

Post Partum Haemorrhage

Management for surgeons



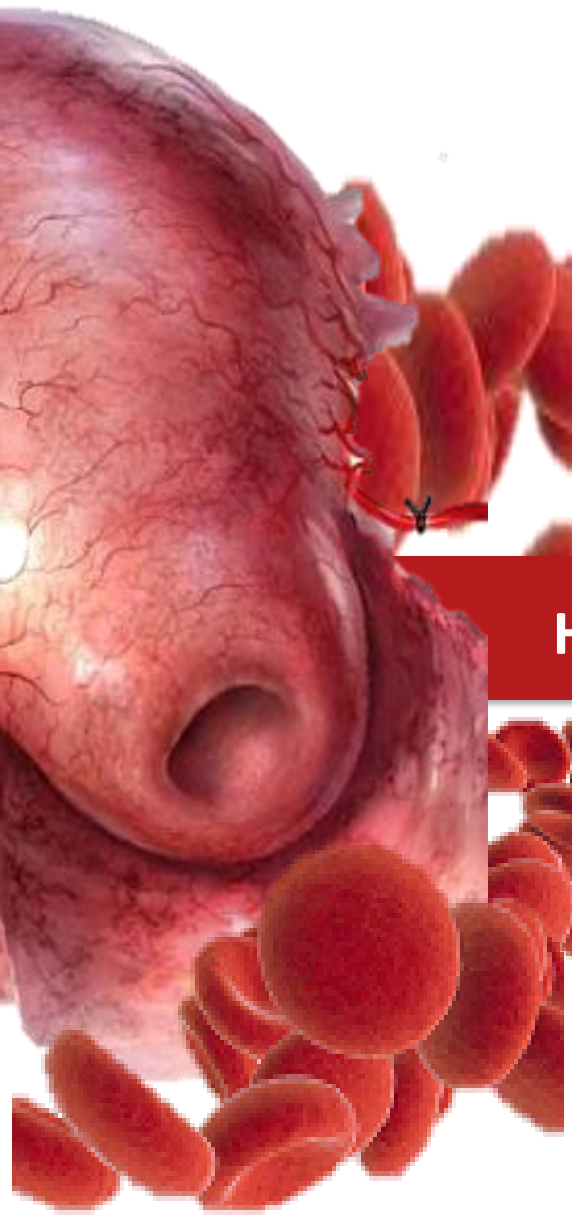
Dr. Carlos Pilasi Menichetti MD MSc FACS
Consultant General and Trauma surgeon
Obstetrician &Gynecologist

FIGO©
International Federation of Gynecology and Obstetrics

- Haemorrhage is the leading direct cause of maternal death worldwide representing 27.1% of maternal deaths.
- More than 2/3 were reported as PPH



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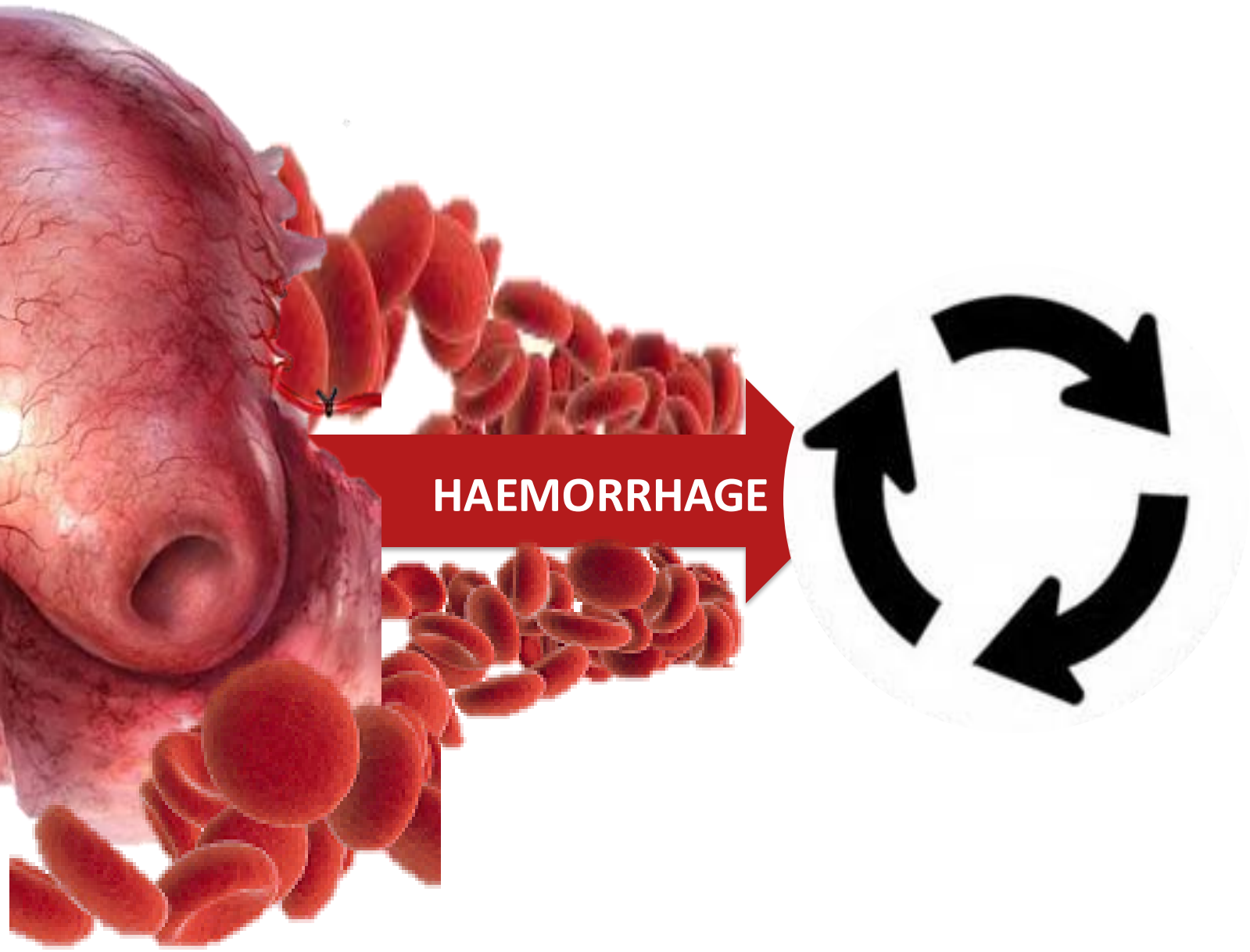
HAEMORRHAGE

