

hemorrhage during procedural abortion, its vasoconstrictive properties may aid in controlling bleeding when administered intracervically or paracervically.

Secondary treatment

When bleeding is excessive or refractory to massage and uterotonics, the clinician should move quickly to secondary treatment measures (Fig. 2). The following measures should be instituted without delay: placement of additional intravenous lines, fluid resuscitation, and laboratory assessment, including hemoglobin, coagulation parameters, and a cross-match for possible blood transfusion. If practicing in a resource-limited setting, appropriate management may require transfer to a higher acuity facility or more prompt use of available measures to manage hemorrhage. For providers at clinics without immediate availability of anesthesiologists or operating room facilities, it is important to develop clear protocols for resuscitation and transfer to nearby hospitals. All members of the care team should be alerted to the possibility of resuscitation needs and surgery.

It is important to have blood and coagulation factors available in the setting of hemorrhage to properly manage DIC, a potential cause or effect of the hemorrhage. If clinical suspicion for DIC is high, administration of fibrinogen concentrate is an acceptable first step, even without laboratory evidence. In the setting of rapid bleeding, transfusion of red blood cells, fresh frozen plasma, and/or cryoprecipitate can also be initiated without laboratory evidence of DIC. Laboratory results will then guide further need for transfusion of fibrinogen, red blood cells, fresh frozen plasma, cryoprecipitate, and platelets.

Tranexamic acid (TXA) inhibits plasminogen activation, thus inhibiting the breakdown of fibrinogen, and is an evidence-based treatment for postpartum hemorrhage [112]. Based on evidence from the postpartum literature, many providers are now using TXA in the postabortion setting, both as prophylaxis and treatment. There is insufficient evidence to recommend for or against the use of TXA in the setting of hemorrhage at the time of abortion. Given data supporting its use in postpartum hemorrhage, we suggest it as a safe and effective agent for prophylaxis and treatment for hemorrhage at the time of abortion (GRADE 2C). TXA is commonly administered intravenously as 1000 mg either 30 minutes before the procedure over 10 minutes when used as prophylaxis or as a push when used as treatment. It can also be administered intramuscularly. We anticipate more research on the role of TXA as prophylaxis and treatment for abortion-related hemorrhage.

Reaspiration is appropriate if there is evidence of retained tissue or reaccumulation of blood on ultrasound. We recommend that clinicians place a Foley or Bakri balloon to tamponade the endometrium if retained tissue or hematometra is not suspected and the etiology is thought to be atony or lower uterine segment bleeding (GRADE 1B). This off-label use of the Foley balloon was first reported in 1995 [113] and is supported by a case series of treatment for cervical ectopic pregnancies [114], as well as a retrospective cohort study of second-trimester procedural abortion complications between 2004 and 2007 in which it was used in 37 of 78 patients with hemorrhage from uterine atony [13]. Once the Foley balloon is proximal to the cervix, it may be inflated to between 30 cc and 80 cc with normal saline. The Bakri balloon was specifically designed for postpartum hemorrhage and may also be used in the postabortion setting. Two case reports from 2007 and 2009 describe the successful use of the Bakri in controlling hemorrhage after abortion [115,116]. Although the Bakri can hold up to 500 cc, the two case reports describe inflating the balloon to lower amounts (120–250 cc) with successful tamponade. These balloons should be filled only with normal saline and never with gas, as this may theoretically lead to an air embolus.

In cases of hemorrhage requiring transfusion, it is reasonable to leave the balloon in place for 12 to 24 hours, both for tamponade and while the patient stabilizes. When balloon tamponade results in rapid hemostasis and the patient is hemodynamically stable, a shorter course of 1 to 12 hours is often sufficient. While a balloon is in place, clinicians should regularly evaluate for continued bleeding, either around the balloon or through the tubing. Uterotonics may be administered while the balloon is in place (Fig. 2). While there is no evidence regarding antibiotic administration with the balloon in place, clinicians may consider it in cases of longer placement (12–24 hours). After deflating the balloon, allow time to evaluate any increase in bleeding and reinflation if necessary.

Tertiary treatment

Interventions such as UAE, laparoscopy, laparotomy, and hysterectomy may be necessary if primary and secondary treatment measures are unsuccessful in controlling bleeding. UAE as treatment for refractory postabortion hemorrhage has been described in several case series with a total of more than 70 cases [16,90,117]. In the largest of these series, Steinauer et al. reported 100% success in treating 42 patients with UAE for refractory hemorrhage from atony, cervical laceration, DIC, and lower uterine segment bleeding [16]. In cases of placenta accreta, UAE was successful in treating 43% of cases (four of seven women eventually needed hysterectomy). Two complications of UAE were noted: one contrast reaction treated with diphenhydramine and one femoral embolus requiring emergent embolectomy. Because it is associated with less morbidity and mortality than laparotomy and hysterectomy, we recommend attempting UAE prior to more invasive measures where available (GRADE 1B). In specific circumstances, UAE can serve as an adjunct treatment to laparotomy. Steinauer's series also described two cases in which postabortion hemorrhage was initially controlled with UAE, followed by laparotomy. In one case, a perforation was identified and repaired by laparotomy. In the other case, laparotomy revealed a stable broad ligament hematoma and no perforation.

If interventional radiology is not available, the next step in treating hemorrhage refractory to primary and secondary measures should be laparotomy. Laparotomy is also indicated in cases of confirmed bowel injury, as when viscera are identified in the aspirate or forceps, or in an unstable patient. Laparoscopy may be helpful in confirming a suspected perforation and, when performed by experienced surgeons, can be used to repair a perforation and inspect the bowel. Often, laparotomy is required to treat hemorrhage due to perforation. Though not described in the abortion literature, it is reasonable to attempt to control bleeding with bilateral uterine artery ligation and/or a B-Lynch suture.

Hysterectomy should be considered only after other treatments have failed. Hysterectomy after abortion is rare, and while recent data are lacking, an older report describes that hysterectomies occur in 1.4 of every 10,000 abortions in the United States [21] and, when they do occur, are most often associated with perforation. The decision to proceed to hysterectomy should be made by considering the severity of the hemorrhage and the clinician's ability to stabilize the patient with temporizing measures, such as transfusion and UAE. Ultimately, hysterectomy is the definitive treatment for abortion-related hemorrhage and should be performed rapidly when all other treatments have failed.

3. Clinical recommendations

Please see [Appendix 1](#) for a key to interpreting GRADE.

- While clinical practices vary, we recommend checking a pre-operative hemoglobin or hematocrit level for individuals undergoing later abortion to appropriately assess and manage blood loss (GRADE 1B).