

Minimally invasive in control of Postpartum Hemorrhage

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Definition

Blood loss	> 500 ml at vaginal delivery
	> 1000 ml at Cesarean
ACOG	10% drop in hematocrit
	Need for blood transfusion
Severe PPH	> 1000 ml loss at vaginal delivery

Any amount of blood loss causes

S/O Hypovolemic Hemorrhagic Shock

- Tachycardia - Hypotension - Reduced urine out put



Why it is important?

- PPH remained one of the top 3 causes of direct maternal deaths.
- Incidence 4% after vaginal delivery
- 6,5% after CS delivery

We have 4 problems



- **Problem 1:** almost 50% of deliveries lose >500 ml of blood.
- **Problem 2:** estimated blood loss is often less than half the actual blood loss.
- **Problem 3:** Most of the serious causes of “PPH” have origins prior to the end of the 3rd Stage of labor.
- **Problem 4:** PPH, as defined, is technically misdiagnosed and clinically irrelevant.

Measuring Blood Loss

A key step to EFFECTIVE TREATMENT.....

- Underestimation leads to delayed intervention.
- Visual estimated amounts of blood loss are far from accurate by as much as 30-50%: especially for very large amounts.
- Old methods for estimating blood loss tend to be complex.
- (include weighing soaked clothes and pads, collection into pans etc., Acid haematin techniques, Spectrophometric technics and measuring plasma volume changes)

Measuring Blood Loss in PPH

THE BRASSS-V DRAPE



CAUSES OF PPH

FOUR “T”s

TONE

TRUAMA

TISSUE RETENSION

THROMBIN



BUT MOST IMPORTANT IS

ALSO

Postpartum Hemorrhage Prevention: Active Management of Third Stage (AMTSL)

- Oxytocin
 - ✎ With or soon after delivery
- Cord traction
 - ✎ Continuous tension
 - ✎ Gentle pull with contraction
- Uterine massage after placenta delivers



Goals of Therapy

- Maintain the following:

Systolic pressure >90 mm Hg

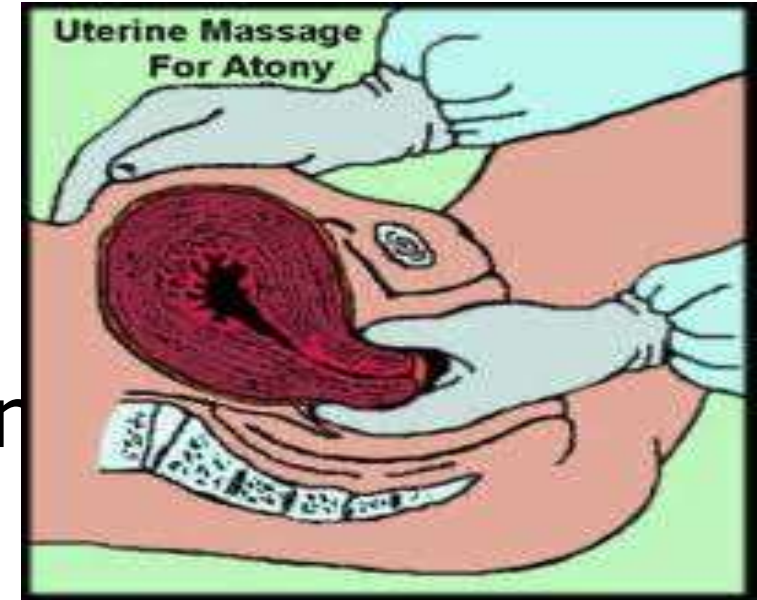
Urine output >0.5 mL/kg/hr

Normal mental status

- Eliminate the source of hemorrhage
- Avoid overzealous volume replacement that may contribute to pulmonary edema

MANAGEMENT of Uterine atony

1. Explore uterus for retained placental tissue.
2. Uterine massage
- 3 Firm bimanual compression



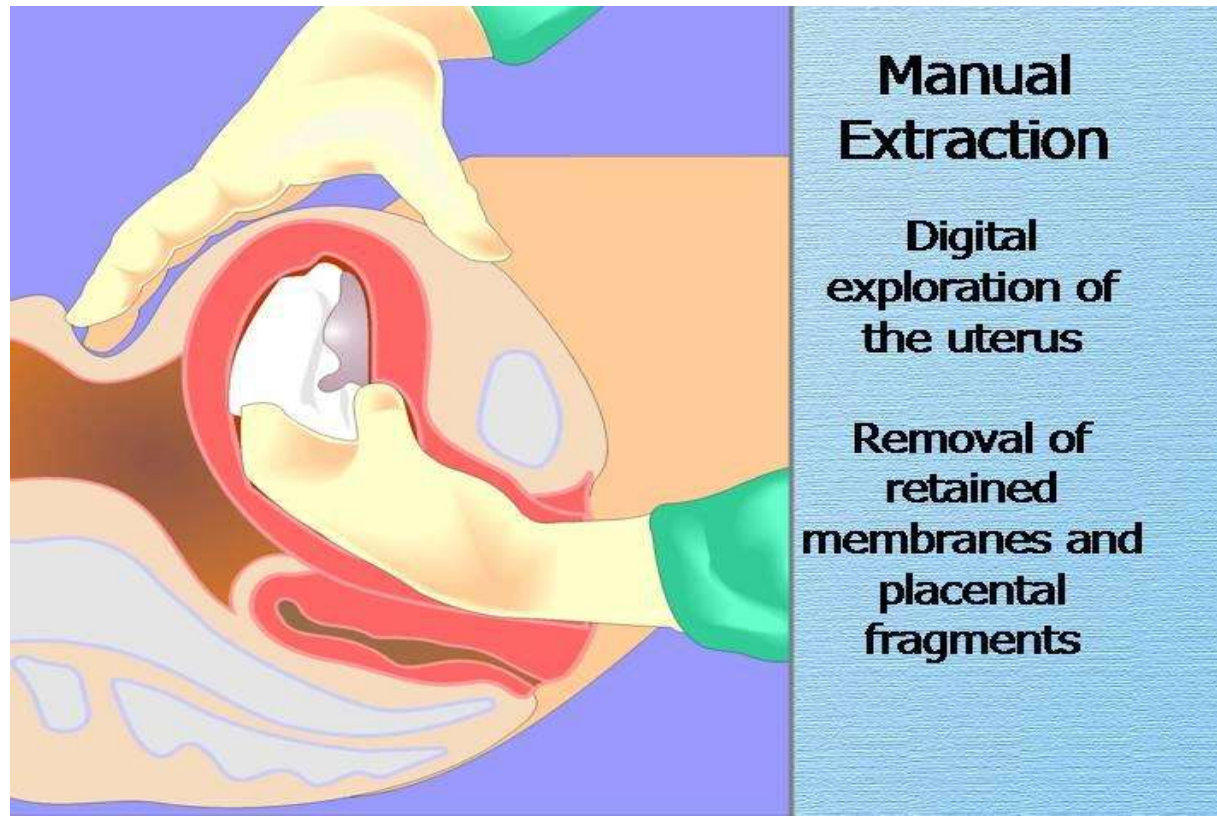
management of uterine atony Cont'

4-ECOBOLICS “uterotonic agents”

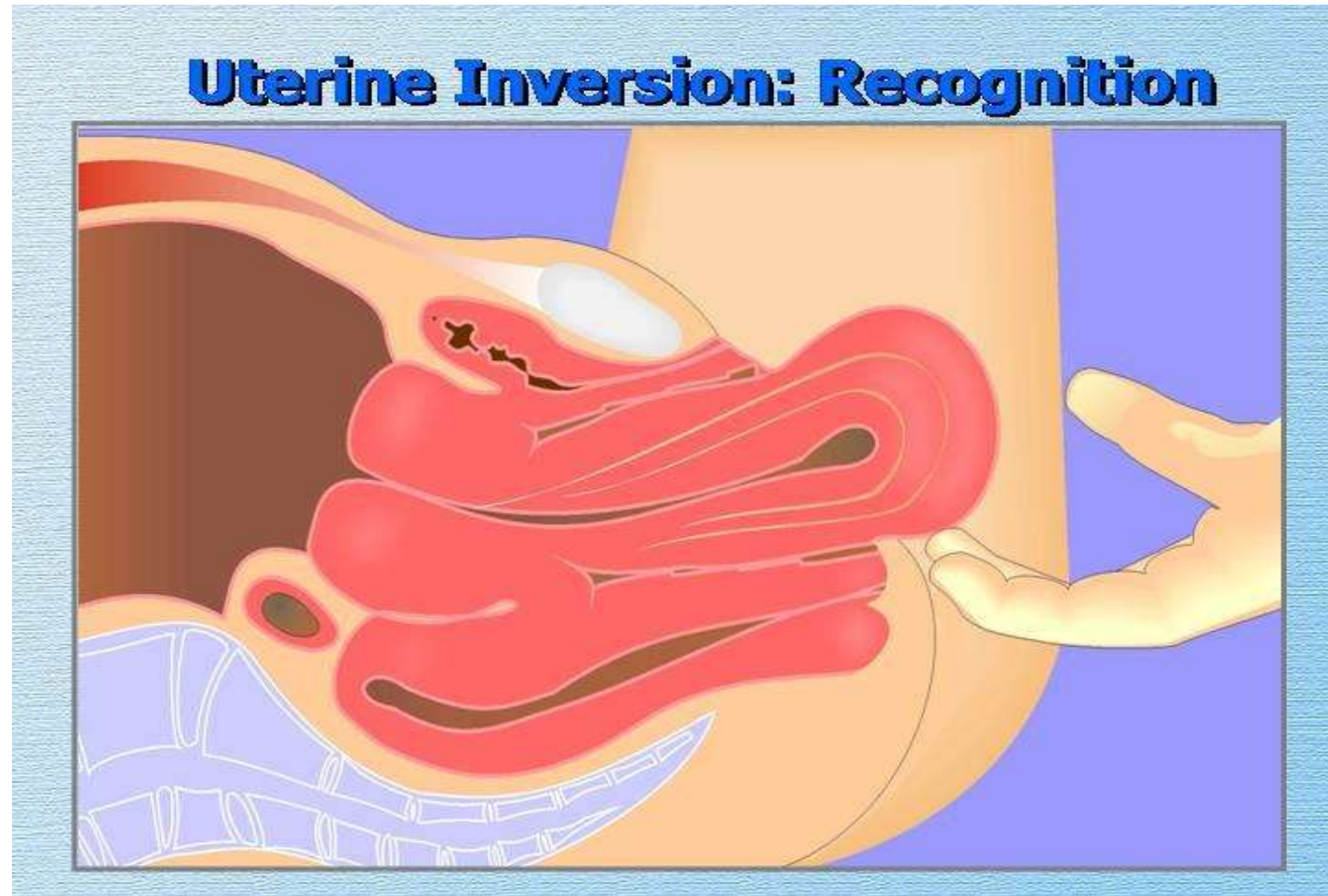
- Oxytocin infusion, 40 units in 1 liter of D₅RL
- Methergine 0.2 mg IM
- 15-methyl prostglandin F_{2a}, 0.25 to 0.50 mg intramuscularly; may be repeated
- , PGE₁ 200 mcg, or PGE₂ 20 mg are second line drugs in appropriate patients