ACIDOSIS

HYPOTHERMIA

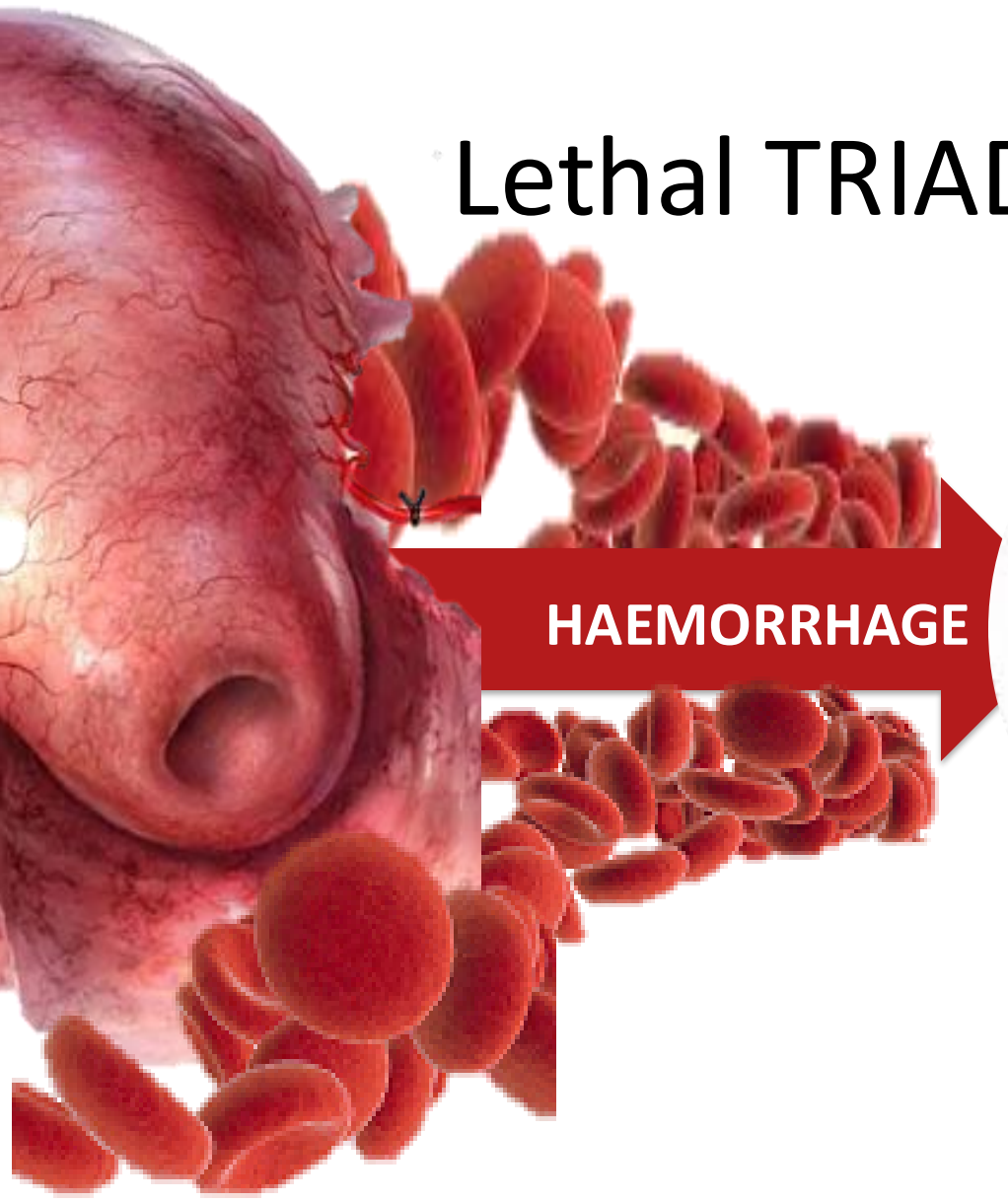
COAGULOPATHY

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Lethal TRIAD



HAEMORRHAGE

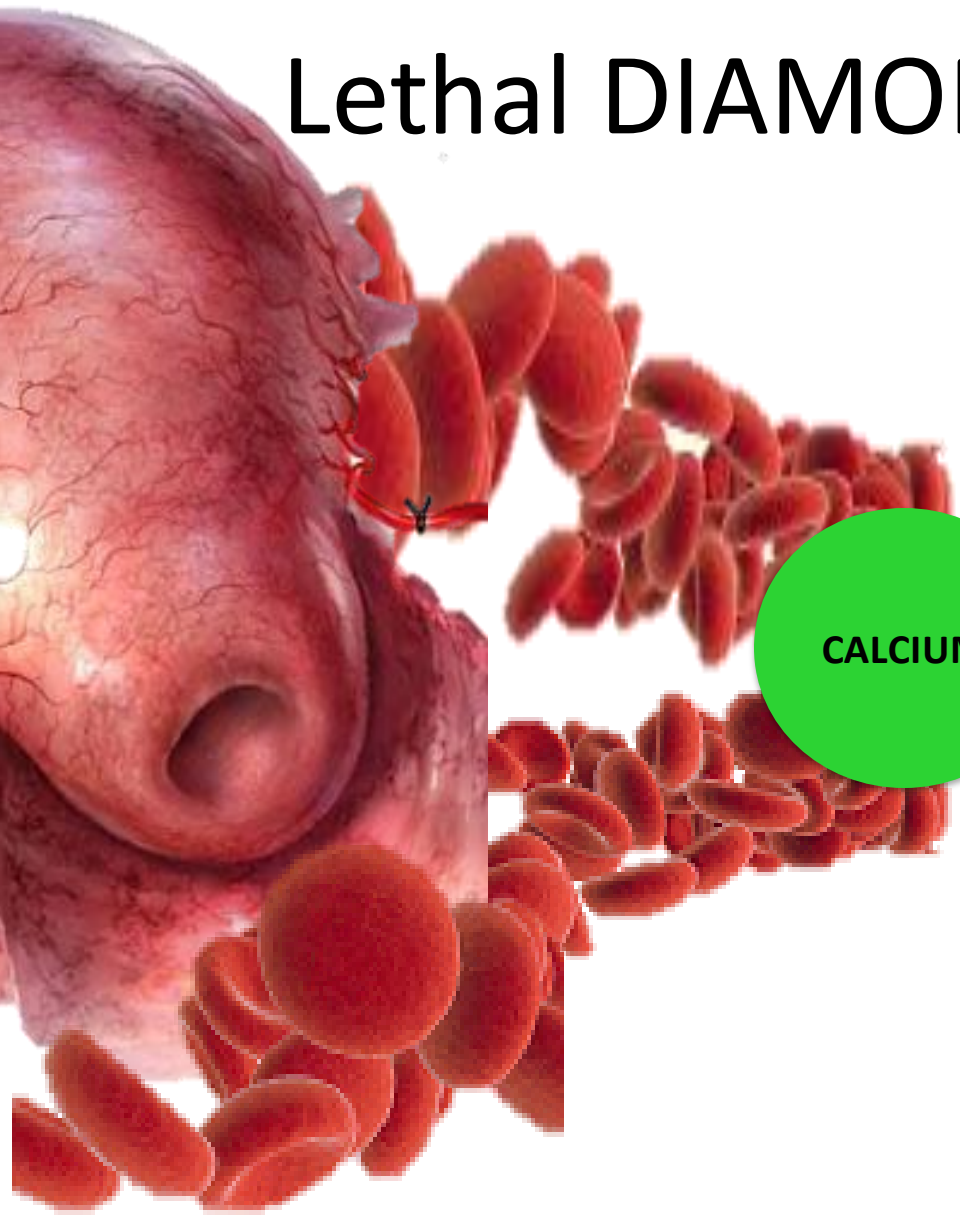
ACIDOSIS

HYPOTHERMIA

COAGULOPATHY

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Lethal DIAMOND



ACIDOSIS

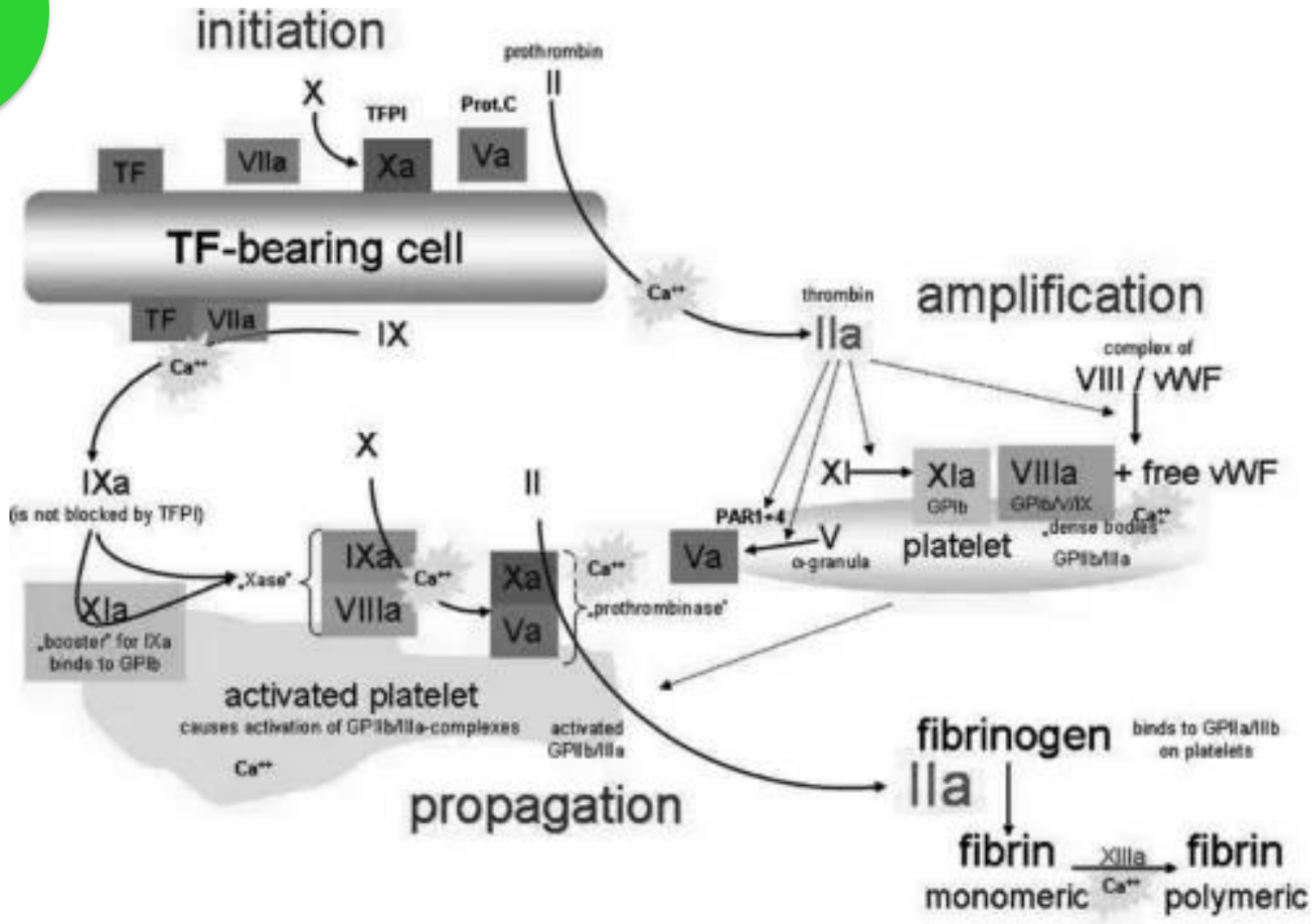
CALCIUM

HYPOTHERMIA

COAGULOPATHY

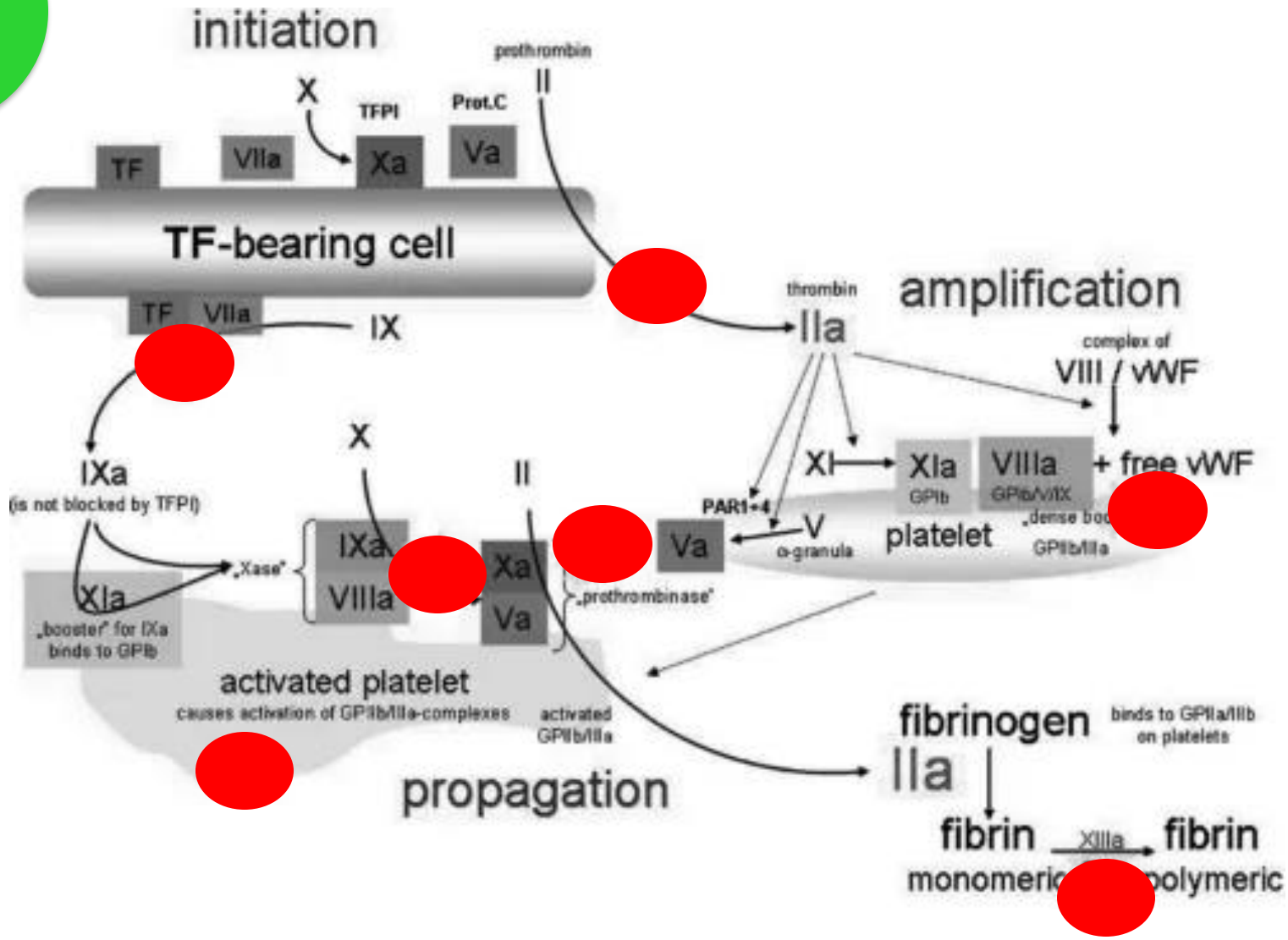
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CALCIUM



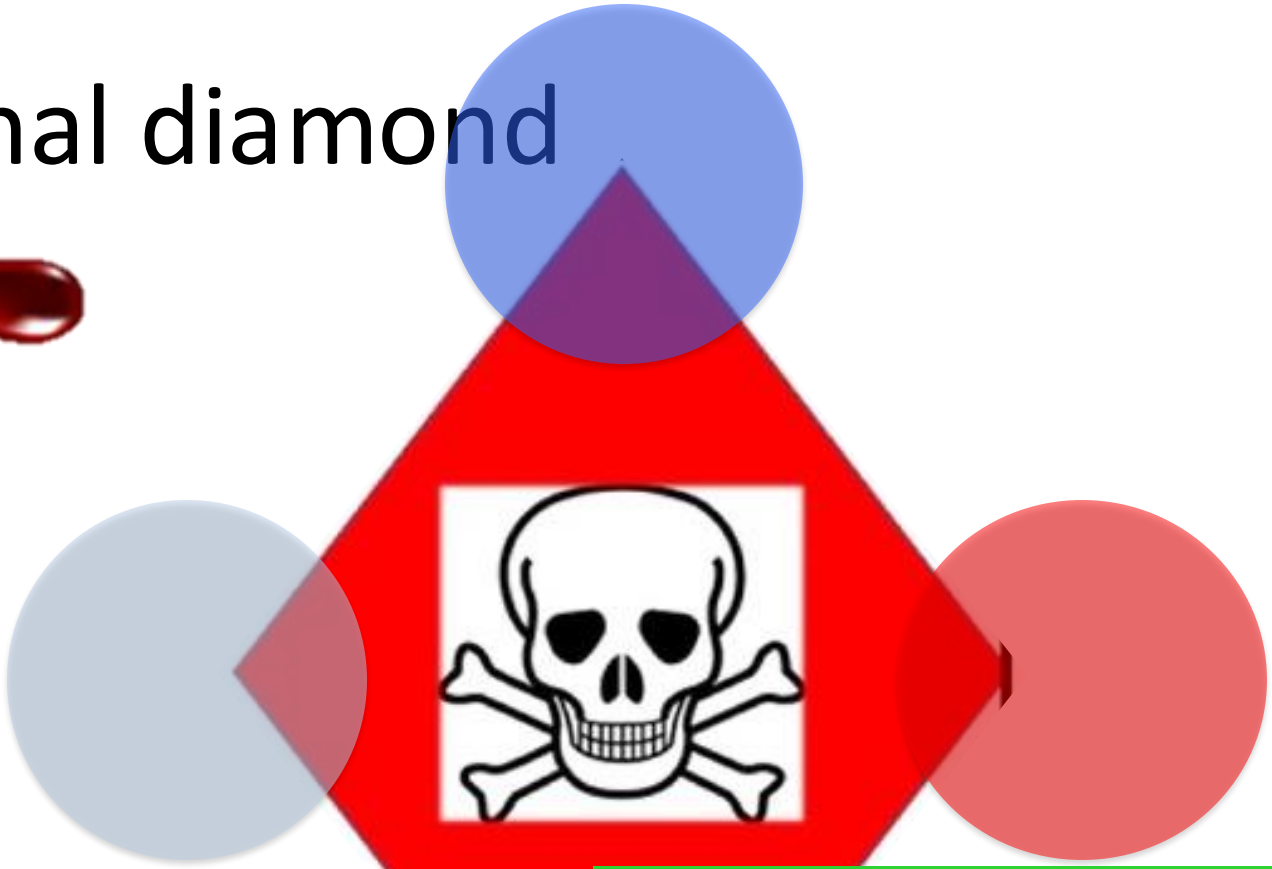
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CALCIUM



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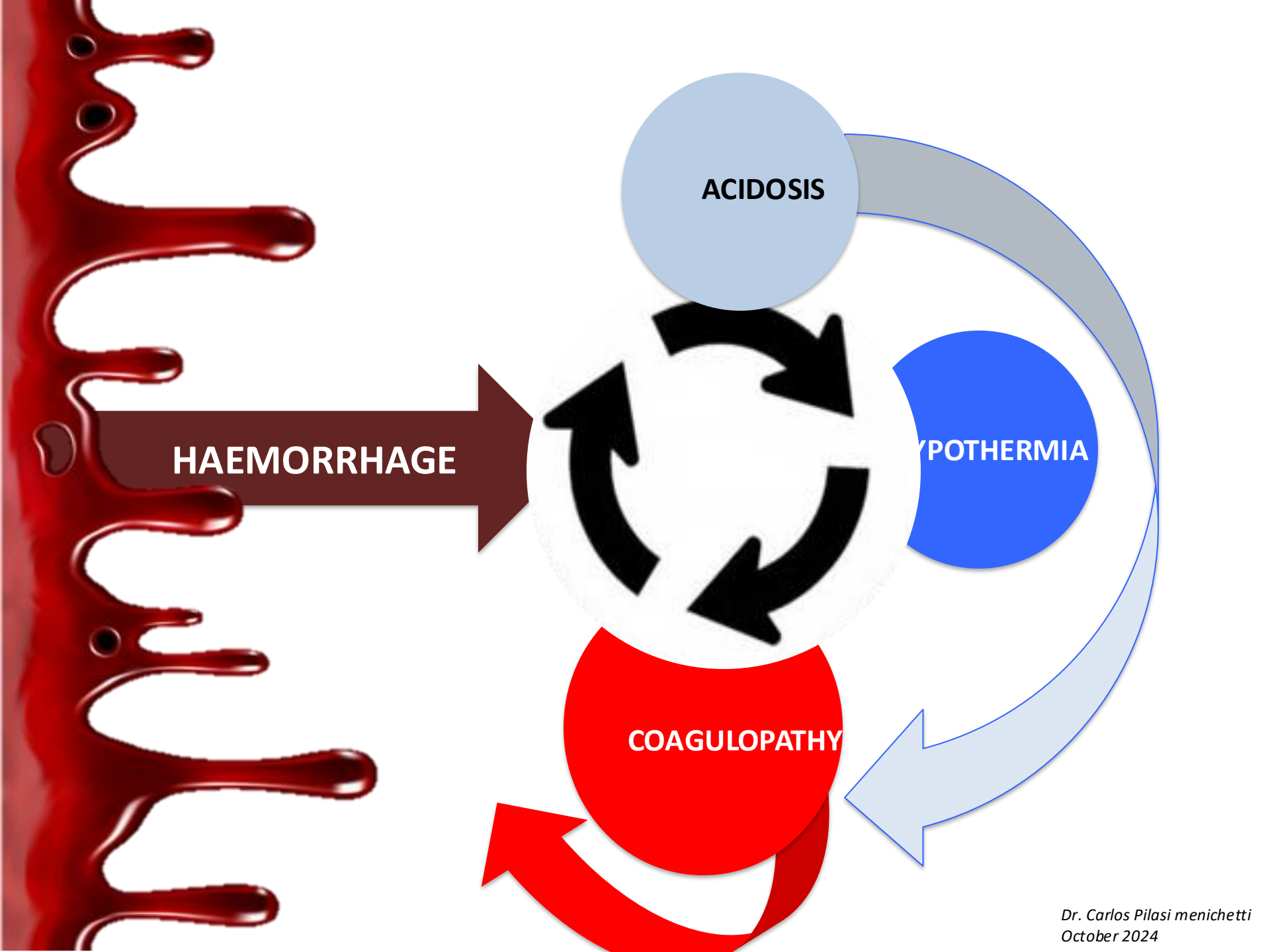
Lethal diamond



HYPOCALCEMIA
Reduced by Blood loss
Exacerbated due to Transfusions

CALCIUM

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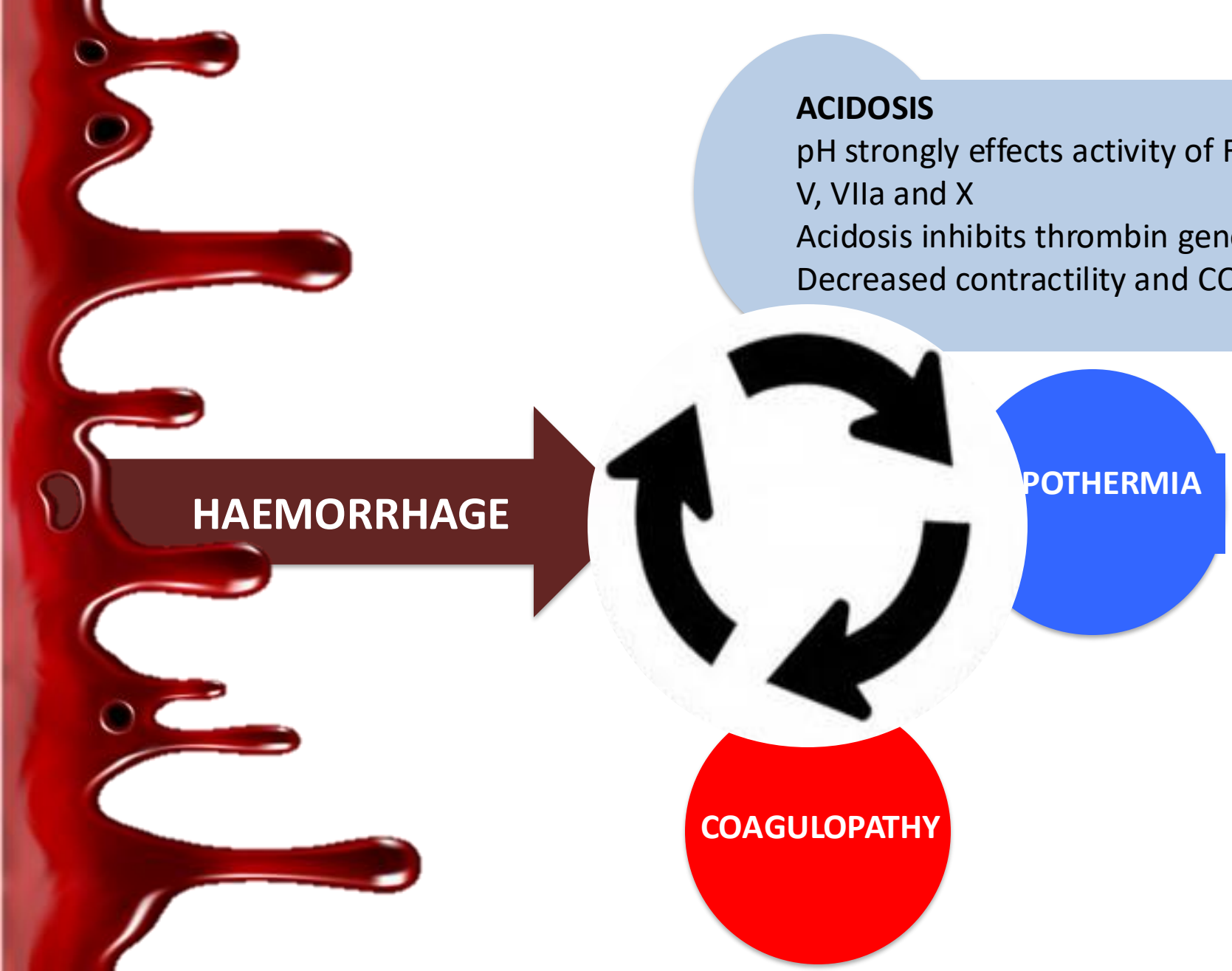
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ACIDOSIS

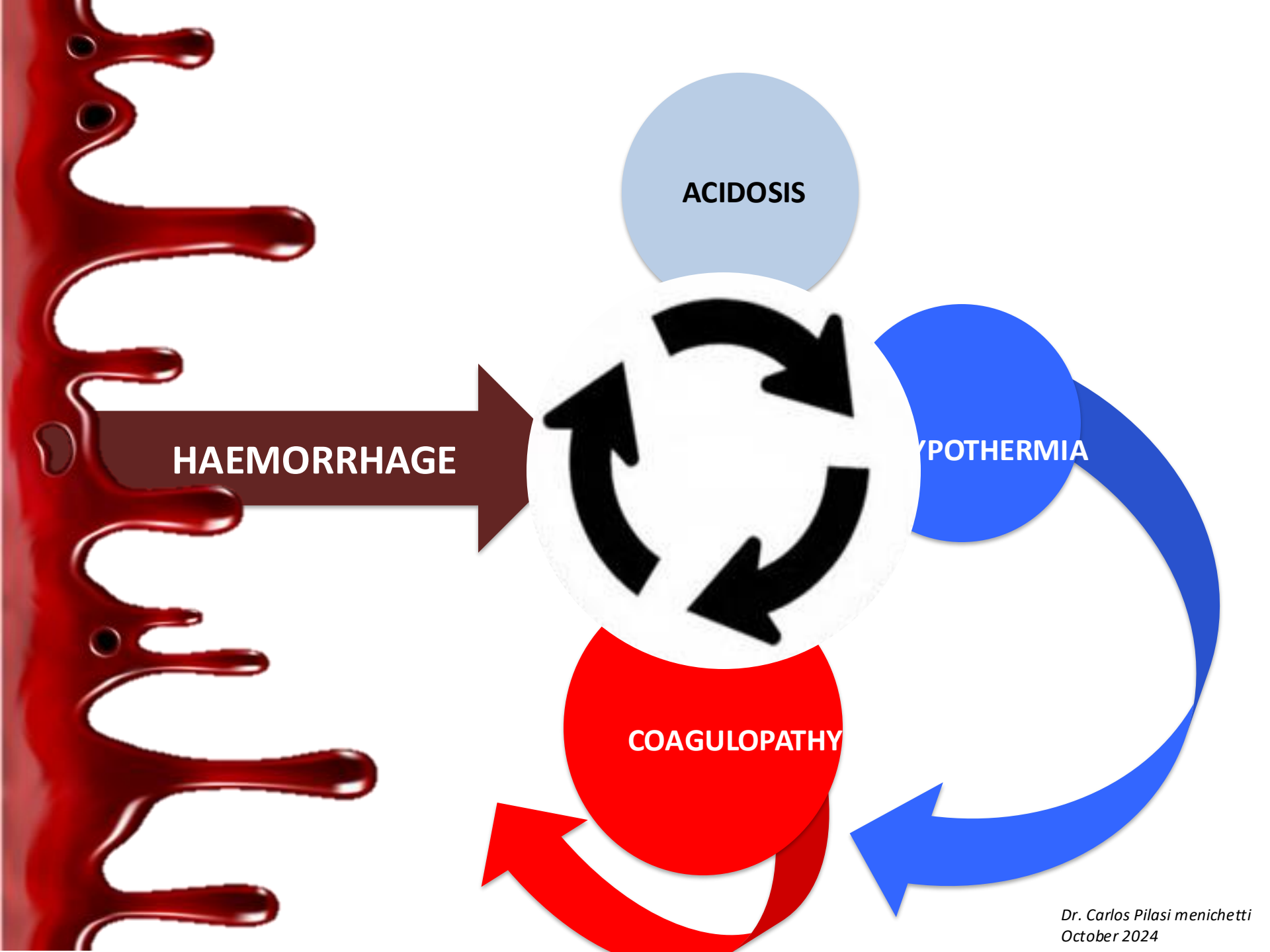
pH strongly effects activity of Factors V, VIIa and X

