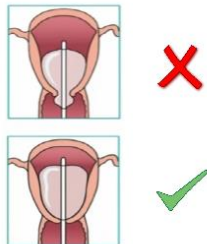
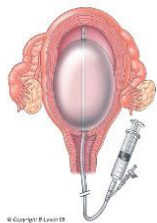


## III CURSO PRACTICO DE URGENCIAS OBSTETRICAS Actualización en hemorragia postparto

# Taponamiento uterino y tratamiento quirúrgico

**Taponamiento uterino**

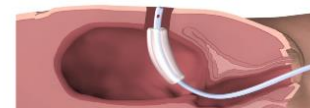


**BALON DE BAKRI**

- Relleno gradual con suero fisiológico hasta capacidad máxima de 500 ml
- Si no cede sangrado inmediatamente: retirar balón
- Si cede sangrado:
  - Colocar compresa en fondo de saco vaginal
  - Antibiótico de amplio espectro y 10 UI de oxitocina en perfusión lenta hasta retirada del balón
  - Vaciamiento gradual
  - Retirada del balón tras 12-24 horas



Inserción vaginal

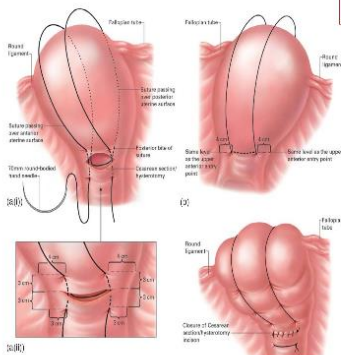


Inserción abdominal

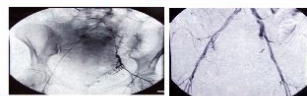
Se recomienda la comprobación ecográfica de la correcta colocación del balón

**Suturas Compresivas**

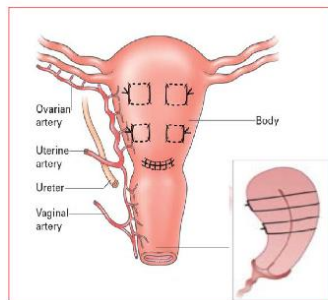
**Atonía - segmento S1 B-LYNCH**



**Embolización arterial. Radiología intervencionista (si disponible)**

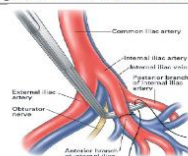


**Acretismo/segmento S2 CHO**

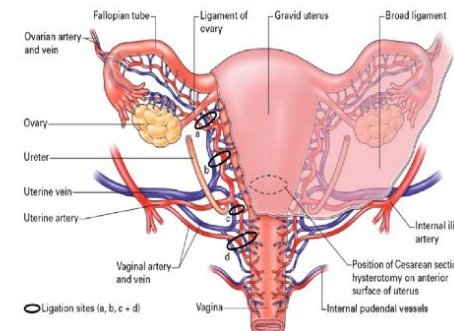


- Ligadura arteria uterina: rama ascendente y descendente
- Ligadura cervicovaginal
- Ligadura arteria ovárica

\* Ligaduras unilaterales ó bilaterales



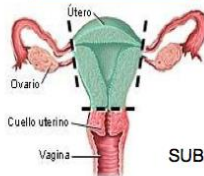
**Ligaduras vasculares**



Ligadura arteria hipogástrica: 2-3 cms bajo la bifurcación de la iliaca primitiva

GRADOS DE SHOCK	CLASE I	CLASE II	CLASE III	CLASE IV
Pérdida sangre (ml y %)	<750 (15%)	750-1500 (15-30%)	1500-2000 (30-40%)	>2000 (>40%)
Frecuencia cardiaca	<100	100-120	120-140	>140
TAS (mm/Hg)	>90	80-90	70-79	<70
Frecuencia respiratoria	14-20	20-30	30-40	>40
Diuresis (ml/h)	>30	20-30	5-15	Mínima
Estado mental	Normal	Normal y/o agitada	Agitada	Letárgico

**Histerectomía**



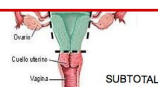
SUBTOTAL

**Taponamiento pélvico**



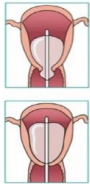
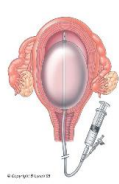
OBJETIVOS	CORREGIR CON
Temperatura >35°C	Manta de calor/Calentador de fluidos y de CH
TAS 80-100 mmHg	Administrar en Y: Cristaloideos balanceados calientes + vasoconstrictores + coloides calientes (<10ml/kg)
Evitar sobrehidratación	CH + Fi O2 100% y alto flujo
Hb ≥ 9 y pH > 7,3	CH ó GluCa
Ca++ ≥ 1.1 mmol/L	Fibrinógeno
Fibrinógeno > 3 g	Complejo protrombínico 10-30 UI/Kg (≤ 40 UI/Kg)
INR < 1.3	1 pool plaquetas
Plaquetas ≥ 100-00 µL	

TAS (mm/Hg)	>90	80-90	70-79	<70
Frecuencia respiratoria	14-20	20-30	30-40	>40
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Estado mental	Normal	Normal y/o agitada	Agitada	Letárgico



SUBTOTAL

Hb ≥ 9 y pH > 7,3	CH + Fi O2 100% y alto flujo
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Plaquetas ≥ 100-00 µL	1 pool plaquetas

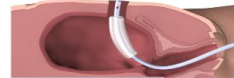


### Taponamiento uterino

- BALON DE BAKRI**
- Relleno gradual con suero fisiológico hasta capacidad máxima de 500 ml
  - Si **no cede sangrado** inmediatamente: retirar balón
  - Si **cede sangrado**:
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    - Antibiótico de amplio espectro y 10 UI de oxitocina en perfusión lenta hasta retirada del balón
    - Vaciamiento gradual
    - Retirada del balón tras 12-24 horas



Inserción vaginal



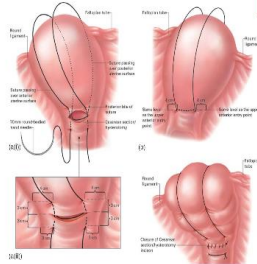
Inserción abdominal

Se recomienda la comprobación ecográfica de la correcta colocación del balón

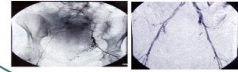


### Suturas Compresivas

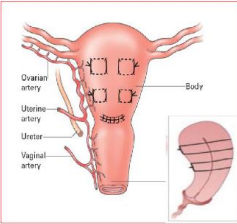
Atonía - segmento S1  
B-LYNCH



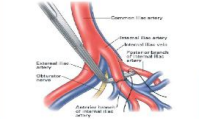
### Embolización arterial. Radiología intervencionista (si disponible)



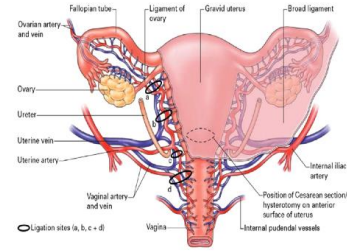
Acretismo/segmento S2  
CHO



- Ligadura arteria: rama ascendente y descendente
- Ligadura cervicovaginal
- Ligadura arteria ovárica



### Ligaduras vasculares

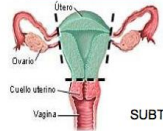


Ligadura arteria hipogástrica: 2-3 cms bajo la bifurcación de la iliaca primitiva



GRADOS DE SHOCK	CLASE I	CLASE II	CLASE III	CLASE IV
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Diuresis (ml/h)	>30	20-30	5-15	Mínima
Estado mental	Normal	Normal y/o agitada	Agitada	Letárgico

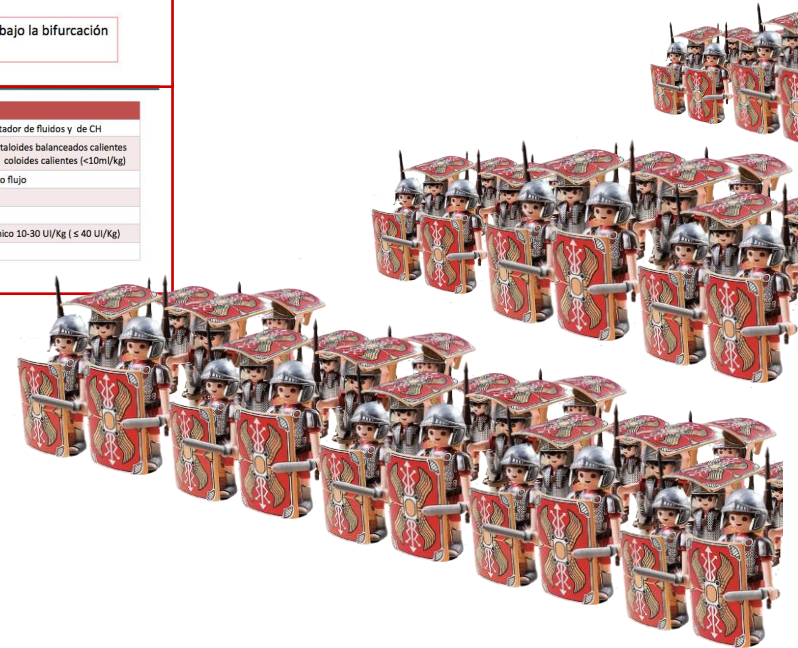
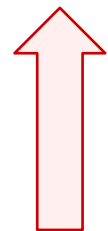
### Histerectomía



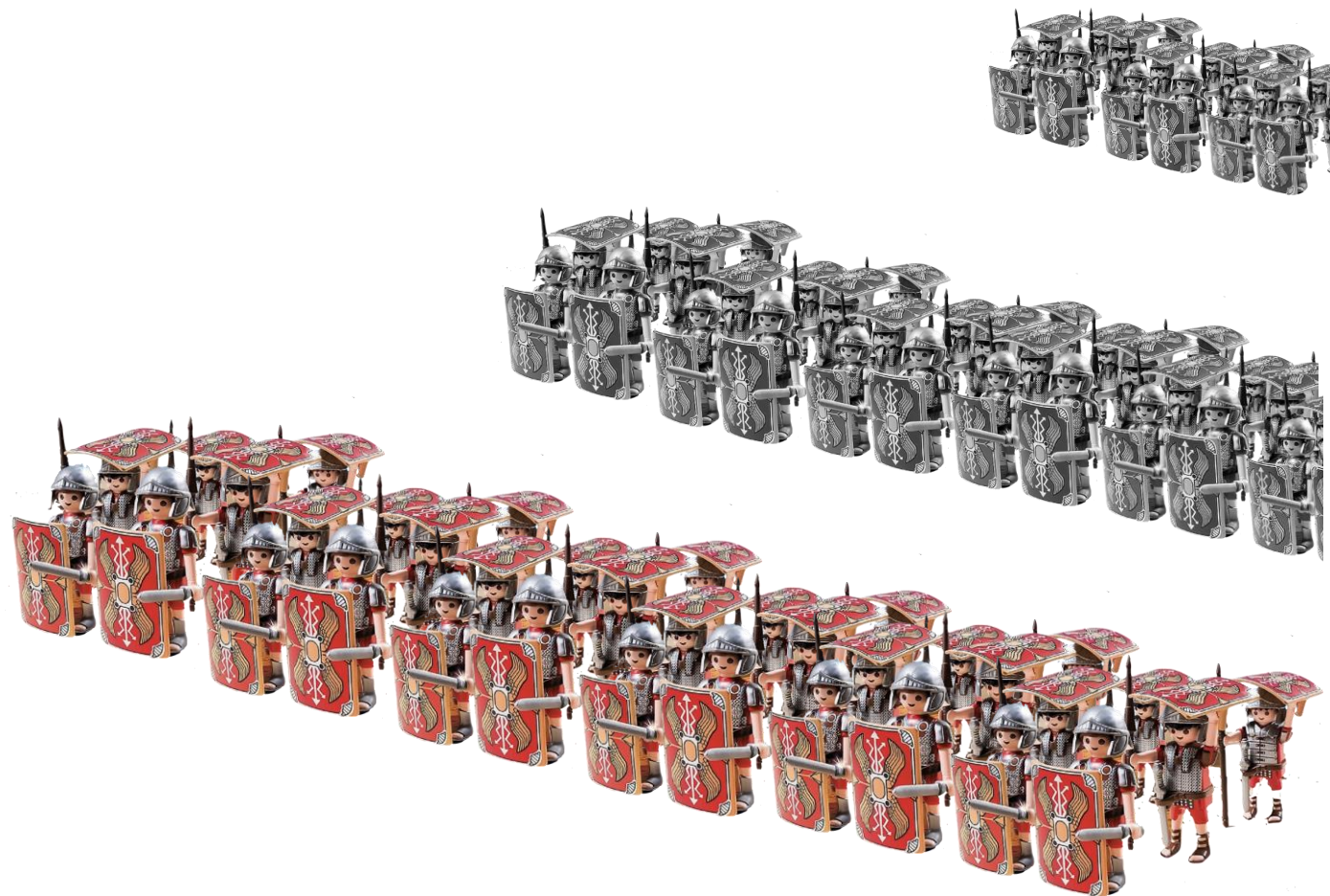
### Taponamiento pélvico



OBJETIVOS	CORREGIR CON
Temperatura >35°C	Manta de calor/Calentador de fluidos y de CH
TAS 80-100 mmHg	Administrar en Y: Cristaloides balanceados calientes + vasoconstrictores + coloides calientes (<10ml/kg)
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INR < 1.3	1 pool plaquetas
Plaquetas ≥ 100-00 µl	



# TAPONAMIENTO UTERINO

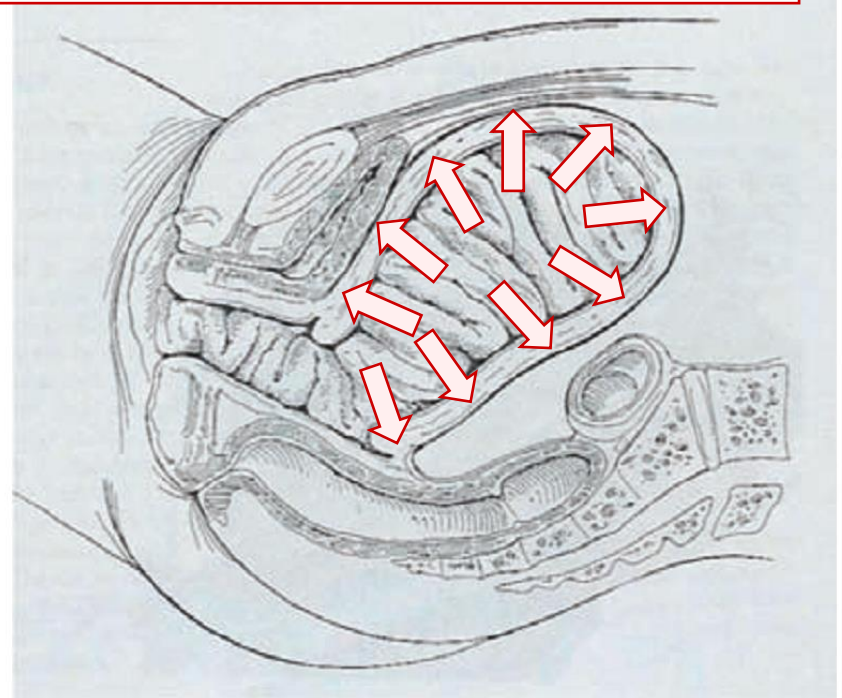
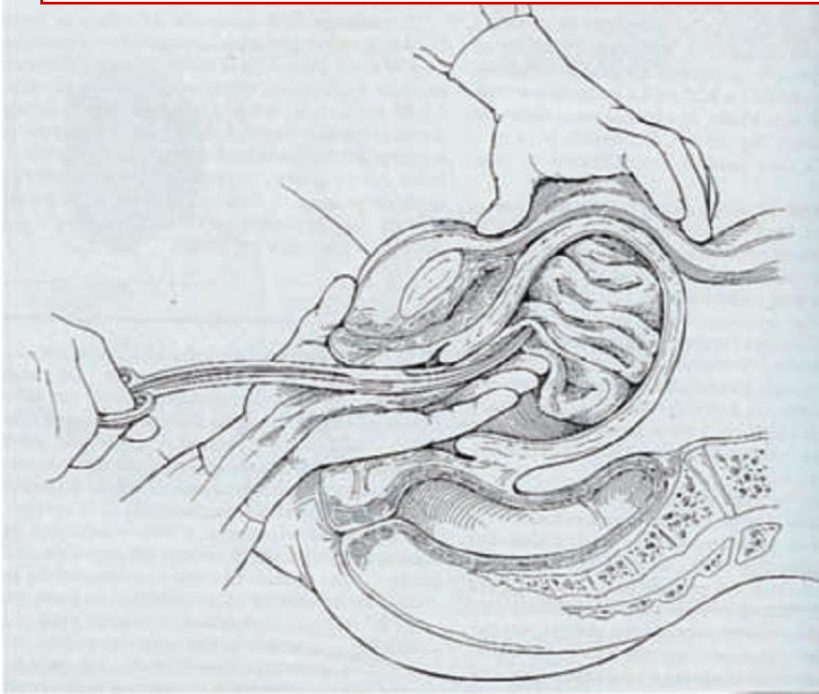




# TAPONAMIENTO UTERINO. Compresas

## Mecanismo de acción

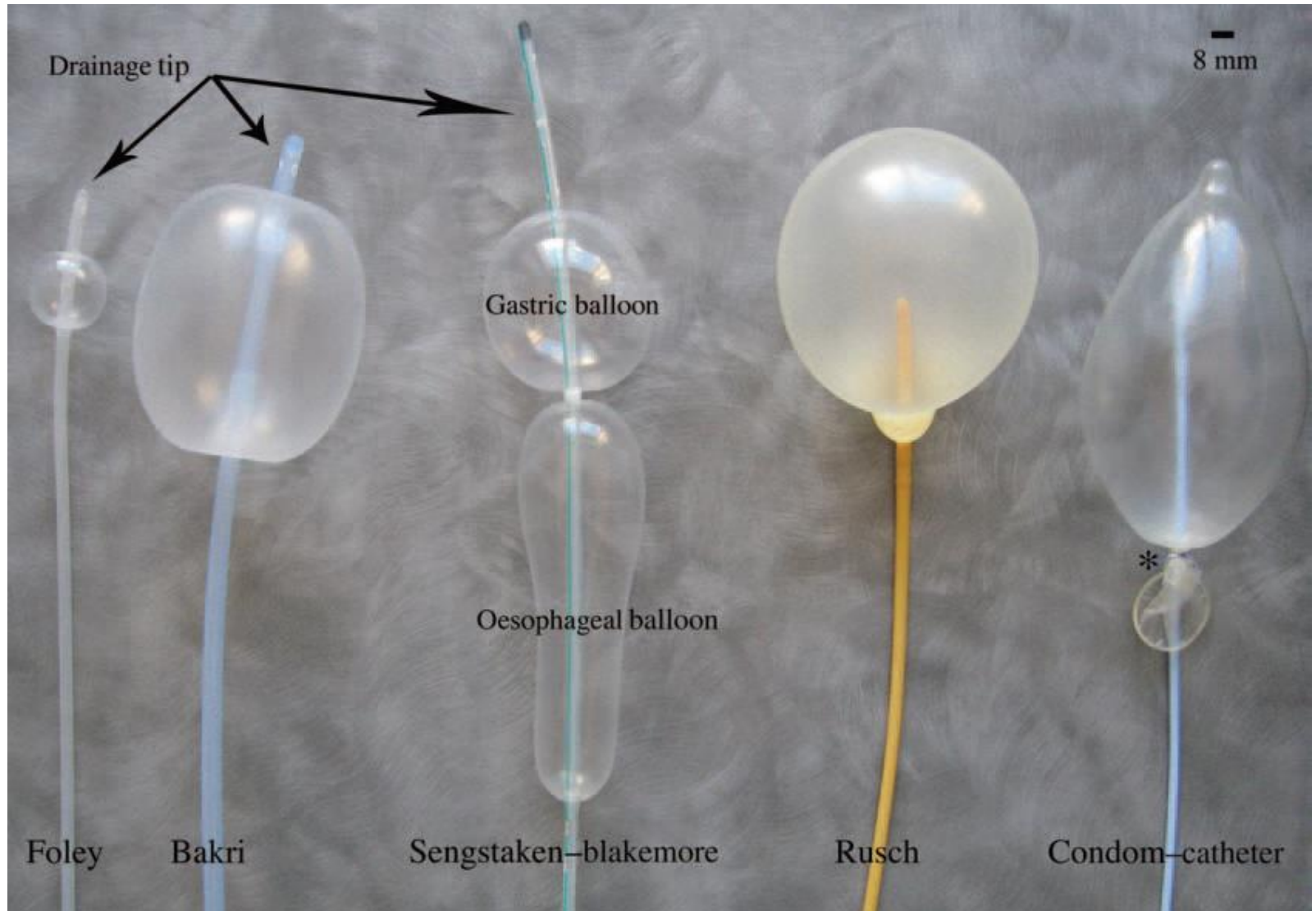
Presión directa en los vasos sangrantes capilares o venosos del lecho placentario