Vaginal exploration

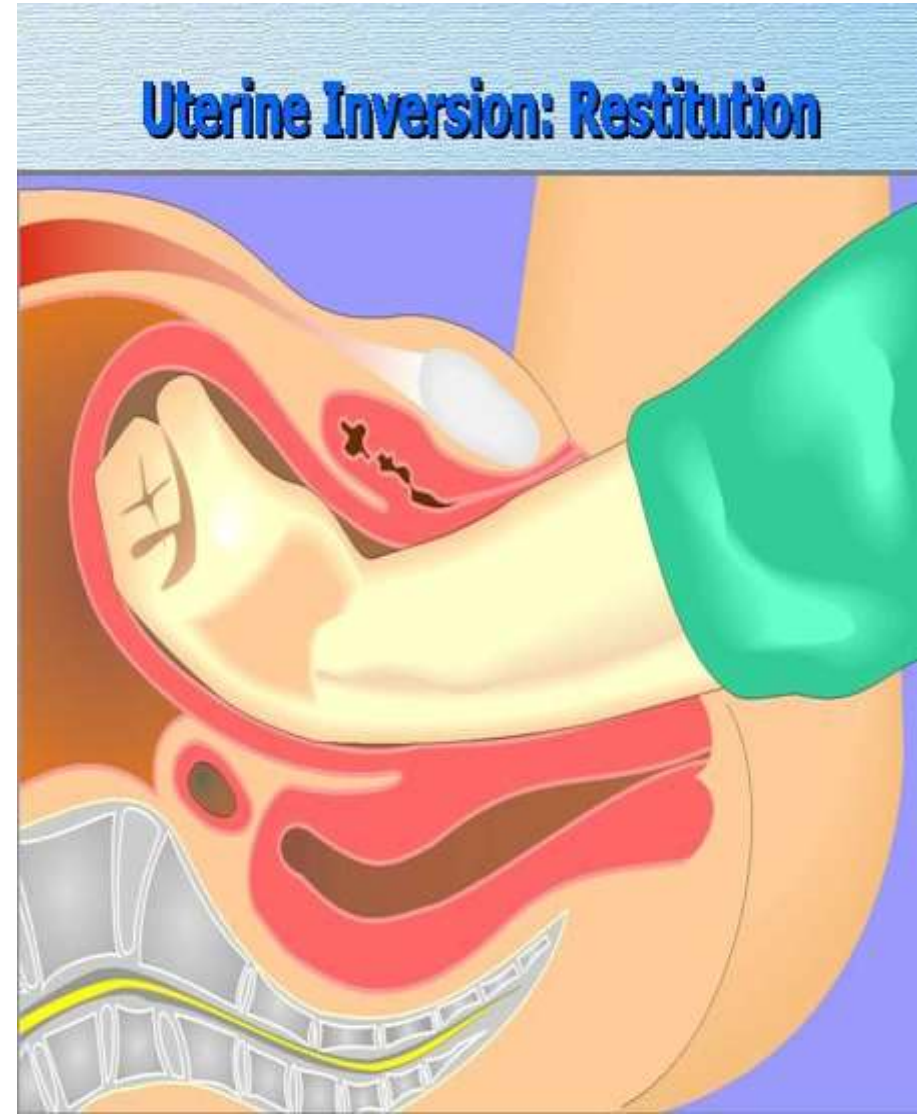
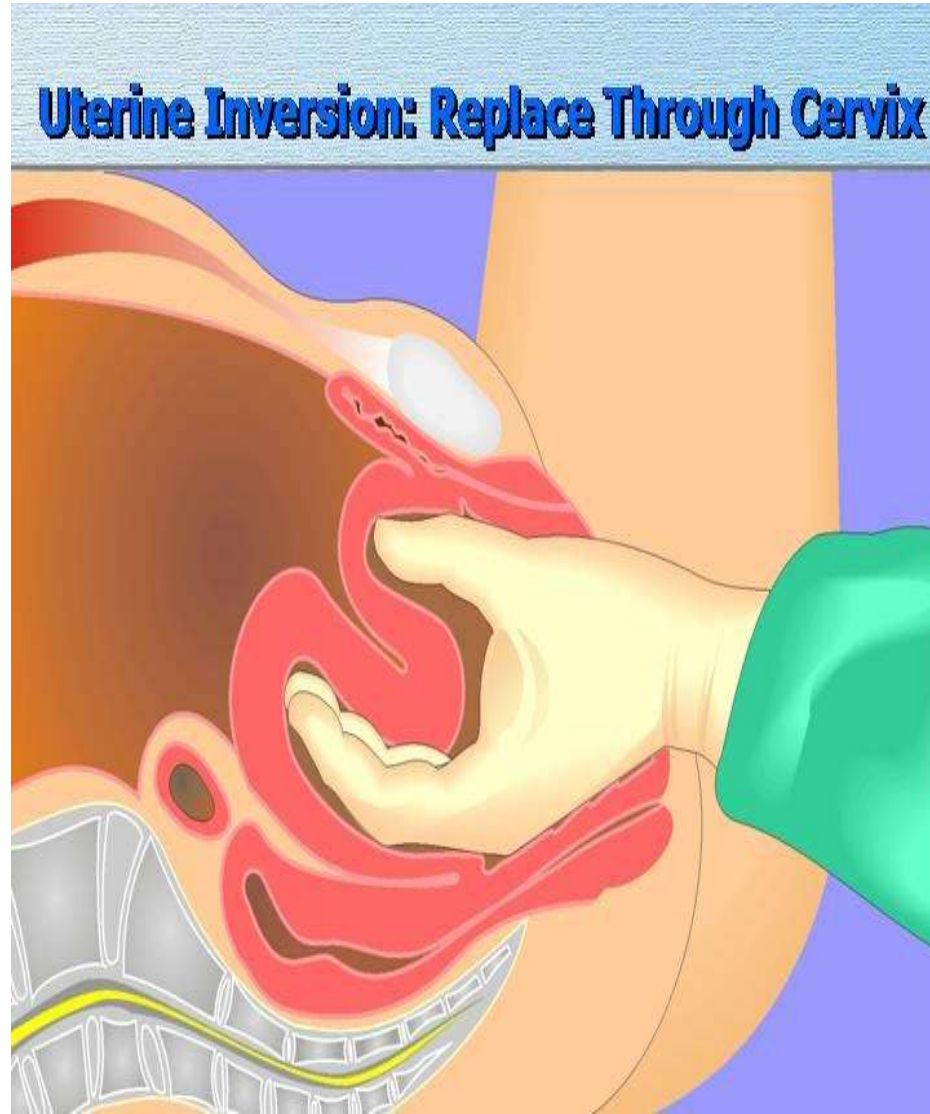
- General anesthesia usually best
- Uterine cavity manual exploration for retained placenta / uterine rupture



Vaginal exploration cont'



Uterine inversion restitution



Vaginal exploration cont'