Acidosis inhibits thrombin generation

Decreased contractility and CO,



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HAEMORRHAGE

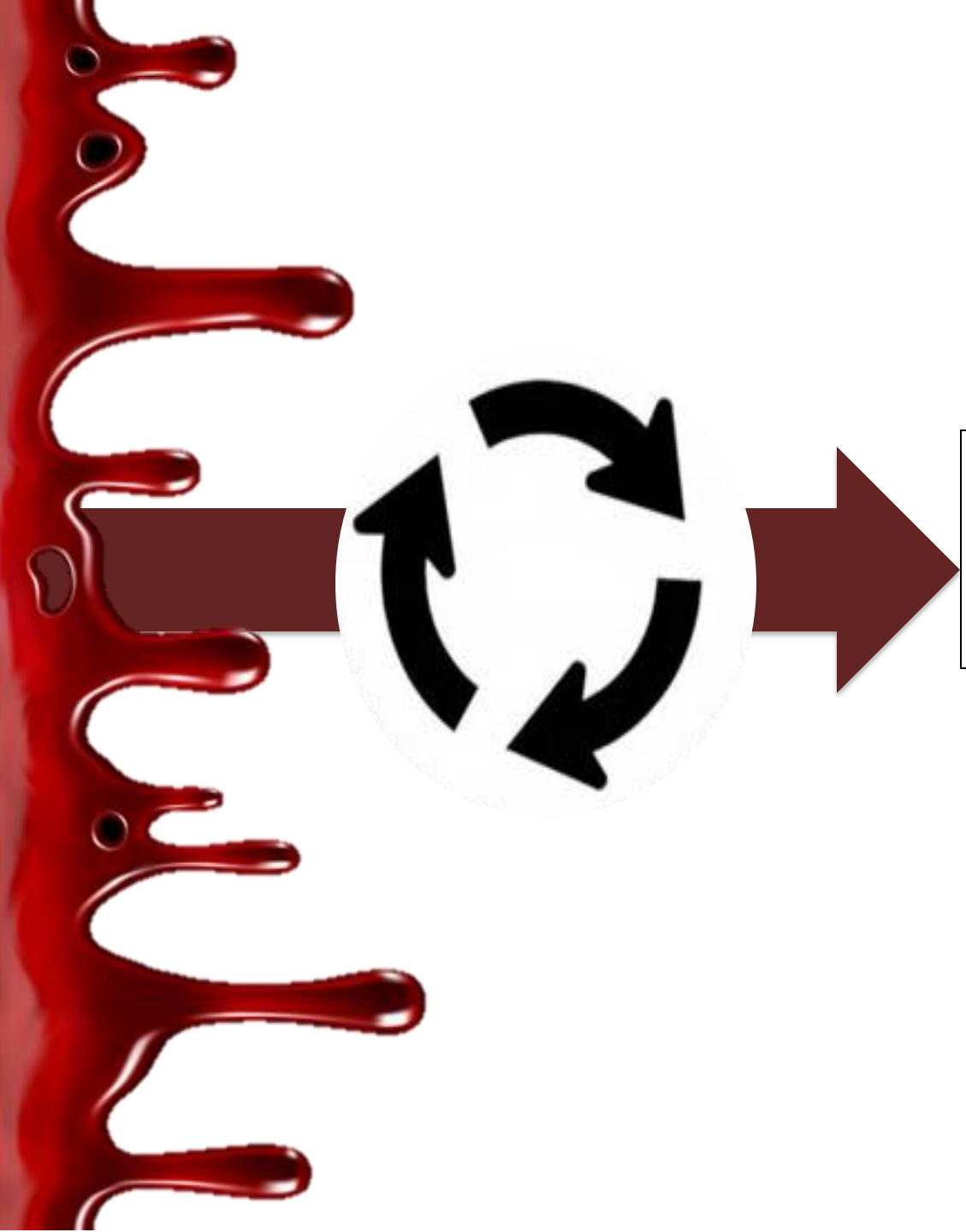
ACIDOSIS

COAGULOPATHY

YPOTHERMIA

- Decreases platelet responsiveness
- Increases platelet sequestration in liver and spleen
- Reduces Factor function eg Factors XI and XII
- Alters fibrinolysis

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Damage control strategy

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Damage control strategy

- Limit harm
- Resuscitate
- Recover physiology→ definitive treatment

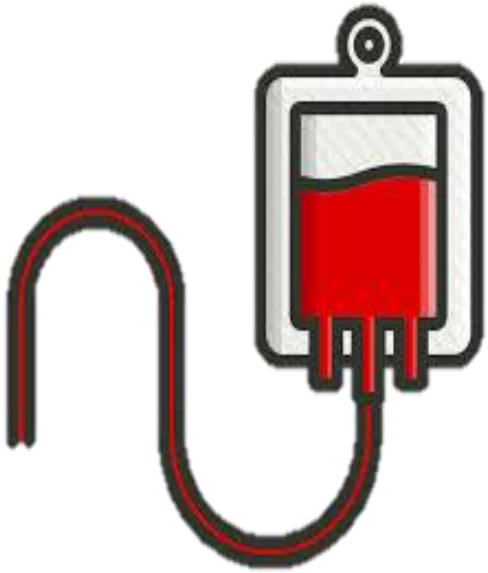
Rotondo, 1993

  - DCS group required less pRBCs and FFP
  - Correct lethal triad of death
  - No definitive surgical repair
  - Keep physiologically normal
- 77% survival in DCS vs 11% in DL (Definitive Laparotomy)

Objectives



Damage control strategy



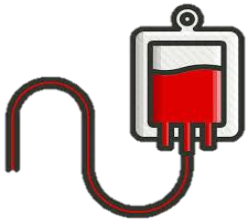


DC RESUSCITATION

DC SURGERY

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Damage control strategy





DC RESUSCITATION

DC SURGERY

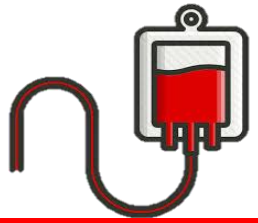
HYPOLVOLEMIC RESUSCITATION

HAEMOSTATIC RESUSCITATION

STOP BLEEDING

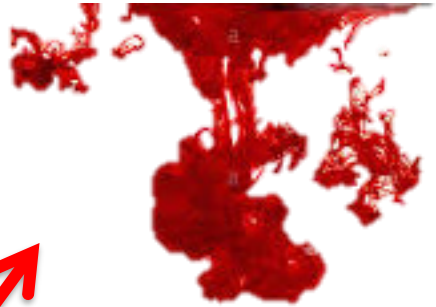
LIMIT CONTAMINATION

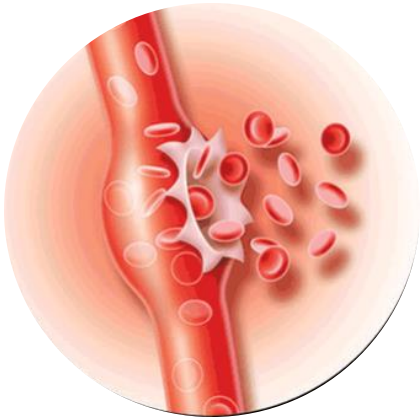
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DC RESUSCITATION

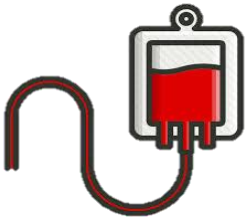
HYPOLVOLEMIC RESUSCITATION







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✓ HYPOLVOLEMIC RESUSCITATION

DC RESUSCITATION

HAEMOSTATIC RESUSCITATION

No O2 carrying capacity
Little correction anaerobic metabolism and O2 debt associated with shock.

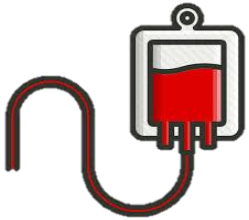






Damage control strategy

In pregnant?



DC RESUSCITATION



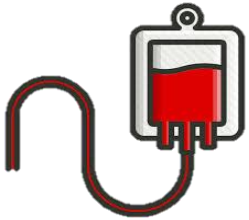
HYPOLVOLEMIC RESUSCITATION

HAEMOSTATIC RESUSCITATION

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Damage control strategy

In pregnant?



DC RESUSCITATION



HYPOLVOLEMIC RESUSCITATION

HAEMOSTATIC RESUSCITATION



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TXA in PPH

TRANEXAMIC ACID

A drug that stops bleeding

Results from the WOMAN trial

woman
World Maternal Antifibrinolytic Trial

20,000 WOMEN
21 COUNTRIES
193 HOSPITALS



The drug could save

1/3

women who would otherwise bleed to death after childbirth

An estimated **100,000** women die from severe bleeding after giving birth every year



The drug reduced the number of women bleeding to death after childbirth by more than 30%



The drug reduced the need for urgent surgery to control bleeding by more than 35%

£2 ($2.5)

The cost of tranexamic acid in most countries

Find out more at **womantrial.lshtm.ac.uk**

Source: The WOMAN trial (2017)
Credit: Rebeccah Robinson/LSHTM



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TXA in PPH

Impact of treatment delay for severe bleeding

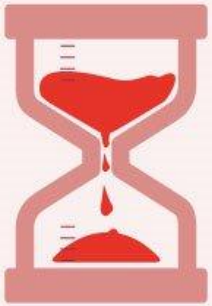
Tranexamic acid must be given urgently to save lives

Immediate treatment



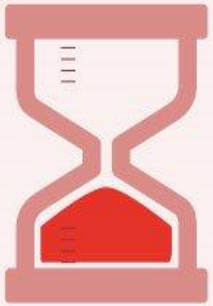
70%
improvement in survival

For every 15 minute delay



10%
decrease in survival benefit

After 3 hours



No benefit

Source: The Lancet (2017). Analysis of data for 40,000 trauma patients and women with severe bleeding after childbirth

Credit: Rebeccah Robinson/LSHTM

WOMAN CRASH-2

Find out more at **TXAcentral.org**



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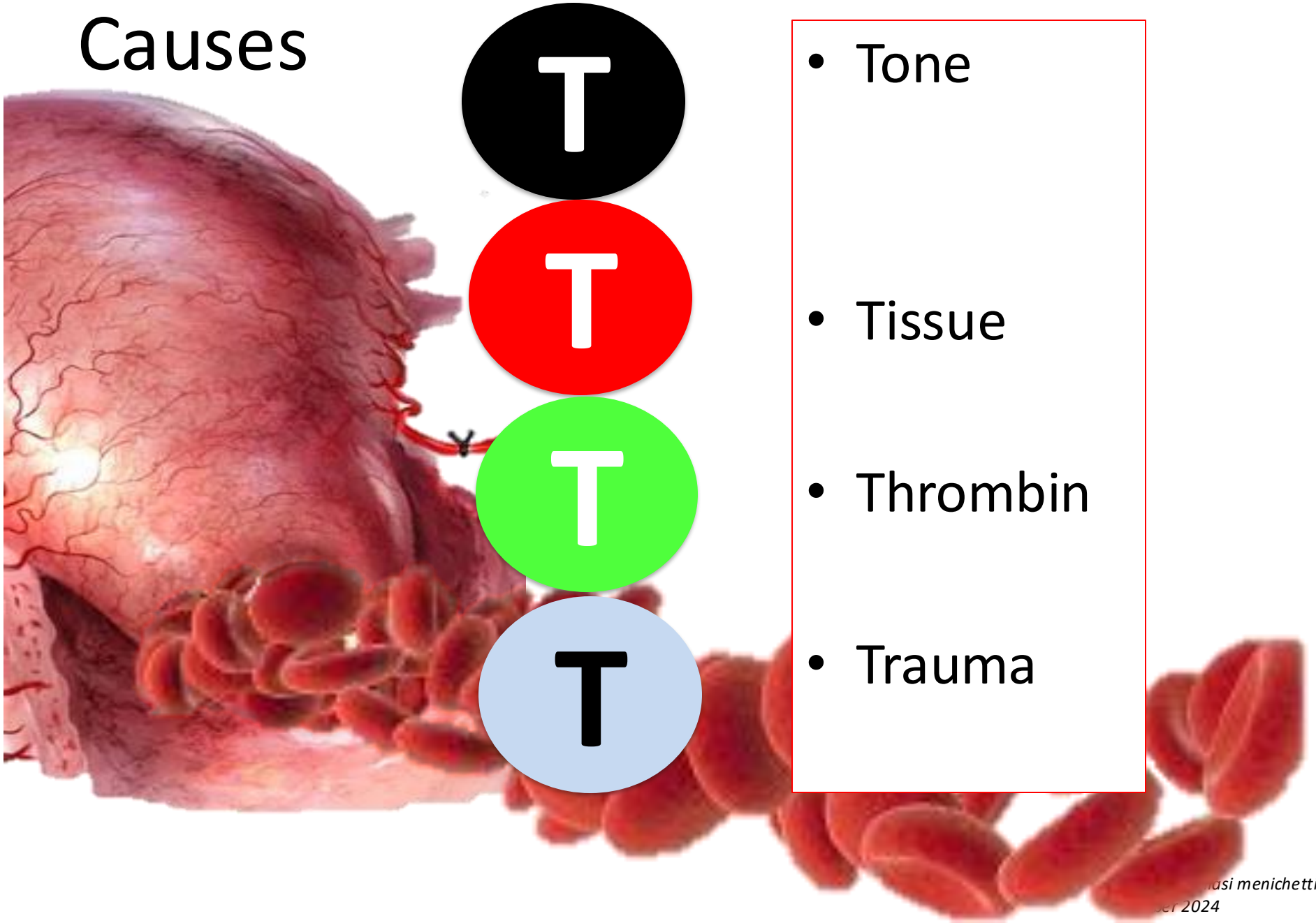
Identify the SOURCE



Treat accordingly

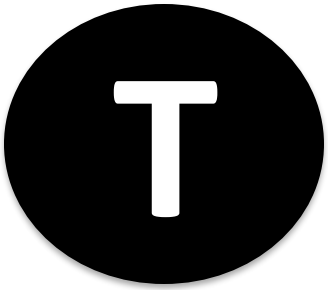


Causes



- Tone
- Tissue
- Thrombin
- Trauma

TONE



- MOST COMMON
- UTERUS UNABLE TO CONTRACT:

TREATMENT

Drugs- uterine tamponade- uterus sparing surgery (B-Lynch)-Hysterectomy

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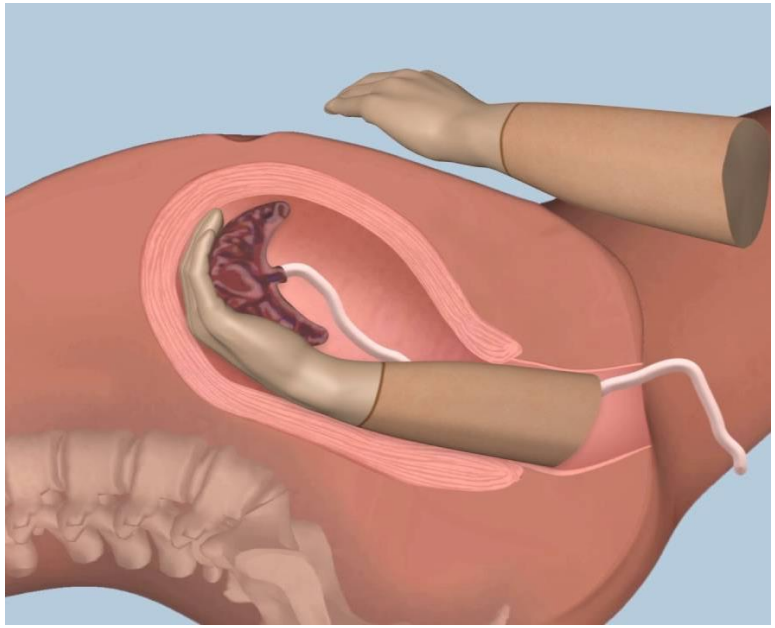
TISSUE



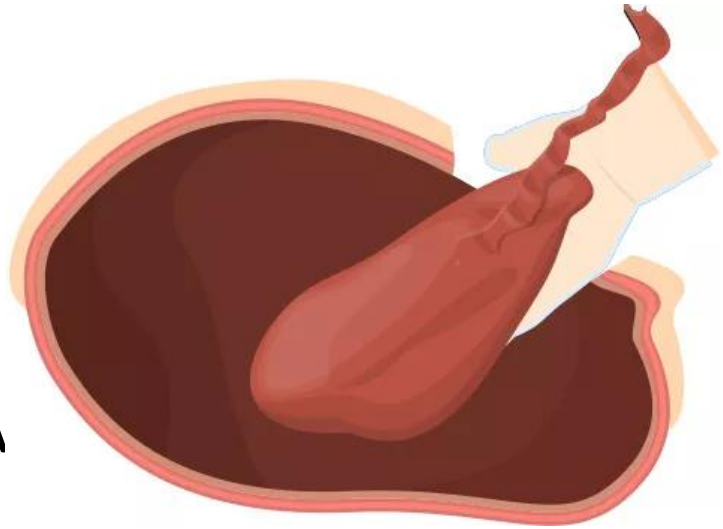
- REATINED TISSUE
- PLACENTA/ Membranes

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TISSUE



T



TREATMENT

- REMOVE REATINED TISSUE
- MANUAL REMOVAL OF PLACENTA

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THROMBIN



- COAGULOPATHY

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THROMBIN



TREATMENT

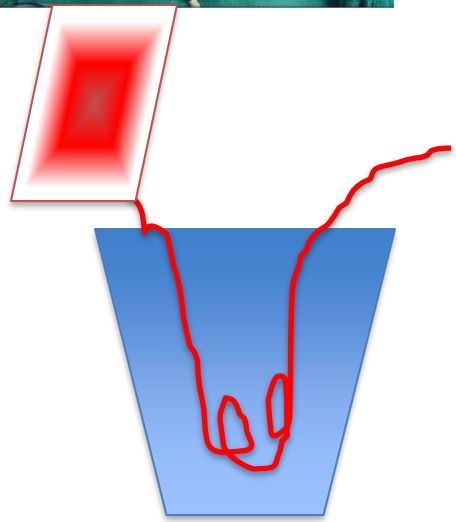
- Limited options
- careful RESUSCITATION (avoid dilution, give Ca)
- LIMIT BLEEDING
- AVOID HYPOTHERMIA

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- STOP BLEEDING
- Don’t forget Refill

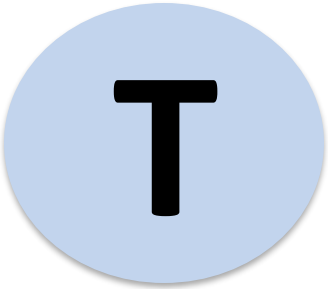






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TRAUMA



- VAGINAL TEAR
- CERVICAL TEAR
- UTERINE RUPTURE

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TRAUMA

T

TREATMENT

REPAIR

- VAGINAL TEAR
- CERVICAL TEAR
- **UTERINE RUPTURE** ≠ **Hysterectomy**

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World Health Organization

considerations

RUPTURE THROUGH CERVIX AND VAGINA

- If the **uterus is torn through the cervix and vagina**, mobilize the bladder at least 2 cm below the tear.
- If possible, place a suture 1 cm below the upper end of the cervical tear and keep traction on the suture to bring the lower end of the tear into view as the repair continues.

