

Intrauterine balloon tamponade for control of postpartum hemorrhage

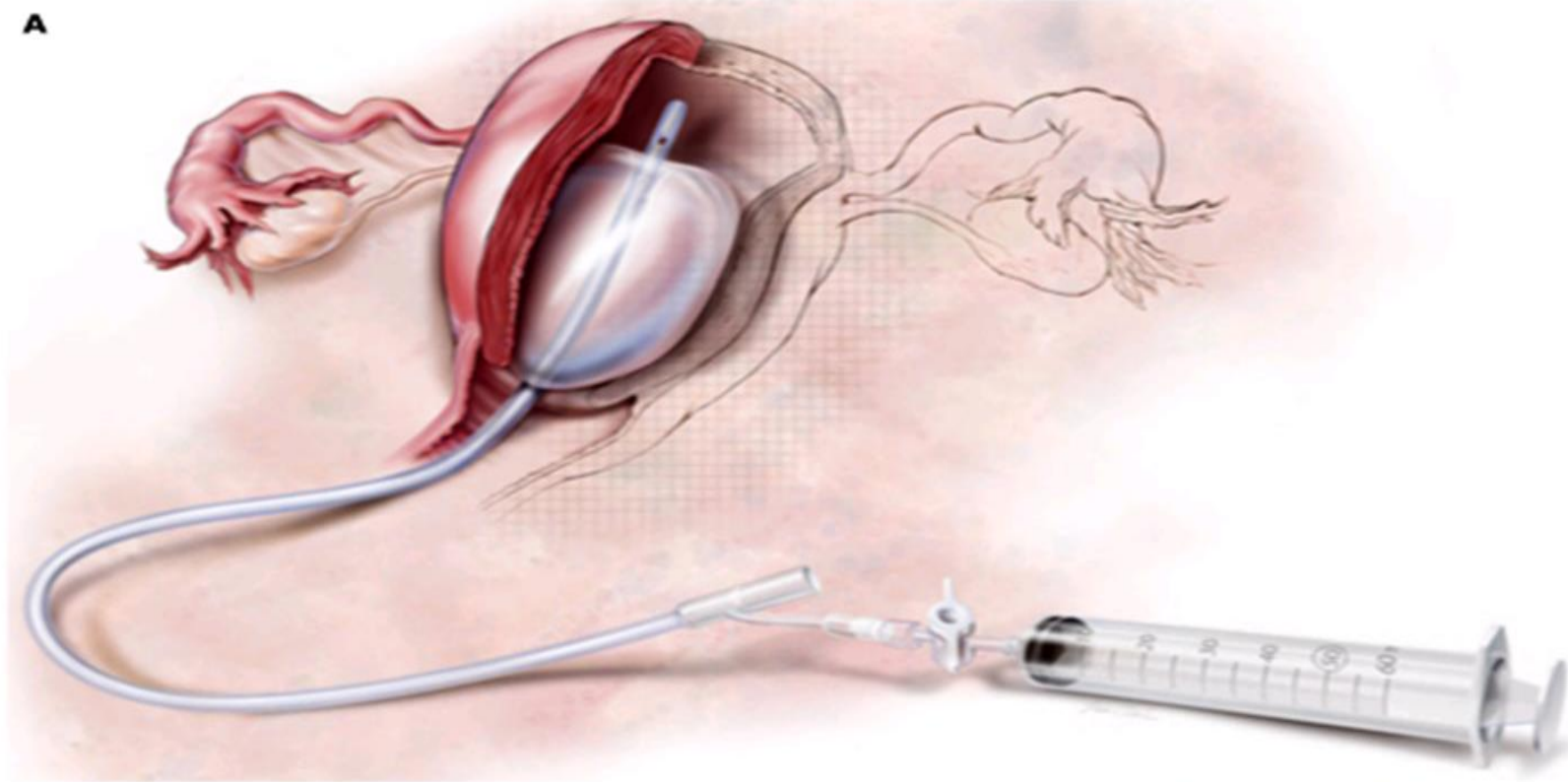
- ▶ Early use of intrauterine balloon tamponade is a way of limiting ongoing uterine blood
- ▶ can be readily implemented by providers with minimal training.
- ▶ It can be a life-saving intervention, especially in low-resource settings where blood transfusion and surgical facilities may not be available