Intrauterine balloon Catheter



Commercially Available Balloon Tamponades in Use



Bakri
\$250 per device



Sengstaken–Blakemore
\$220 for two devices



BT-CATH
\$200 per device

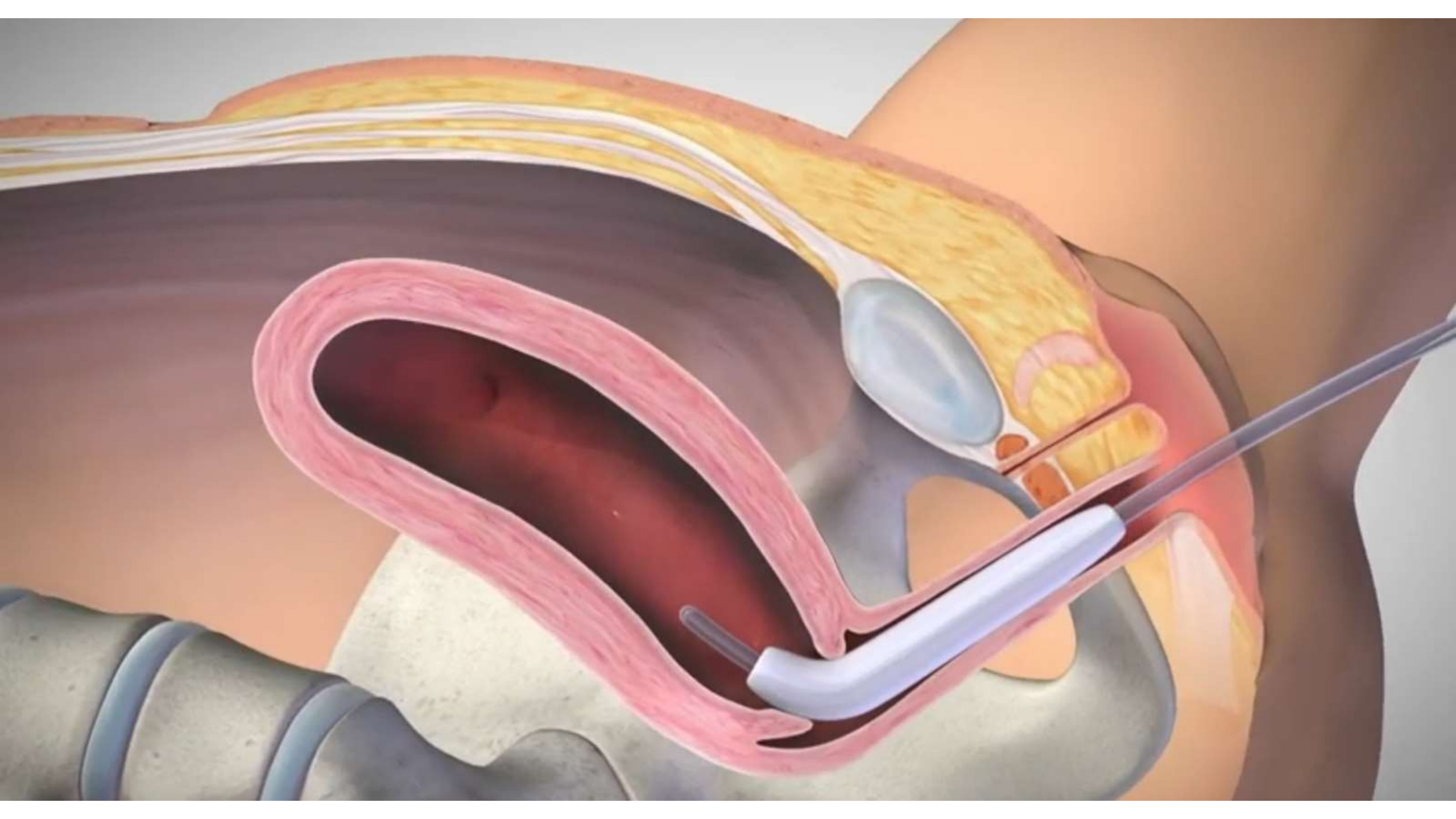


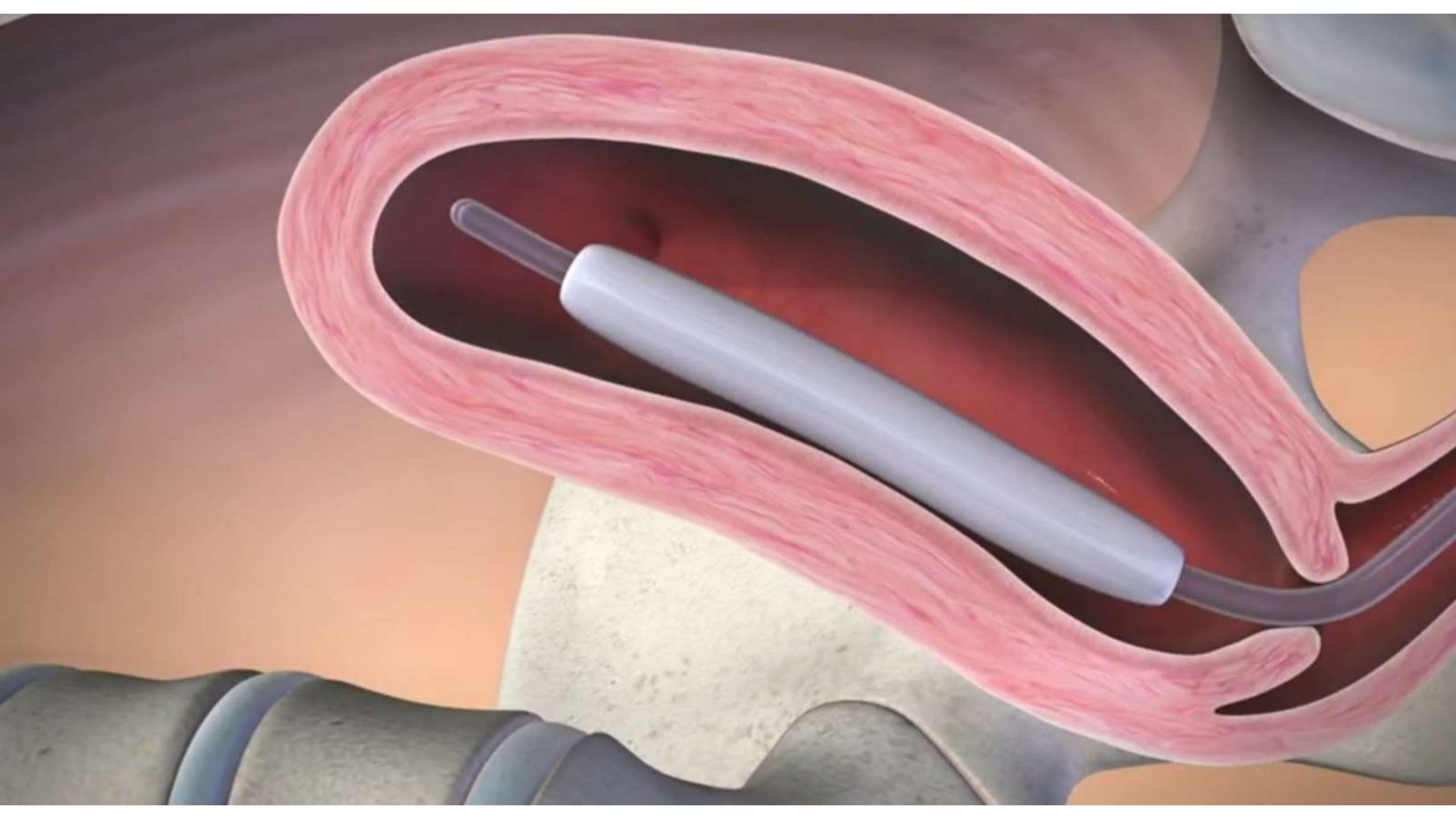
Rusch hydrostatic
\$77 (quoted £50)

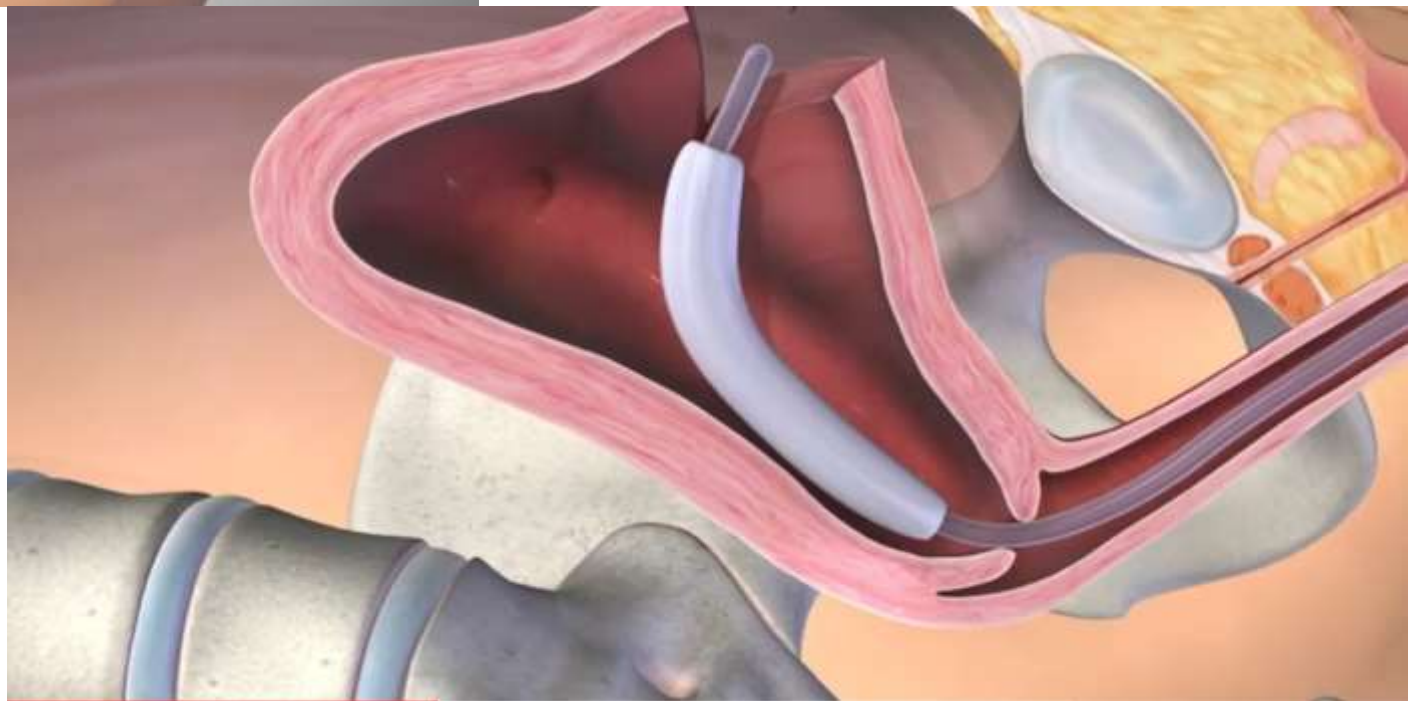
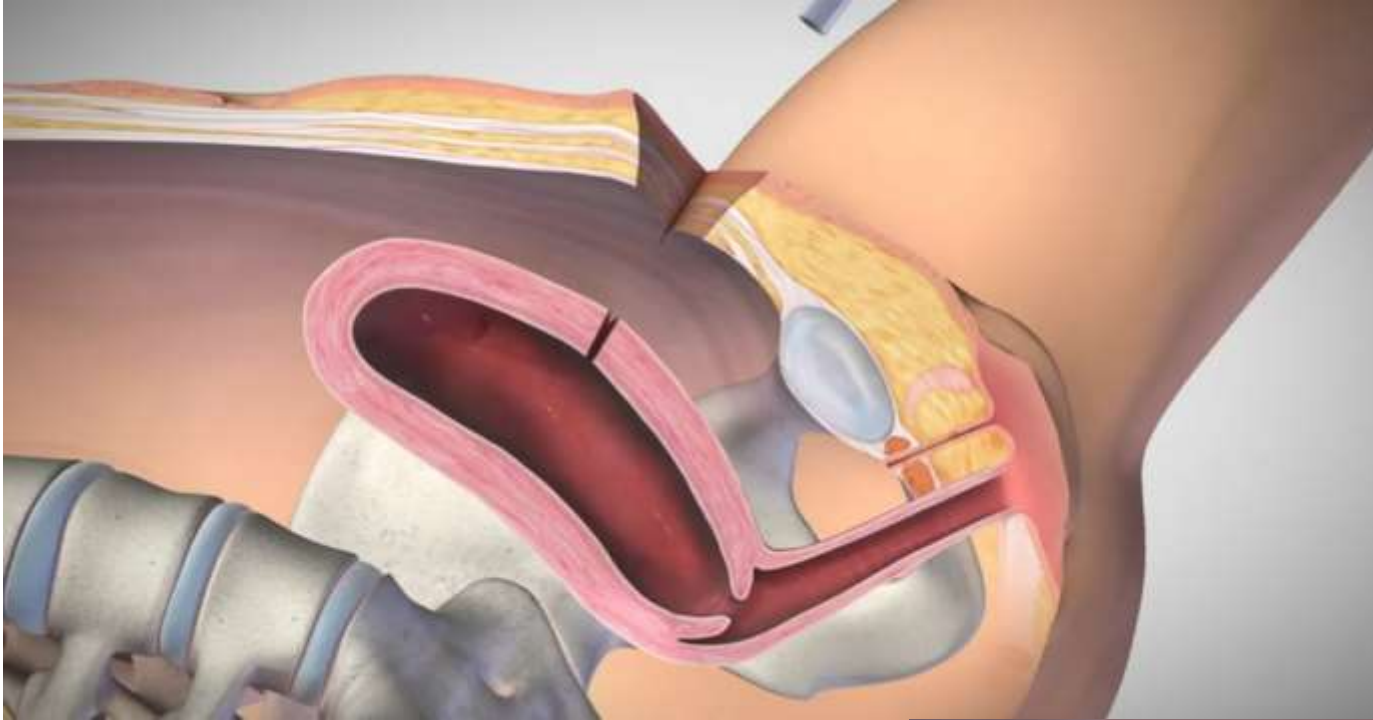