RUPTURE LATERALLY THROUGH UTERINE ARTERY

- If the **rupture extends laterally to damage one or both uterine arteries**, ligate the injured artery.
- Identify the arteries and ureter prior to ligating the uterine vessels (Fig P-53).
-

RUPTURE WITH BROAD LIGAMENT HAEMATOMA

- If the rupture has created a broad ligament haematoma (Fig S-2), clamp, cut and tie off the round ligament.
- Open the anterior leaf of the broad ligament.
- Drain off the haematoma manually, if necessary.
- Inspect the area carefully for injury to the uterine artery or its branches. Ligate any bleeding vessels.

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REPAIRING THE UTERINE TEAR

- Repair the tear with a continuous locking stitch of 0 chromic catgut (or polyglycolic) suture. If **bleeding is not controlled** or if the **rupture is through a previous classical or vertical incision**, place a second layer of suture.
- **Ensure that the ureter is identified and exposed to avoid including it in a stitch.**
- If the **rupture is too extensive for repair**, proceed with hysterectomy.
- Control bleeding by clamping with long artery forceps and ligating. If the bleeding points are deep, use figure-of-eight sutures.
- Drain?
- Ensure that there is no bleeding. Remove clots using a sponge.
- In all cases, check for injury to the bladder. If a **bladder injury is identified**, repair the injury (see below).
- Close the fascia with continuous 0 chromic catgut (or polyglycolic) suture.
- **Note**: There is no need to close the bladder peritoneum or the abdominal peritoneum.

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Intraabdominal packing post HT

RESEARCH ARTICLE

Maternal outcome after abdominal packing for uncontrolled postpartum hemorrhage despite peripartum hysterectomy

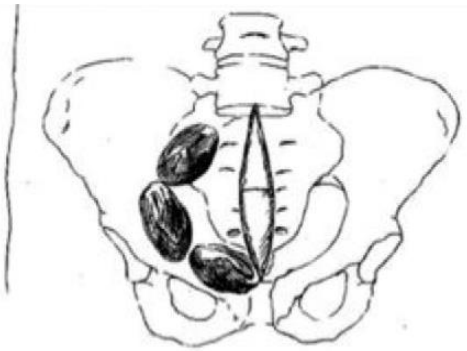
Xavier Deffieux[1]*, Marie Vinchant[1], Ingrid Wigniolle[1], François Goffinet[2], Loïc Sentilhes[3]

1 AP-HP, GHU Sud, Hôpital Antoine Béclère, Service de Gynécologie-Obstétrique et Médecine of the Reproduction, Clamart, France, **2** AP-HP, Maternité Port Royal, Université Paris Descartes, DHU Risque et grossesses, EPOPé INSERM U953, Paris, France, **3** CHU Bordeaux, Service de Gynécologie-Obstétrique, Bordeaux, France

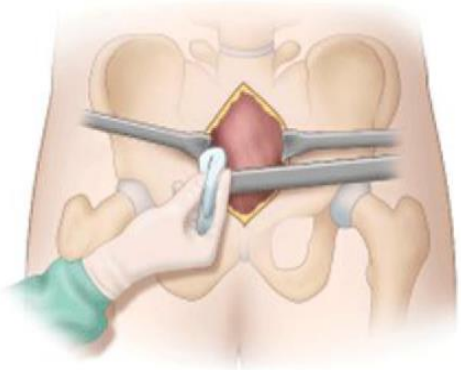
- Abdominal packing was used in about 7% of peripartum hysterectomies due to persistent uncontrolled PPH.
- The success rate was 62%.

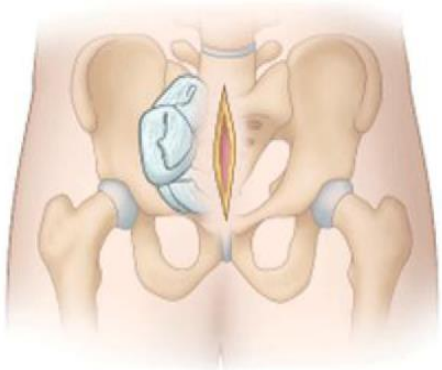
Extraperitoneal packing
Between the peritoneum and the bone

- Extrem measure for patients where there is continuous bleeding despite surgery and intraabdominal packing









Pelvic packing



- Retroperitoneal packing is a lesson gleaned from trauma surgery and has profound application in cases of severe postpartum hemorrhage
- The success of this technique is clear from the trauma literature, but the data have yet to be widely applied in nontraumatic applications

OBG MANAGEMENT

Consider retroperitoneal packing for postpartum hemorrhage

For intractable bleeding, this technique, borrowed from pelvic trauma surgery, allows you to stabilize the patient until her underlying injury can be addressed

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REPAIR OF BLADDER INJURY

Identify the extent of the injury by grasping each edge of the tear with a clamp and gently stretching. Determine if the injury is close to the bladder trigone (ureters and urethra).

- Dissect the bladder off the lower uterine segment with fine scissors or with a sponge on a clamp.
- Free a 2 cm circle of bladder tissue around the tear.

Repair the tear in two layers with continuous 3-0 chromic catgut (or polyglycolic) suture:

- - Suture the bladder mucosa (thin inner layer) and bladder muscle (outer layer);
- - Invert (fold) the outer layer over the first layer of suture and place another layer of suture;
- - Ensure that sutures do not enter the trigone area.
- Test the repair for leaks:
- - Fill the bladder with sterile saline or water through the catheter;
- - If **leaks are present**, remove the suture, repair and test again.
- If it is **not certain that the repair is well away from the ureters and urethra**, complete the repair and refer the woman to a higher-level facility for an intravenous pyelogram.

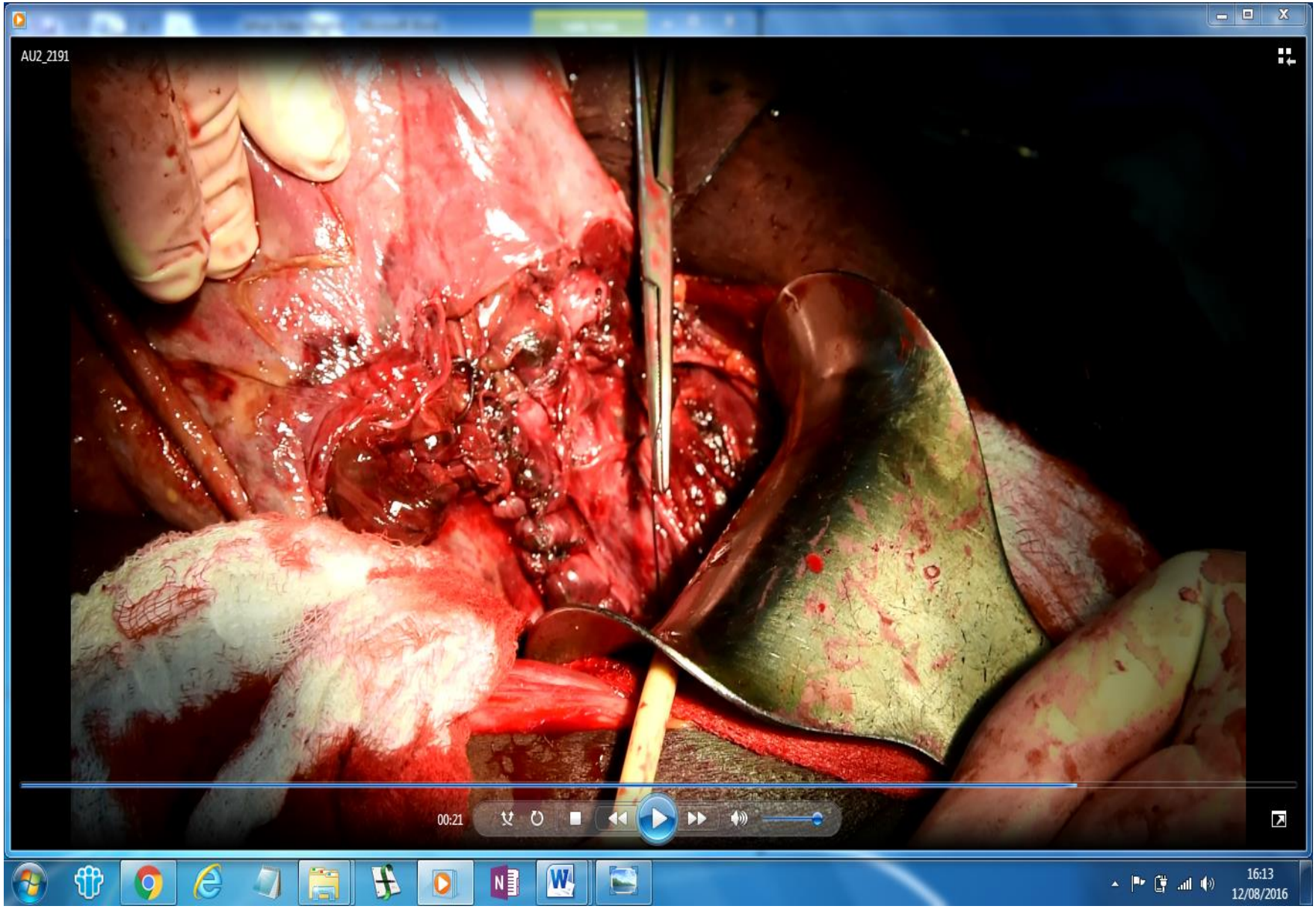
Keep the bladder catheter in place for at least 7 days and until urine is clear. Continue IV fluids to ensure flushing of the bladder.

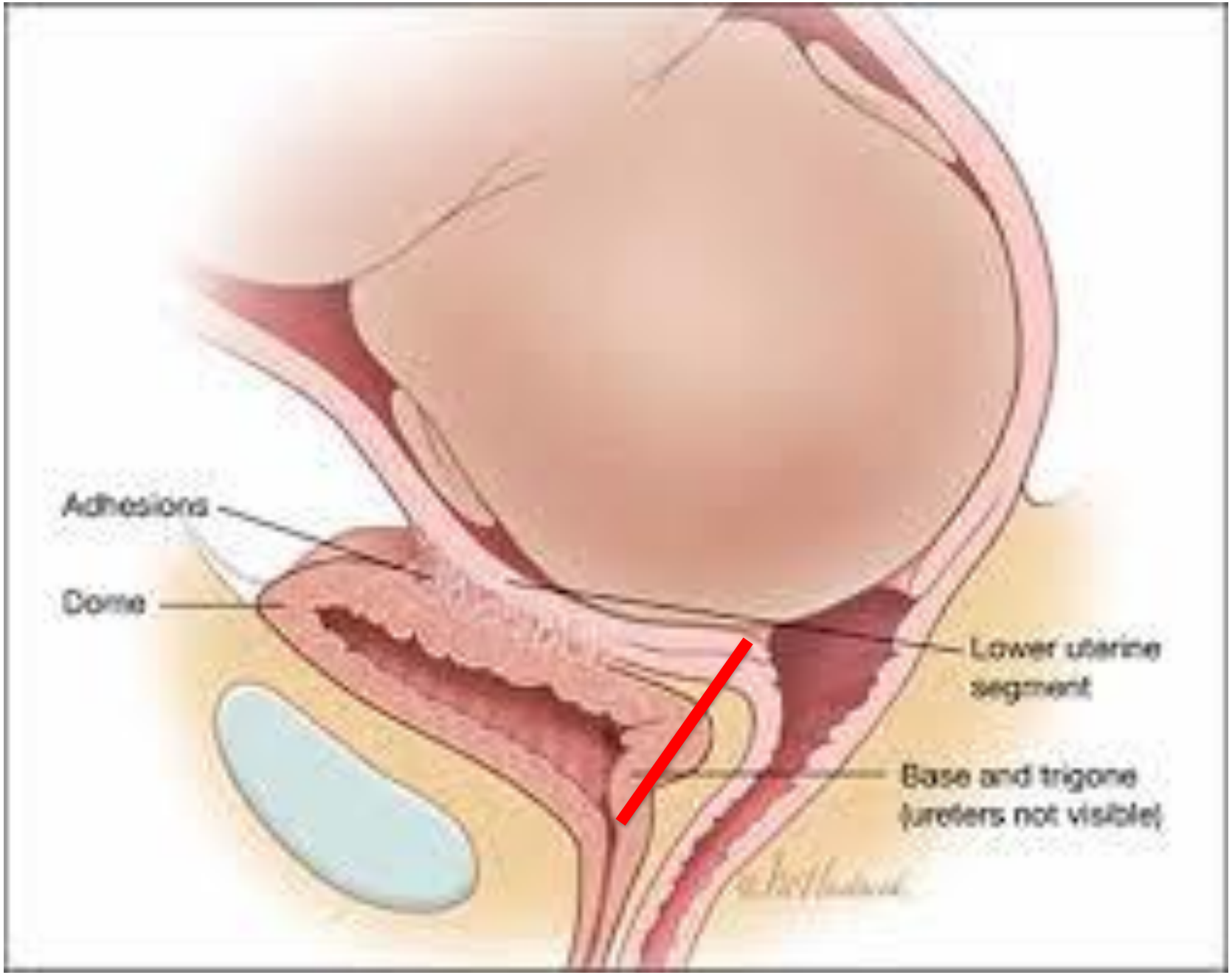
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15:59
12/08/2016


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02:15
16:02
12/08/2016


AU2_2191
00:21
16:13
12/08/2016


Adhesions
Dome
Lower uterine segment
Base and trigone (ureters not visible)

Internal repair



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POST-PROCEDURE CARE

- Analgesia
- Antibiotics as per protocol
- If **tubal ligation was not performed**, offer family planning . If the **woman wishes to have more children**, advise her to have elective caesarean section for future pregnancies.
- **Because there is an increased risk of rupture with subsequent pregnancies, the option of permanent contraception needs to be discussed with the woman after the emergency is over.**

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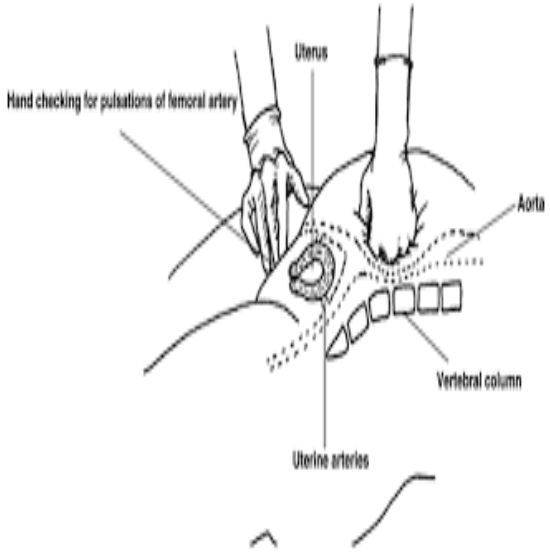
Need to DAMAGE CONTROL???
Early decision making



Why ? PRIOITIES

- Continuing the surgery is too risky
- quick bleeding control (occlusion of aorta) and increase resuscitation efforts by TRANSFUSING
- Buys time for the anesthetist to transfuse (refill)