TYPES OF BALLOON CATHETERS

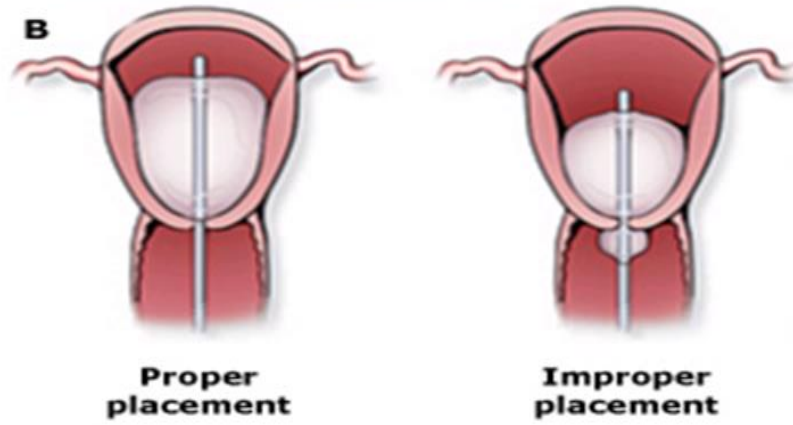
- ▶ **Bakri tamponade balloon catheter**
- ▶ It consists of a silicone balloon that maximum recommended fill volume 500 mL, but volumes up to 1300 mL.
- ▶ connected to a 24 French silicone catheter
- ▶ The collapsed balloon is inserted into the uterus; when filled with fluid, the balloon adapts to the configuration of the uterine cavity to tamponade uterine bleeding.
- ▶ The central lumen of the catheter allows drainage.
- ▶ It designed to monitor ongoing bleeding above the level of the balloon .