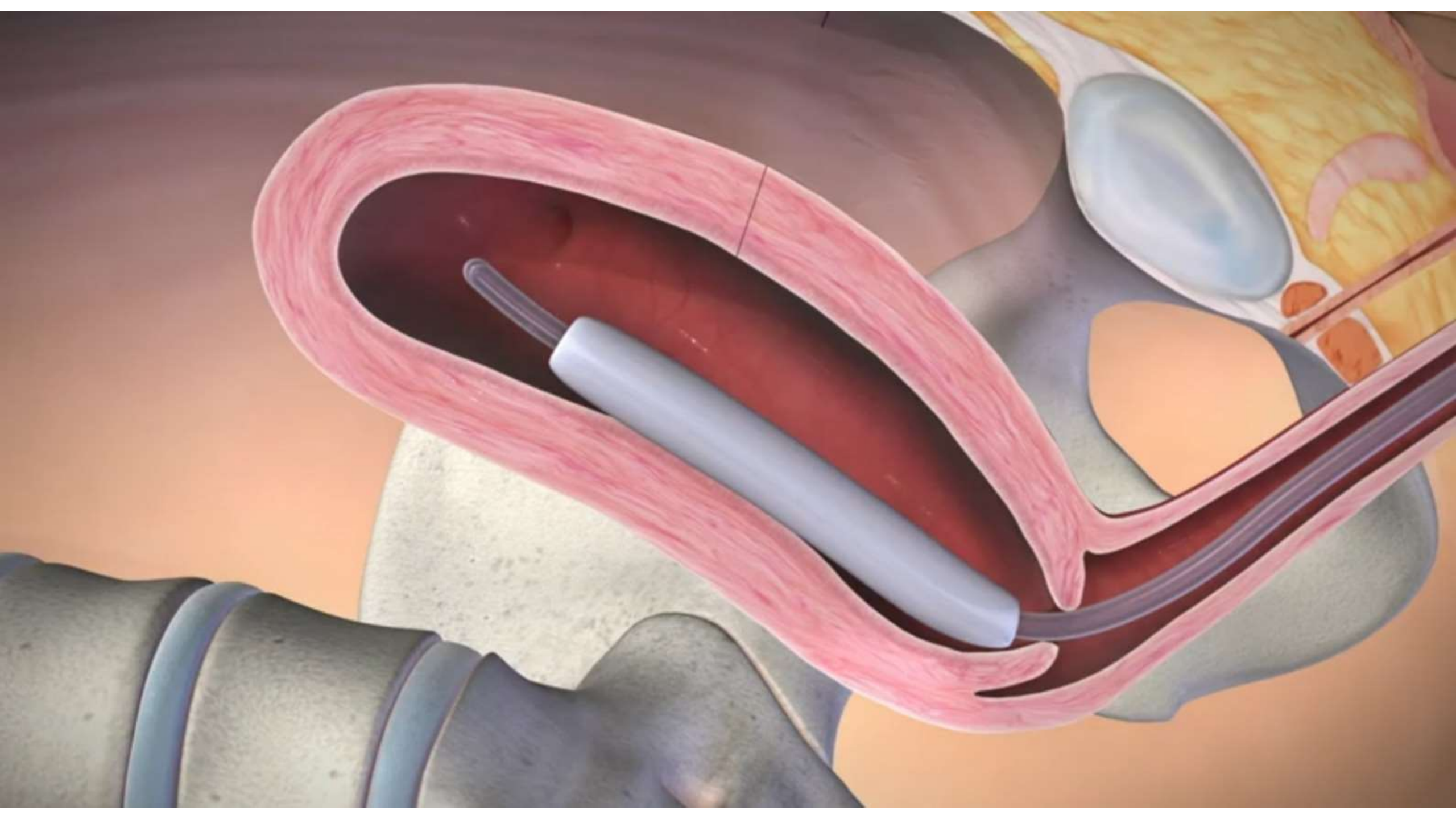
Note: The Bakri Postpartum Balloon now comes with a 50 mL syringe. (60 mL is shown in video.)

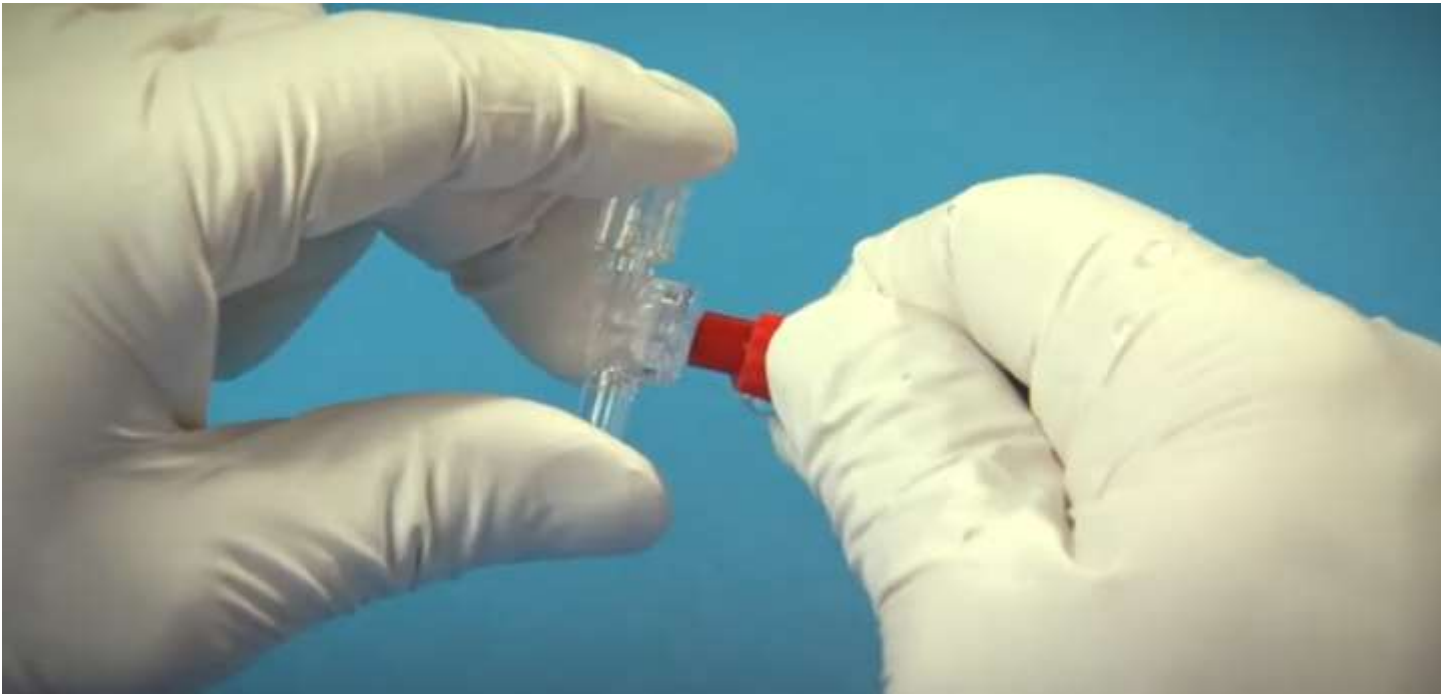








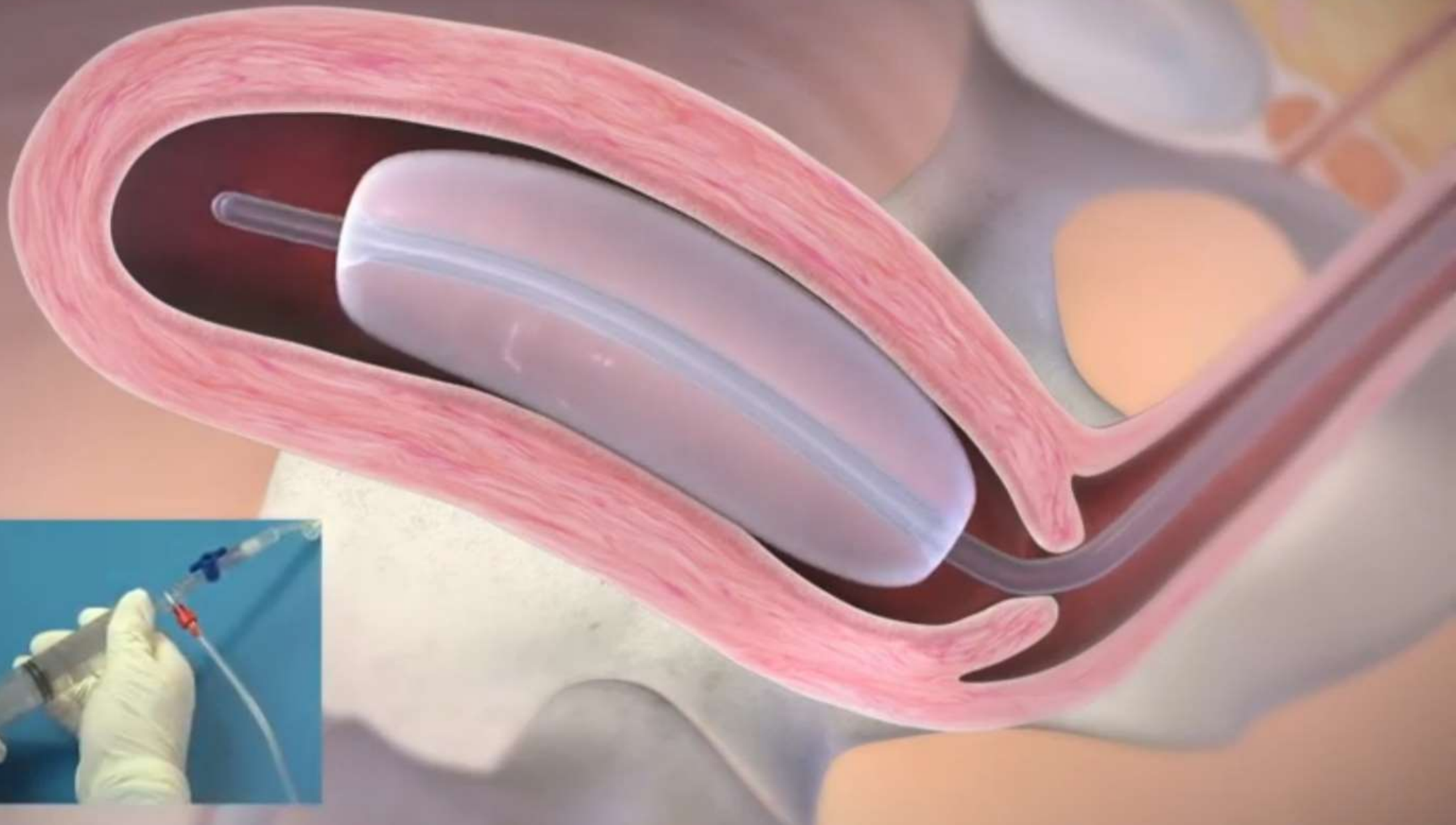




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The Innovative Condom Tamponade Unit