## Indicación

Ausencia de balón de taponamiento intrauterino

# TAPONAMIENTO UTERINO. Balón intrauterino



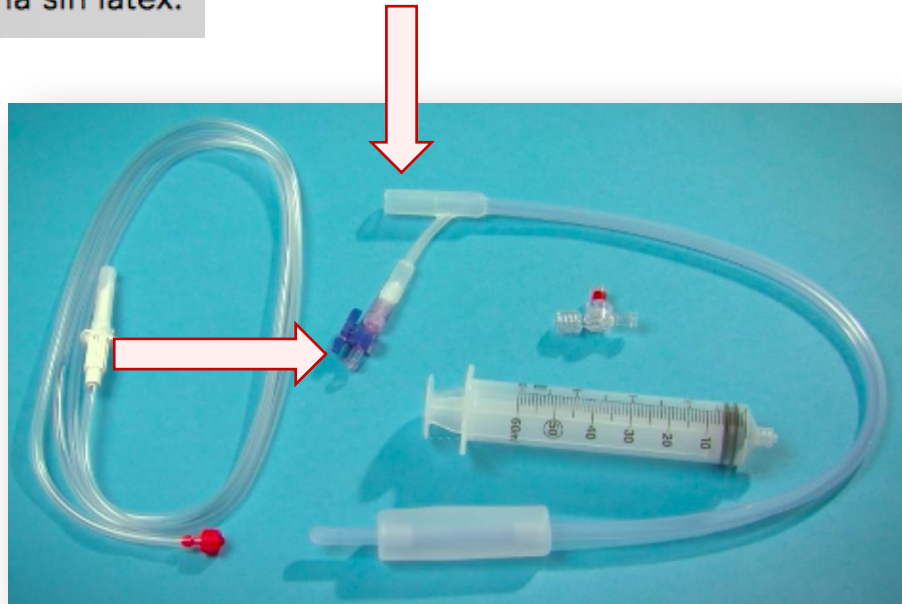
# TAPONAMIENTO UTERINO. Balón de Bakri





# TAPONAMIENTO UTERINO. Balón de Bakri

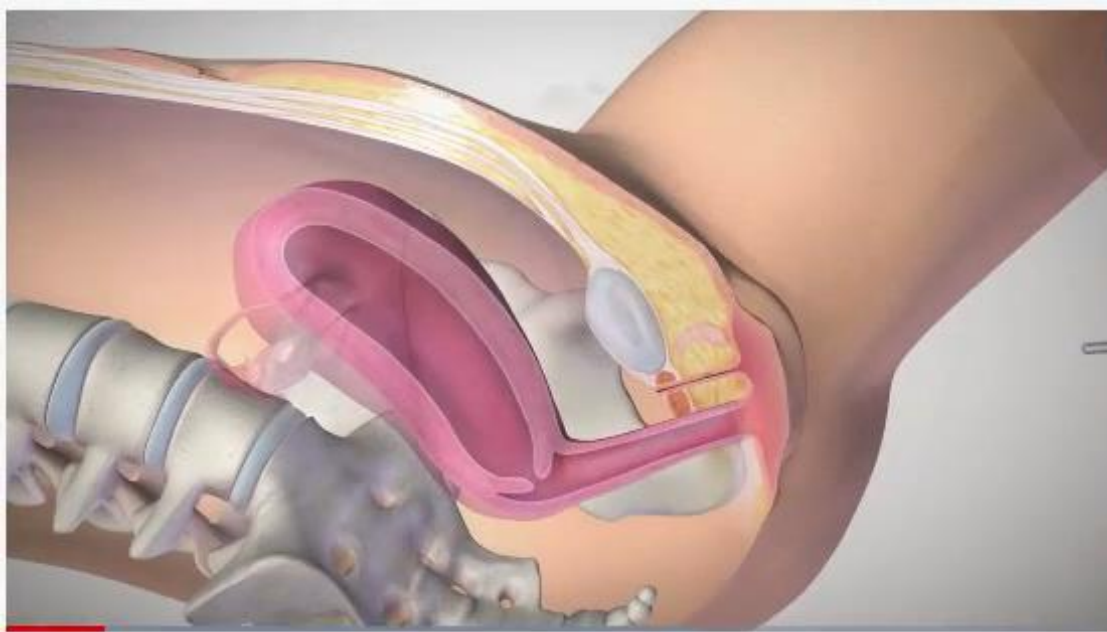
Está fabricado con silicona sin látex.



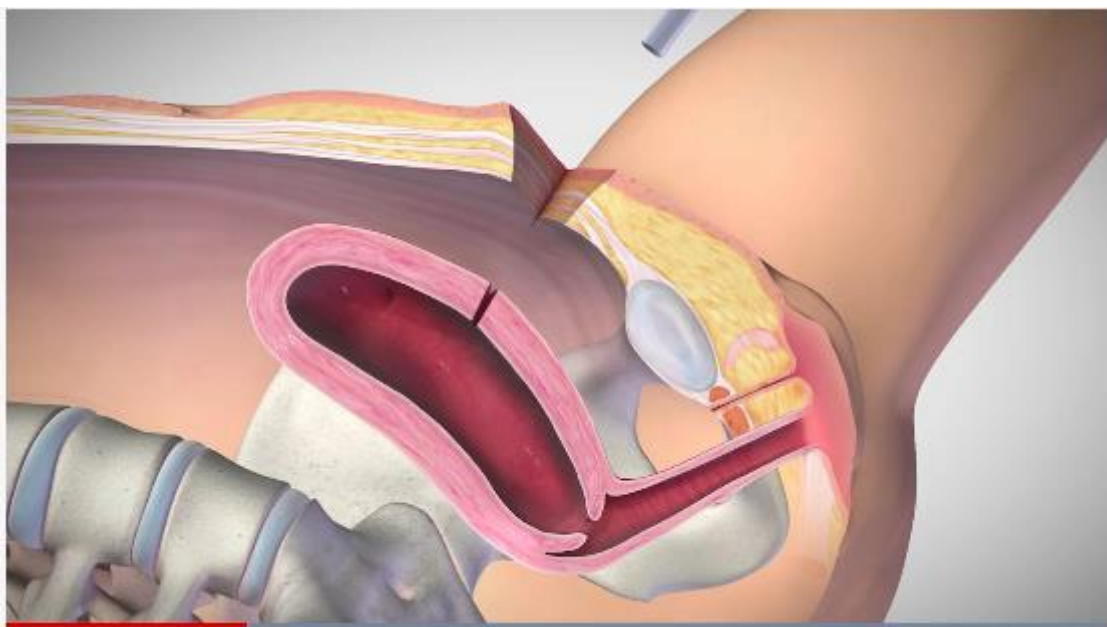
- The balloon should be inflated with a **sterile liquid** such as sterile water, sterile saline, or lactated Ringer's solution. The balloon should never be inflated with air, carbon dioxide, or any other gas.

- **The maximum inflation is 500 mL.** Do not overinflate the balloon. Overinflation of the balloon may result in the balloon being displaced into the vagina.

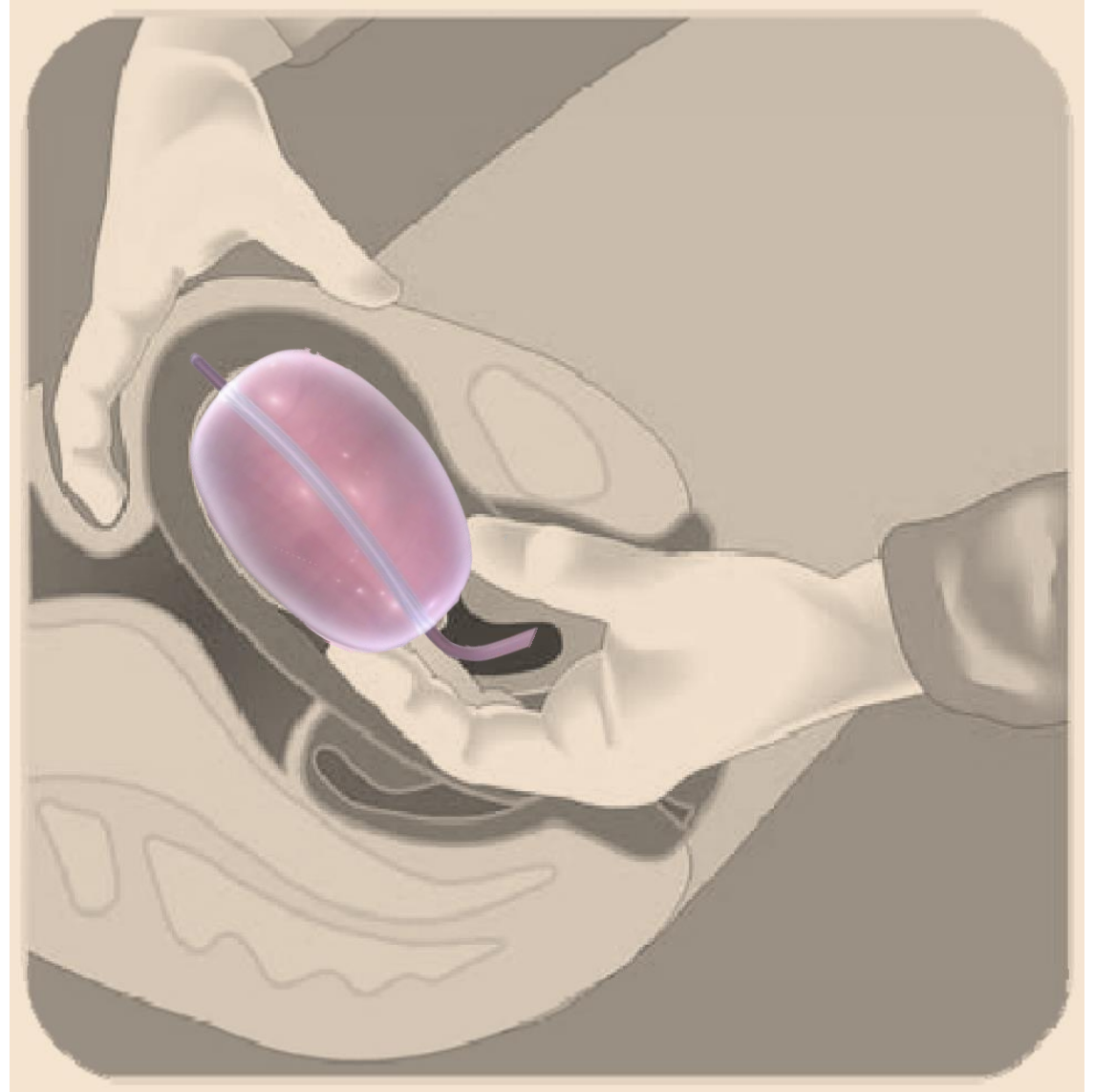
**TRANSVAGINAL  
(anterógrada)**



**TRANSABDOMINAL  
(retrógrada)**



# Balón de Bakri. Inserción



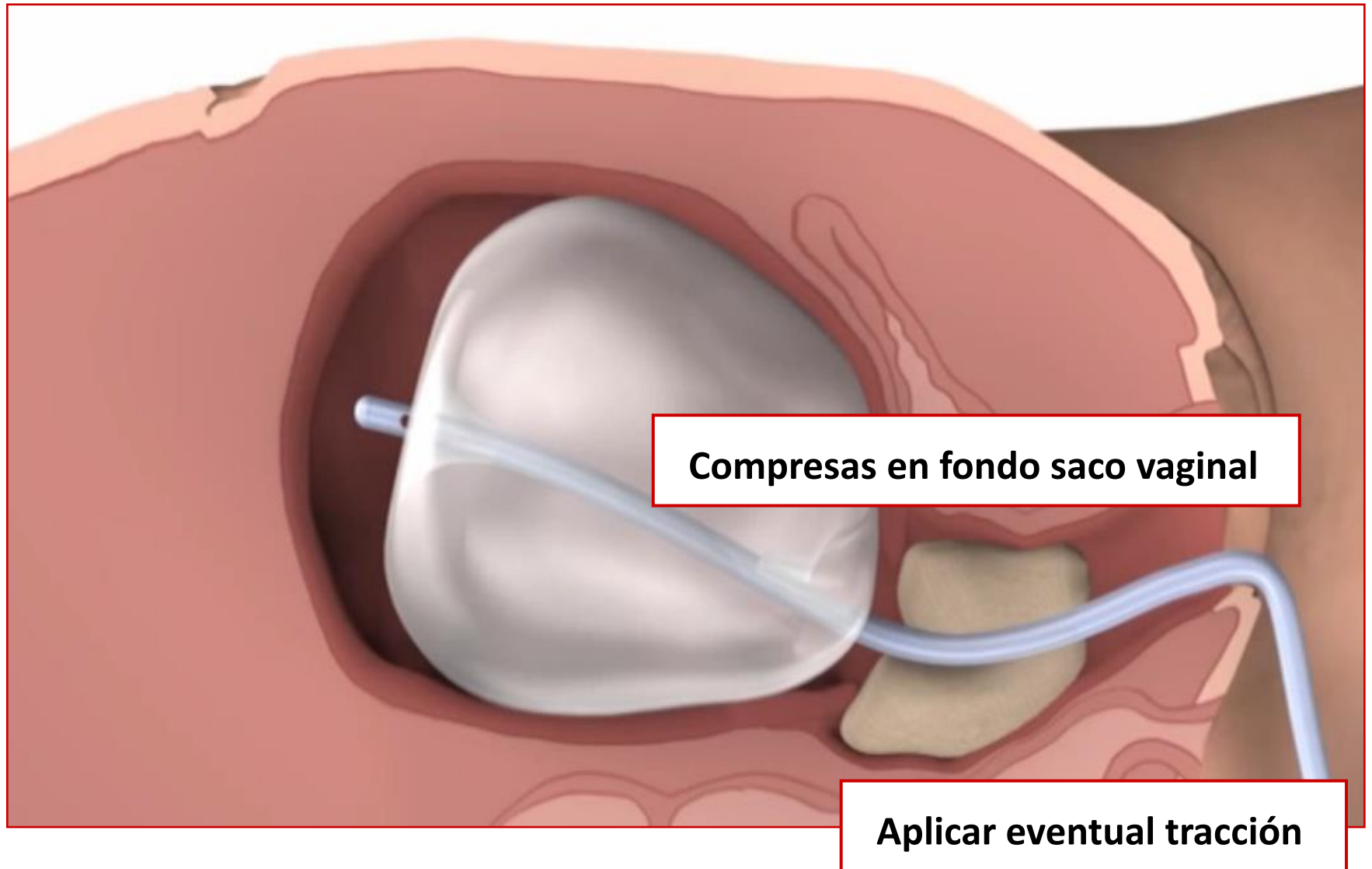
# Balón de Bakri. Mecanismo de acción

## **3 principios:**

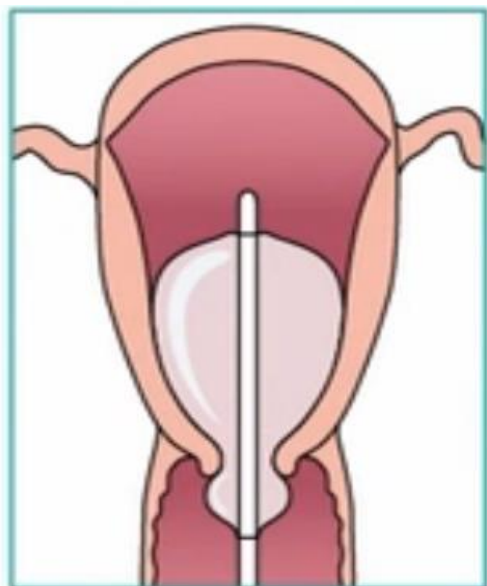
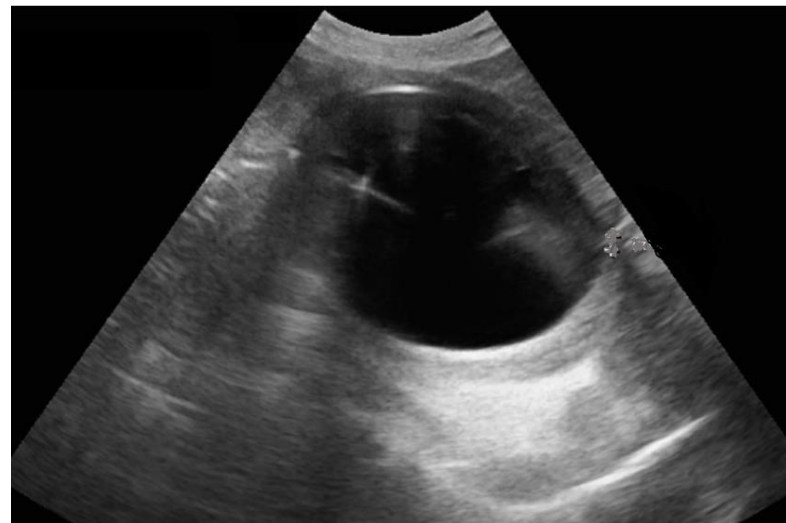
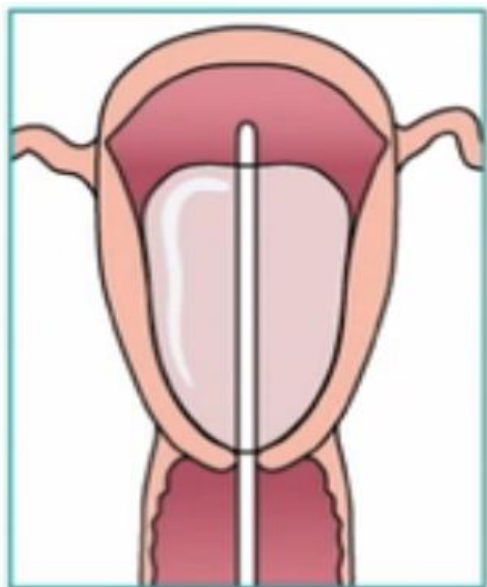
- ❖ PRESIÓN intrauterina mayor que presión arterial sistémica: en ese momento el sangrado cesa.
- ❖ Útero distendido → Reacción: contracción uterina
- ❖ Presión hidrostática sobre las arterias uterinas.