Bakri balloon for management of postpartum hemorrhage

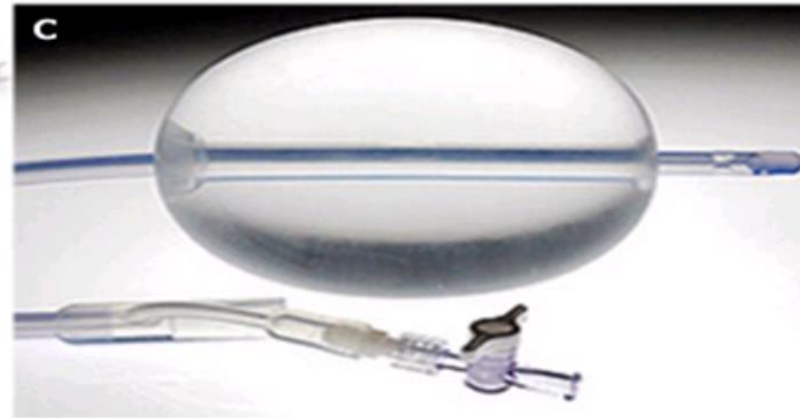
A



B



C



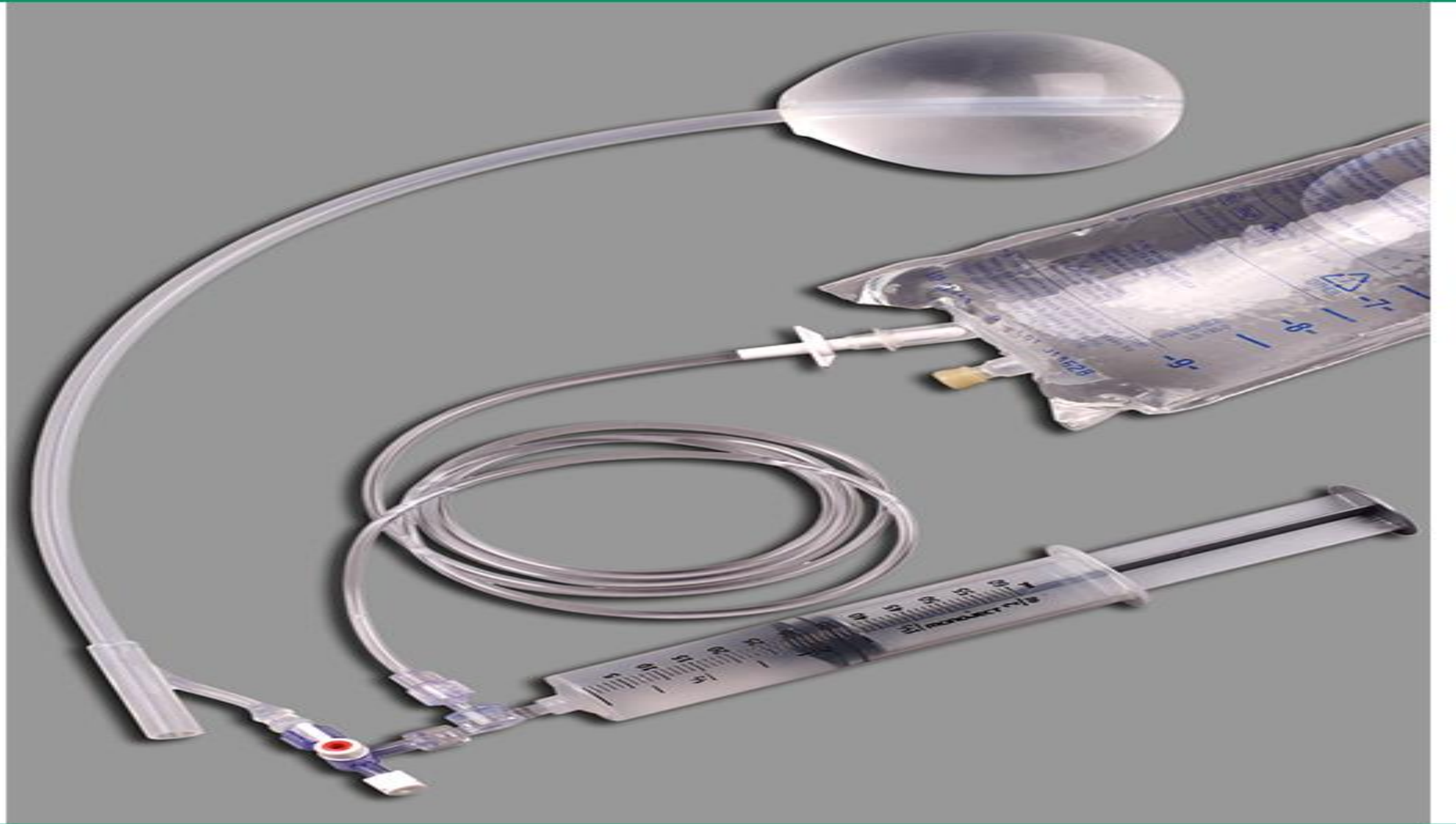
Bakri tamponade balloon catheter



▶ **BT-Cath**

- ▶ The BT-Cath is a silicone balloon (maximum recommended fill volume 500 mL) with an inverted pear shape to conform to the shape of the uterine cavity .
- ▶ In contrast to the Bakri tamponade balloon catheter, the balloon end of the catheter is flush with the end of the balloon.
- ▶ One lumen of the dual lumen catheter is used to infuse saline and expand the balloon, while the other lumen allows drainage of blood from the fundus. It is intended for one-time use.