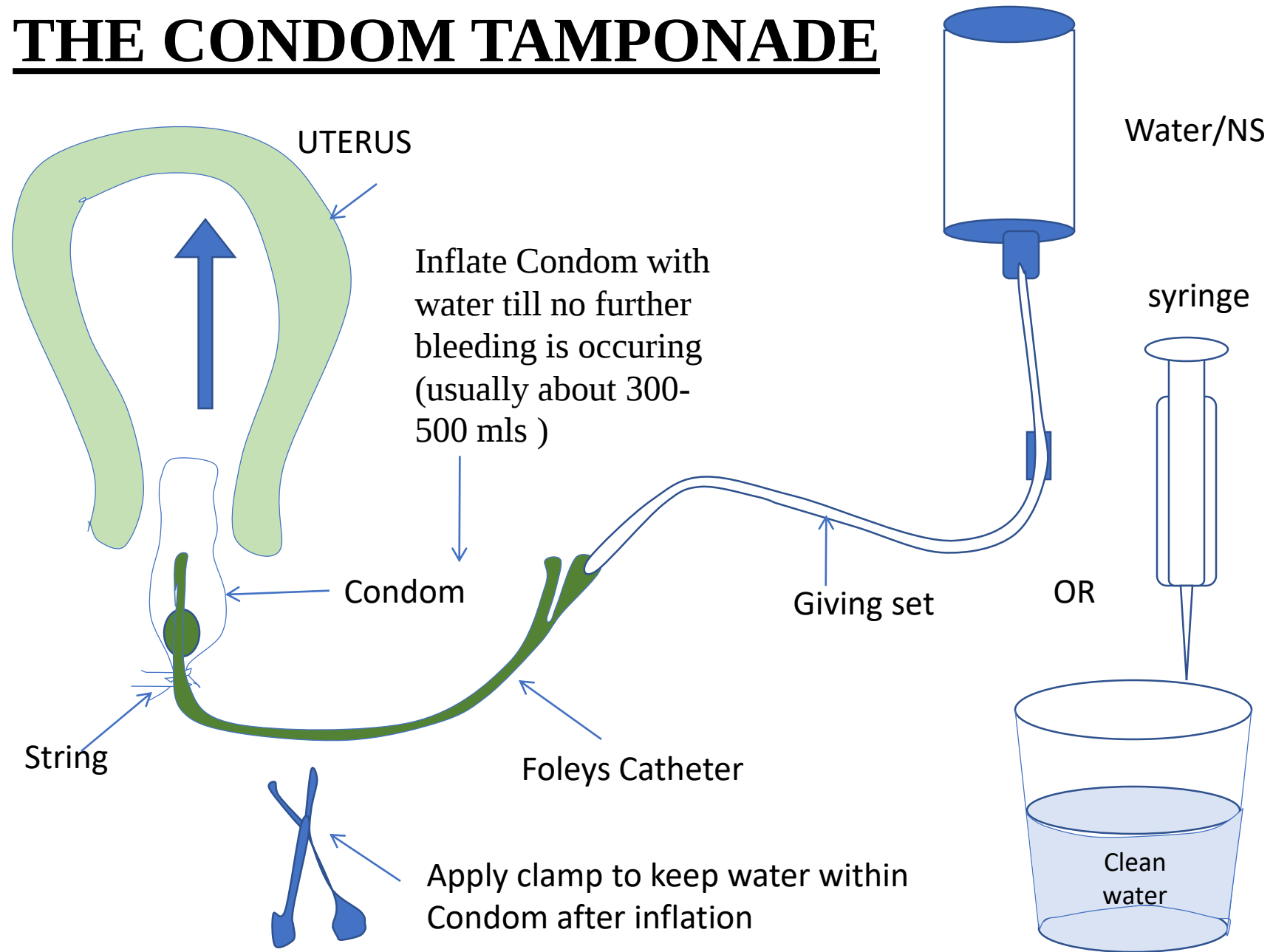
A condom still saves lives even during Childbirth!



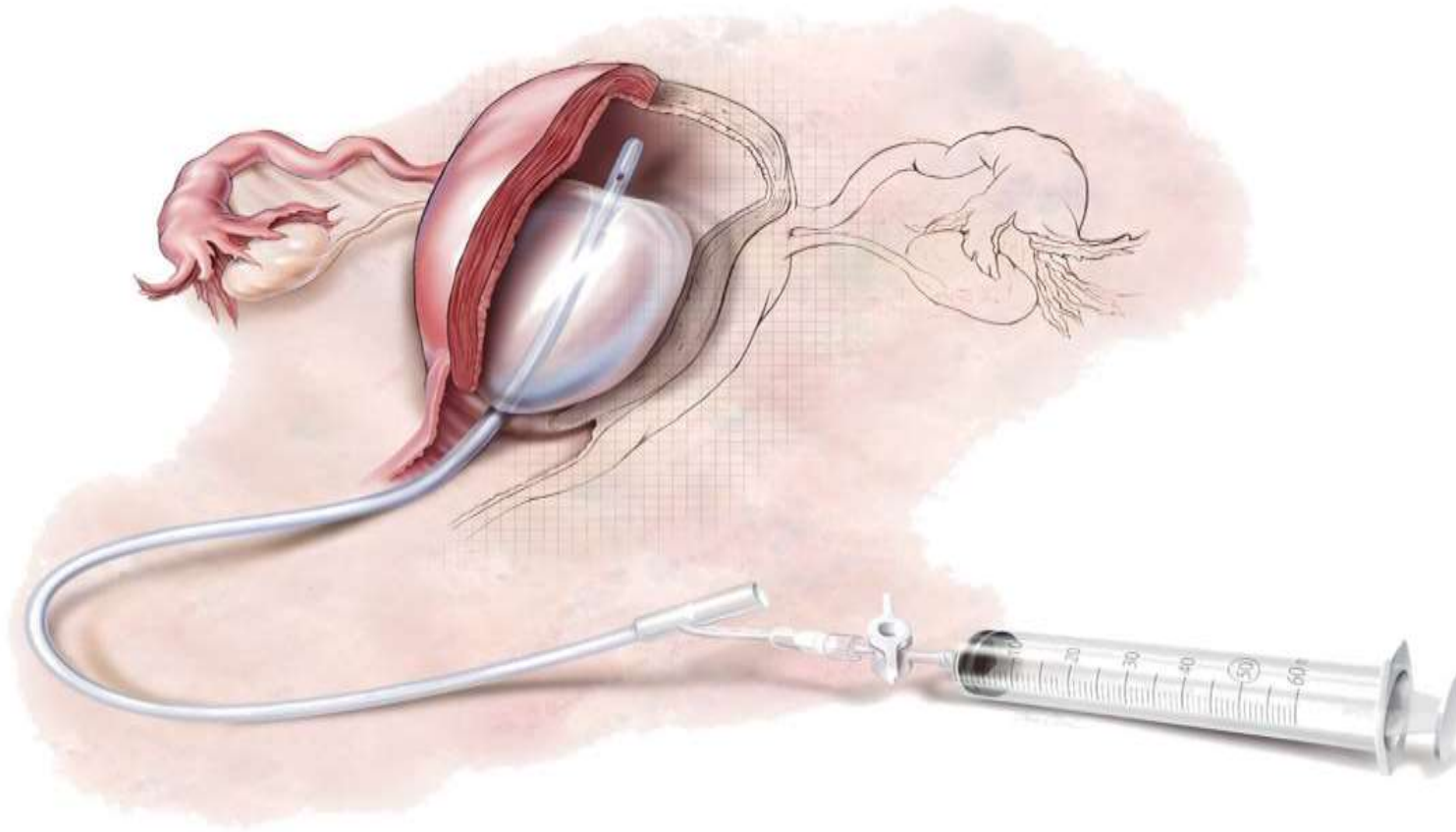
**Developed in Bangladesh
by Ashkter and Team**

**The Condom /Catheters Unit
can be assembled in a few
minutes and cost of
components is $\leq$ U.S.\$5**

THE CONDOM TAMPONADE



Bakri Balloon is a tamponade technique that can be used for PPH.



Contraindications To Use

When should we not use the balloon?