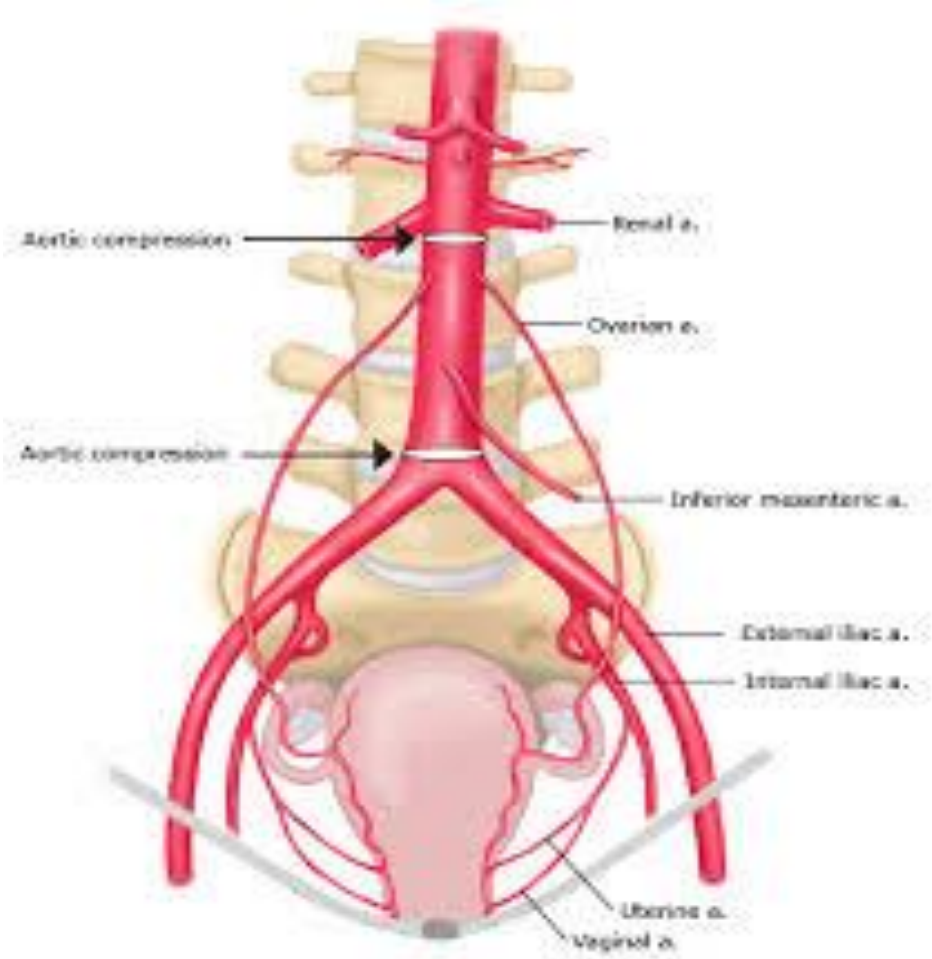
Aortic external compression





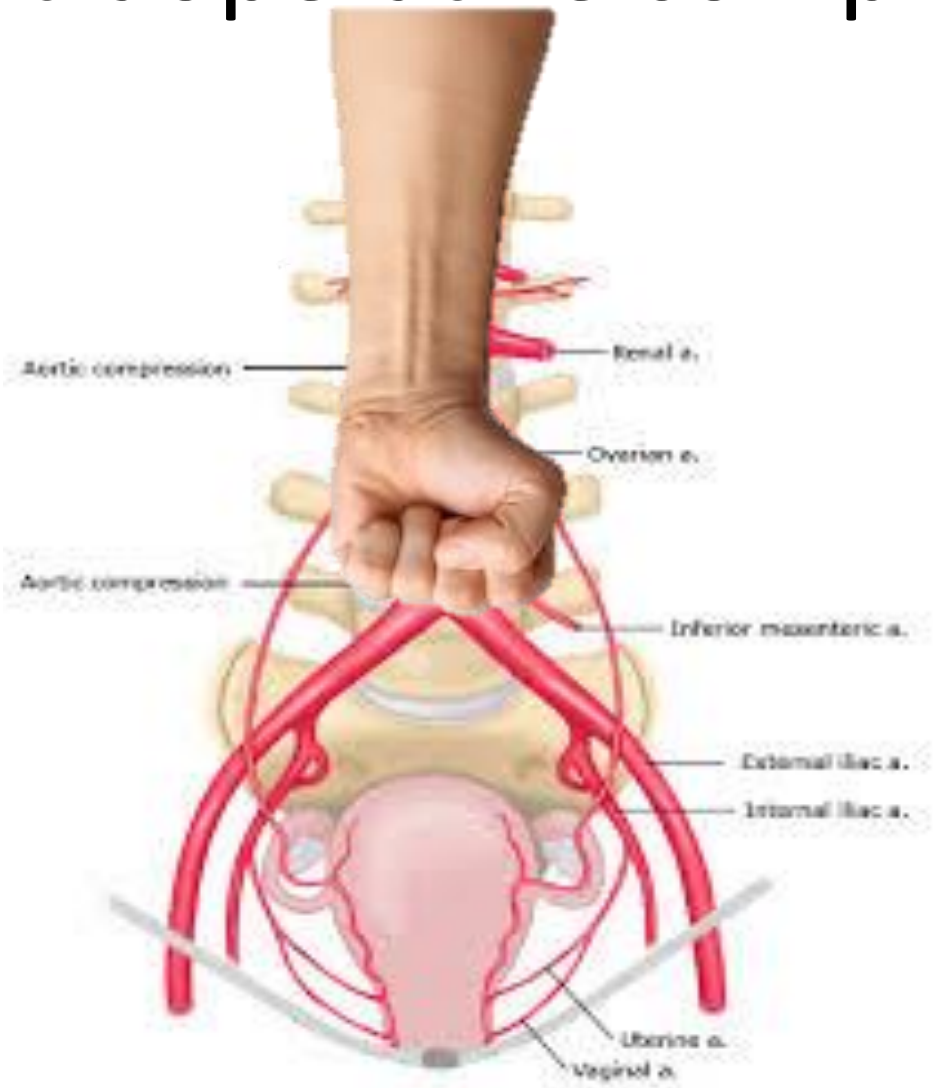
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Aortic intraoperative compression



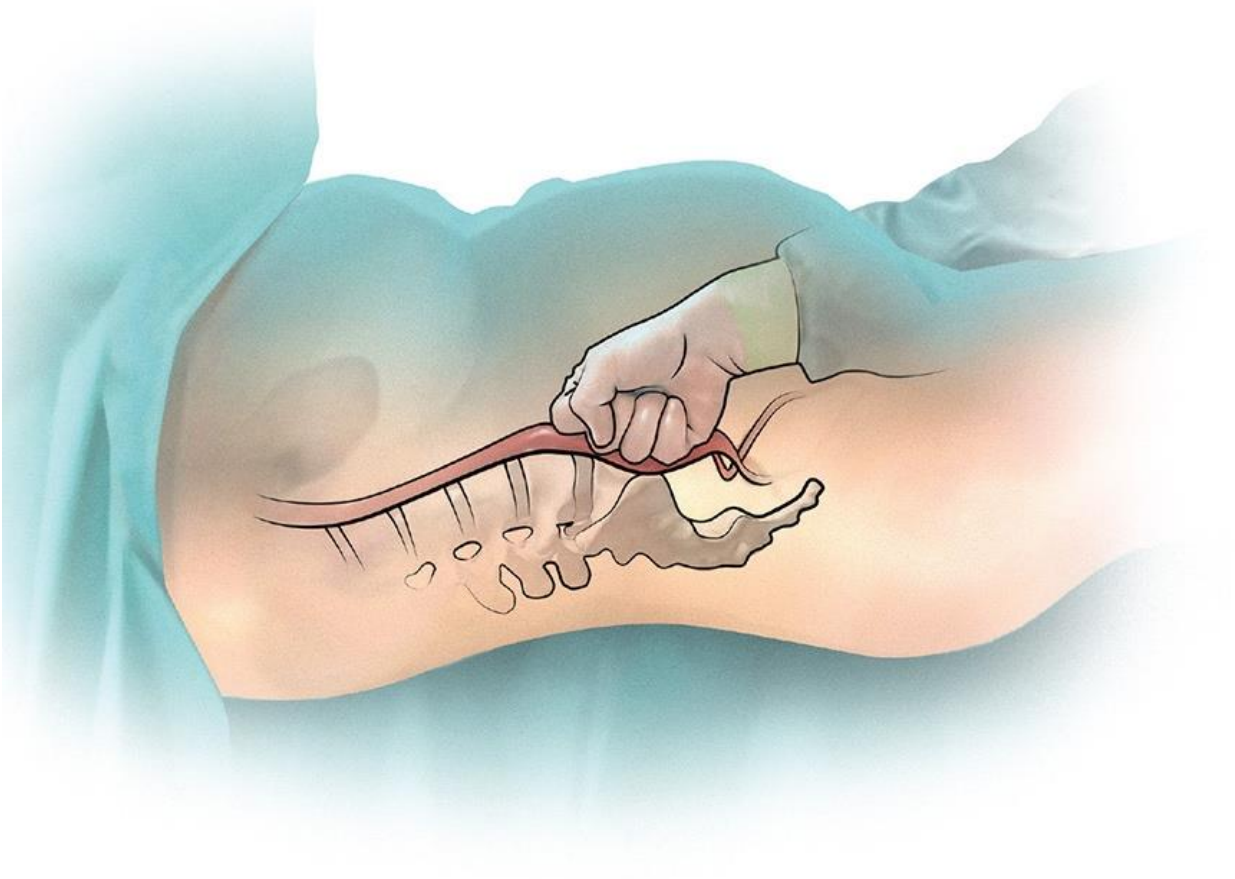
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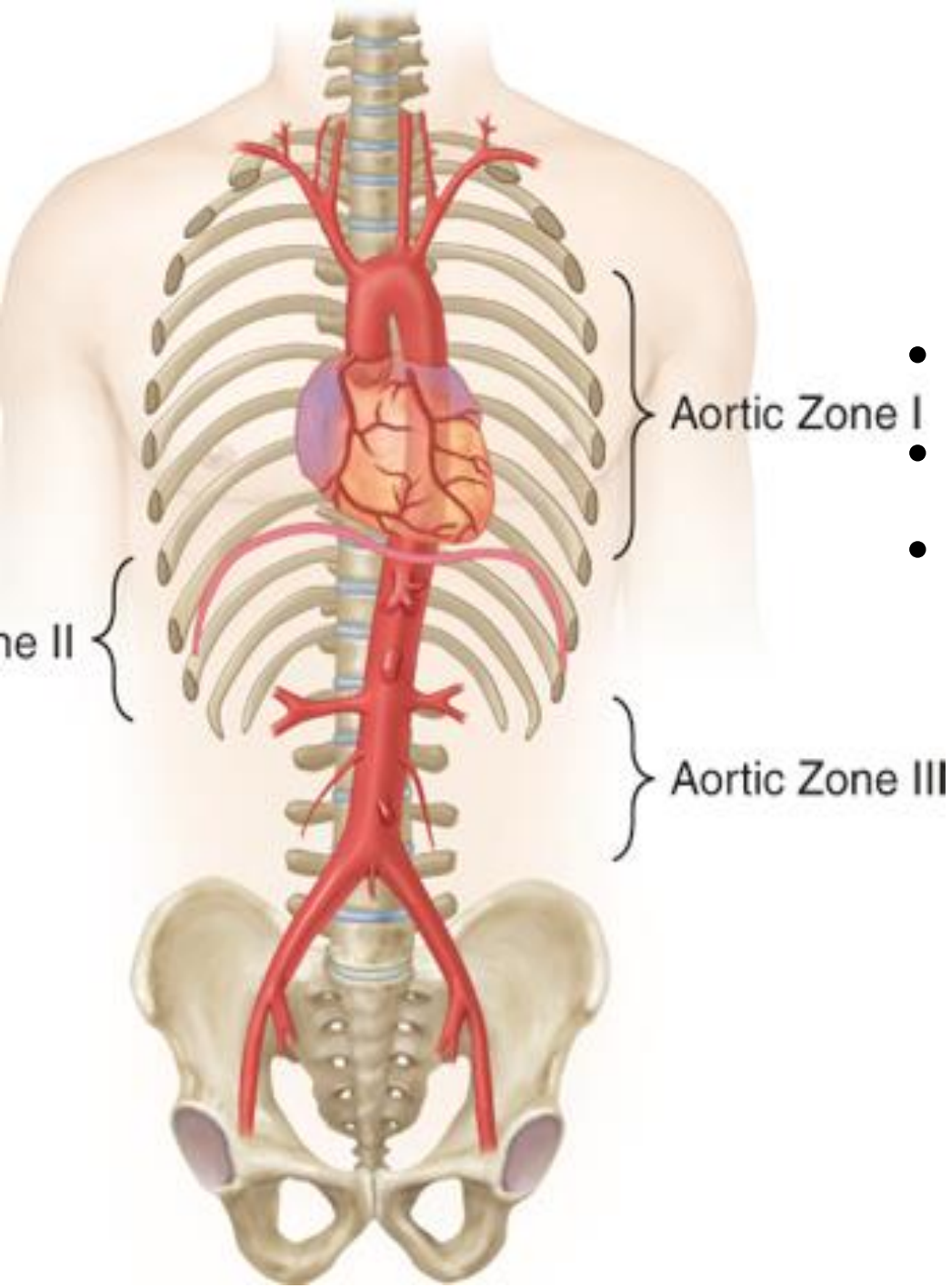
Aortic intraoperative compression



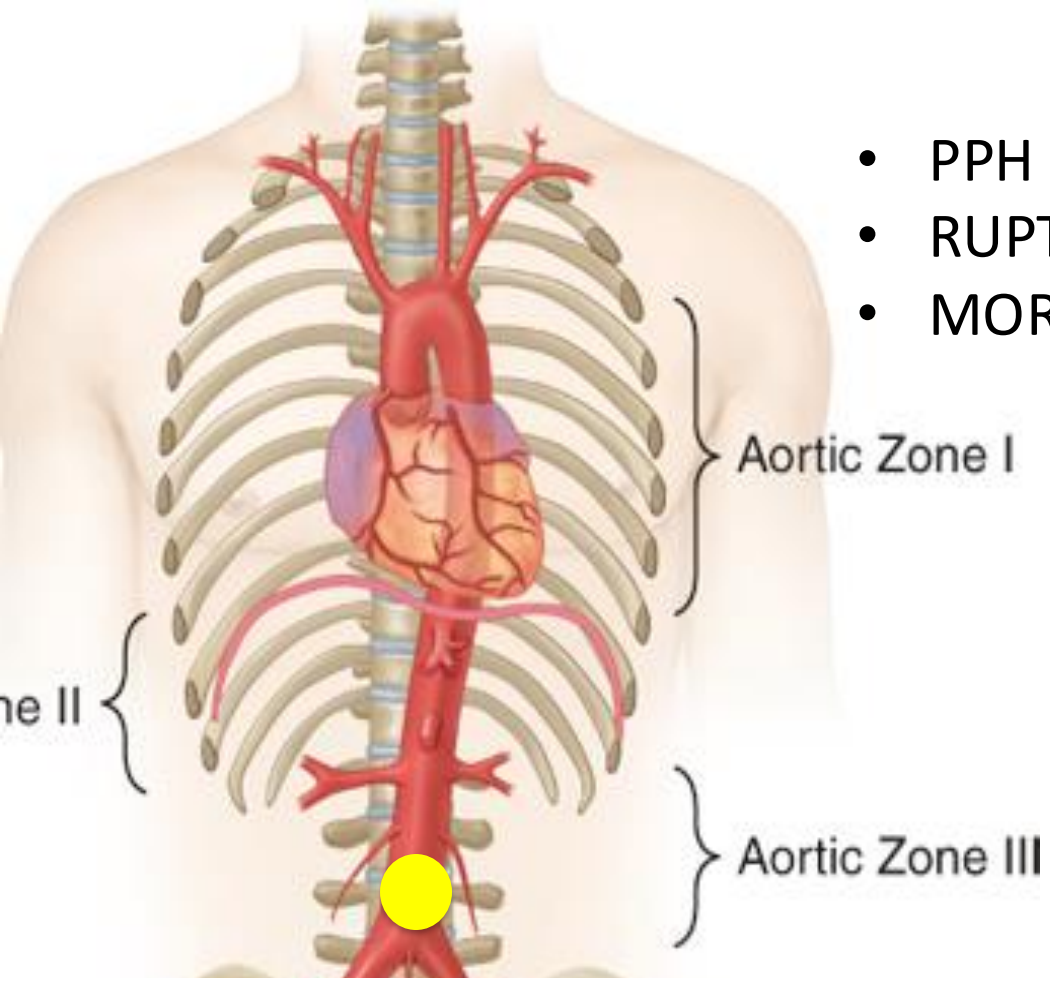
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Patient in extremis (periatrest) occlude the AORTA with FIST



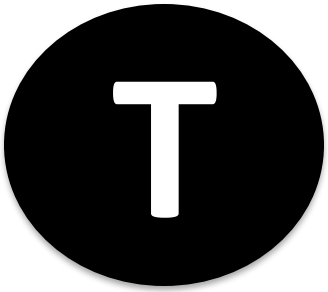


- Where?
- Above bifurcation
- Against vertebral bodies

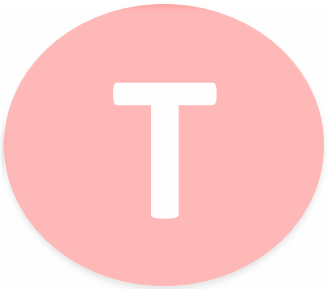


- PPH
- RUPTURED UTERUS
- MORBIDLY ADHERENT PLACENTA

- *Stensaeth KH, Sovik E, Haig IN, Skomedal E, Jorgensen A. Fluoroscopy-free Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for controlling life threatening postpartum hemorrhage. PLoS One. 2017;12(3):e0174520.*
- *Okada A, Nakamoto O, Komori M, Arimoto H, Rinka H, Nakamura H. Resuscitative endovascular balloon occlusion of the aorta as an adjunct for hemorrhagic shock due to uterine rupture: a case report. Clin Case Rep. 2017;5(10):1565-8.*
- *Manzano-Nunez R, Escobar-Vidarte MF, Naranjo MP, Rodriguez F, Ferrada P,Casallas JD, et al. Expanding the field of acute care surgery: a systematic review of the use of resuscitative endovascular balloon occlusion of the aorta (REBOA) in cases of morbidly adherent placenta. Eur J Trauma Emerg Surg. 2018;44(4):519-26.*
- *Ordoñez CA, Manzano-Nunez R, Parra MW, RasmussenTE, Nieto AJ, Herrera-Escobar JP, et al. Prophylactic use of resuscitative endovascular balloon occlusion of the aorta in women with abnormal placentation: a systematic review, meta-analysis,and case series. J Trauma Acute Care Surg. 2018;84(5):809-18.*