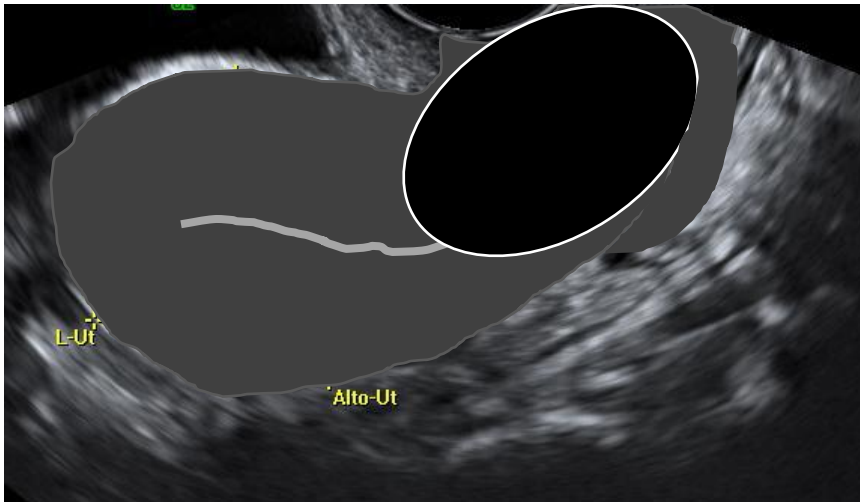
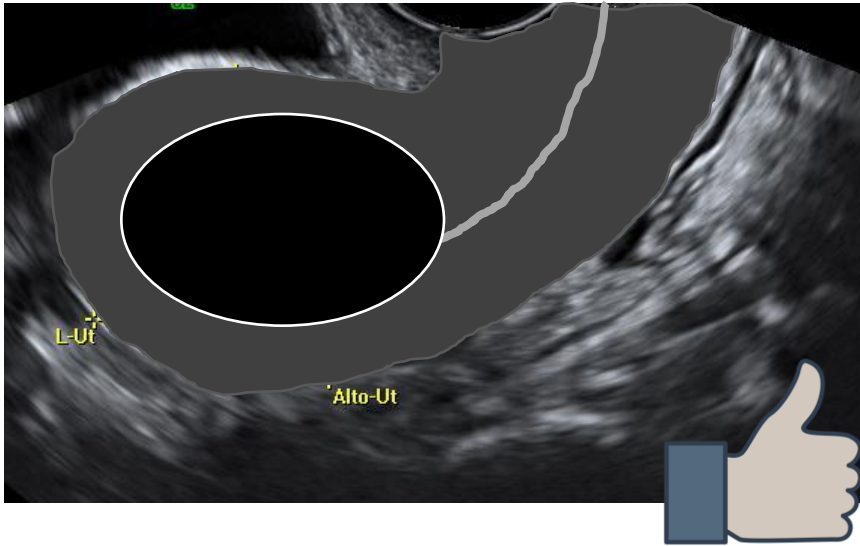
# Balón de Bakri. Tras inserción

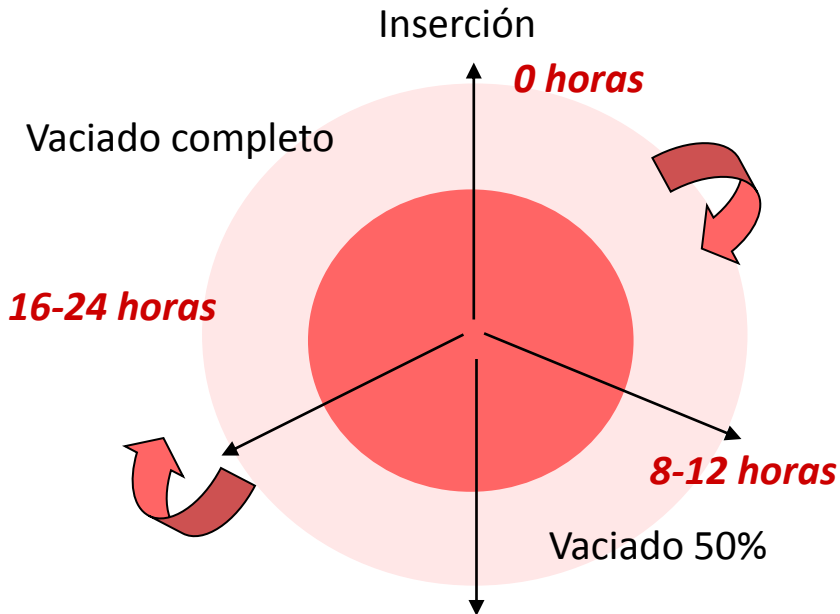


# Balón de Bakri. Ecografía



# Balón de Bakri. Ecografía





# Balón de Bakri. Retirada

Remove the balloon.

- Maximum indwelling time **24 hours.**
- The attending clinician determines when the balloon is removed after bleeding is controlled and the patient is stable.

## The association between intrauterine balloon tamponade duration and postpartum hemorrhage outcomes



Brett D. Einerson, MD, MPH; Moeun Son, MD; Patrick Schneider, MD; Ian Fields, MD; Emily S. Miller, MD, MPH

American Journal of Obstetrics & Gynecology MARCH 2017

TABLE 2

Postpartum hemorrhage outcomes in women with intrauterine balloon tamponade

Outcome	IUBT 2–12 hours (n = 68)	IUBT >12 hours (n = 206)	P	Odds ratio	Adjusted odds ratio <sup>a</sup>
Nadir hemoglobin $\leq 6.0$ mg/dL	12 (17.7)	39 (18.9)	.935	1.20 [0.43–3.38]	1.06 [0.49–2.29]
Transfusion of any blood product(s)	35 (51.5)	128 (62.1)	.120	1.55 [0.89–2.69]	1.55 [0.85–2.80]
Transfusion of $\geq 4$ U PRBC	10 (14.7)	35 (17.0)	.659	1.19 [0.55–2.55]	1.28 [0.56–2.91]
Estimated blood loss after balloon placement $>200$ mL	39 (57.4)	136 (66.0)	.197	1.44 [0.82–2.53]	1.29 [0.71–2.35]
Uterine artery embolization	11 (16.2)	31 (15.1)	.823	0.91 [0.43–1.94]	0.76 [0.34–1.72]
Hysterectomy	1 (1.5)	0 (0)	.248	—	—
Maternal ICU admission	5 (7.4)	18 (8.7)	.721	1.21 [0.43–3.38]	1.30 [0.44–3.88]



## Early usage of Bakri postpartum balloon in the management of postpartum hemorrhage: a large prospective, observational multicenter clinical study in South China

J. Perinat. Med. 2017;

**Table 3:** Comparison of the Bakri balloon failure versus success characteristics.

	Failure (n=34)	Success (n=373) 91.65%	P-value
Age (years, mean ± SD)	32.97 ± 4.13	32.10 ± 5.33	0.046 <sup>a</sup>
Gestational age (weeks, mean ± SD)	37.54 ± 4.38	37.79 ± 4.13	0.527
Number of cesarean delivery (n, %)	28, 82.35%	312, 83.65%	0.456
Infused volume (mL, mean ± SD)	419.53 ± 104.48	373.00 ± 92.67	0.007 <sup>a</sup>
Time between delivery/insertion (min, mean ± SD)	55.34 ± 45.24	38.25 ± 40.63	0.126
Blood loss before using the Bakri balloon (mL, mean ± SD)	1700 ± 1429.88	918 ± 493.92	0.002 <sup>a</sup>
Blood loss after using the Bakri balloon (mL, mean ± SD)	1209.58 ± 1139.72	266.57 ± 361.60	0.001 <sup>a</sup>

**Table 2:** Blood loss and hemoglobin after Bakri balloon insertion in different groups.

Group (according to blood loss before using the Bakri balloon, mL)	n	Blood loss after using the Bakri balloon (mL, mean ± SD)	P-value	Hemoglobin after using the Bakri balloon (g/L, mean ± SD)	P-value
<b>Transvaginal</b>					
Total	67	279.90 ± 405.11	–	92.54 ± 20.20	–
<1000	31	242.06 ± 313.69	–	92.06 ± 19.60	–
1000–1999	30	264.63 ± 430.23	0.815	96.93 ± 18.71	0.325
≥2000	6	551.67 ± 635.17	0.039 <sup>a</sup>	73.00 ± 21.77	0.029 <sup>a</sup>
<b>Cesarean section</b>					
Total	340	325.21 ± 505.90	–	93.49 ± 19.47	–
<1000	193	244.28 ± 250.97	–	96.91 ± 17.98	–
1000–1999	127	360.72 ± 527.00	0.109	91.76 ± 15.11	0.047 <sup>a</sup>
≥2000	20	880.75 ± 1299.37	<0.001 <sup>a</sup>	71.50 ± 36.55	<0.001 <sup>a</sup>



# Balón de Bakri. Ventajas

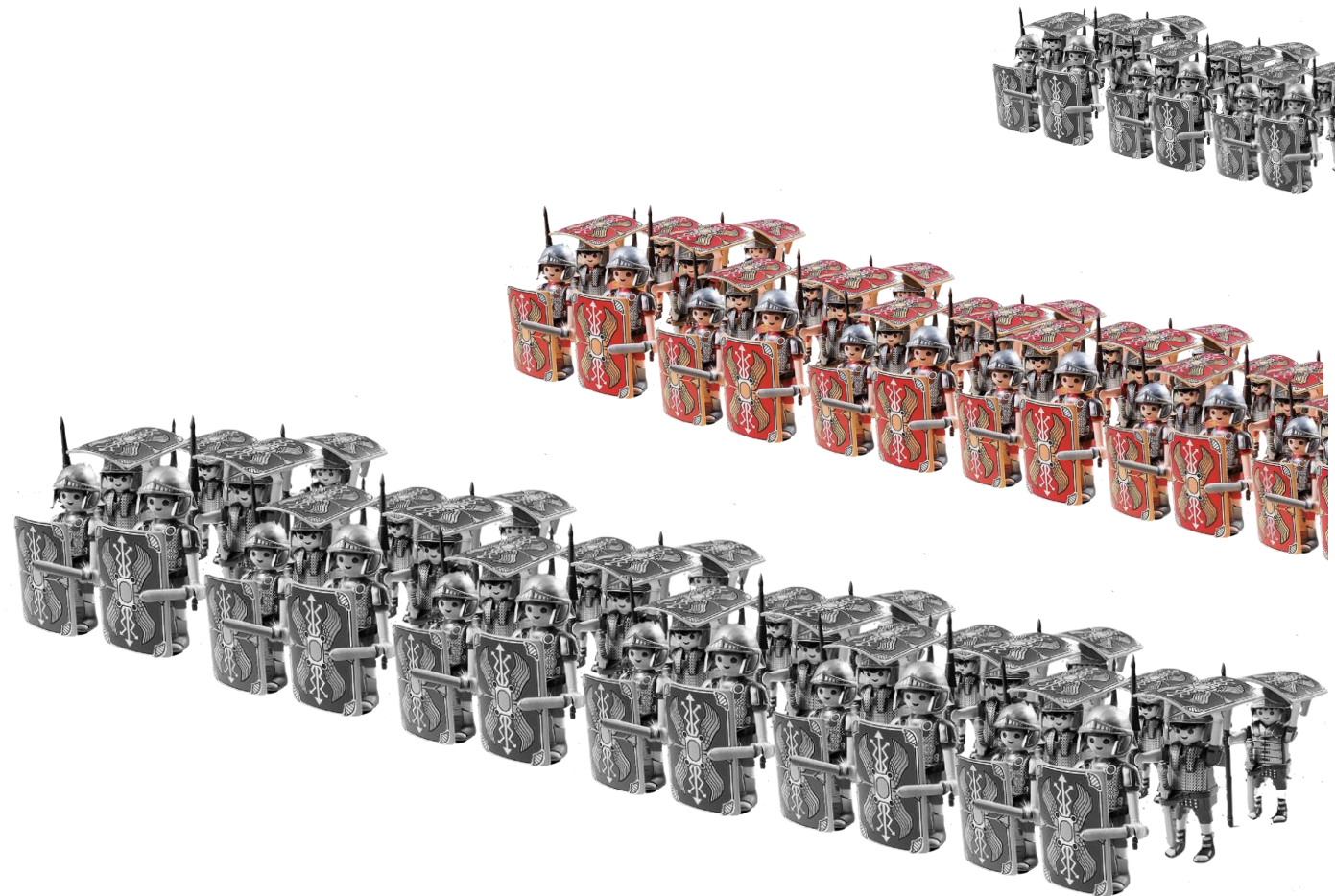
Early usage of Bakri postpartum balloon in the management of postpartum hemorrhage: a large prospective, observational multicenter clinical study in South China

	Total	Cesarean section	Transvaginal
n	407	340	67
Rate of success (%)	91.65%	92.06%	89.55%
<u>Complications associated with the Bakri balloon</u>			
Uterine infection (n)	0	0	0
Uterine perforation (n)	0	0	0
Obstetric canal lacerations (n)	0	0	0
Pain (n)	8	6	2

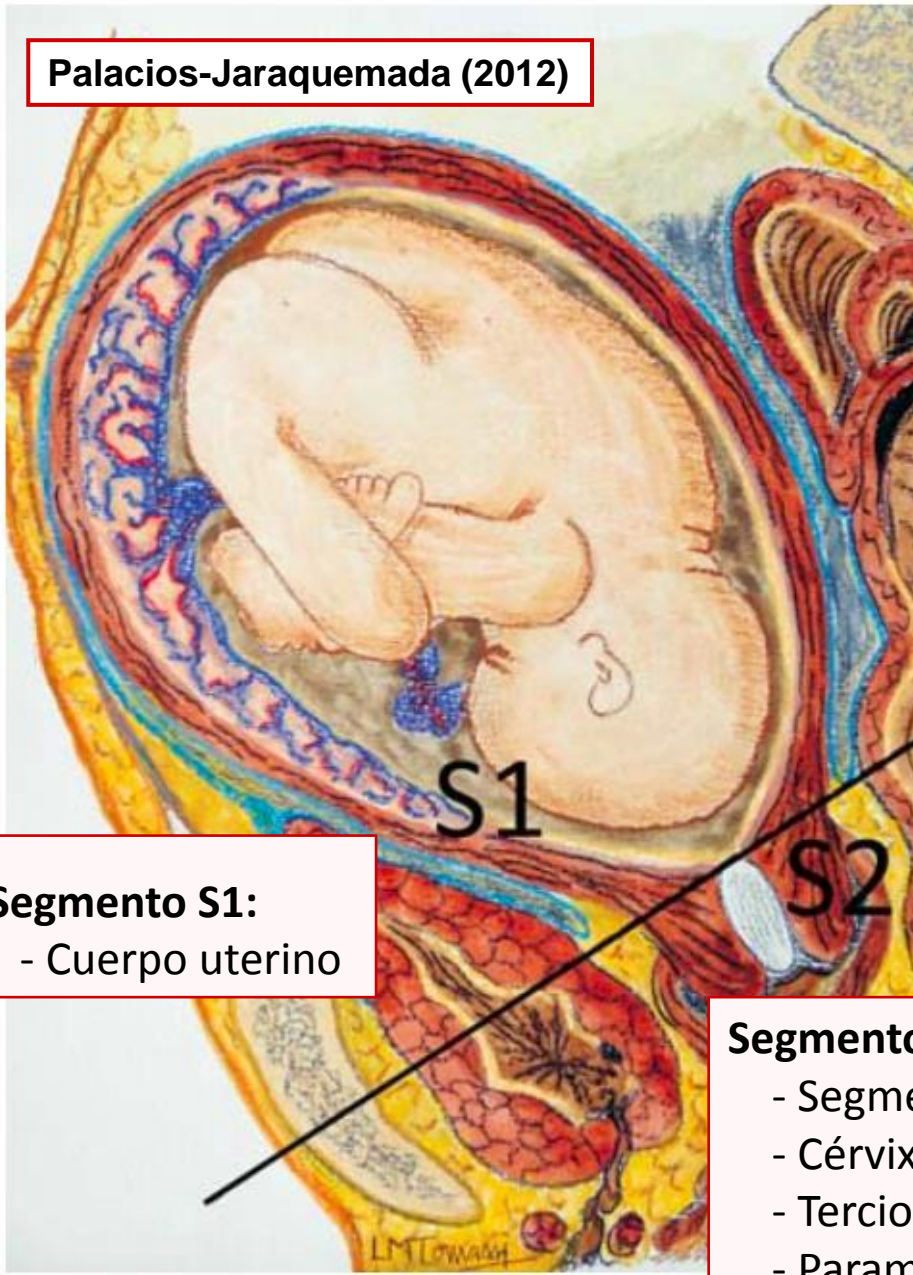
- ❖ Facilidad inserción / retirada. Mínimamente invasivo
- ❖ **Drenaje:**
  - ❖ Evita colección sangre intraútero
  - ❖ Permite estimación del sangrado
- ❖ Medición rápida de su eficacia. **Test del taponamiento**
- ❖ Posibilidad de combinar otros tratamientos
- ❖ Preserva fertilidad

SUTURAS COMPRESIVAS

LIGADURAS VASCULARES



Palacios-Jaraquemada (2012)



**Segmento S1:**

- Cuerpo uterino

**Segmento S1:**

- Ramas ascendentes de las arterias uterinas.
- Ramas descendentes de las arterias ováricas. *En menor medida.*
- Arterias de los ligamentos redondos. *Escasa contribución.*

**Segmento S2:**

- Ramas descendentes de las arterias uterinas.
- Ramas de las arterias:  
Cervicales / Vaginales  
Vesicales superiores.  
Pudendas.

**Segmento S2:**

- Segmento uterino inferior
- Cérvix
- Tercio superior de vagina
- Parametrios

**Anastomosis**  
arterias vaginales-arterias uterinas

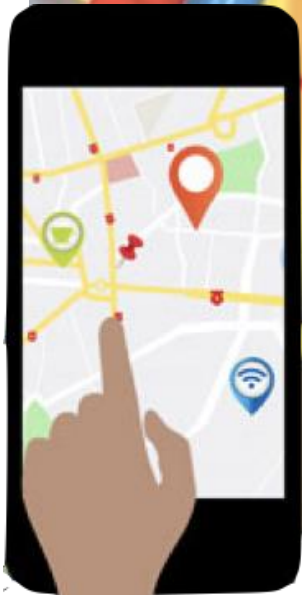
**Calibre**  
arterias vaginales > arterias uterinas

**Anastomosis**  
arterias uterinas derecha-izquierda

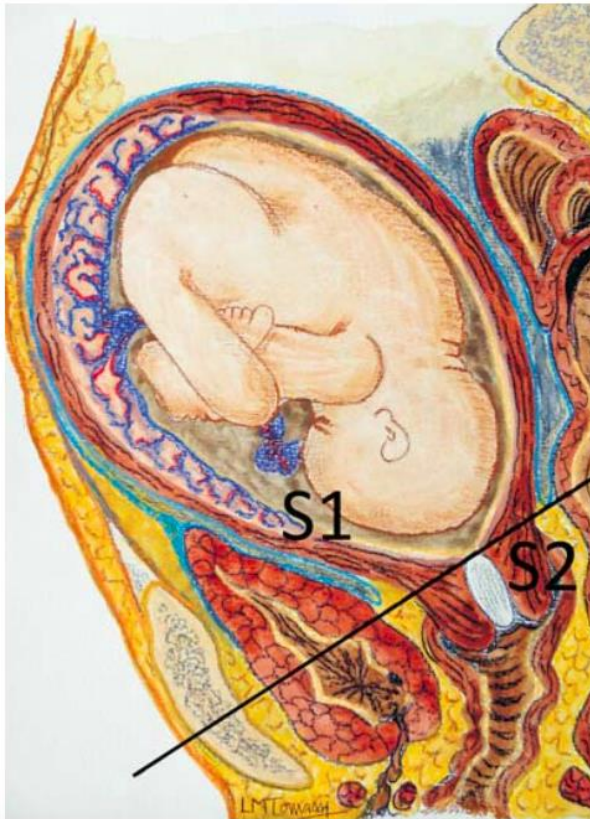
Necesidad de ligaduras bilaterales

Éxito de suturas compresivas verticales (Hayman, B-Lynch)

“En parto vaginal traumático la histerectomía no es la solución”



# SUTURAS COMPRESIVAS. Técnicas de capitonaje



Palacios-Jaraquemada (2005)

Experiencia quirúrgica

Rápidas, seguras, económicas y altamente eficaces\*

Fertilidad preservada

## S1 Atonía uterina

Suturas compresivas longitudinales

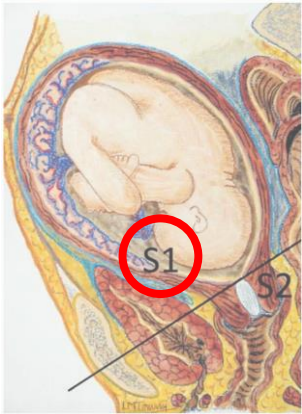
## S2 Inserción placentaria anormal

Suturas compresivas transversas en segmento inferior  
Si no es suficiente, añadir el componente longitudinal de la sutura.