BT-Cath



MECHANISM OF ACTION

- ▶ Application of inward to outward hydrostatic pressure against the uterine wall; this pressure may or may not be in excess of systemic arterial pressure .
- ▶ Compression of blood vessels reduces blood flow and Facilitates clotting. The net result is reduction in persistent capillary and venous bleeding from the endometrium, placental remnants, and myometrium.

Indications

- ▶ Intrauterine balloon tamponade is indicated when uterotonic drugs and bimanual compression of the uterus fail to control bleeding.
- ▶ Its use is indicated before resorting to more invasive surgical approaches requiring laparotomy.
- ▶ Balloon tamponade is often successful, obviating the need for arterial embolization or an open surgical intervention.
- ▶ Acute postpartum hemorrhage due to **uterine atony**.
- ▶ Intrauterine balloon catheters have also been used with variable success to bleeding after **cesarean delivery with placenta previa, low lying placenta**, or a **focally invasive or adherent placenta** .

- ▶ A small number of cases of **delayed (secondary) postpartum hemorrhage** have been successfully managed with balloon catheters
- ▶ **Acute, recurrent uterine inversion**
- ▶ Prophylactically or as an adjuvant therapy to control bleeding in women with **cesarean scar pregnancy or cervical pregnancy**.

Contraindications

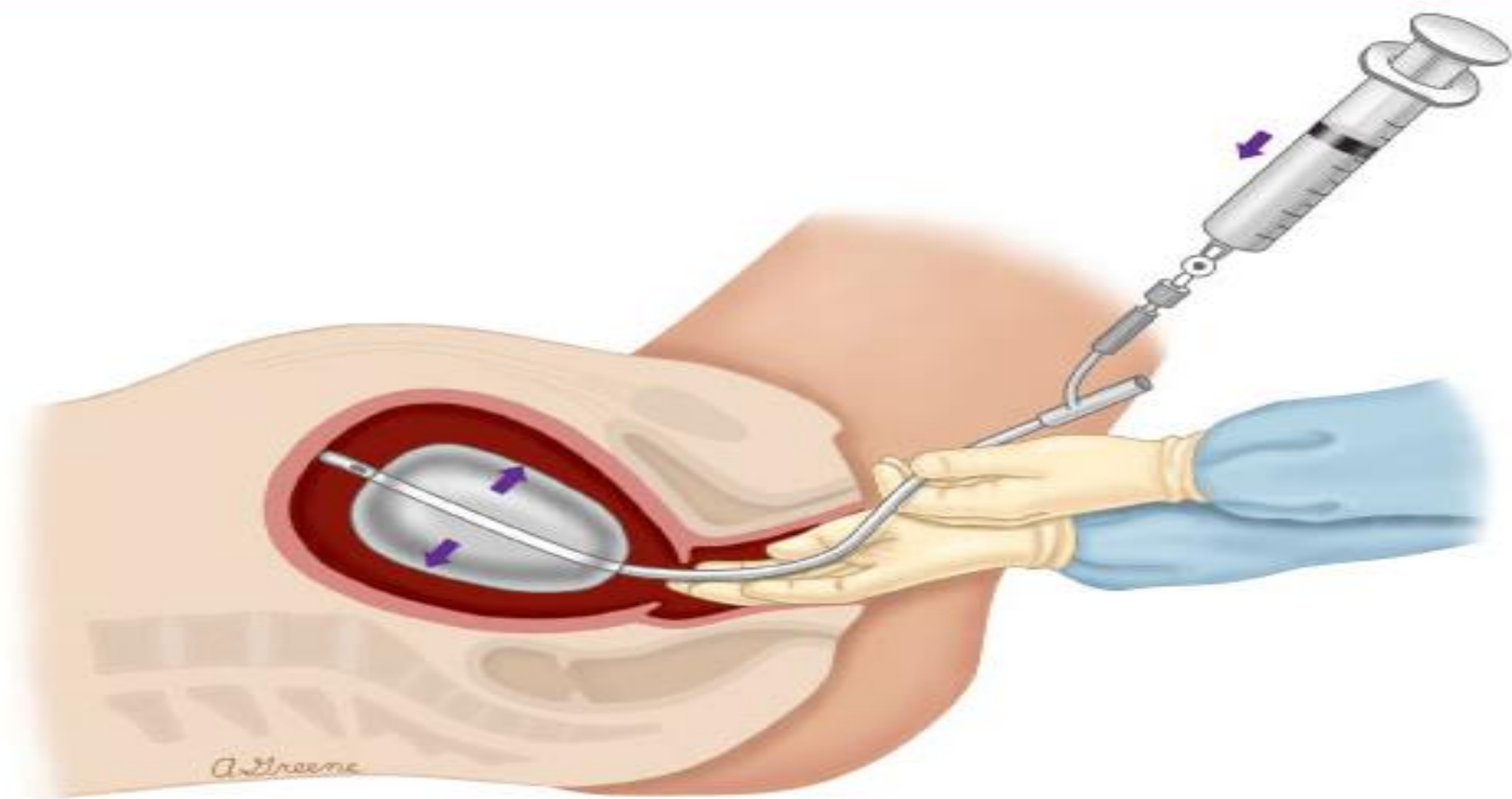
- ▶ Bleeding from pelvic vessels
- ▶ cervical or vaginal trauma
- ▶ uterine abnormalities that prevent effective balloon Tamponade
- ▶ suspected uterine rupture
- ▶ cervical cancer
- ▶ purulent infection of the vagina, cervix or uterus
- ▶ large amount of placenta is adherent to the uterus
- ▶ immediate hysterectomy may be life-saving

