarriage.

Like medical management for miscarriage, expectant management requires multiple office visits plus repeat ultrasounds or β -hCG measurement trends to confirm treatment success. Women who fail expectant management will require medical or surgical intervention to resolve the pregnancy. For those who are seeking pregnancy right away, the unpredictability and longer time to resolution of miscarriage may render expectant management anxiety provoking and unacceptable.

Etiology: Do true and perceived causes match?

Miscarriage during the first 13 weeks of gestation occurs in at least 10% of all clinically diagnosed pregnancies.¹⁰ A recent survey administered by Bardos and colleagues

assessed perceived prevalence and causes of miscarriage in more than 1,000 US men and women.¹⁴ The majority of respondents believed miscarriage is uncommon, occurring in less than 5% of pregnancies. Respondents also believed stressful events, lifting heavy objects, and prior use of intrauterine or hormonal contraception are often to blame for pregnancy loss.

Despite more than 3 decades of data confirming that more than 60% of early losses are associated with chromosomal abnormalities and that an additional 18% may be associated with fetal anomalies, women often blame themselves.¹⁵ Bardos and colleagues found that 47% of women felt guilty about the experience of miscarriage.

Diagnosis: Updated ultrasonography criteria issued

When miscarriage is suspected based on symptoms of pain and bleeding in pregnancy, obtain a thorough history and conduct a limited physical examination. If an intrauterine pregnancy (IUP) was previously identified, a repeat ultrasound can confirm the presence or absence of the gestational sac. If an IUP has not been documented, then additional studies, including serial serum β -hCG examinations and ultrasonography, are essential to rule out ectopic pregnancy. Rh status should be determined and a 50- μ g dose of Rh(D)-immune globulin administered to Rh(D)-unsensitized women within 72 hours of documented bleeding.

Ultrasonography is often used to diagnose miscarriage. Many gynecologists use ultrasound criteria based on studies conducted in the early 1990s that define nonviability by an empty gestational sac with mean gestational sac diameter greater than 16 mm or a crown-rump length (CRL) without evidence of fetal cardiac activity greater than 5 mm.¹⁰ In 2012, members of the Society of Radiologists in Ultrasound Multispecialty Panel on Early First Trimester Diagnosis of Miscarriage and Exclusion of a Viable Intrauterine Pregnancy developed more conservative criteria for the diagnosis of miscarriage.¹⁶



Data have long indicated early pregnancy loss is due to chromosomal abnormalities or fetal anomalies, but women often feel guilt over the experience

Doubilet and colleagues suggested new cutoffs, based on their reanalysis of 2 large prospective studies conducted in the United Kingdom.¹⁷ Calculations for these new cutoffs are based on mathematical adjustments for interobserver variability. Strict adherence to these more conservative criteria is sensible when a pregnancy is desired. For women who do not want to continue the pregnancy there is no medical justification for using this diagnostic process. Indeed, delays can lead to stress and poor outcomes including emergent surgical management for spontaneous and heavy bleeding.

Culture change is needed

Patients' beliefs and scientific evidence about miscarriage are incongruous. By making simple changes in practice and providing straightforward patient education, ObGyns can demystify the causes of miscarriage and improve its management. In particular, providing office-based MVA when requested can streamline treatment for many women. For too long, patients have blamed themselves for miscarriage and physicians have relied on D&C in the OR. Changes in culture surrounding miscarriage are long overdue. 📌

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