- Tone



- Tissue

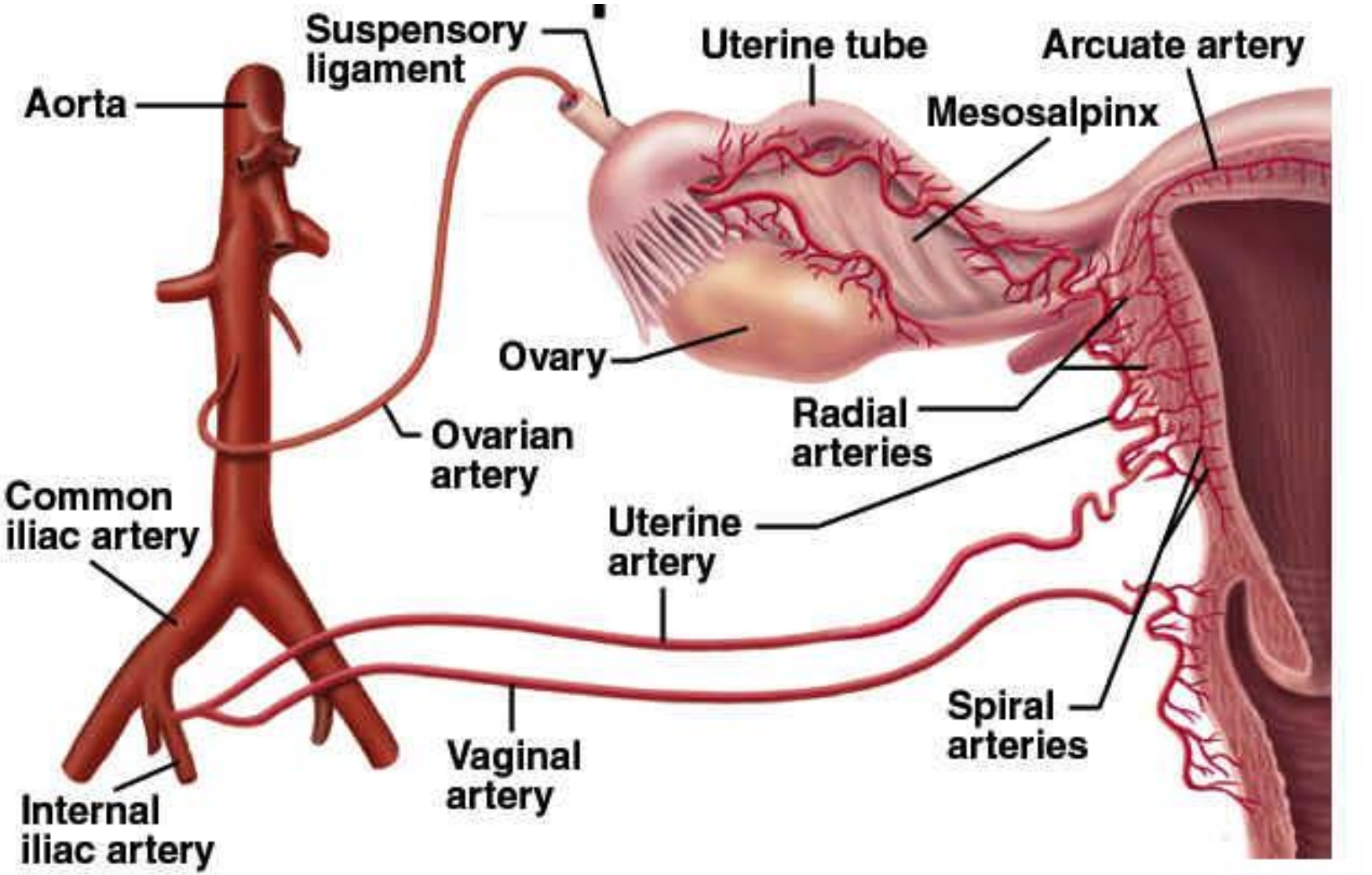
- Thrombin



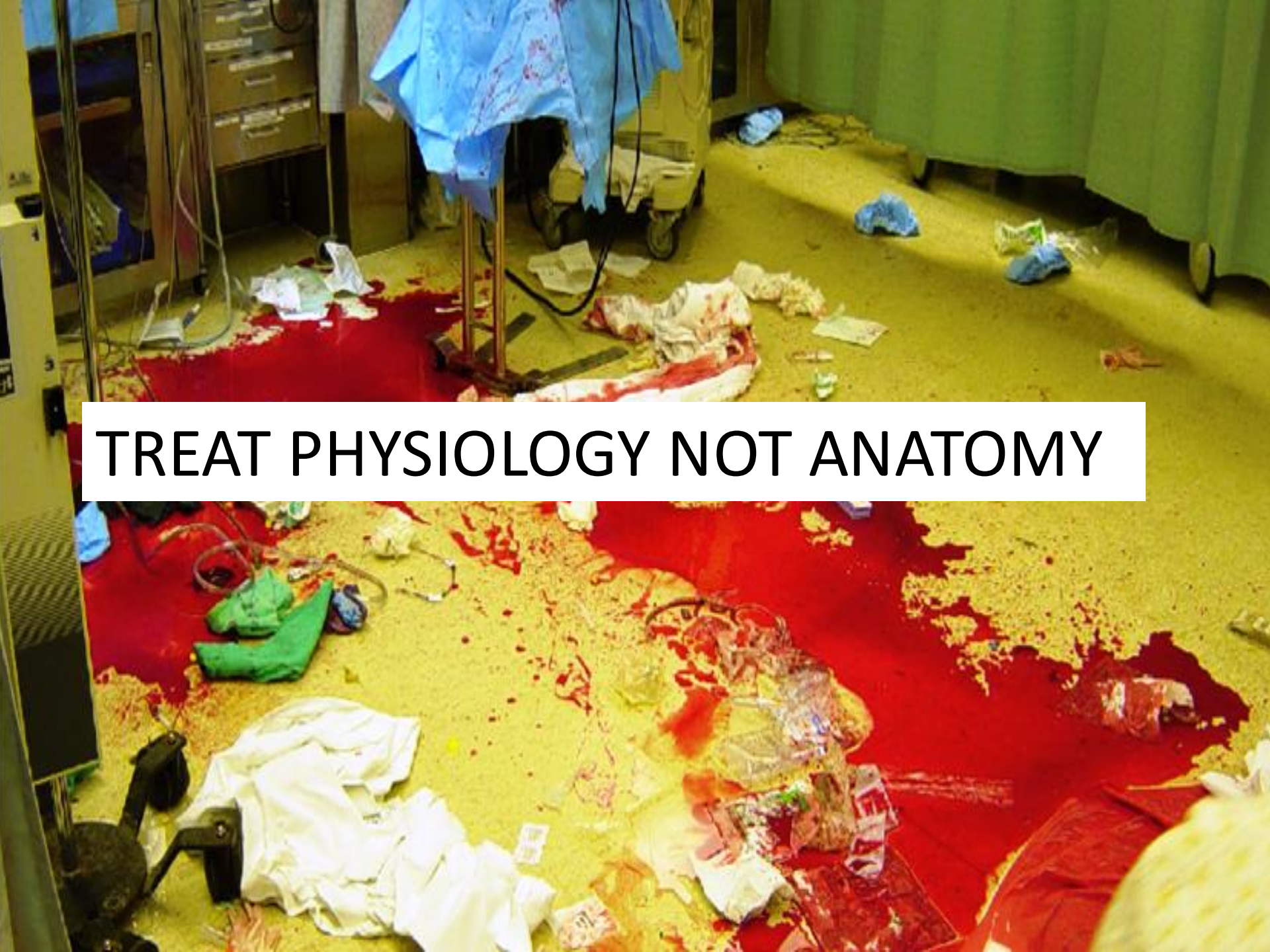
- Trauma

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Blood supply to UTERUS



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TREAT PHYSIOLOGY NOT ANATOMY

SURGICAL APPROACH



CONSERVATIVE

- Compression techniques:
- Vascular ligation:
- Packing

HYSTERECTOMY

- SUBTOTAL
- TOTAL

SURGICAL APPROACH



Why not the first option??

HYSTERECTOMY

- SUBTOTAL
- TOTAL

SURGICAL APPROACH



HYSTERECTOMY

- SUBTOTAL
- TOTAL

Why not the first option??

- Not accepted culturally (risk for the mission, the patient, the staff)
- No consent = No surgery
- Coagulopathy= more bleeding
- No evidence supporting this

SURGICAL APPROACH



CONSERVATIVE

- Compression techniques:
- Vascular ligation:
- Packing

Compression techniques



- Brace-like suturing:
  - **B-Lynch (1997)**
  - **Pereira (2005)**

- Penetrating sutures:
  - **“U” stitches (2008)**

- Packing: intrauterine/ extraperitoneal

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B-LYNCH suture

Christopher B-Lynch, Coker A, Laval AH, Abu J, Cowen MJ. The B-Lynch surgical technique for control of massive postpartum haemorrhage: an alternative to hysterectomy? Five cases reported. Br J Obstet Gynaecol



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Pereira technique

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

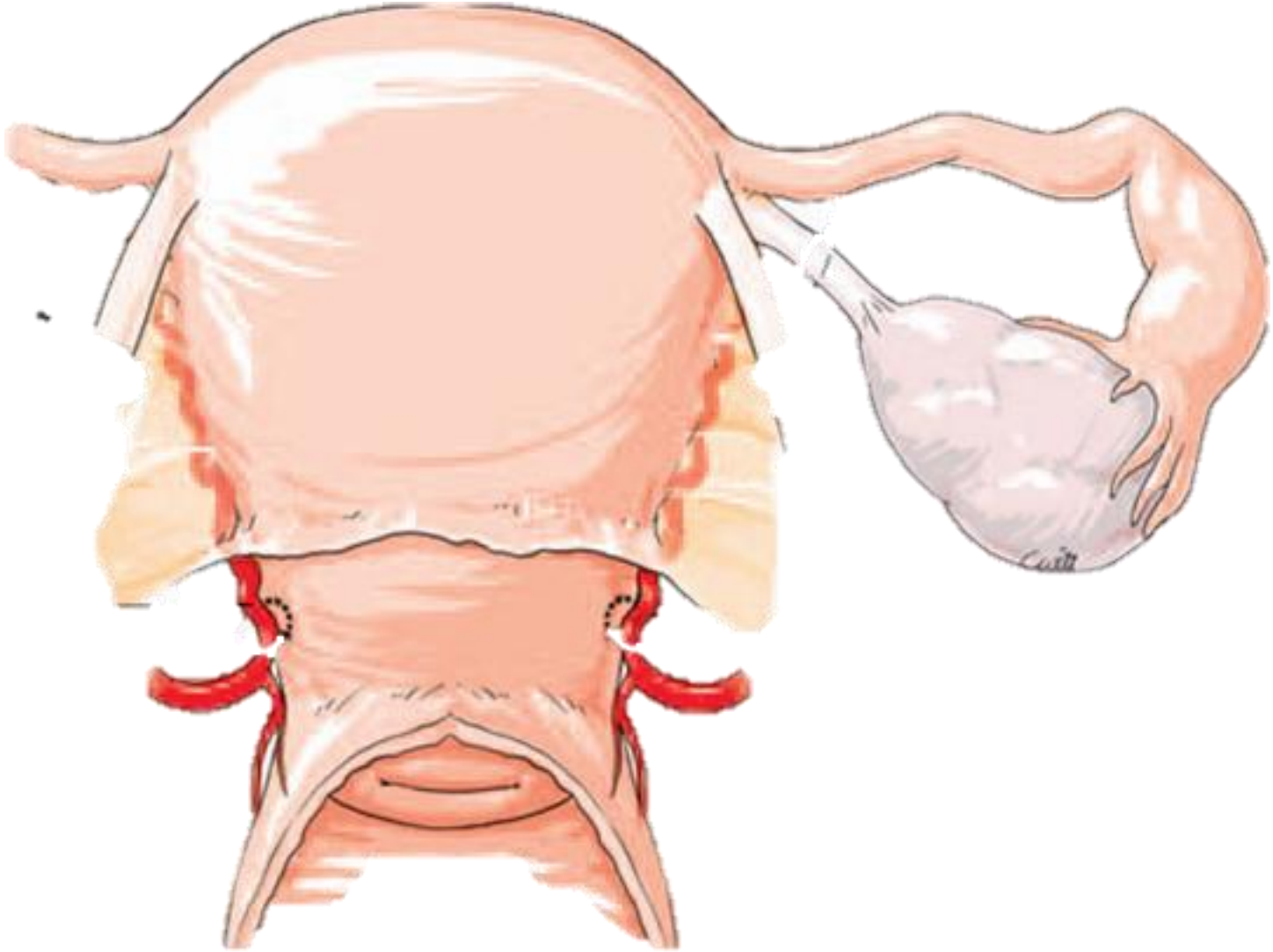
Compressive Uterine Sutures to Treat Postpartum Bleeding Secondary to Uterine Atony. Obstetrics & Gynecology

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Position of uterine arteries



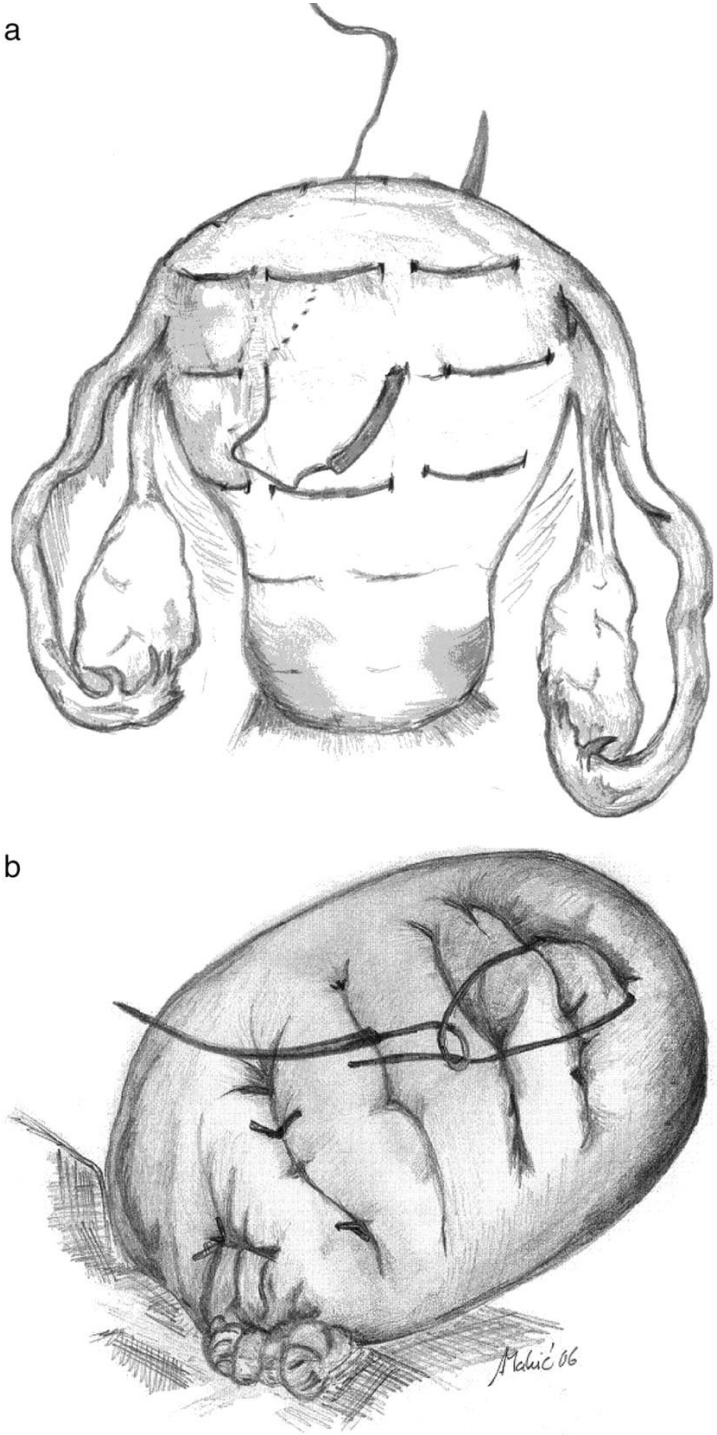
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“U” Stitches

Hackethal A et al.

Hum. Reprod. 2008;23:74-79



Posterior view of the uterus showing the U-suturing technique.

Hackethal A et al. Hum. Reprod. 2008;23:74-79

Intra-operative position showing the uterus after U-suturing.