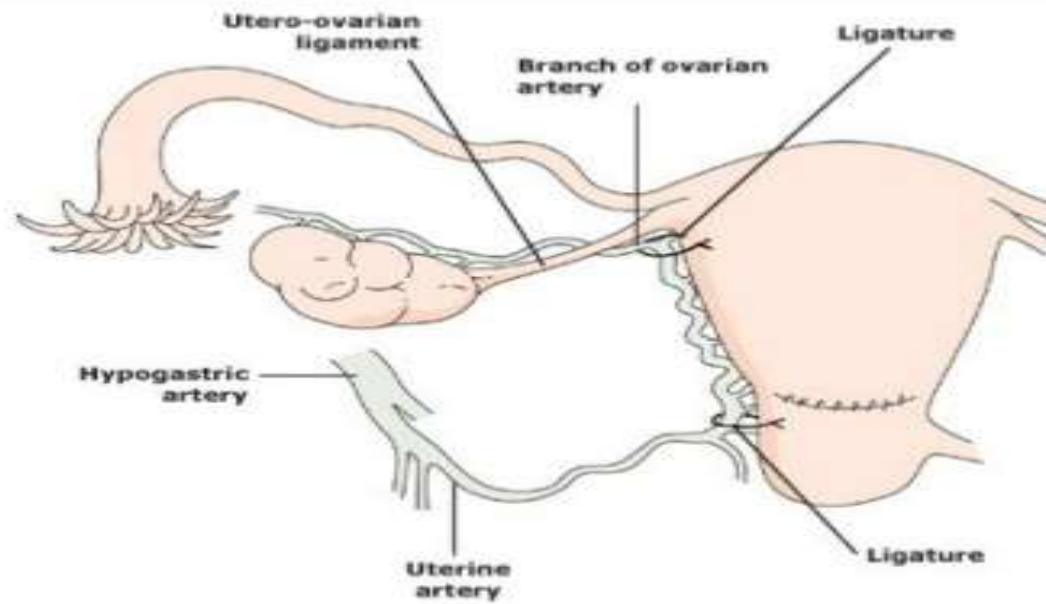
- Arterial bleeding requiring exploration and ligation or angiographic embolization.
- Cases indicating hysterectomy.
- Where uterine rupture is suspected
- Cervical cancer.
- Disseminated Intravascular Coagulation (DIC) *.

New Intra-Operative Surgical Techniques

A variety of new intra-operative techniques are now available to effectively control bleeding from the uterus: They either act to produce tamponade by compressing the uterus and apposing its anterior and posterior walls or to effectively reduce blood flow to the uterus. These techniques include:

- **Uterine Compression sutures :e.g.**
 - B-Lynch Brace Sutures
 - Cho Sutures
 - Square sutures
- **Arterial ligation/pelvic devascularization**
- **Selective Arterial embolization (Uterine Artery)**
- **Use of Topical Haemostatic agents**

Sutures are placed to ligate the ascending uterine artery and the anastomotic branch of the ovarian artery.



Selective Artery Embolisation

- Evolved from other angiographic embolisation techniques (Since 30 Years)
- Gelatin Sponges are injected into the bleeding vessel until stasis of flow in target vessel is achieved. Access is gained via femorals to internal iliac and subsequently the uterine arteries

Non-Pneumatic Anti-Shock Garment (NASG)

- **NASG is a simple device that counteracts shock and decreases blood loss by applying direct counter pressure to the lower parts of the body.**
- Developed by **NASA** 20+ yrs ago
- Useful as a first aid tool that
Keeps woman alive during
prolonged transportation to reach
help (CEOC).



PPH at CS due to Uterine Atony

Assess and Resuscitate

- Monitor vital signs
- Measure blood loss
- IV fluids (3:1 ratio)
- Blood transfusion as needed

Medical Treatment

- Uterotonics
- TXA – 1 gm IV
- Uterine massage



Surgical Management

- **Uterine compression sutures** (e.g., B-Lynch)
- **Uterine devascularization**
 - Utero-ovarian artery
 - Uterine artery (O'Leary stitch)
 - Hypogastric artery
- **Hysterectomy (Subtotal)**

Uterotonics:

Advantages

- It can very easily and quickly applied. Application requires about 2 mins
- Can be used by persons with minimal training
- Within 2-5 minutes of application most patients with severe shock regain consciousness and vital signs begin to stabilize
- The Non Pneumatic Garment is less expensive and simpler than predecessors
- It also has less danger of excessive pressures due to overinflation



When medical management fails

SURGICAL MANAGEMENT

- Uterus conserving : NEED OF TIME
- Definitive - Hysterectomy



Uterine massage

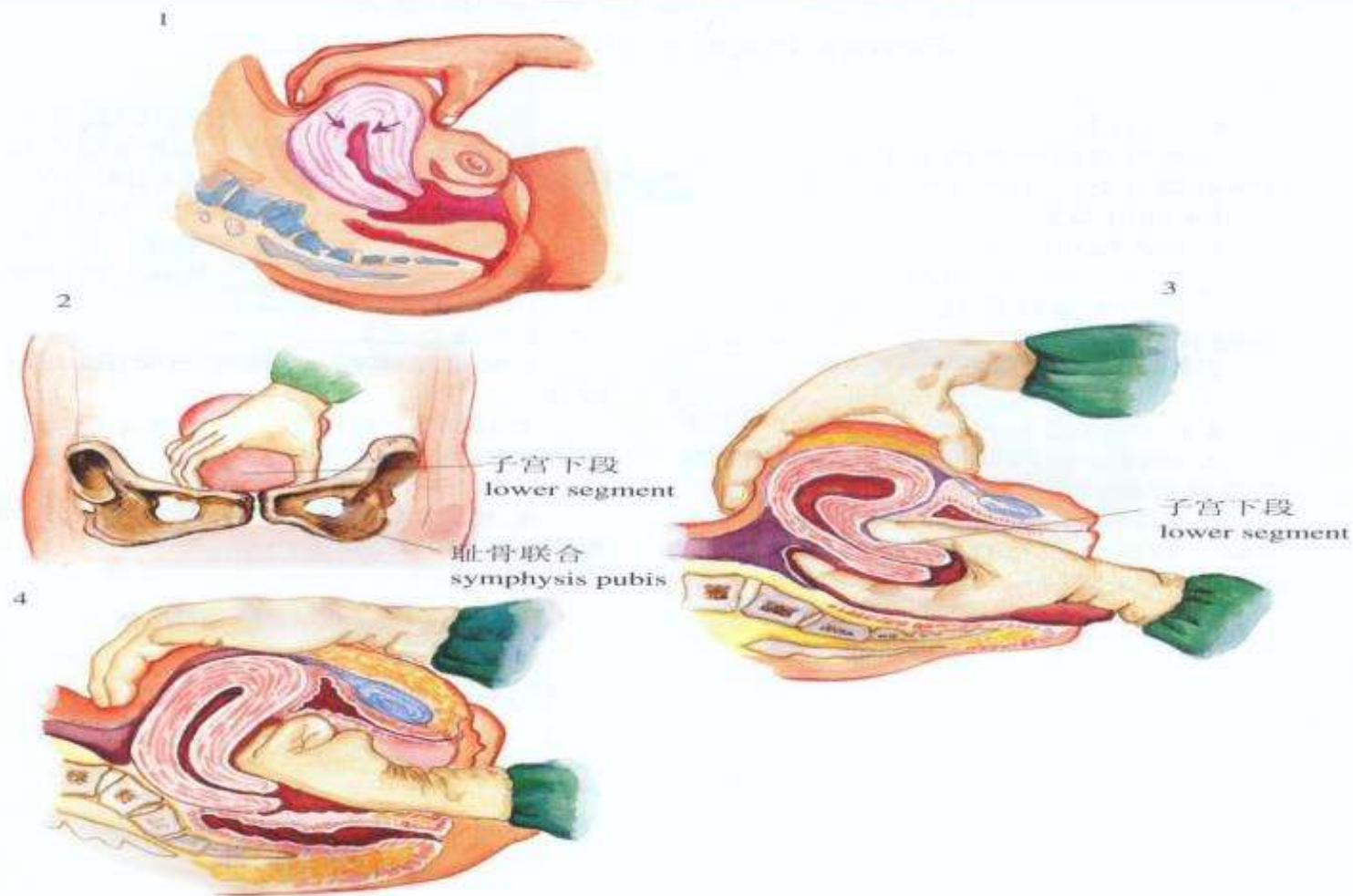


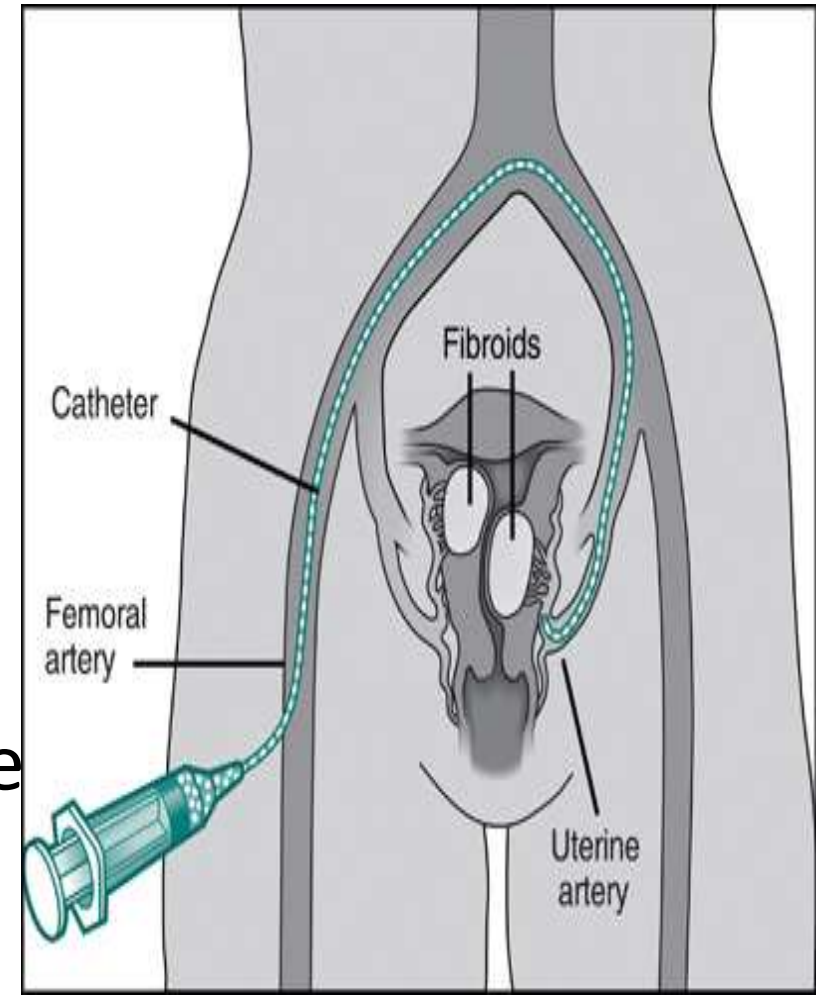
图 4—33 子宫按摩与压迫术
Uterus Massage and Compression