### \* Uterine compression sutures for postpartum hemorrhage: an overview

SHIGEKI MATSUBARA, HITOSHI YANO, AKIHIDE OHKUCHI, TOMOYUKI KUWATA, RIE USUI & MITSUAKI SUZUKI

Department of Obstetrics and Gynecology, Jichi Medical University, Tochigi, Japan



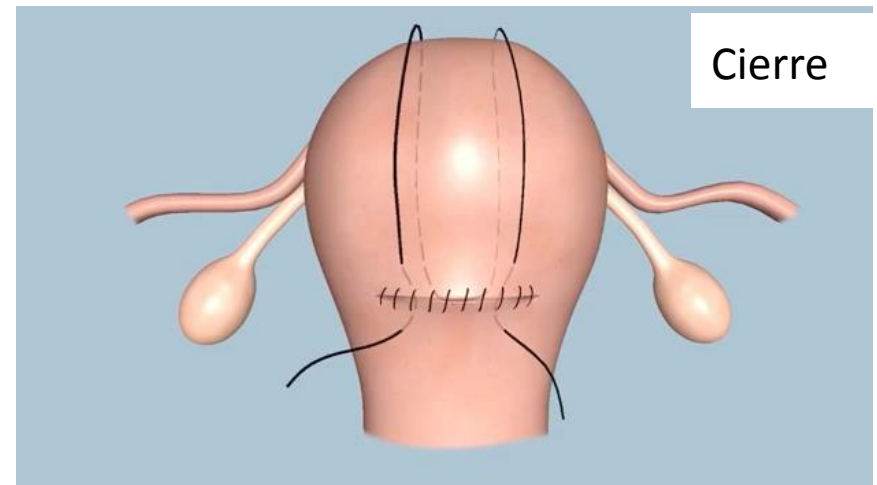
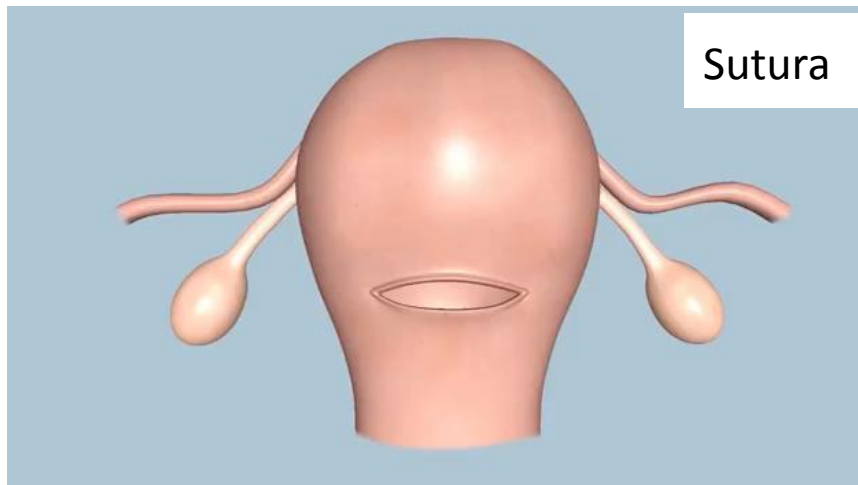
# SUTURAS COMPRESIVAS. B-Lynch

## Objetivo:

Sutura compresiva longitudinal

Compresión vertical continua del sistema vascular uterino

Cese de sangrado



# SUTURAS COMPRESIVAS. B-Lynch

## Siempre histerotomía

- **Parto vaginal:** se realiza una incisión transversa en segmento uterino inferior
- **Cesárea:** se retiran los puntos de histerorrafia

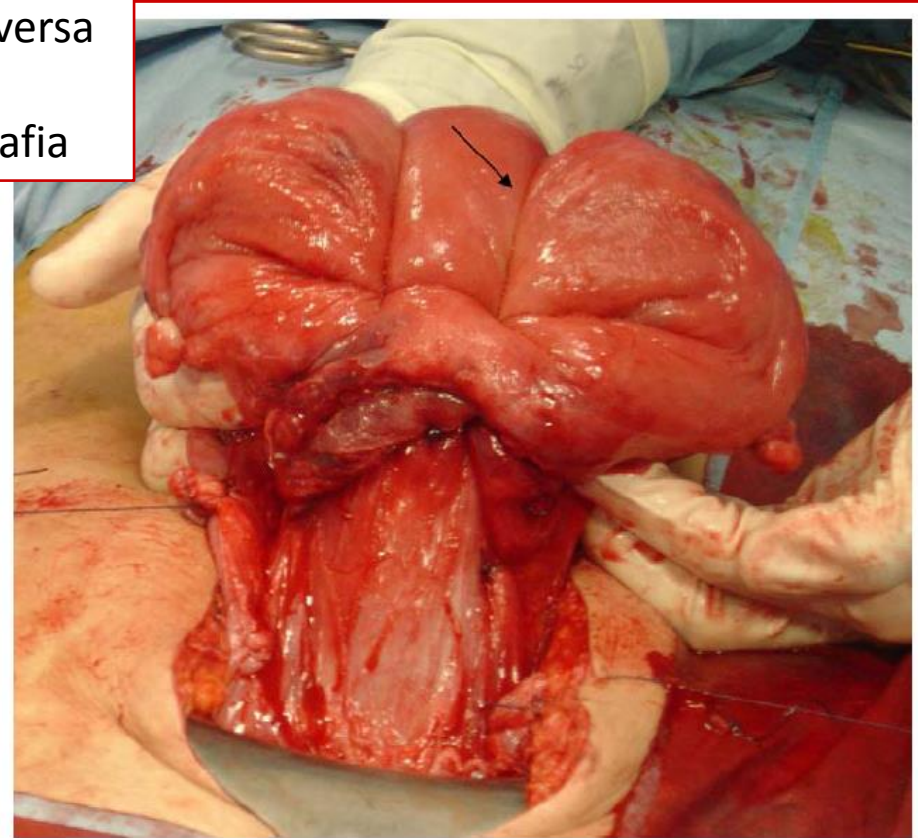
La principal involución uterina ocurre en la primera semana posparto



**Efecto máximo de la sutura: 24-48 horas**



Después pierde tensión pero la hemostasia ya se ha logrado

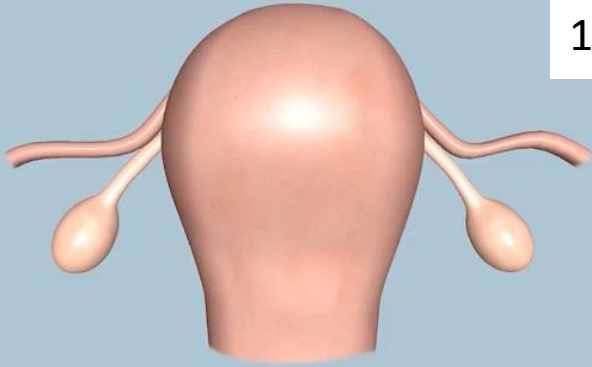


**Figure 8.** Operative view: uterine mattress sutures as described by B-Lynch et al. [25]: The passage of absorbable "suspenders" sutures through the uterine fundus.

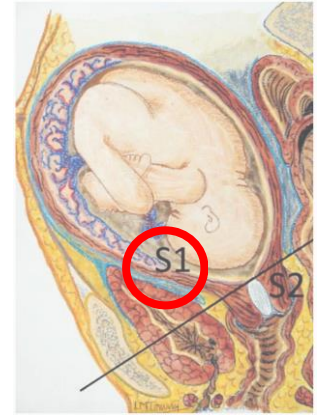


# SUTURAS COMPRESIVAS. Hayman

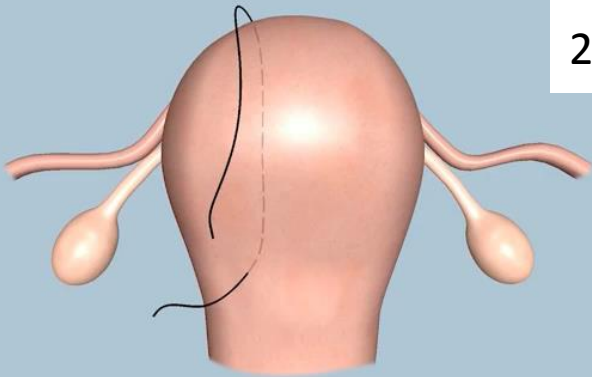
1ºtirante



**Objetivo**  
Sutura compresiva longitudinal



2ºtirante

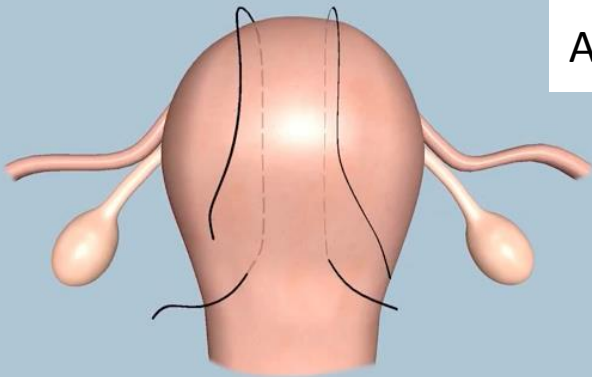


No requiere apertura de cavidad uterina



Técnica rápida

Anudado



**Inconvenientes**

- No visión directa de cavidad uterina
- Riesgo de isquemia por:
  - Tensión desigual
  - Deslizamiento de sutura

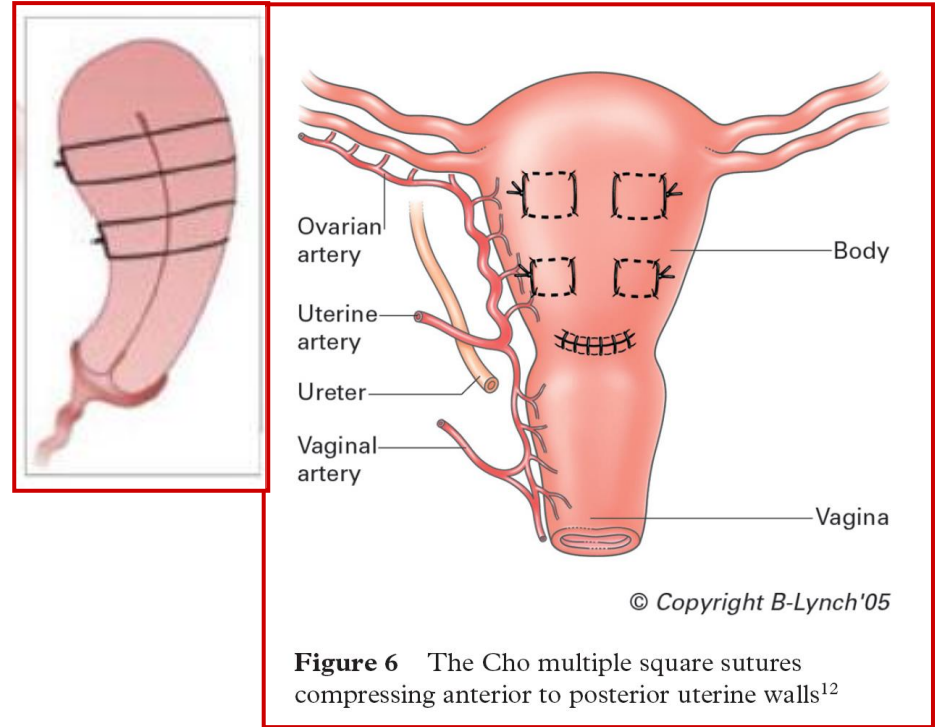
# SUTURAS COMPRESIVAS. Suturas de Choo



Múltiples suturas cuadradas



Se abarca todo el espesor uterino



**Figure 6** The Cho multiple square sutures compressing anterior to posterior uterine walls<sup>12</sup>

## Inconvenientes

- Si se requieren muchas se alarga el tiempo quirúrgico
- Se pueden dificultar las contracciones y la involución uterina
- Riesgo de piometra y sinequias uterinas posteriores
- Escasa información de fertilidad posterior

# SUTURAS COMPRESIVAS. Pereira

## Compressive Uterine Sutures to Treat Postpartum Bleeding Secondary to Uterine Atony

Alcides Pereira, MD, Filomena Nunes, MD, Sónia Pedroso, MD, João Saraiva, MD, Hélio Retto, MD, and Manuel Meirinho, PhD

VOL. 106, NO. 3, SEPTEMBER 2005 OBSTETRICS & GYNECOLOGY

OBSTETRICS & GYNECOLOGY



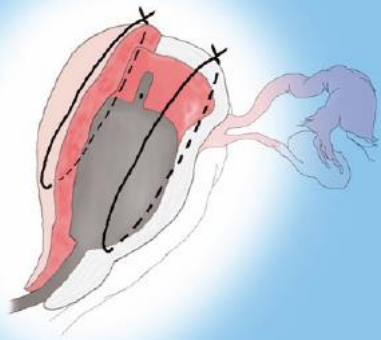
**Fig. 6.** Final aspect of the uterus with all sutures applied.  
Pereira. *Compressive Uterine Sutures*. *Obstet Gynecol* 2005.

### Ventajas

- Mejor distribución de compresión
- No se penetra en cavidad uterina
- Menor riesgo de infección
- Se preservan trompas, ligamentos útero-ováricos y ligamentos redondos.
- Se ligan ramas ascendentes de las arterias uterinas

# Técnica “Sandwich”

**Figure 1.** ‘Uterine sandwich’ technique combining Hayman external compression suture with intrauterine Bakri balloon tamponade (Yoong and Abenberthy 2011).



## Application of uterine compression suture in association with intrauterine balloon tamponade (‘uterine sandwich’) for postpartum hemorrhage

WAI YOONG<sup>1</sup>, ALEXANDRA RIDOUT<sup>2</sup>, MARIA MEMTSA<sup>1</sup>, ANDREAS STAVROULIS<sup>1</sup>, MERNOOSH AREF-ADIB<sup>1</sup>, ZEUDI RAMSAY-MARCELLE<sup>1</sup> & ABIODUN FAKOKUNDE<sup>1</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, North Middlesex University Hospital, and <sup>2</sup>University College London Medical School, London, UK

*Acta Obstetrica et Gynecologica Scandinavica* © 2011 Nordic Federation of Societies of Obstetrics and Gynecology 91 (2012) 147–151

**Table 1.** Demographic data of 11 patients who underwent the ‘uterine sandwich’ technique.

Patient	Age (years)	Ethnicity	Mode of delivery	Parity	Risk factor	Gestational age (weeks)	Suture	Estimated blood loss (ml)	Bakri balloon volume (ml)	Units of blood transfused	FU (months)
1	16	Black African	Emergency CS	0	PP	36	B-Lynch	2400	280	4	3
2	33	Black African	Elective CS	4	PP, previous uterine rupture	36	B-Lynch	1000	350	0	12
3	18	Eastern European	Normal vaginal delivery	0	–	42	Hayman	2700	300	8	3
4	27	Black African	Elective CS	0	PP	39	Hayman	750	200	0	32
5	36	Eastern European	Elective CS	3	PP	36	Hayman	2000	300	3	3
6	40	White Caucasian	Elective CS	1	PP, accreta	37	Hayman	4000	200	9 (ICS)	18
7	31	White Caucasian	Elective CS	1	PP	37	Hayman	1500	200	2 (ICS)	6
8	36	Black African	Elective CS	0	PP	36	Hayman	1500	200	0 (ICS)	12
9	27	Turkish	Elective CS	1	PP	37	Hayman	4500	300	6	3
10	26	Somalian	Elective CS	0	PP	37	Hayman	950	150	0 (ICS)	6
11	30	White Caucasian	Elective CS	0	PP	38	Hayman	2000	200	2 (ICS)	6

Abbreviations: CS, cesarean section; ICS, intraoperative cell salvage; PP, placenta previa.