Hackethal A et al. Hum. Reprod. 2008;23:74-79

Establish systematically cause of PPH

- Uterus is empty
- No tear in vagina or cervix
- Uterus not contracting
- Drugs→ NOT RESPONDING
- Balloon→NOT RESPONDING
- B-Lynch→ pereira→ NOT respo

SURGICAL APPROACH



CONSERVATIVE

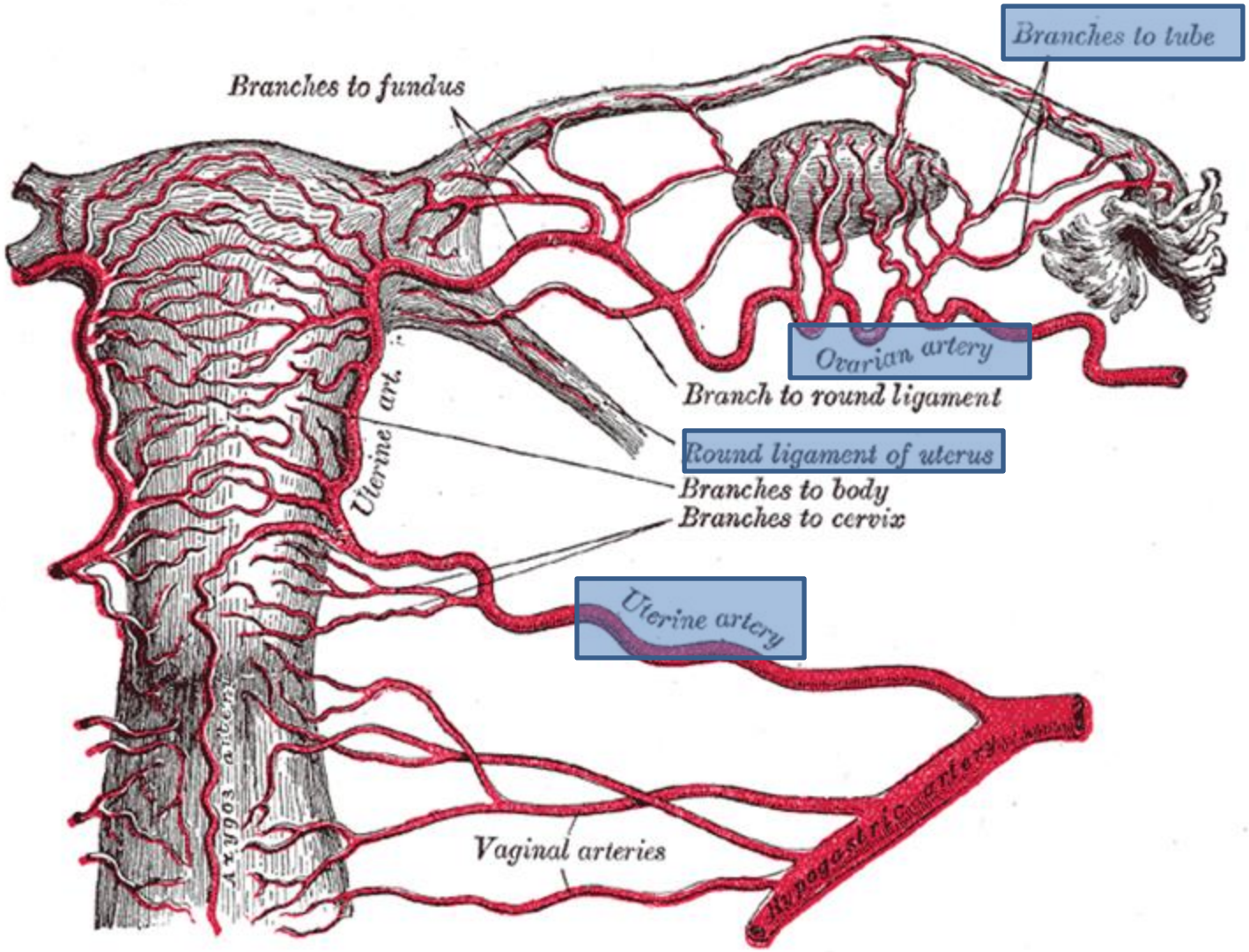
- Compression techniques:
- Vascular ligation:
- Packing

Conservative surgical approach
Vascular ligation



- Uterine suture: 80% Effectiveness
- Triple suture
- BIIAL

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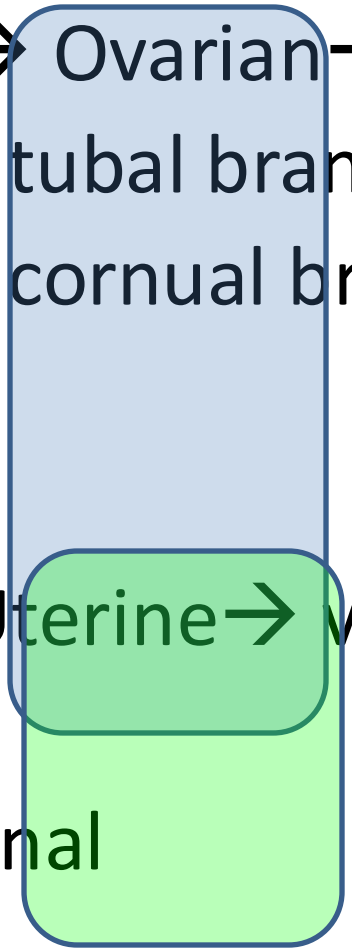
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ANASTOMOSIS

- AORTA → Ovarian → round ligament branch
  tubal branch
  cornual branch

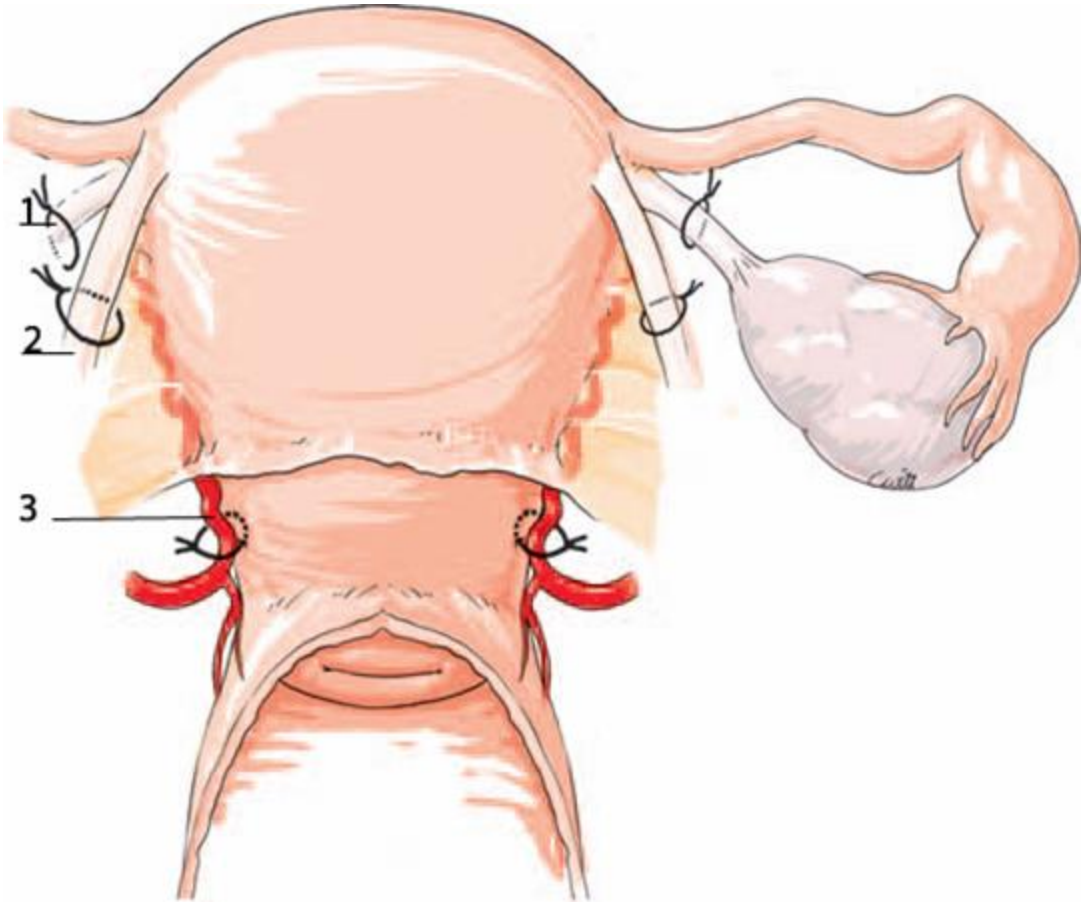
- INTERNAL
  ILIAC → Uterine → vaginal branch

  →vaginal

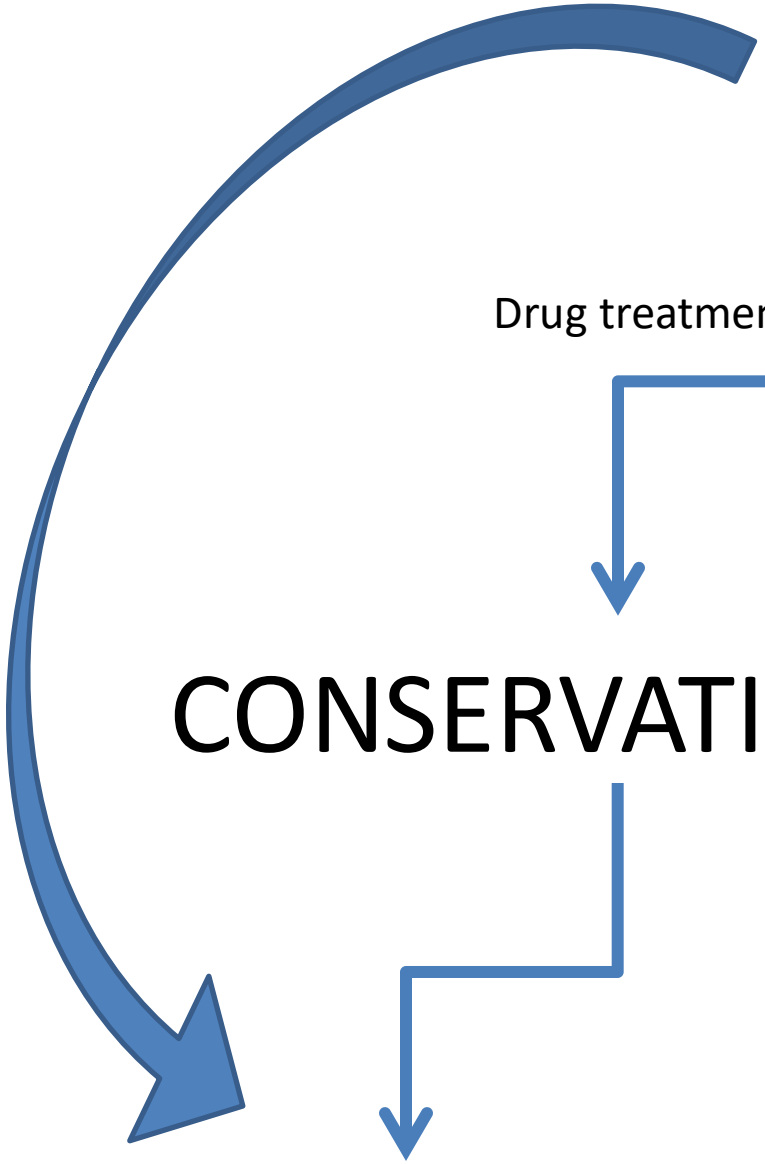


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Triple suture TSIRULINKOV (uterine devascularization)



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DRUGS

Drug treatment fails to in fewer than 1%

Prendiville *et al*., 2000

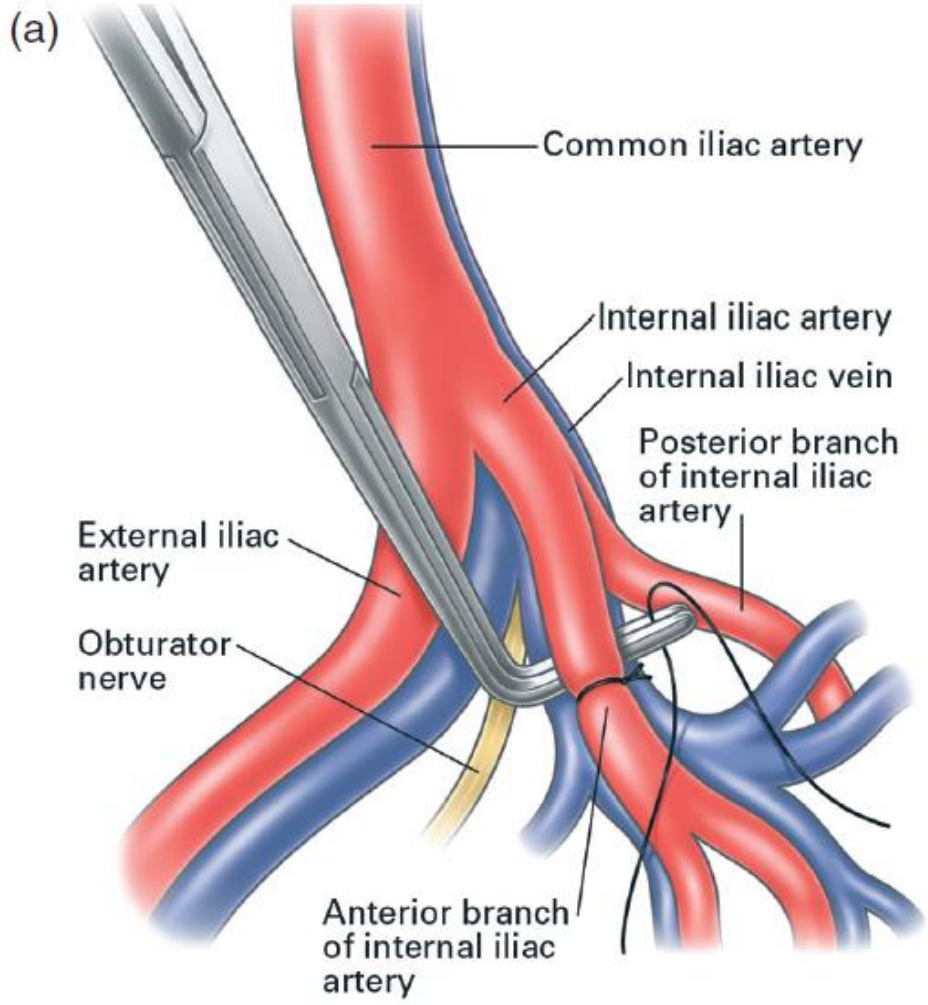
CONSERVATIVE SURGERY

The incidence of emergency postpartum hysterectomy, the final option when all conservative treatments fail, is 1–3 per 1000 deliveries (Engelsen *et al*., 2001; Francois *et al*., 2005; Wingprawat *et al*., 2005).

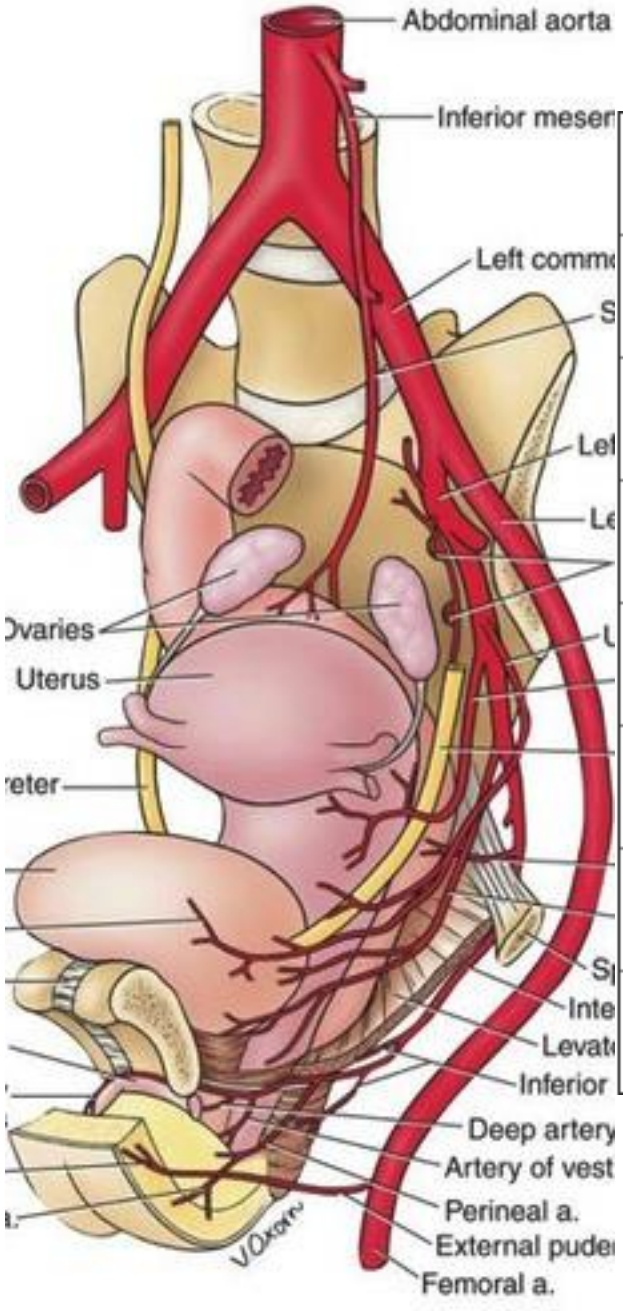
EMERGENCY HYSTERECTOMY

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BIAL, Where? Needed?

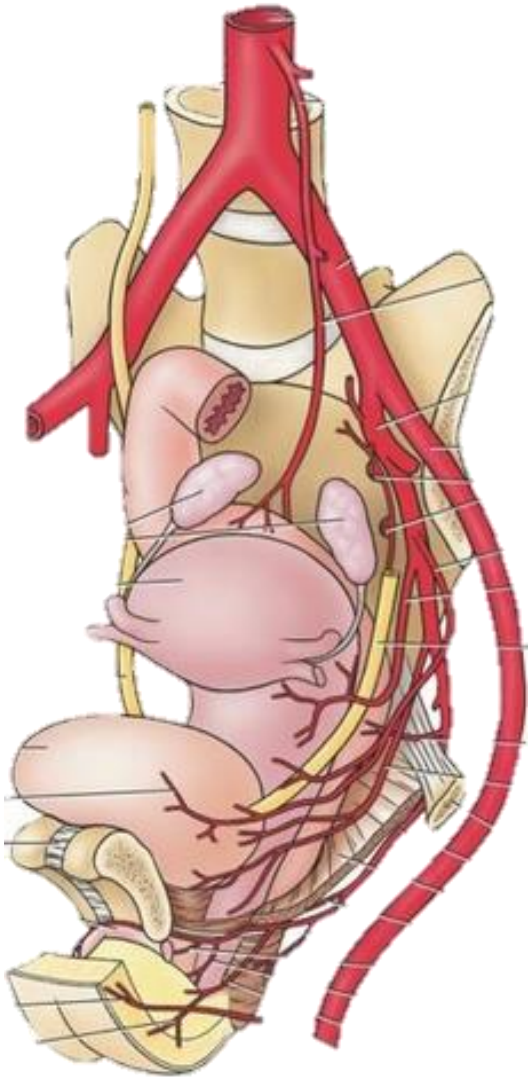


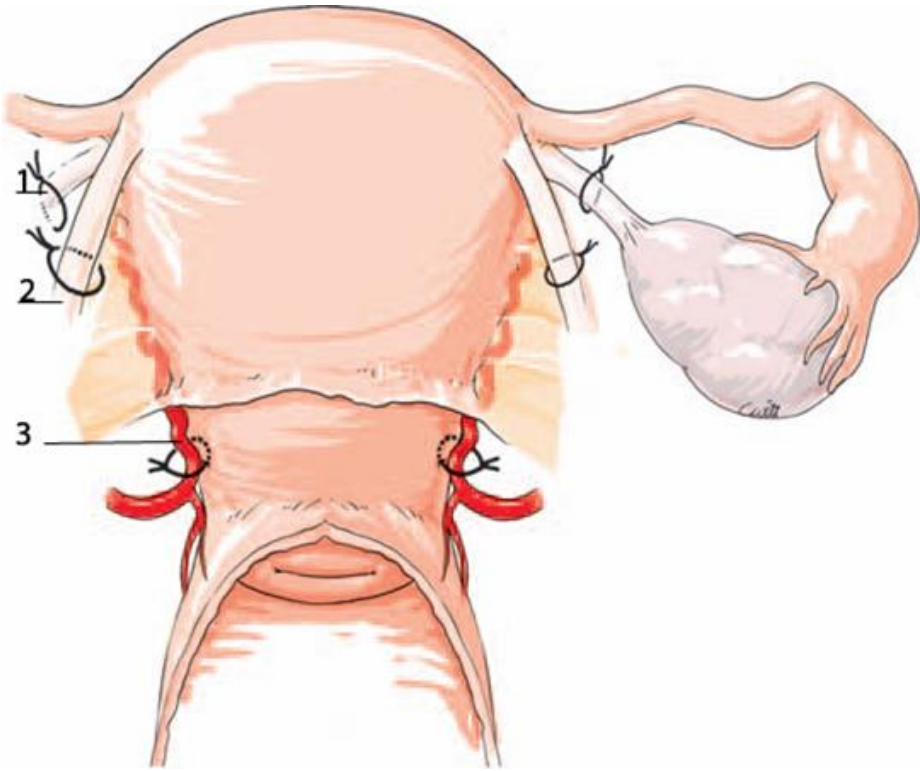
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Posterior Division	Anterior Division	
Parietal	Parietal	Visceral
Iliolumbar a.	Obturator a.	Umbilical a. (fetal)
		Superior vesical a.
Lateral sacral a.	Internal pudendal a.	Inferior vesical a.
		Middle hemorrhoidal a.
Superior gluteal a.	Inferior gluteal a.	Uterine a.
		Vaginal a.