Selective Arterial Embolization

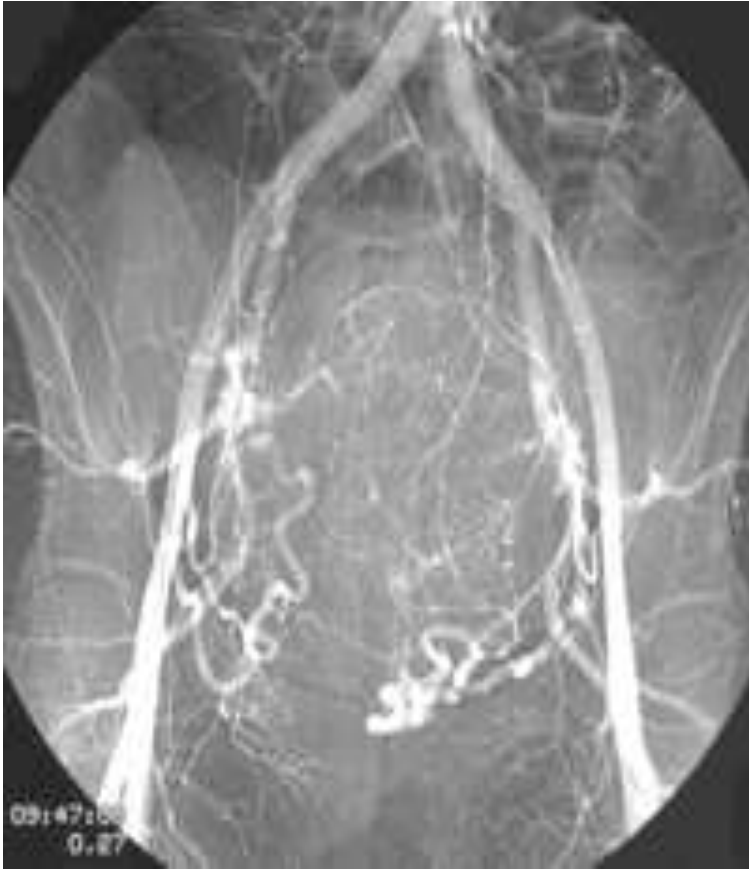
- If the patient is stable
- and bleeding is not “torrential”,
- and if interventional radiology is available,
- then pelvic arteriography may show the site of blood loss and therapeutic arterial embolization may suffice to stop the bleeding.

Uterine artery embolization

- Real time X-Ray (Fluoroscopy)
- Gelatin Sponges are injected
- into the bleeding vessel until
- stasis of flow in target vessel is
- achieved.
- Access via RTfemorals
- to internal iliac and
- subsequently the uterine arterie



Pre embolization vs. .post embolization



Pre Embolization



Post Embolization

Laparotomy for Obstetric Hemorrhage

:

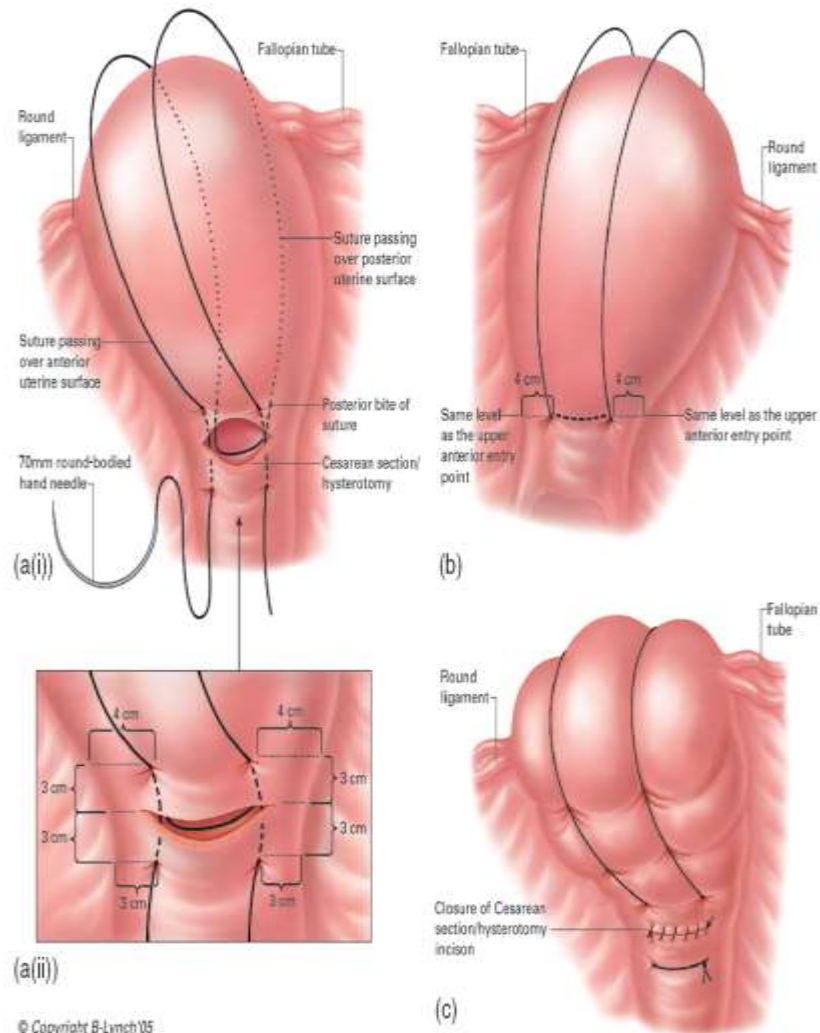
- Bleeding at Cesarean section
- “Torrential” Hemorrhage
- Pelvic hematoma (expanding)
- Bleeding uncontrolled by other means

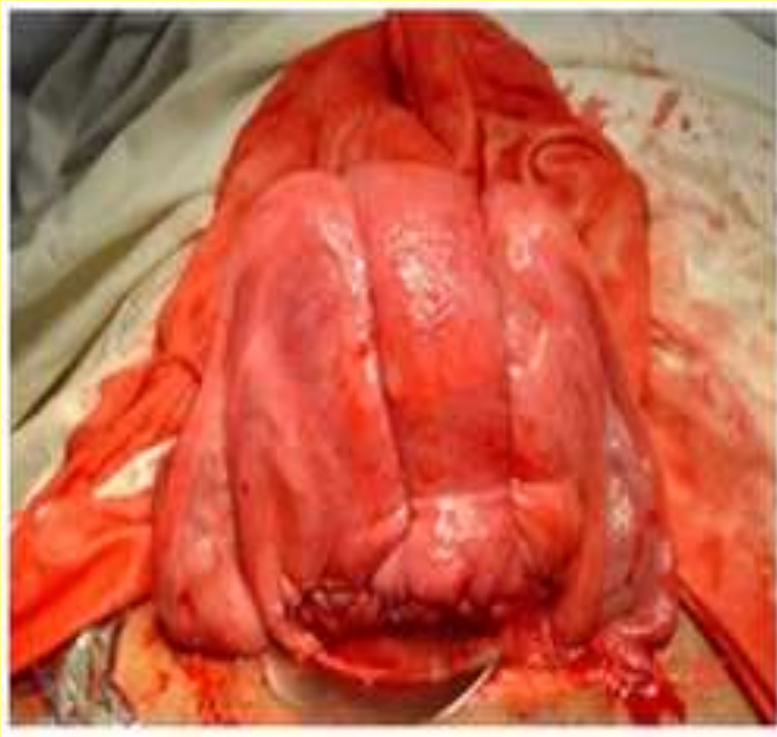
AT laparotomy

- Consider vertical abdominal incision
- General anesthesia usually best
- Get Help!
- Avoid compounding problems by making major mistakes
- Direct manual uterine compression / uterotonics
- Direct aortic compression
- Modified B-Lynch Suture for atony: #2 chromic
- Ligation of uterine and utero-ovarian vessels: #1 chromic



B-Lynch suture vs Modified B-Lynch Suture





Anterior view of uterus
showing modified B-Lynch
Technique



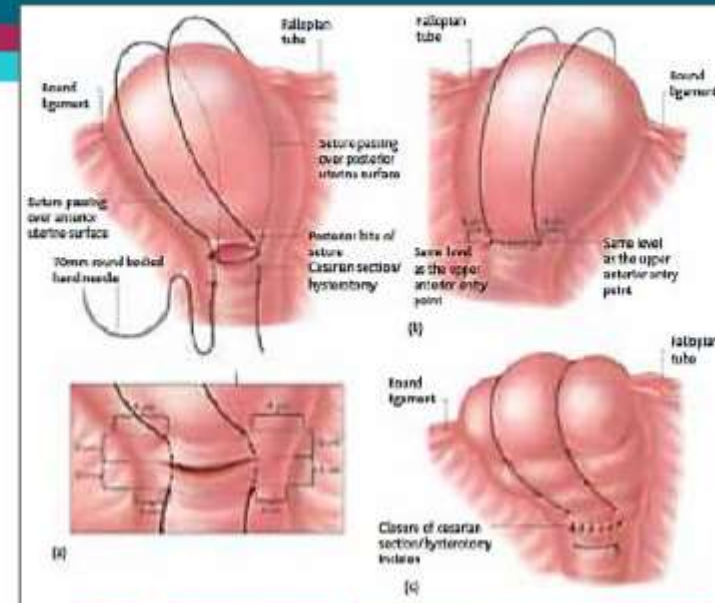
posterior view of uterus
showing modified B-Lynch
Technique

Why B-Lynch Suture?