# SUTURAS COMPRESIVAS. Eficacia

## Uterine compression sutures for postpartum hemorrhage: an overview

SHIGEKI MATSUBARA, HITOSHI YANO, AKIHIDE OHKUCHI, TOMOYUKI KUWATA, RIE USUI & MITSUAKI SUZUKI

*Department of Obstetrics and Gynecology, Jichi Medical University, Tochigi, Japan*



*Acta Obstetrica et Gynecologica Scandinavica* © 2013 Nordic Federation of Societies of Obstetrics and Gynecology **92** (2013) 378–385

**Table 1.** Characteristics of various uterine compression sutures.

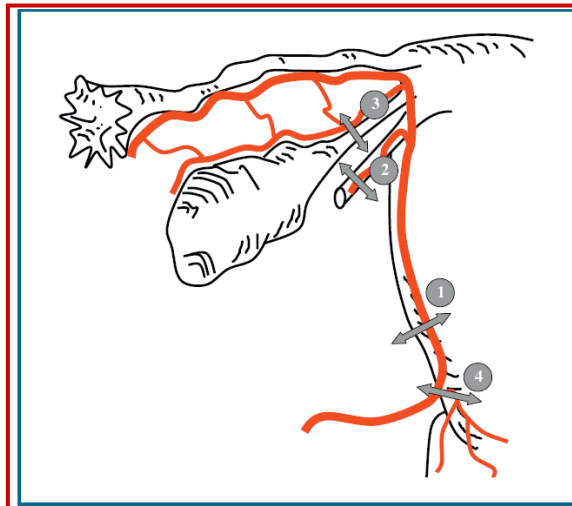
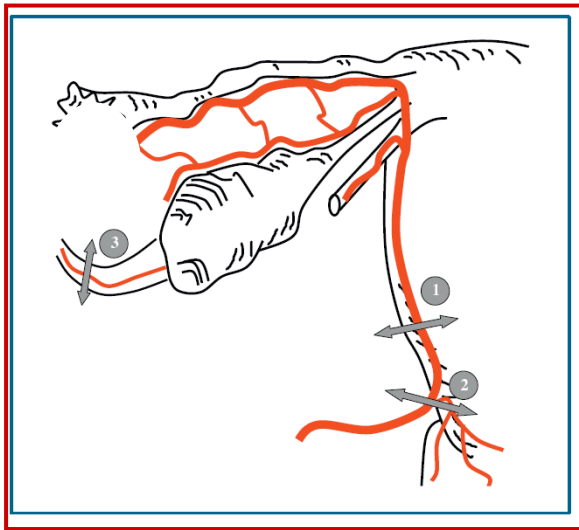
Procedure (year)	Number of patients	Transfixation of total uterine wall	Uterus open	Number of threads used	Hemostasis achieved (%)	Pregnancy or delivery after the suture (%)
B-Lynch (1997)	5	No <sup>1</sup>	Yes	1	5/5 (100)	2/5 (40)
Hayman (2002)	3	Yes	No	2	3/3 (100)	nd
Cho (2000)	23	Yes	No	4–5	23/23 (100)	4/10 (40)
Pereira (2005)	7	No	No	4–6	7/7 (100)	1/7 (14)
Ouahba (2007)	20	Yes	No	4	19/20 (95)	6/8 (75)
Hackethal (2008)	7	Yes	No	6–16	7/7 (100)	Pregnancy desire (–)
Makino-Takeda (2012)	3	Yes	No	4	3/3 (100)	nd
Matsubara-Yano (2009)	8	Yes	No	4–5	8/8 (100)	2/8 (25)
Marasinghe (2011)	17	Yes	No	2	13/17 (76)	2/10 (20)
Meydanli (2008)	7	Yes	No	1	6/7 (86)	Pregnancy desire (–)
Zheng (2011)	9	No	No	2	9/9 (100)	1/9 (11)
				Total	103/109 (97)	18/57 (32)

# LIGADURAS ARTERIALES

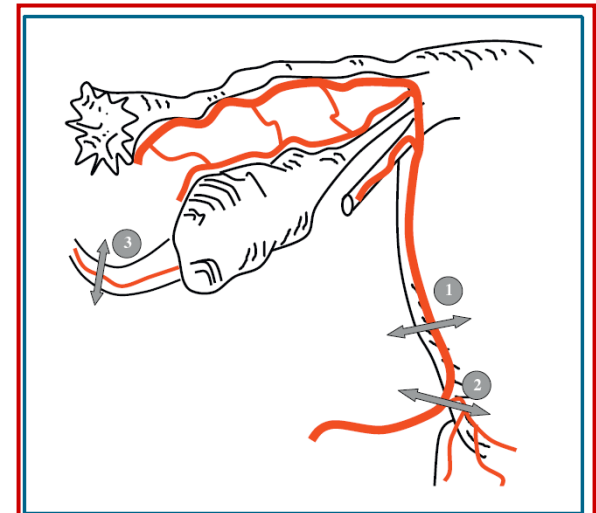
## Ligadura uterina bilateral

### Técnica de Tsirulnikov (triple ligadura)

### Ligadura arterial progresiva (stepwise): 5 pasos



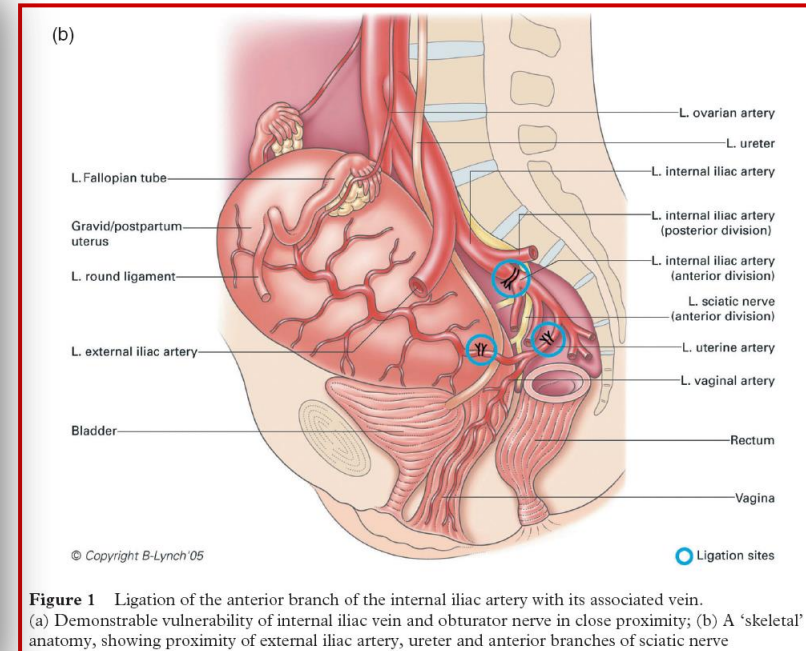
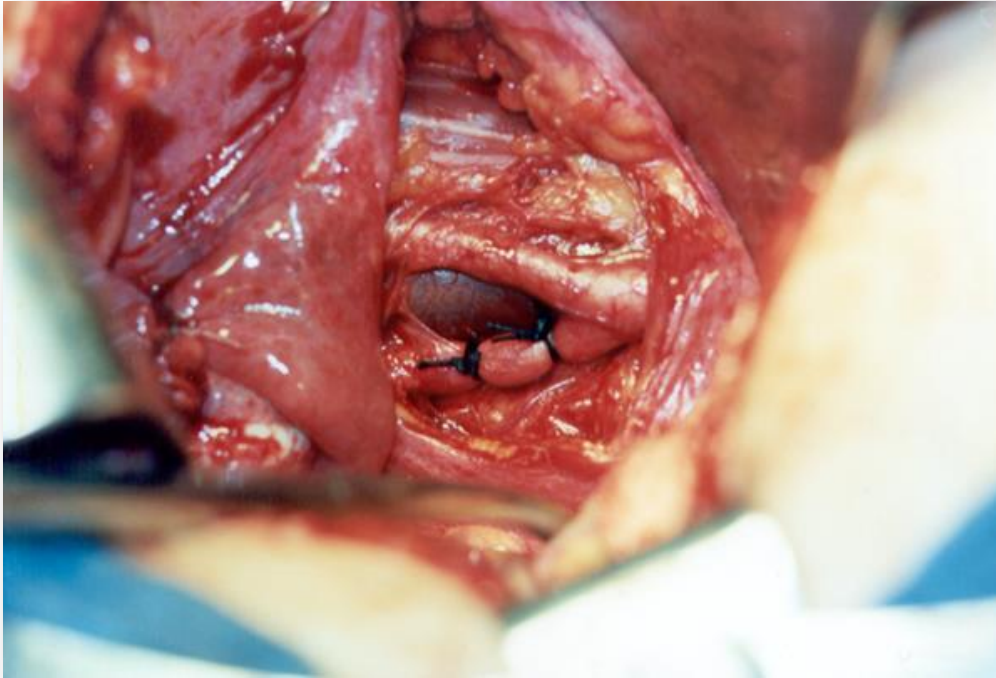
**Figure 7.** Schematic: vascular ligation (sequence recommended by the authors): distal ligation of uterine arteries (1), ligation of the round ligaments (2), ligation of utero-ovarian ligaments (3); proximal ligation of uterine arteries (4).



**Figure 5.** Schematic: "stepwise" sequential ligation: step one: distal ligation of the uterine arteries (1); step two: distal ligation of uterine arteries (2); step 3: ligation of the infundibulopelvic ligaments and ovarian vessels (3).

# LIGADURAS ARTERIALES

## Ligadura hipogástricas



- **Técnica compleja**
- Escasas indicaciones si se dispone de radiología intervencionista.
- Un 25% de los casos finaliza en una histerectomía

# CIRUGÍA CONSERVADORA. Eficacia

*Acta Obstetricia et Gynecologica Scandinavica* © 2011 Nordic Federation of Societies of Obstetrics and Gynecology 90 (2011) 1036–1042

## Efficacy of surgical techniques to control obstetric hemorrhage: analysis of 539 cases

JOSÉ MIGUEL PALACIOS-JARAQUEMADA<sup>1,2</sup>

<sup>1</sup>Center for Medical Education and Clinical Research (CEMIC), Buenos Aires, and <sup>2</sup>J.J. Naon Morphological Institute, School of Medicine, University of Buenos Aires, Argentina

**Table 1.** Efficacy to stop bleeding: techniques by topographic area.

Procedure	BUAL	B-Lynch	Hayman	Cho	Pereira	Selective pedicle ligation
<u>S1 bleeding (uterine atony)</u>	19/23	49/52	25/26	11/11	2/2	0
<u>S1 bleeding (placenta accreta)</u>	18/20	32/34	9/11	26/26	9/9	0
<u>S2 bleeding</u>	Placenta accreta 0/11; placenta previa 0/5	0	0	Placenta accreta 204/225; placenta previa 21/21; CEP 19/19; LGT 24/24	0	Placenta accreta 31/36

Total hemostasis in 499 of 539 cases; raw hemostatic efficacy 93%.

Abbreviations: BUAL, bilateral uterine artery ligation; CEP, cervical ectopic pregnancy; LGT, lower genital tears; S1, sector 1; S2, sector 2.



# CIRUGÍA CONSERVADORA. Eficacia

## Efficacy of surgical techniques to control obstetric hemorrhage: analysis of 539 cases

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*Acta Obstetricia et Gynecologica Scandinavica* © 2011 Nordic Federation of Societies of Obstetrics and Gynecology **90** (2011) 1036–1042

**Table 2.** Main features of surgical hemostatic techniques.

Procedure	S1 efficacy (atony)	S1 efficacy		Time to perform the		Additional maneuvers	Technical difficulty	Specific material
		Good	Poor or ineffective	2–5	5–10			
BUAL	Excellent					Peritoneal vesico-uterine fold opening	Low	No
B-Lynch	Excellent	Good	Poor or ineffective	2–5		No	Mid	Needle and suture
Cho	Good	Excellent	Poor or ineffective			No	Low in S1; mid in S2	Needle
Hayman	Excellent	Good	Poor or ineffective	2–7		No	Low	Needle
Pereira	Excellent	Excellent	Poor or ineffective	5–10		No	Low to mid	No
SLVL	Not applicable	Not applicable	Excellent	5–15		Peritoneal vesico-uterine fold opening	Mid to high	No

Abbreviations: BUAL, bilateral uterine artery ligation; S1, sector 1; S2, sector 2; SLVL, selective lower vascular ligation.

### Atonía uterina:

- Potencial hemostático similar.
- B-Lynch la más rápida.

### Placenta ácreta en cuerno

### Sangrado de cérvix o vagina

# CIRUGÍA CONSERVADORA. Fertilidad

## Menstrual and fertility outcomes following the surgical management of postpartum haemorrhage: a systematic review

SK Doumouchtsis, K Nikolopoulos, VS Talaulikar, A Krishna, S Arulkumaran

2013 Royal College of Obstetricians and Gynaecologists

**Table 1.** Long-term effects of uterine artery embolisation, uterine devascularisation, and uterine compression on menstrual, fertility, and pregnancy outcomes

Type of procedure	Number of studies	Number of women included	Normal resumption of menstruation (<6 months)	Women who expressed a clear desire for subsequent pregnancies	Number of pregnant patients	Total term live births	Preterm	Early pregnancy loss (ectopic, miscarriage, elective abortions)	Recurrent PPH
Pelvic/uterine artery embolisation	17 (refs5, 7–12, 14–23)	675	460/503 (91.45%)	168	126 (75%)	136	4	30	18
Uterine devascularisation	5 (refs24–28)	195	28/32 (87.5%)	39	33 (84.61%)	68	1	23	8
Uterine compression sutures	6 (refs29–34)	125	65/71 (90.27%)	28	24 (85.71%)	21	0	0	0

# HISTERECTOMÍA POSTPARTO



# HISTERECTOMÍA POSTPARTO

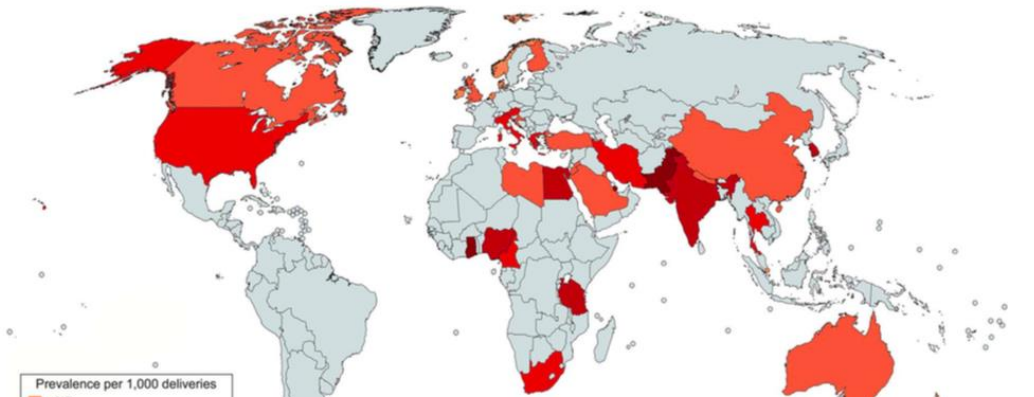
## Prevalence, Indications, Risk Indicators, and Outcomes of Emergency Peripartum Hysterectomy Worldwide

*A Systematic Review and Meta-analysis*

*Thomas van den Akker, MD, PhD, Carolien Brobbel, MD, Olaf M. Dekkers, MD, PhD, and Kitty W. M. Bloemenkamp, MD, PhD*

VOL. 128, NO. 6, DECEMBER 2016

OBSTETRICS & GYNECOLOGY



**Weighted mean estimated blood loss was 3.7 L**

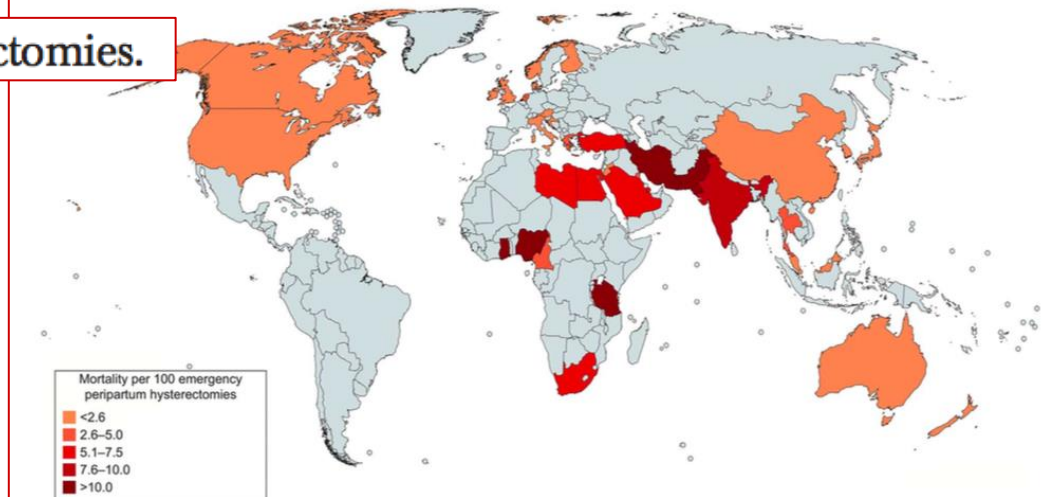
van den Akker. Emergency Peripartum Hysterectomy Worldwide. Obstet Gynecol 2016.

**mortality rate was 5.2 per 100 hysterectomies.**

**Table 4. Procedures in Addition to Hysterectomy**

Procedure	Prevalence (n=3,703 Women)
Relaparotomy	333 (9)
Salpingo-oophorectomy	214 (6)
Bladder or ureteral repair	110 (3)
Artery ligation or embolization	30 (1)
Other*	18 (<1)

Data are n (%).



**Fig. 3.** World map showing maternal mortality after emergency peripartum hysterectomy. Image created using mapchart.net.

van den Akker. Emergency Peripartum Hysterectomy Worldwide. Obstet Gynecol 2016.

# HISTERECTOMÍA POSTPARTO. Indicaciones

**Table 1. Indications for Emergency Peripartum Hysterectomy**

Indication	Prevalence (n=6,765)
<u>Placental pathology</u>	2,542 (38)
Abnormally invasive placenta	1,276 (19)
Placenta previa	650 (10)
Combined or unspecified placental pathology	517 (8)
Placental abruption or couvelaire uterus	99 (1)
<u>Uterine atony</u>	1,819 (27)
<u>Uterine rupture*</u>	1,740 (26)
Unspecified hemorrhage	352 (5)
Infection <sup>†</sup>	129 (2)
Cervical tear or laceration	85 (1)
Leiomyomas or myomas with major obstetric hemorrhage	56 (1)
Disseminated intravascular coagulation	30 (<1)
Hematoma <sup>‡</sup>	26 (<1)
Abnormal pregnancy <sup>§</sup>	12 (<1)
Other <sup>  </sup>	33 (<1)
Unknown	126 (2)



Cesárea anterior



## Prevalence, Indications, Risk Indicators, and Outcomes of Emergency Peripartum Hysterectomy Worldwide

*A Systematic Review and Meta-analysis*

*Thomas van den Akker, MD, PhD, Carolien Brobbel, MD, Olaf M. Dekkers, MD, PhD, and Kitty W. M. Bloemenkamp, MD, PhD*

# HISTERECTOMÍA POSTPARTO

## Risk for Peripartum Hysterectomy and Center Hysterectomy and Delivery Volume

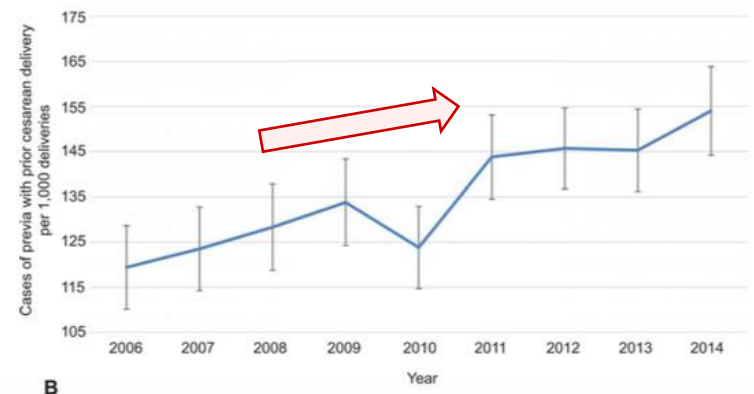
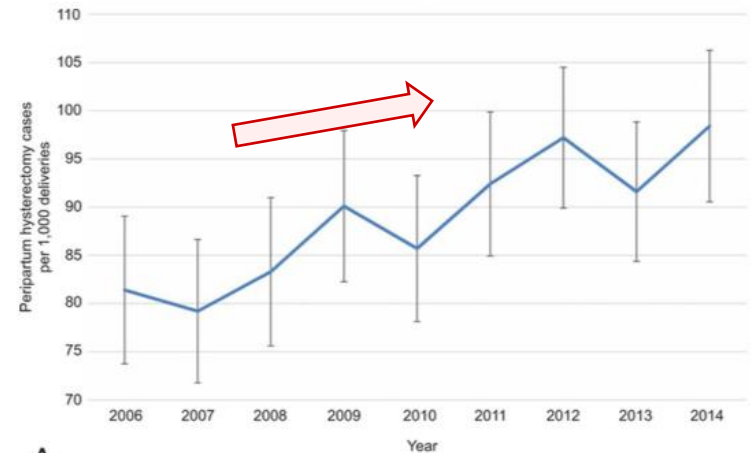
Shravya Govindappagari, MD<sup>1</sup>, Jason D. Wright, MD<sup>1</sup>, Cande V. Ananth, PhD, MPH<sup>1,2</sup>, Yongmei Huang, MD MPH<sup>1</sup>, Mary E. D'Alton, MD<sup>1</sup>, and Alexander M. Friedman, MD<sup>1</sup>

<sup>1</sup> Columbia University College of Physicians and Surgeons, New York Presbyterian Hospital New York.

*Obstet Gynecol.* 2016 December ; 128(6): 1215–1224.