TECHNIQUE

- ▶ **The balloon should be inserted before coagulopathy develops since tamponade is less likely be successful if clotting is impaired .**
- ▶ Ensure that the bladder is empty by placing a bladder catheter.
- ▶ Cleanse the cervix and vagina with an antiseptic solution, such as povidone iodine
- ▶ Perform a second visual inspection of the vagina and cervix to ensure the absence of bleeding lacerations as the source of the hemorrhage. Bleeding lacerations should be repaired
- ▶ Check the placenta to ensure that it is complete. Perform a gentle digital examination of the uterine cavity to make sure it is empty

- ▶ Grasp the anterior lip of the cervix with ring forceps and apply gentle traction to align the direction of the cervical canal to that of the uterine cavity
- ▶ Use long dressing forceps to insert the balloon catheter into the uterine cavity, above the level of the internal cervical os, as high in the uterine cavity as possible without exerting any force
- ▶ Alternatively, the catheter can be inserted manually
- ▶ At times, resistance is felt within the proximal part of the uterine cavity after negotiating the cervical canal. This is due to non-alignment of the direction of the cervical canal to that of the uterine cavity and can be managed by gentle pressure antero-posteriorly over the uterine fundus by a hand on the abdomen.

Placement of an intrauterine balloon catheter



- ▶ **Ultrasound, if available, is useful**
- ▶ to confirm correct placement in the uterine cavity to exclude extrauterine placement as might occur with uterine rupture.
- ▶ On post-insertion ultrasound examination, the balloon may be in the lower segment and the upper segment may be well contracted with a thin endometrial shadow.
- ▶ To evaluate for significant residual placental tissue, which should be removed if present

- ▶ Once correct position is confirmed, inflate the balloon with warm sterile fluid (warmth promotes the clotting cascade) until slight resistance is encountered to further instillation
- ▶ This usually occurs between 250 and 300 mL and bleeding slows down or stops.
- ▶ The maximum recommended volume to be instilled depends on the specific device , 500 mL for the Bakri tamponade balloon catheter
- ▶ larger volumes can be infused if needed to control hemorrhage (Bakri tamponade balloon can hold 1300 mL).