- Fast to perform: < 2 minutes
- Easy to learn – easy to practice on simulator
- Does not require special equipment or supplies
- Effectiveness: generally **75 – 90%**^{18,19}
- Most studied method (compare to Cho, Hayman, other modifications)
- No apparent impact on infertility

Considerations:

- Do *not* use permanent suture – risk of bowel herniation/strangulation
- Some concerns regarding risk of uterine necrosis if combined with devascularization sutures



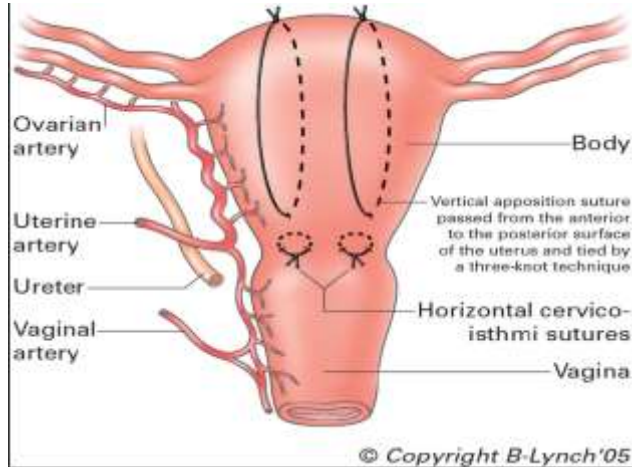
Source:

18. Kaya B, Tuten A, Daglar K, et al. B-Lynch uterine compression sutures in the conservative surgical management of uterine atony. *Arch Gynecol Obstet*. 2015;291(5):1005-1014. doi:10.1007/s00404-014-3511-2

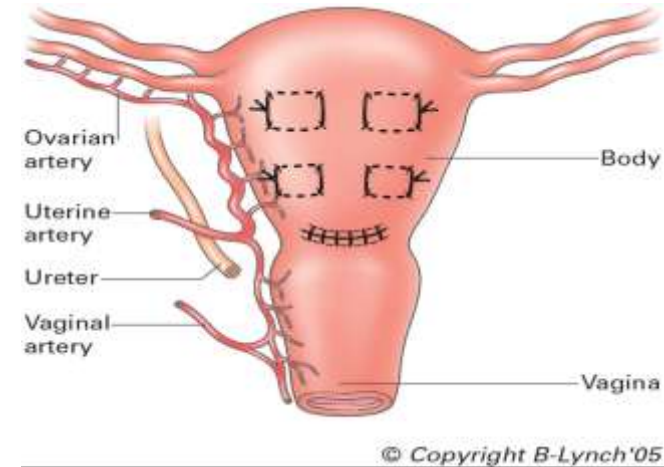
19. El-Sokkary M, Wahba K, El-Shahawy Y. Uterine salvage management for atonic

OTHER COMPRESSION SUTURES

- Hayman Uterine Compression Suture



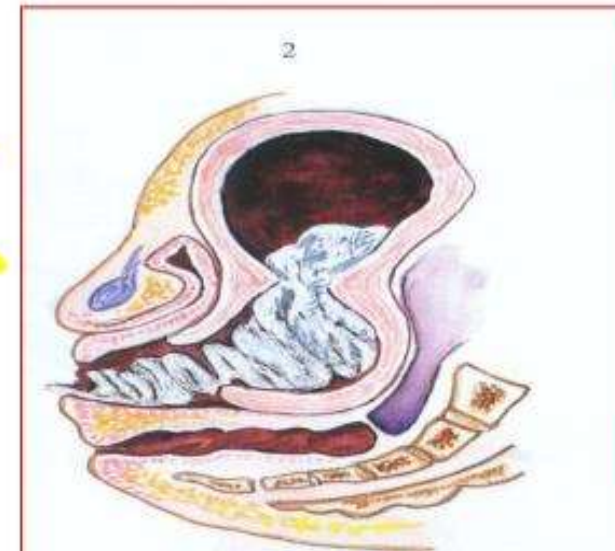
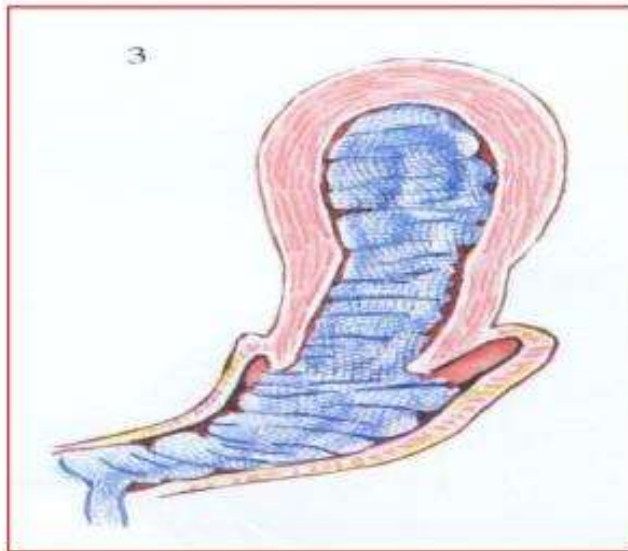
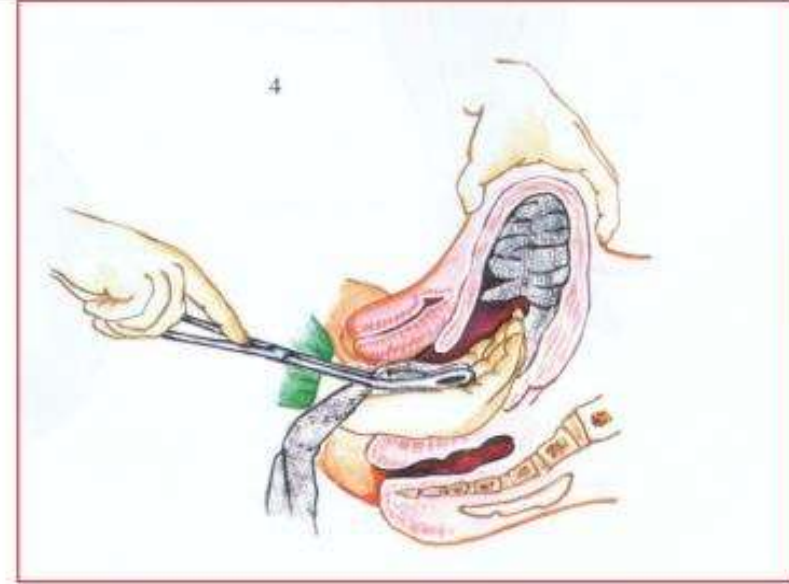
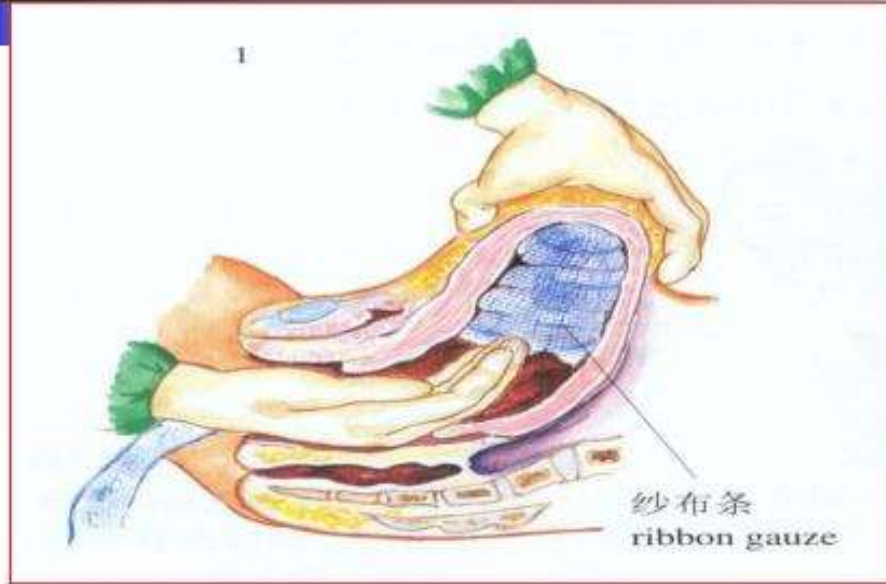
- Cho's Multiple Square Suture

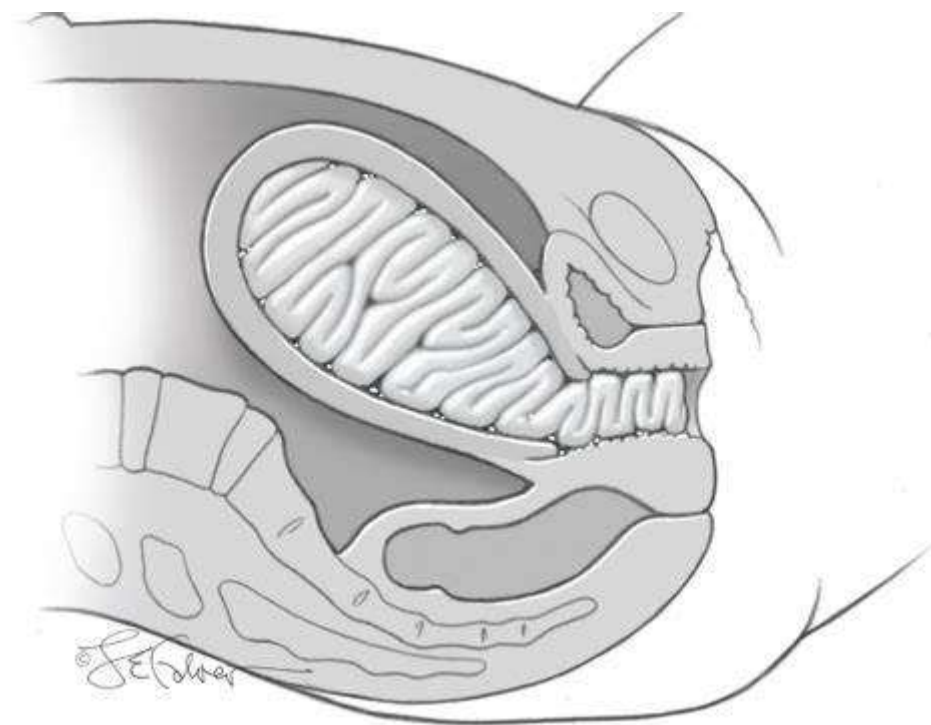


Global Stitch By
Dr. Gunasheela Bangalore

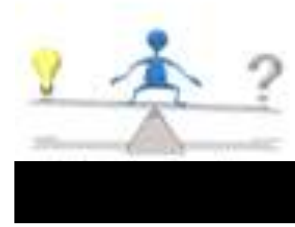


Uterine packing





COMPLICATIONS



NIL - IF DONE PROPERLY

TOO TIGHT COMPRESSION --

CUT THROUGH STITCH

UTERINE NECROSIS

INTRAPERITONEAL BLEED

Intrauterine Balloon Technique



- Insert under ultrasound guidance
- Inflate to 500 cc with sterile water or NaCl
- Use vaginal packing (iodoform or antibiotic soaked gauze) to maintain correct placement and maximize tamponade
- Gentle traction — secure to patient's leg or attach weight <than 500 g

Intrauterine Balloon Technique



- Transabdominal placement (via incision) — late after incision is closed
- Connect to fluid collection bag to monitor hemostasis
- Continuous monitoring of vital signs and signs of increased bleeding
- May need to flush clots with sterile isotonic saline
- Maximum time balloon can remain in place is 24 hours
- To deflate:
 - Remove tension from shaft
 - Remove packing
 - Aspirate fluid
 - Remove catheters gently



FIGURE 1 Nonpneumatic antishock garment



The neoprene device's panels reduce blood flow to the pelvis and extremities