**Results**—Four thousand eight hundred eleven hysterectomies occurred among 5,388,486 deliveries in 500 hospitals over the study period. The peripartum hysterectomy rate increased from 81.4 per 100,000 deliveries in 2006 to 98.4 in 2014. The prevalence rate of placenta previa in the setting of previous cesarean also increased over the study period. Between 2006-2008 and

All patients, n (%)	Placenta previa and prior CS, n(%)	Hysterectomy, n (%)
5,388,486	7,337	4,811



# HISTERECTOMÍA POSTPARTO. Resultados

## Emergency peripartum hysterectomy: results from the prospective Nordic Obstetric Surveillance Study (NOSS)

Nordic Federation of Societies of Obstetrics and Gynecology, *Acta Obstetrica et Gynecologica Scandinavica* 94 (2015) 745–754

**Table 4.** Treatment of postpartum hemorrhage before hysterectomy.

	Denmark n = 50	Finland n = 74	Sweden n = 52	Norway n = 31	Total <sup>a</sup> n = 211
<b>Medication and procedures</b>					
Oxytocin	37	55	36	26	157 (74.4)
Prostaglandins	33	39	32	23	130 (61.6)
B-Lynch sutures	11	9	5	10	35 (16.6)
Local sutures	17	39	11	12	79 (37.4)
Tamponade	19	19	8	9	57 (27.0)
Bakri balloon	3	18	11	4	38 (18.0)
Embolization	NA	12	6	1	19 (9.0)
Manual removal of placenta	1	5	0	7	13 (6.2)
Other	NA	8	NA	15	23 (10.9)
<b>Estimated blood loss (in liters)</b>					
Mean/SD	6.8/5.2	8.8/5.4	7.2/6.0	4.4/2.1	7.2/5.3
<1.5	11	1	1	2	16 (7.6)
1.5–4.9	7	15	14	15	51 (24.2)
5–9.9	23	20	28	14	86 (40.8)
10–14.9	7	14	6	0	28 (13.3)
≥15	2	11	3	0	16 (7.6)
Missing	0	13	0	0	14 (6.6)
<b>Whole blood or packed red cells</b>					
Yes	41	72	49	29	195 (92.4)
No	9	2	3	2	16 (7.6)
<b>Mean number of units (SD)</b>					
0	9	2	3	1	15 (7.1)
1–5	5	13	12	5	35 (16.6)
6–9	7	9	7	10	33 (15.6)
10–14	8	25	9	5	47 (22.3)
≥15	21	24	21	9	75 (33.5)
Missing	0	2	0	1	3 (1.4)
<b>Plasma</b>					
Yes	38	62	38	26	168 (79.6)
No	12	9	11	2	34 (16.1)
Missing	0	4	3	3	10 (4.7)
Factor VII	4	13	5	2	25 (11.8)

**Table 5.** Maternal morbidity and mortality in the study period; overview by country.

	Denmark n = 50	Finland n = 74	Sweden n = 52	Norway n = 31	Total <sup>a</sup> n = 211	
					n	%
<b>Maternal death</b>	1	0	0	0	1	0.5
<b>Intensive care unit admission</b>						
Yes	33	35	41	22	135	64.0
No	17	38	11	9	75	35.5
Missing	0	1	0	0	1	0.5
Respirator treatment <sup>b</sup>	2	NA	7	2	11	5.2
<b>Maternal morbidity</b>						
<b>Organ damage</b>						
Bladder lesion	0	2	4	1	7	3.3
Ureter lesion	0	1	1	1	3	1.4
<b>Other major maternal morbidity</b>						
Sepsis	3	1	0	0	4	1.9
Repeated laparotomy	1	15	13	3	32	15.2
Resuscitation <sup>b</sup>	1	1	1	0	3	1.4
DIC <sup>b</sup>	2	1	1	2	6	2.8
Other	5 <sup>c</sup>	5 <sup>d</sup>	2 <sup>e</sup>	1 <sup>f</sup>	13	6.2
<b>Total (maternal morbidity)</b>	12	26	22	8	68	32.2

# HISTERECTOMÍA POSTPARTO. Resultados

## Morbidity and Mortality of Peripartum Hysterectomy

Jason D. Wright, MD, Patricia Devine, MD, Monjri Shah, MD, Sreedhar Gaddipati, MD, Sharyn N. Lewin, MD, Lynn L. Simpson, MD, Clarissa Bonanno, MD, Xuming Sun, MD, Mary E. D'Alton, MD, and Thomas J. Herzog, MD

- 4.967 hysterectomías periparto. De 1998 a 2007.
- Base de datos de la Agencia Calidad EEUU.

VOL. 115, NO. 6, JUNE 2010 **OBSTETRICS & GYNECOLOGY**

**Table 2. Unadjusted and Adjusted Rates of Operative and Perioperative Complications Associated With Peripartum and Nonobstetric Hysterectomy**

	Peripartum Hysterectomy	Nonobstetric Hysterectomy	P	Peripartum vs Nonobstetric Hysterectomy*
Intraoperative injury				
Bladder injury	458 (9.2)	6,178 (1.1)	<.001	9.02 (8.10–10.05)
Ureteral injury	33 (0.7)	711 (0.1)	<.001	5.04 (3.47–7.32)
Intestinal injury	38 (0.8)	5,010 (0.9)	.44	0.97 (0.70–1.34)
Vascular injury	19 (0.4)	2,683 (0.5)	.40	0.71 (0.45–1.12)
Other operative injury	481 (9.7)	10,536 (1.8)	<.001	5.49 (4.97–6.08)
Perioperative surgical complications				
Reoperation	202 (4.1)	2,673 (0.5)	<.001	6.46 (5.51–7.58)
Postoperative hemorrhage	251 (5.1)	8,360 (1.5)	<.001	2.96 (2.59–3.39)
Wound complication	507 (10.2)	19,638 (3.4)	<.001	3.24 (2.95–3.57)
Venous thromboembolism	49 (1.0)	3,871 (0.7)	.01	1.49 (1.11–1.99)
Medical complications				
Cardiovascular	212 (4.3)	1,641 (0.3)	<.001	12.24 (10.35–14.46)
Pulmonary	459 (9.2)	14,119 (2.4)	<.001	3.74 (3.37–4.14)
Gastrointestinal	367 (7.4)	17,741 (3.1)	<.001	2.88 (2.58–3.22)
Renal	117 (2.4)	4,607 (0.8)	<.001	2.87 (2.36–3.47)
Infectious	614 (12.4)	23,487 (4.1)	<.001	2.73 (2.50–2.98)
Transfusion	2,284 (46.0)	21,446 (3.7)	<.001	19.19 (18.0–20.5)
Length of stay (d)	8.7±12.2	2.9±2.0	<.001	5.58 <sup>†</sup> (5.51–5.64)
Perioperative death	48 (1.0)	209 (0.04)	<.001	14.37 (9.84–20.98)

Data are n (%), odds ratio (95% confidence interval), or mean±standard deviation unless otherwise specified.

\* Adjusted for age, race, year of diagnosis, area of residence, household income, insurance status, hospital size, hospital location, and hospital type.

<sup>†</sup> Parameter estimate.



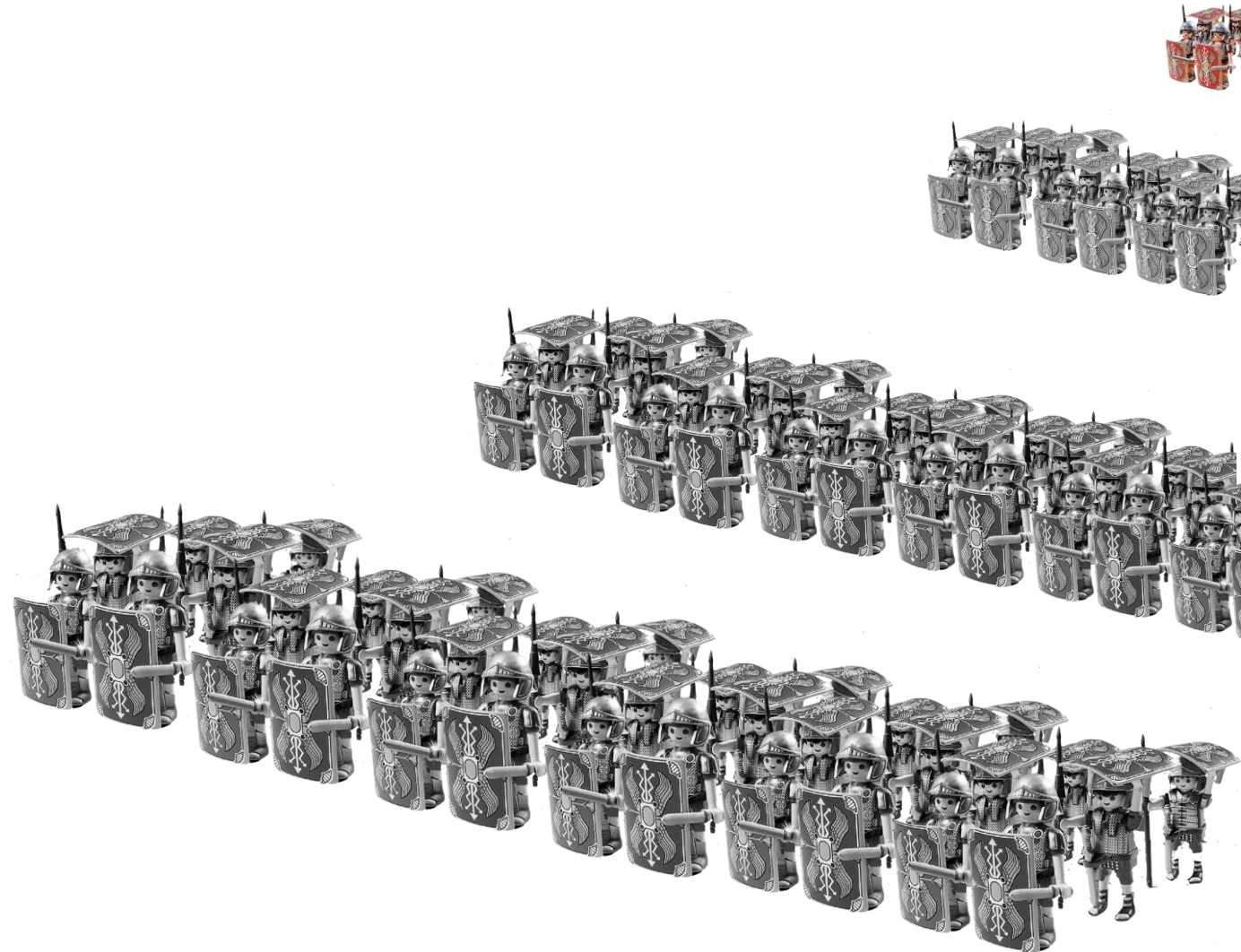
# HISTERECTOMÍA POSTPARTO. HT subtotal

- Valorar si cérvix y paracolpos no están implicados en la causa del sangrado.
- **¿Es más segura, rápida y sencilla?**

**Table 4. Morbidity and Mortality of Total and Subtotal Peripartum Hysterectomy**

	Total Hysterectomy	Subtotal Hysterectomy	<i>P</i>	Total vs Subtotal Hysterectomy*
Intraoperative injury	3,295 (66.3)	1,672 (33.7)		
Bladder injury	337 (10.2)	121 (7.2)	<.001	1.42 (1.14–1.77)
Ureteral injury	24 (0.7)	9 (0.5)	.44	1.49 (0.68–3.27)
Intestinal injury	21 (0.6)	17 (1.0)	.15	0.51 (0.26–0.99)
Vascular injury	12 (0.4)	7 (0.4)	.77	0.85 (0.32–2.24)
Other operative injury	343 (10.4)	138 (8.3)	.02	1.30 (1.06–1.61)
Perioperative surgical complications				
Reoperation	118 (3.6)	84 (5.0)	.02	0.69 (0.52–0.93)
Postoperative hemorrhage	156 (4.7)	95 (5.7)	.15	0.80 (0.61–1.04)
Wound complication	335 (10.2)	172 (10.3)	.89	0.98 (0.80–1.19)
Venous thromboembolism	36 (1.1)	13 (0.8)	.29	1.33 (0.69–2.55)
Medical complications				
Cardiovascular	136 (4.1)	76 (4.6)	.49	0.93 (0.69–1.25)
Pulmonary	297 (9.0)	162 (9.7)	.44	0.93 (0.75–1.14)
Gastrointestinal	261 (7.9)	106 (6.3)	.04	1.28 (1.01–1.62)
Renal	81 (2.5)	36 (2.2)	.50	1.23 (0.82–1.84)
Infectious	391 (11.9)	223 (13.3)	.14	0.87 (0.72–1.04)
Transfusion	1,408 (42.7)	876 (52.4)	<.001	0.76 (0.67–0.86)
Length of stay (d)	9.2±12.8	7.8±10.7	<.001	1.42 <sup>†</sup> (0.70–2.13)
Perioperative death	25 (0.8)	23 (1.4)	.04	0.53 (0.29–0.94)

# TAPONAMIENTO PÉLVICO

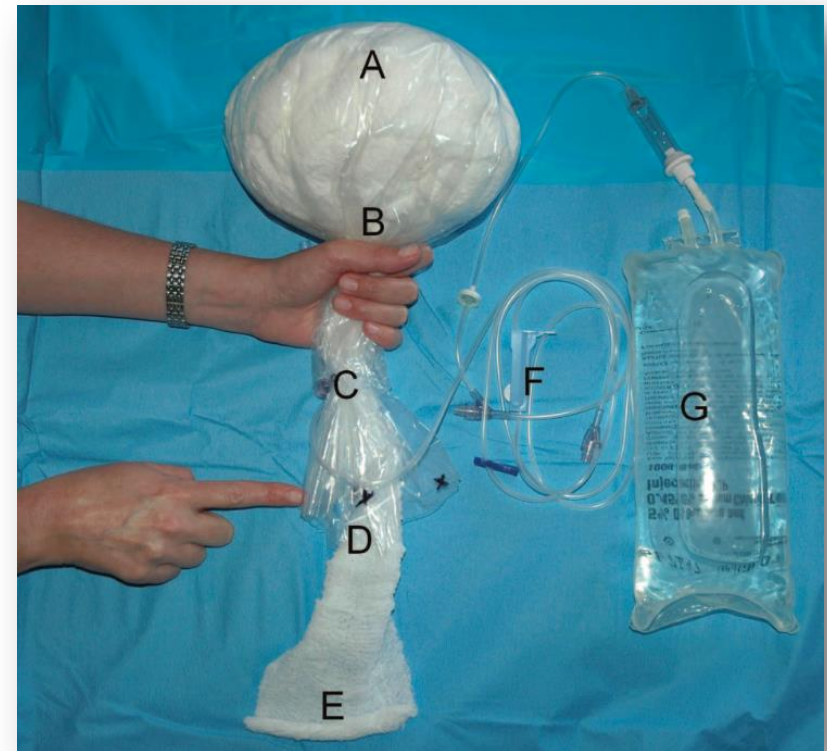
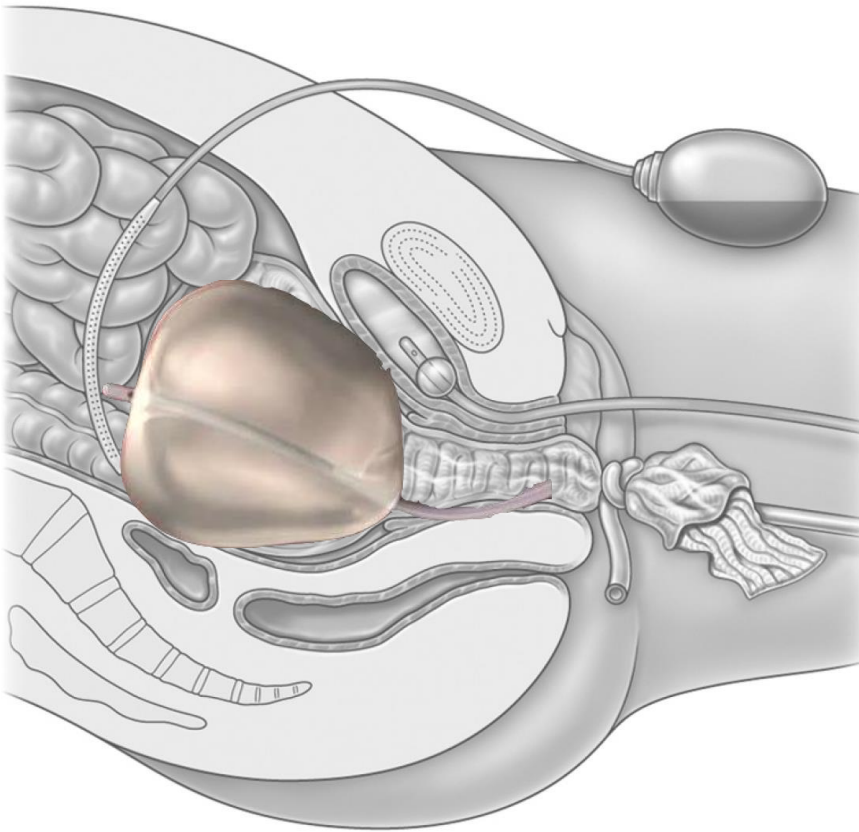


# TAPONAMIENTO PÉLVICO

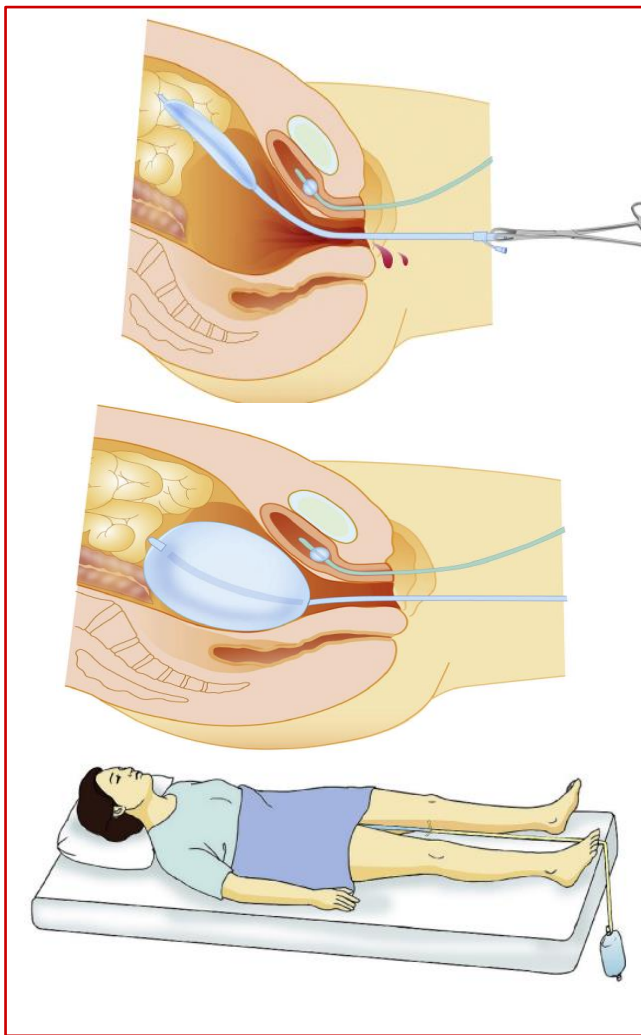
**Posthisterectomía**

Hemorragia de gran superficie

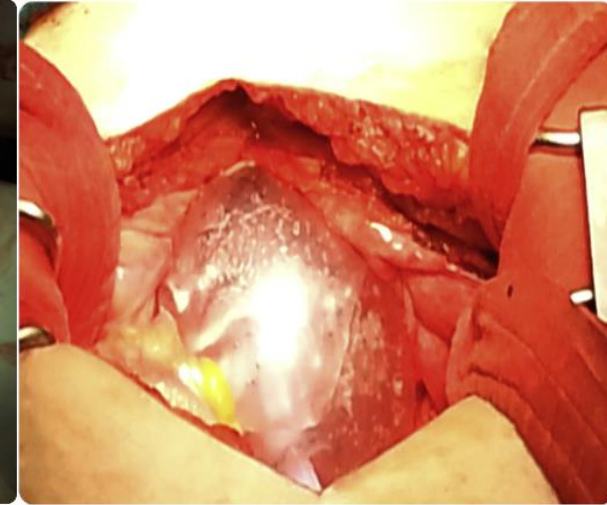
Presión contra fascia y pelvis ósea



# TAPONAMIENTO PÉLVICO



Sterile normal saline was used to gradually inflate the balloon.