PERIPROCEDURE MONITORING AND CARE

- ▶ The effectiveness of balloon tamponade is assessed by the "tamponade test," which rapidly identify patients who will require a laparotomy.
- ▶ After insertion and inflation of the intrauterine balloon, if bleeding promptly stops or is minimal then the test is positive (**successful**), the inflated balloon is left in place, and laparotomy can be avoided.
- ▶ Patients with a negative test (bleeding is not controlled with inflation of the balloon) should proceed to laparotomy and, possibly, hysterectomy. Arterial embolization by an interventional radiologist .

- ▶ **A pen mark** is placed on the abdomen at the level of the uterine fundus. An increase in uterine size above this mark along with changes in pulse, blood pressure, respiratory rate, and urine output despite no overt vaginal bleeding suggests that blood is accumulating within the uterine cavity above the balloon.
- ▶ Most clinicians continue use of **oxytocin infusion** for six to eight hours to prevent uterine atony . Other uterotonics (eg, methylergonovine, prostaglandins) may be used instead of, or in addition to, oxytocin.
- ▶ We suggest administering **broad spectrum antibiotic** prophylaxis while the balloon is in place. Because cervicovaginal bacteria can enter the uterus with introduction of the balloon catheter, the surface of the catheter is a potential site for microbial adherence and retention, and the endometrium is a good target for infection.

- ▶ Monitor for signs and symptoms of ongoing blood loss, such as pallor, dizziness, hypotension, tachycardia, confusion, uterine enlargement, abdominal pain, abdominal distension, and oliguria. Blood transfusion(s) and/or blood products should be given, as needed, to correct prior deficits.
- ▶ Obstetrical providers should be prepared to intervene surgically if the patient's hemodynamic status worsens or does not immediately improve.
- ▶ The balloon catheter can be removed after two hours if hemostasis has been achieved, the patient's vital signs are normal and stable, and any coagulopathy is corrected. Most clinicians leave the balloon in the uterus for up to 24 hours

- ▶ To remove the balloon, it is deflated, either all at once (usual practice) or gradually over several hours, while monitoring the patient for recurrent bleeding.
- ▶ Emergency surgical services and experienced staff should be readily available when the balloon is deflated in case of recurrent hemorrhage.
- ▶ The deflated balloon can be left in situ for 30 minutes to observe for any bleeding and withdrawn once the absence of bleeding is confirmed.

SUCCESS RATE

- ▶ success rates of uterine balloon catheters for controlling hemorrhage range from 20 to 65 percent after cesarean delivery and 90 to 100 percent after vaginal delivery.
- ▶ Even if balloon tamponade fails, it may reduce bleeding and provide time to prepare for other interventions or transportation from a local hospital to a tertiary center.
- ▶ Balloon tamponade protocol observed a 75 percent reduction in use of embolization after initiating this protocol as the second-line approach to treatment for severe postpartum hemorrhage.
- ▶ Coagulopathy and large blood loss before insertion appear to be a risk factors for failure , which underscores the importance of placing the balloon early.

- ▶ The success rates were **90.7 percent** for **arterial embolization**, **84.0 percent** for **balloon tamponade**, **91.7 percent** for **uterine compression sutures**, and **84.6 percent** for **internal iliac artery ligation** .
- ▶ As balloon tamponade is the most rapid, least invasive, and least costly of these approaches, we suggest performing this procedure if uterotonic therapy fails and before resorting to more invasive approaches.
- ▶ Foley balloon catheters are typically too small to significantly compress the inner uterus after delivery of a term or near term baby so multiple balloon catheters may need to be used.

COMPLICATIONS

- ▶ Potential complications include perforation of the uterus during placement or inflation and cervical trauma due to inflation at an incorrect location; however, these complications have not been reported in the postpartum uterus.
- ▶ Infection has been reported, but causality is difficult to prove, as these patients have had multiple risk factors for postpartum fever.