Charoenkwan. Posthysterectomy pelvic packing balloon. Am J Obstet Gynecol 2014.

## Effective use of the Bakri postpartum balloon for posthysterectomy pelvic floor hemorrhage

Kittipat Charoenkwan, MD

### Retirada

- **Vaginal:** de elección
- Tras estabilización y corrección coagulopatía
- **Entre 24-72 horas**
- Disminuye morbilidad infecciosa



# TAPONAMIENTO PÉLVICO

## An Effective Pressure Pack for Severe Pelvic Hemorrhage

Gary A. Dildy, MD, James R. Scott, MD, Craig S. Saffer, MD, and Michael A. Belfort, MD, PhD

OBSTETRICS & GYNECOLOGY L. 108, NO. 5, NOVEMBER 2006

Table 1. Summary of Cases in This Series



Year and State	Case Summary	Shifts RBC <sup>†</sup>	Platelet Nadir	Hypogastric Artery Ligation	Packing Material	Pack Success	Pack Removal	Infection	Postpartum Days in Hospital
1968 IA	19-year-old 0-0-0-0 at 40 weeks Mid-forceps rotation, vaginal lacerations	12	NA	Yes	1. Pillowcase 2. Polyester	Yes	1.5 days transvaginally 3 days transvaginally	Yes, unspecified	16
1972 IA	51-year-old 31 days postvaginal hysterectomy	23	45	Yes	Pillowcase	Yes	2 days transvaginally	Yes, unspecified	17
1976 IA	38-year-old 9-0-1-9 at 43 weeks Ruptured uterus after difficult internal version	28	23	Yes	Not stated	Yes	5 days unknown method	Subphrenic abscess	30

Table 2. Summary of Contemporary (Since 1960) Reported Cases of Pelvic Pressure Pack for Obstetric and Gynecologic Posthysterectomy Pelvic Hemorrhage\*

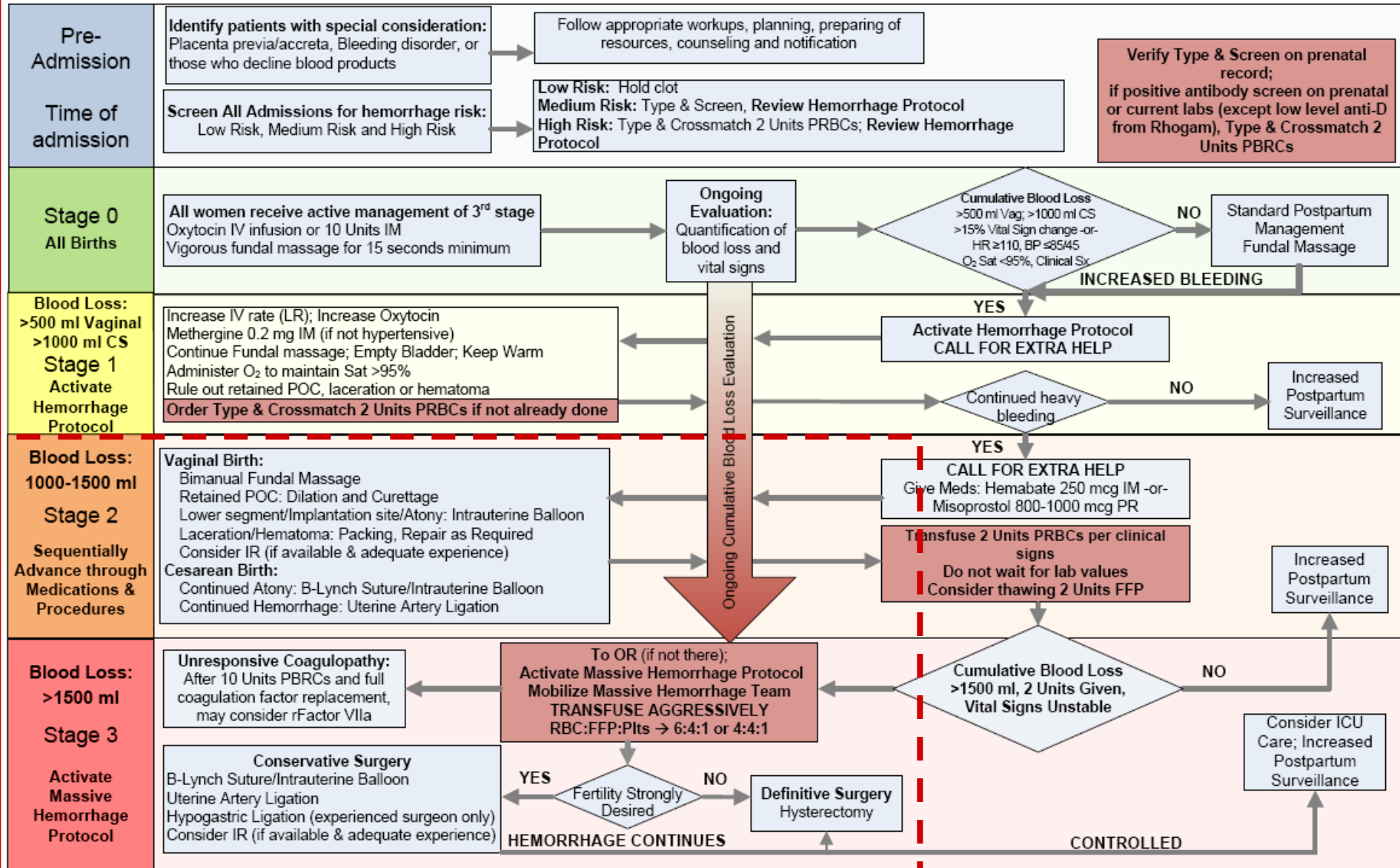
Series	Packing Material	Successful Gynecology (n/N)	Successful Obstetric (n/N)
Parente 1962 <sup>11</sup>	Gauze	14/14	—
Burchell 1968 <sup>10</sup>	Gauze	8/8	—
Cassels 1985 <sup>12</sup>	Lap pad	—	1/1
Robie 1990 <sup>13</sup>	Gauze	—	1/1
Hallak 1991 <sup>14</sup>	Plastic	—	1/1
Howard 2002 <sup>15</sup>	Plastic	—	1/1
Dildy (current)	Various	1/1	8/10
Total		23/23	12/14
Proportion (95% CI)		100 (85–100)	86 (57–98)

\* Successful is defined as the pelvic pressure pack being the last intervention to control bleeding.

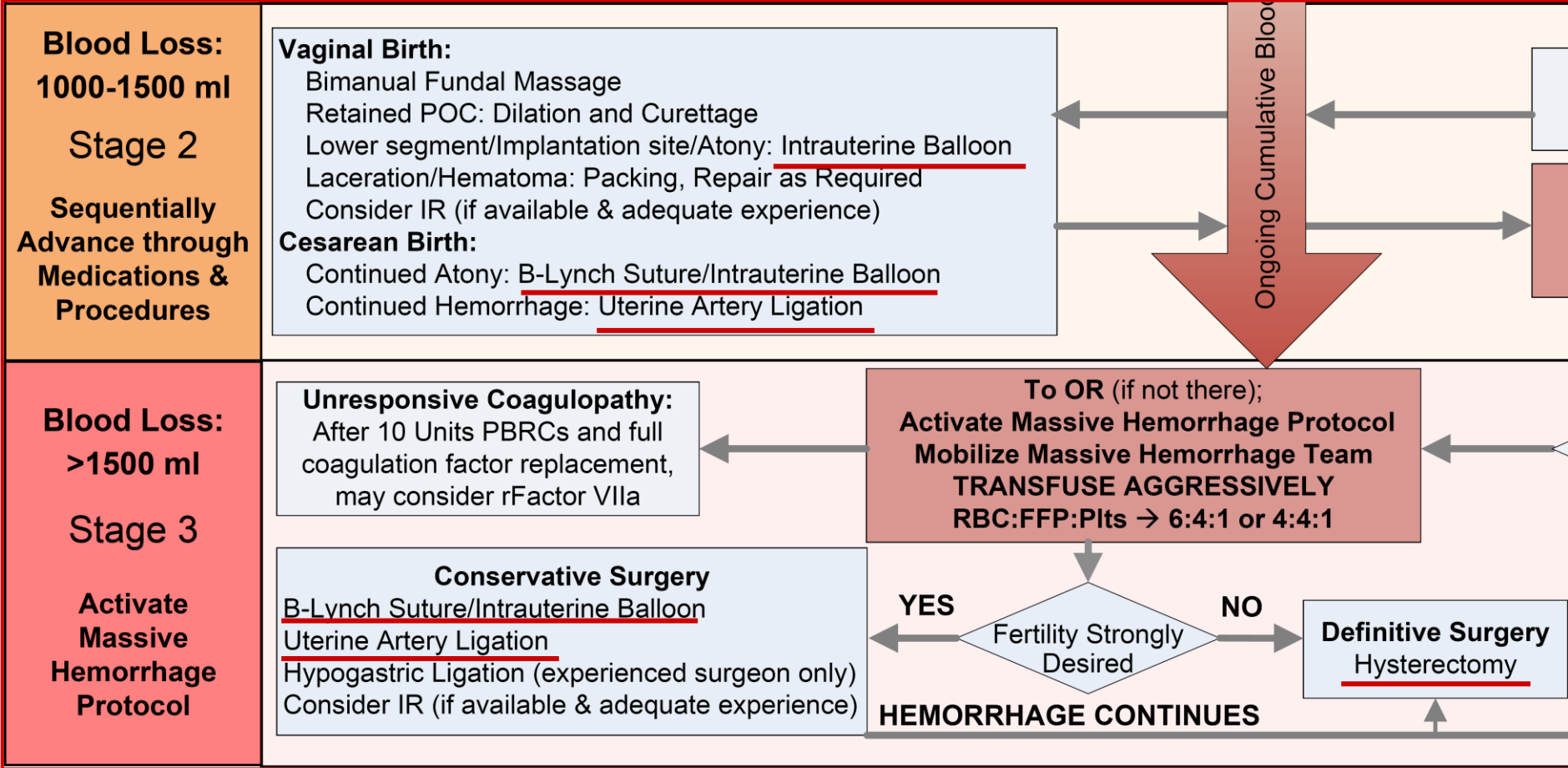
¿QUÉ HACER?



# OBSTETRIC HEMORRHAGE CARE SUMMARY: FLOW CHART FORMAT



# OBSTETRIC HEMORRHAGE CARE SUMMARY:







# ACOG PRACTICE BULLETIN

Clinical Management Guidelines for Obstetrician–Gynecologists

NUMBER 183, OCTOBER 2017

(Replaces Practice Bulletin Number 76, October 2006)

## Sequential steps in managing postpartum hemorrhage

<b>Assemble team and notify appropriate departments</b> (obstetrics, nursing, anesthesiology, blood bank, laboratory)
<b>Initiate uterine massage and establish large bore (two 16 or 18-gauge, ideally 14-gauge) intravenous access</b>
<b>Administer oxygen (10–15 liters/minute) by face mask. Anesthesia team should evaluate airway and breathing, intubate if indicated.</b>
<b>Fluid resuscitation:</b> Infuse crystalloid (at least 3 liters for each liter of estimated blood loss)
<b>Transfusion:</b> If hemodynamics do not improve with 2 to 3 liters of crystalloid administration and bleeding continues, administer blood products, initially two units packed red blood cells. For massive transfusion, administer red blood cells, fresh frozen plasma, and apheresis platelets in a ratio of 6:4:1 or 4:4:1.
<b>Administer uterotonic drugs* to reverse atony:</b> It should be possible to determine within 30 minutes whether uterotonic treatment will reverse atony. If it does not, prompt invasive intervention is usually warranted.

**Tamponade bleeding from the uterine cavity.** Options include Bakri or BT-Cath balloon, Sengstaken-Blakemore tube, Foley catheter balloon, or packing if medical therapy fails and prior to, or in conjunction with, preparations for surgery or transarterial embolization.

**Recombinant factor VIIa:** Consider recombinant activated factor VIIa (off-label use) for management of intractable hemorrhage and coagulopathy. Risk of thromboembolism. High cost. See "Management of postpartum hemorrhage at vaginal delivery" section "Recombinant activated factor VIIa".

**Perform transarterial embolization if the woman is stable and there is time for personnel and facilities to mobilize**

**Perform laparotomy if the above measures fail.** Surgical approaches that are quick, relatively easy, and effective should be tried first. In utilizing these measures, the surgeon should be cognizant of the amount of blood loss and the stability of the patient, and should perform hysterectomy rather than resort to temporizing measures if her cardiovascular status is unstable or if it appears that the anesthesiologist will not be able to keep up with her fluid needs. Options include:

Ligate bleeding sites

Perform uterine artery ligation, including the utero-ovarian arcade

Place a B-Lynch stitch or other uterine compression suture

Perform hysterectomy - Hysterectomy is the last resort, but should not be delayed in women who have disseminated intravascular coagulation and require prompt control of uterine hemorrhage to prevent death

Suture deep pelvic bleeders

Tamponade pelvic bleeding with pelvic packing

**Perform transarterial embolization if the woman is stable and there is time for personnel and facilities to mobilize**

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Suture deep pelvic bleeders

Tamponade pelvic bleeding with pelvic packing

PG: prostaglandin, PPH: Postpartum hemorrhage

\* All uterotonic agents can cause nausea and vomiting.

• Not available in US. Available in Canada, UK, EU and elsewhere.

Δ Oral tablets may be given per rectum or as a micro-enema prepared from oral misoprostol tablets dissolved in 5 mL saline.<sup>[4]</sup>

References: [1] American College of Obstetricians and Gynecologists Committee on Practice Bulletins—Obstetrics Postpartum hemorrhage (ACOG Practice Bulletin, number 76, issued October 2006). *Obstet Gynecol* 2006; 108: 1039–47. [2] Ramanathan G, Arulkumaran S. Postpartum hemorrhage. *J Obstet Gynaecol Can* 2006; 28: 967–73. [3] WHO guidelines for the management of postpartum haemorrhage and retained placenta (issued 2009). [4] Bugalho A, Daniel A, Faundes A, et al: Misoprostol for prevention of postpartum hemorrhage. *Int J Gynecol Obstet* 2001; 73:1–6.

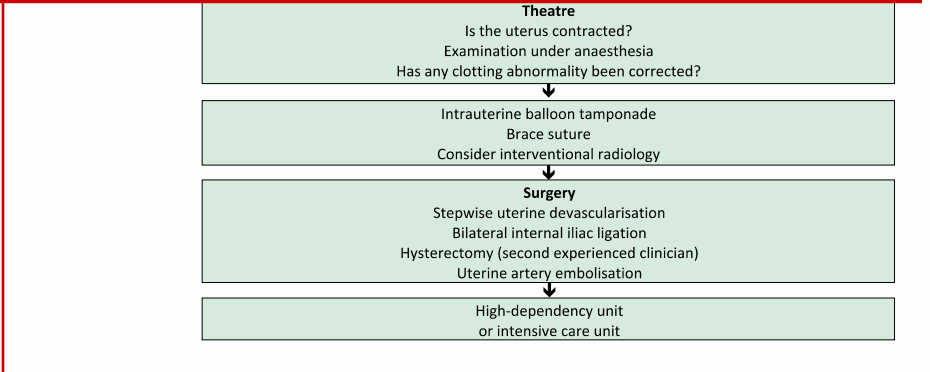
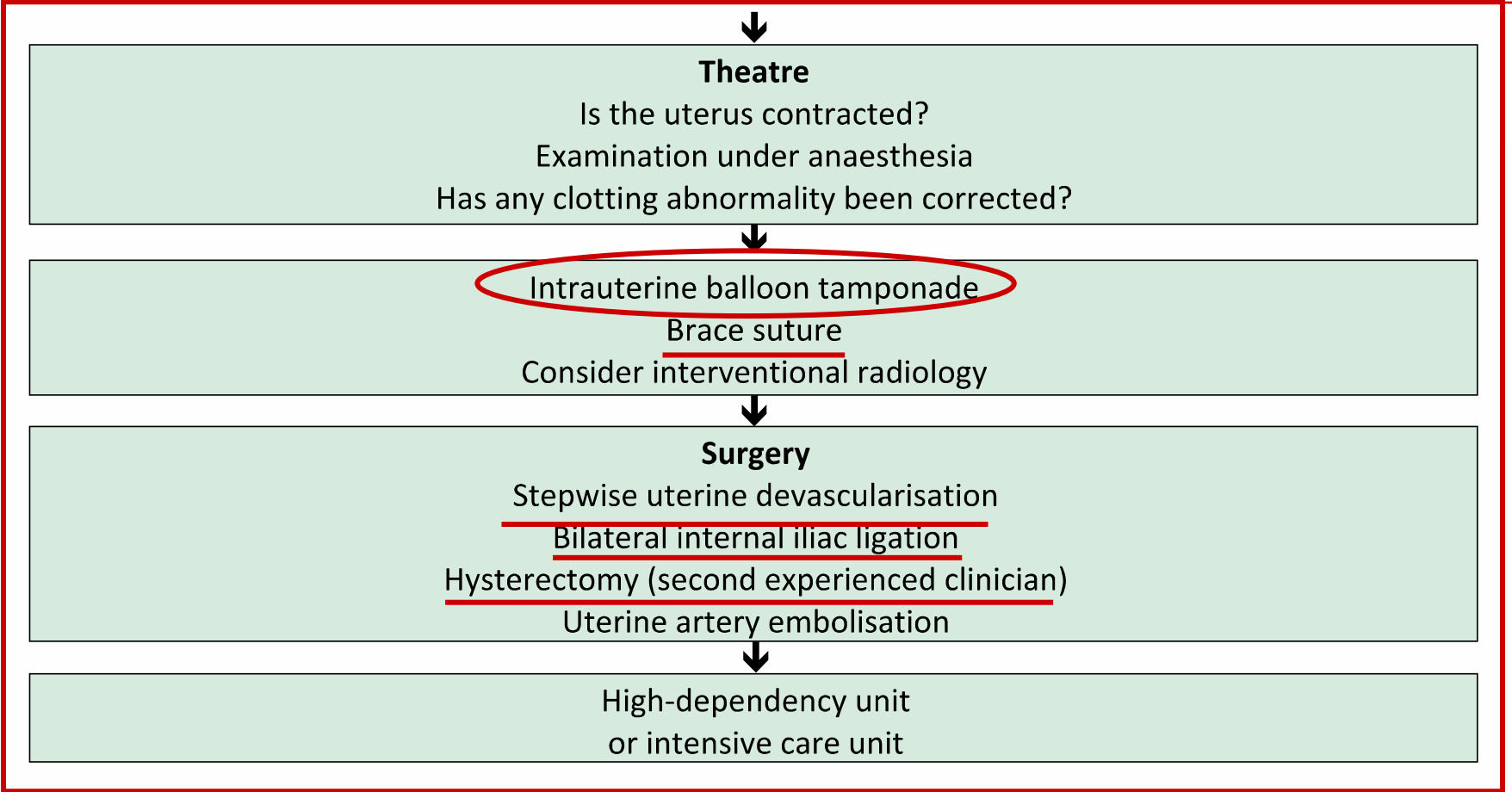
**Table 4. Treatment of PPH**

**SOGC CLINICAL PRACTICE GUIDELINE**

OCTOBER JOGC OCTOBRE 2009

Initial assessment and treatment for primary PPH		Assess etiology	Directed therapy	If bleeding continues	If bleeding continues	If bleeding continues	
<p>Call for help</p> <p>Resuscitation</p> <ul style="list-style-type: none"> <li>• Assess the "ABC"</li> <li>• Oxygen by mask</li> <li>• IV line</li> <li>• Crystalloid, isotonic fluid replacement</li> <li>• Monitor BP, P, R</li> <li>• Empty bladder, monitor urine output</li> </ul> <p>Laboratory tests</p> <ul style="list-style-type: none"> <li>• Complete blood count</li> <li>• Coagulation screen</li> <li>• Blood grouping and cross</li> </ul>	Uterus soft and relaxed	Uterine atony	<p>Uterine massage</p> <p>Uterotonic drugs</p>	<p>Nonsurgical uterine compression</p> <ul style="list-style-type: none"> <li>• Bimanual uterine compression</li> <li>• External aortic compression</li> <li>• Uterine packing</li> <li>• Balloon (condom) tamponade</li> </ul>	<p><u>Compression sutures</u></p> <ul style="list-style-type: none"> <li>• B-Lynch</li> <li>• Vertical compression</li> <li>• Cho square</li> </ul> <p><u>Uterine artery embolization</u></p>	<p><u>Artery ligation</u> (uterine, hypogastric)</p> <p><u>Hysterectomy</u> (subtotal or total)</p>	
	Placenta not separated or partially separated (with or without hemorrhage)	Retained placenta	<p>Whole placenta in uterus</p> <ul style="list-style-type: none"> <li>• Uterotonics</li> <li>• Controlled cord traction</li> <li>• Intraumbilical vein injection</li> </ul>	<p>Placenta still retained</p> <p>Manual removal</p>	<p>Placenta still retained (placenta accreta)</p> <p>Partial or complete removal of placenta through laparotomy</p> <p>Hysterectomy</p>		
				<p>Incomplete separation</p> <ul style="list-style-type: none"> <li>• Manual vacuum aspiration</li> <li>• Manual exploration</li> <li>• Gentle curettage</li> </ul>	<p>Hysterectomy</p>		
	Excess bleeding or shock shortly after birth, uterus contracted	Low genital tract trauma		→ Repair tears in perineum, vagina and cervix			
		Uterine rupture		→ Laparotomy: <ul style="list-style-type: none"> <li>• Primary repair</li> <li>• Hysterectomy</li> </ul>			
	Uterine fundus not felt abdominally OR visible vaginally	Uterine inversion		→ Correct inversion in theatre under general anaesthesia	If nonsurgical correction fails, ensure that uterus remains contracted by continued oxytocin infusion	<p>Surgery</p> <p>Correction via laparotomy</p> <p>Hysterectomy</p>	
Clotting			<p>Clotting disorder</p> <ul style="list-style-type: none"> <li>• Treat accordingly with blood products</li> </ul>				

Adapted with permission of the World Health Organization from Postpartum Hemorrhage Technical Consultation Meeting Document<sup>65</sup>





# Management of Postpartum Haemorrhage (PPH)

Review due: March 2017

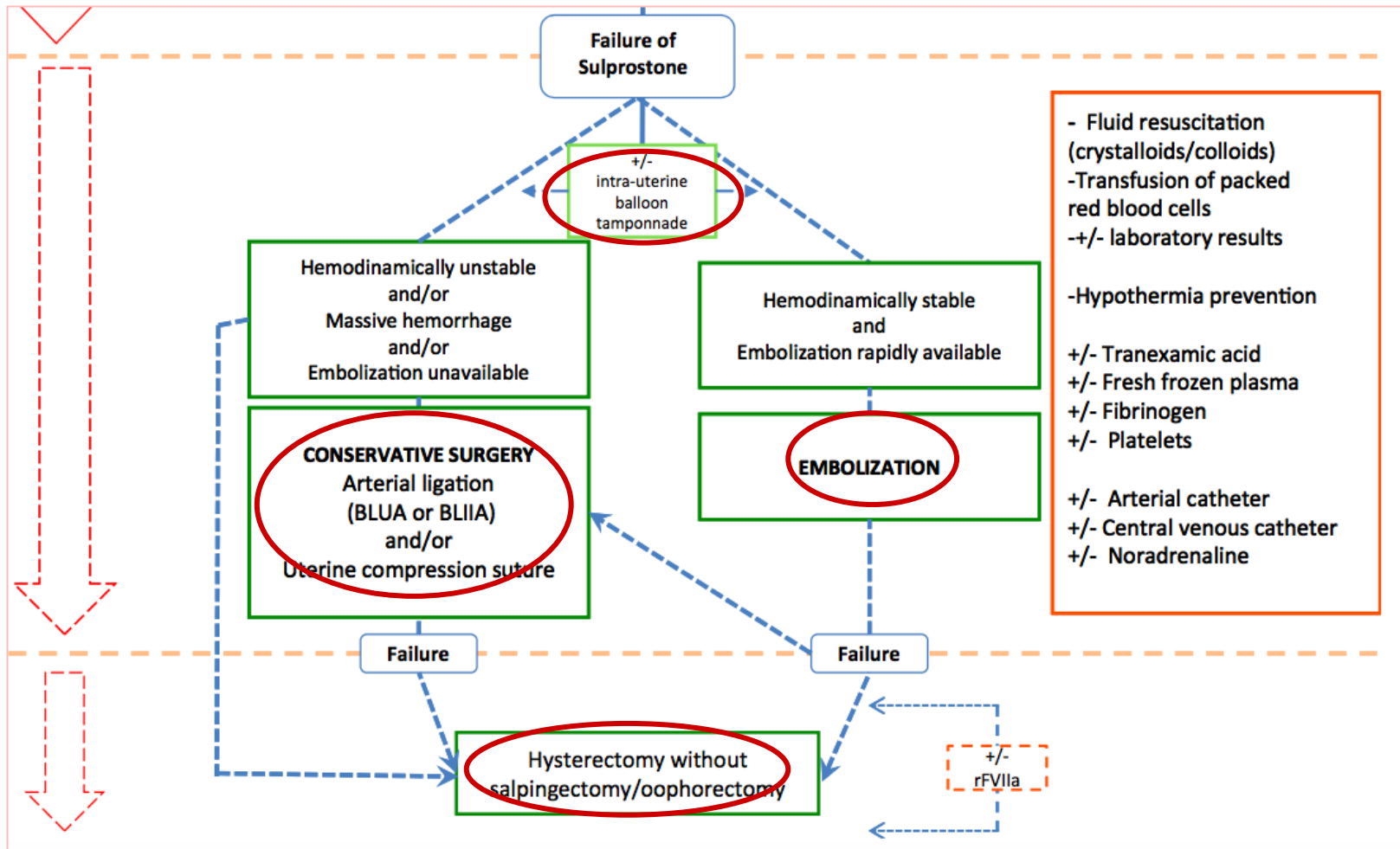
Theatre - surgical interventions should be initiated sooner rather than later, especially hysterectomy in cases of uterine rupture, placenta accreta or uncontrolled massive haemorrhage. The following is a list of some available procedures. This should not necessarily be a step-wise progression and both order and utilisation will depend on the services/ clinical experience available and the individual clinical circumstances.

- i. Balloon tamponade. Several case series have been published reporting the results of using a Foley catheter, Bakri balloon, Rusch balloon or Sengstaken-Blackmore oesophageal catheter with good results where the uterus is empty and contracting.<sup>1</sup>
- ii. Haemostatic brace suturing (such as the B-Lynch suture).<sup>1</sup>
- iii. Bilateral ligation of uterine arteries.
- iv. Bilateral ligation of internal iliac arteries by an experienced operator.
- v. Selective arterial embolisation. This intervention can only be achieved in institutions with timely access to both radiological expertise and equipment. It is important to note that time delays in accessing embolisation can occur and should not preclude alternate surgical treatment.
- vi. Hysterectomy.

Postpartum hemorrhage: guidelines for clinical practice from the French College of Gynaecologists and Obstetricians (CNGOF) in collaboration with the French Society of Anesthesiology and Intensive Care (SFAR)

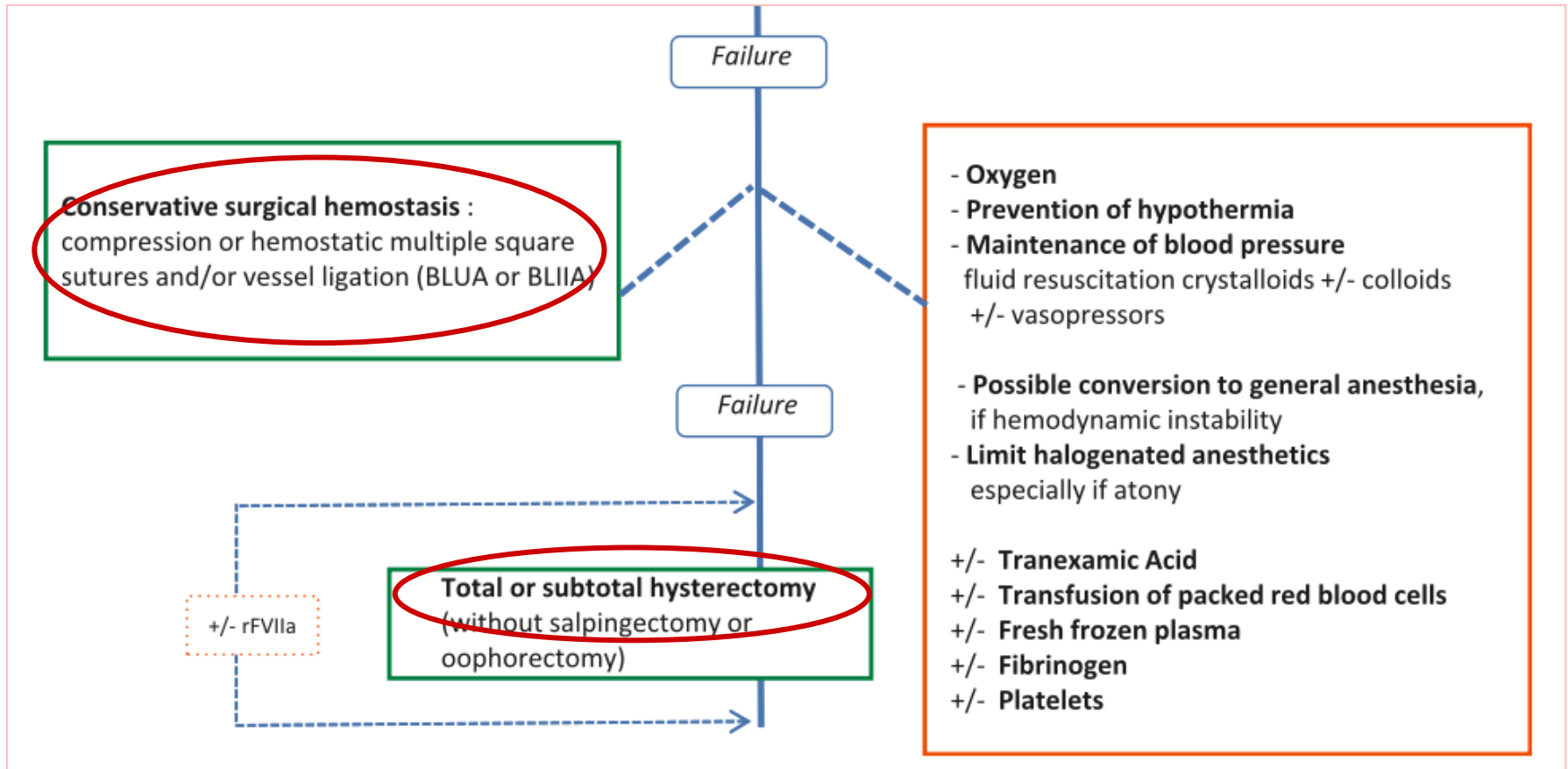
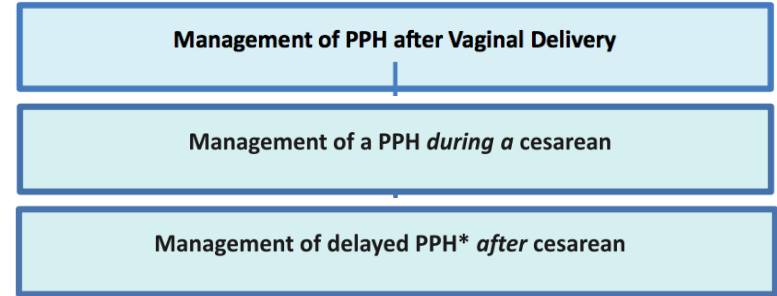
European Journal of Obstetrics & Gynecology and Reproductive Biology 198 (2016) 12–21

Management of PPH after Vaginal Delivery
Management of a PPH <i>during</i> a cesarean
Management of delayed PPH* <i>after</i> cesarean



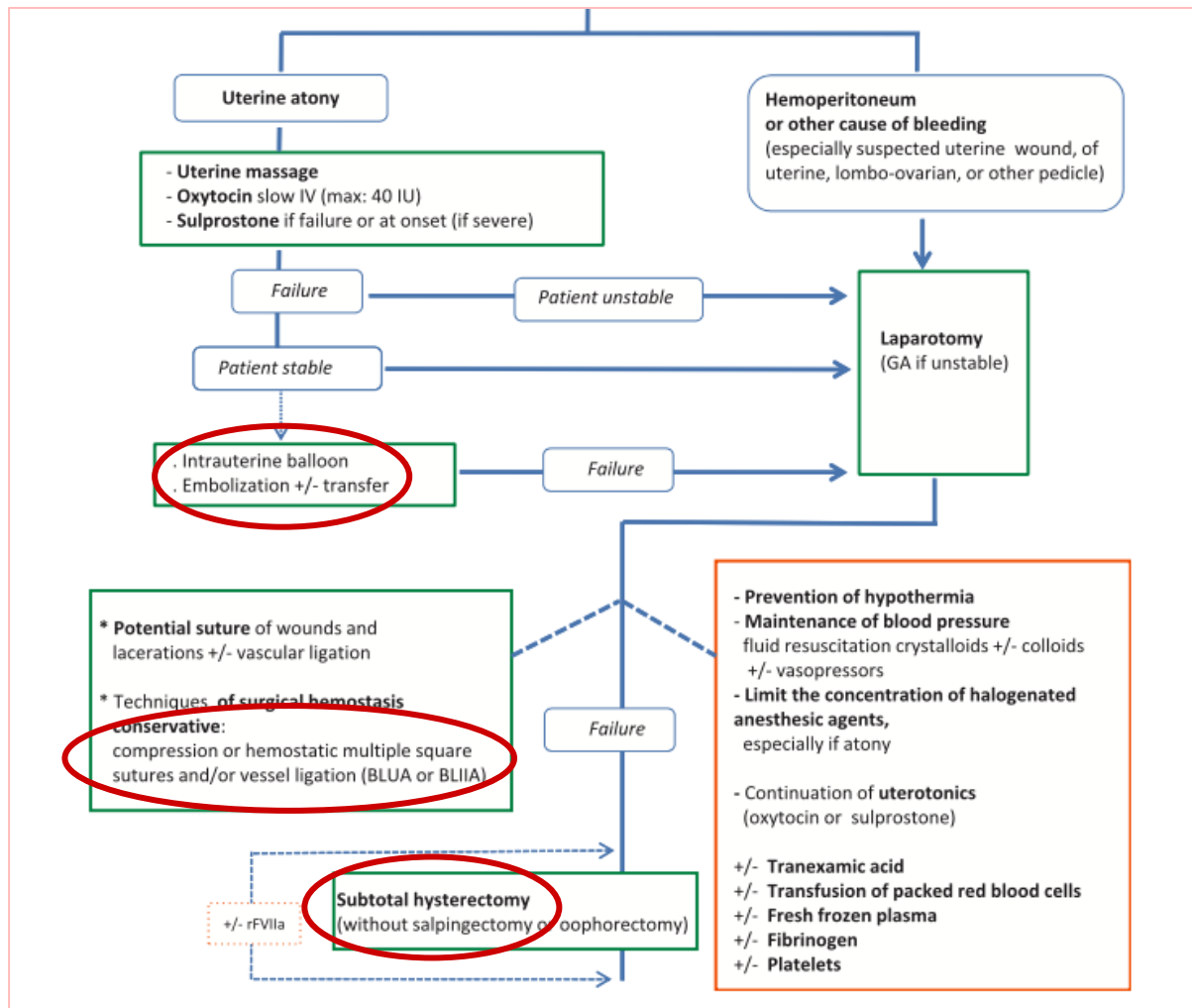
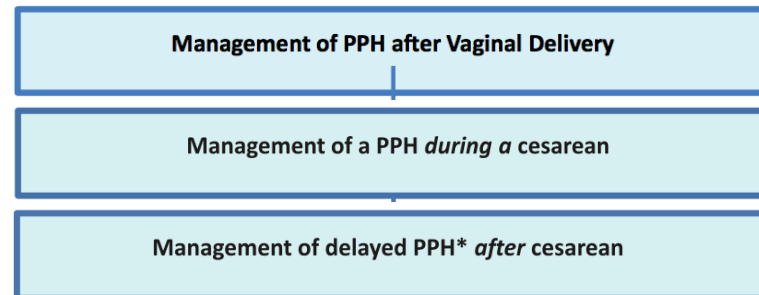
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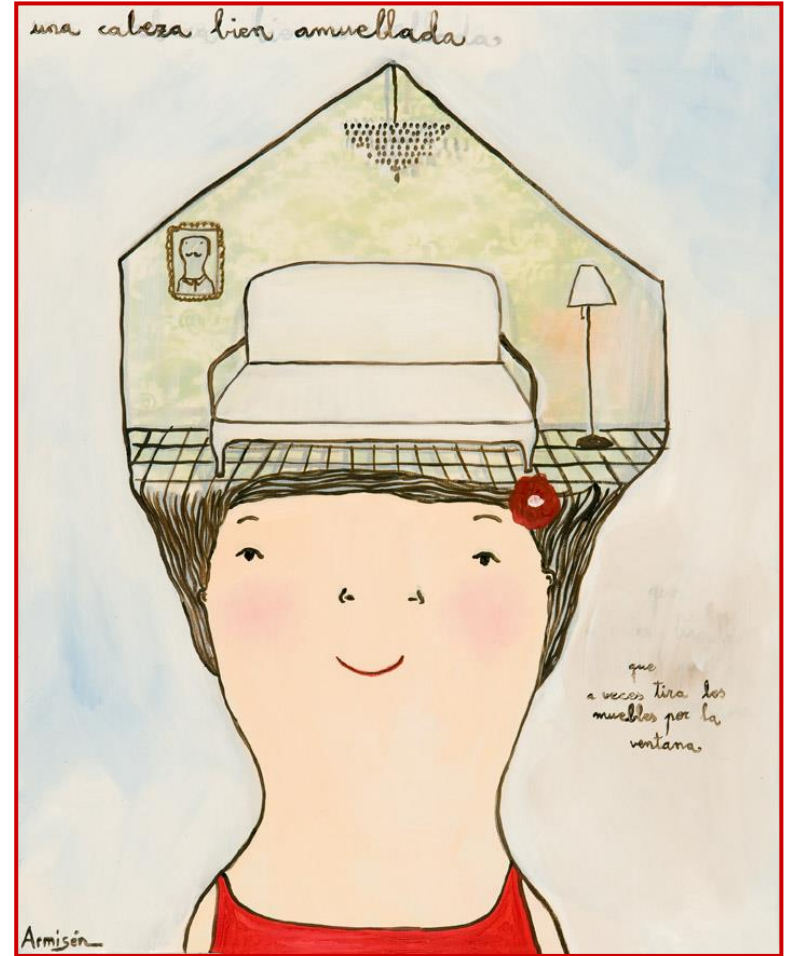
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**Gracias**