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Summary :Uterine Rupture

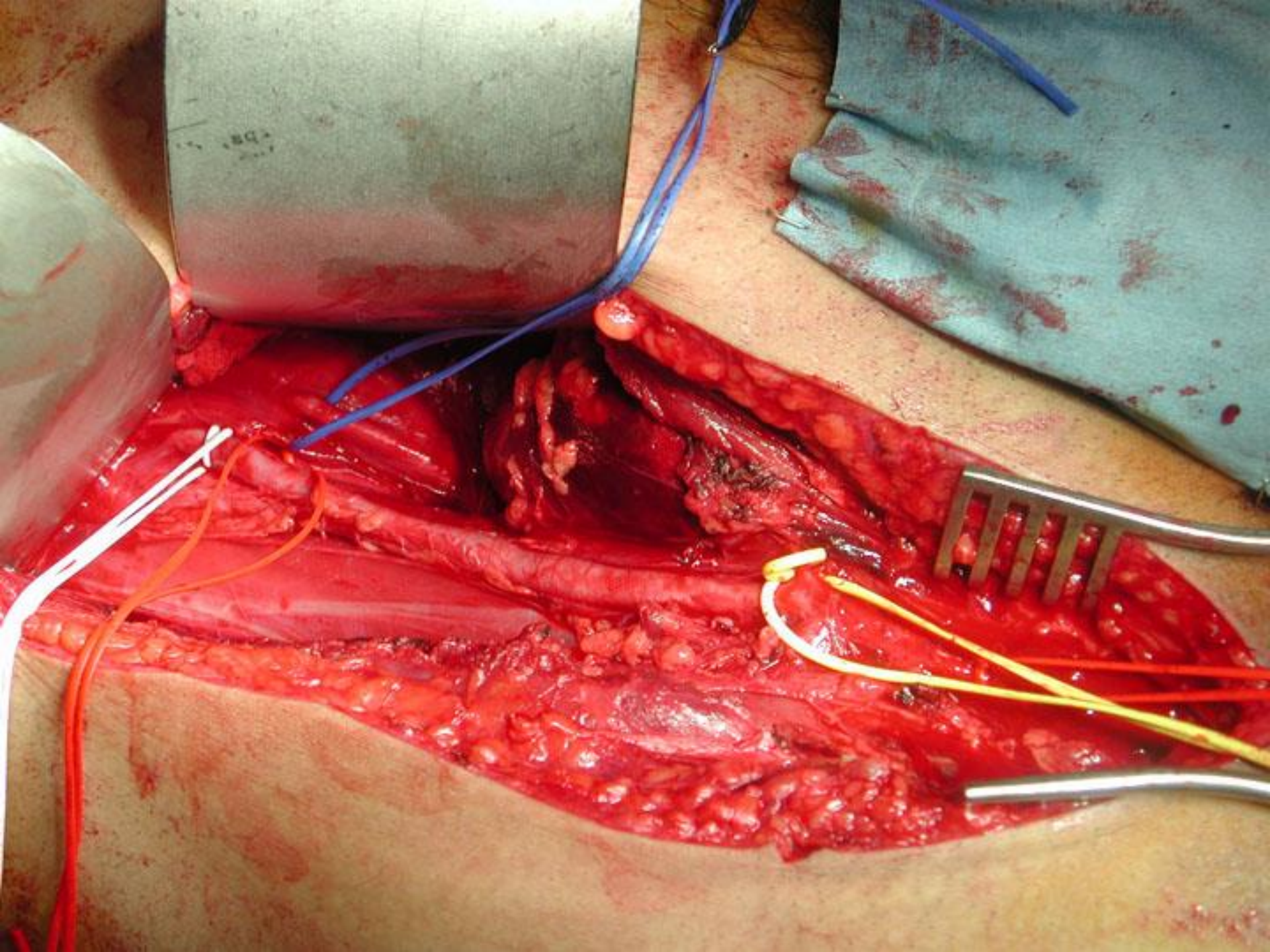
REPAIR:

- The Preferred option
- Ideally associate with tubal ligation
- Advise contraception otherwise
- Very high risk of rupture/abnormal adhesions for next pregnancy

Hysterectomy

- Total/subtotal
- Without ovaires

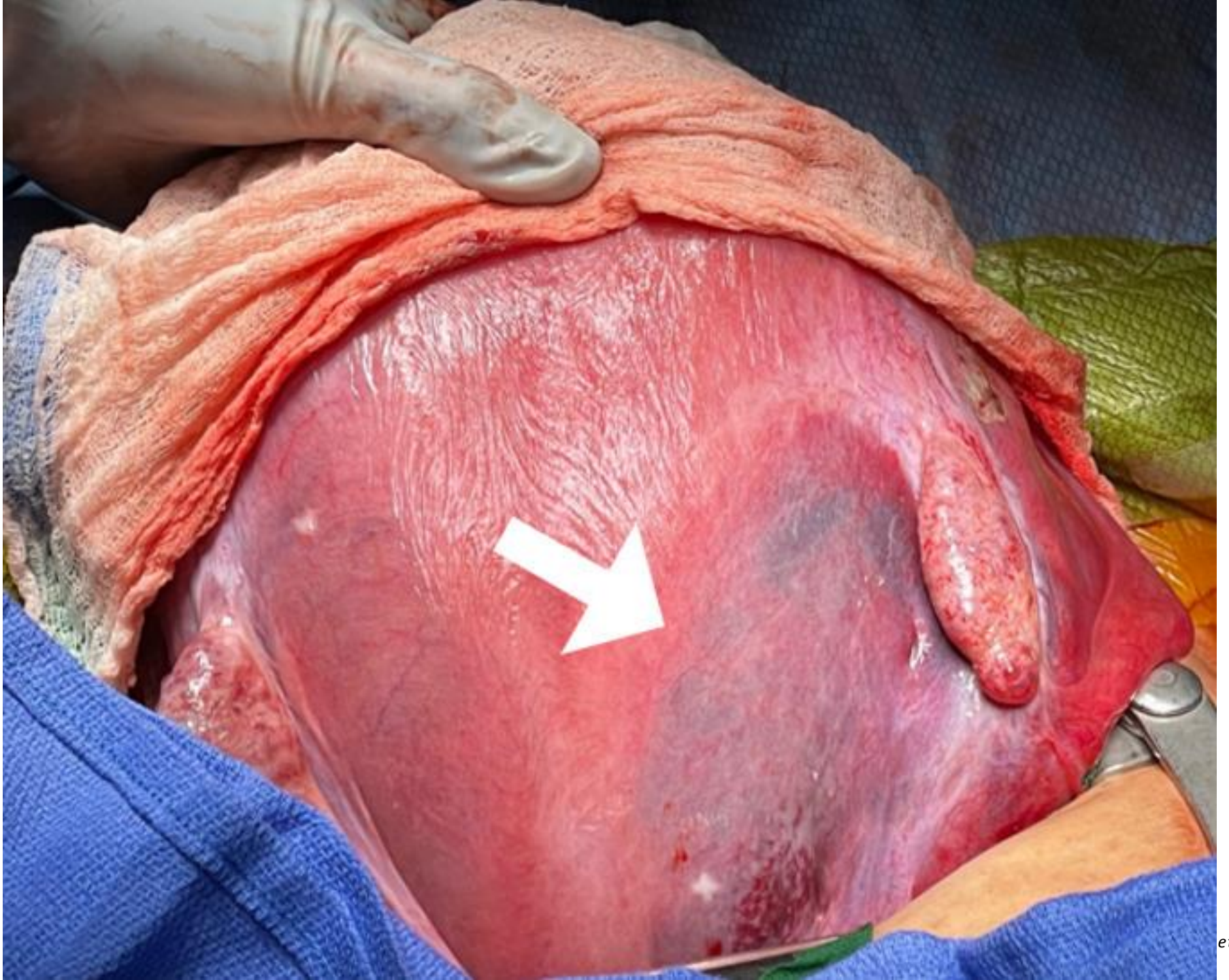




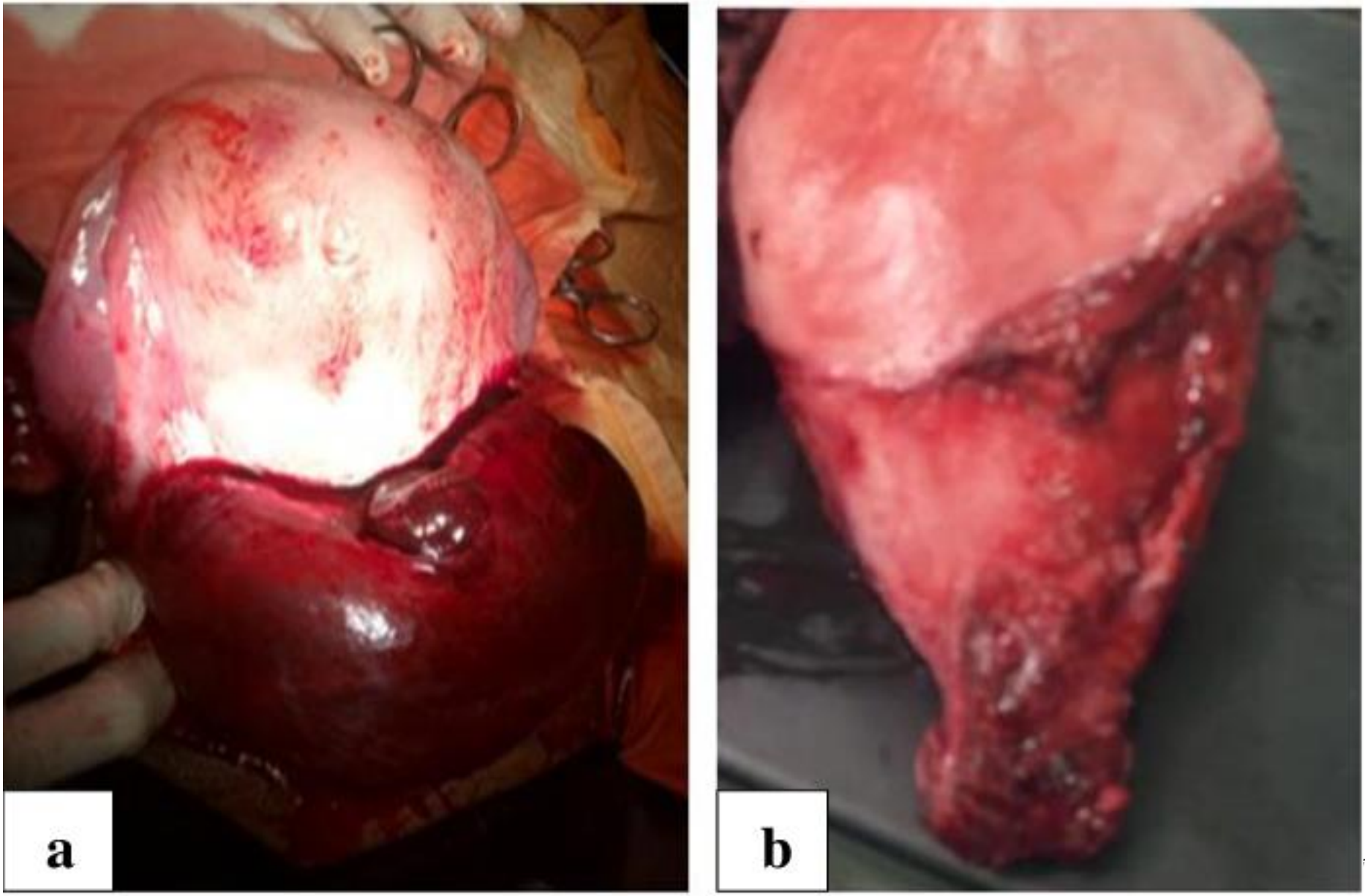
Case 1

- 20 primigravida
- Term delivered at home after many hours complete placenta. Dead baby
- HR:130
- BP:80/60
- Currently bleeding uterus big, not atonic

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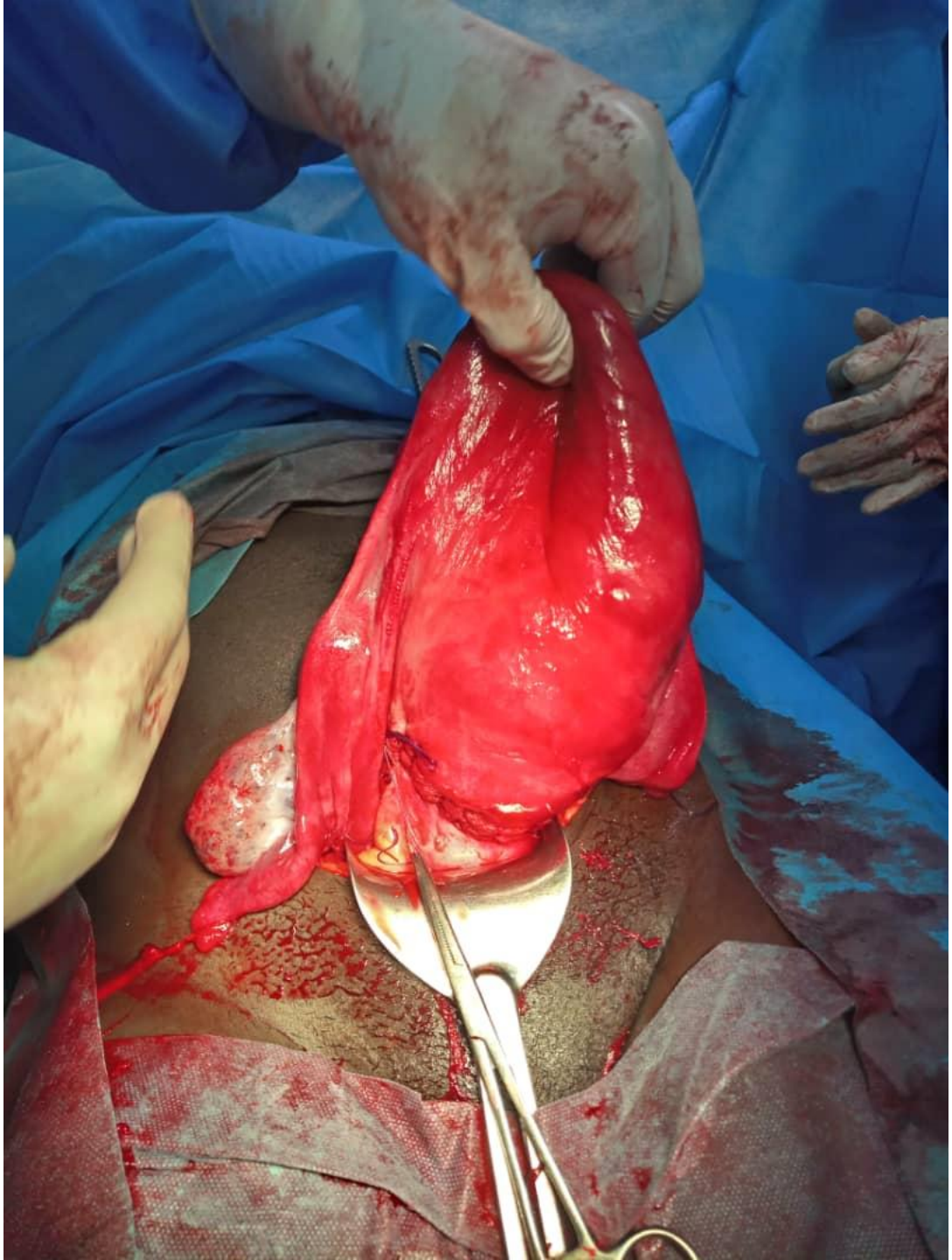
etti


a
b

Case 1

- 40 G12 P10 A 2
- Term delivered at hospital due to transverse pres. after many hours complete placenta. Baby ok, big
- HR:130
- BP:80/60
- Currently bleeding uterus big, floppy

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As per protocol

- Drugs given
- Baloon not available
- more hypotension: HR 140 SBP 60

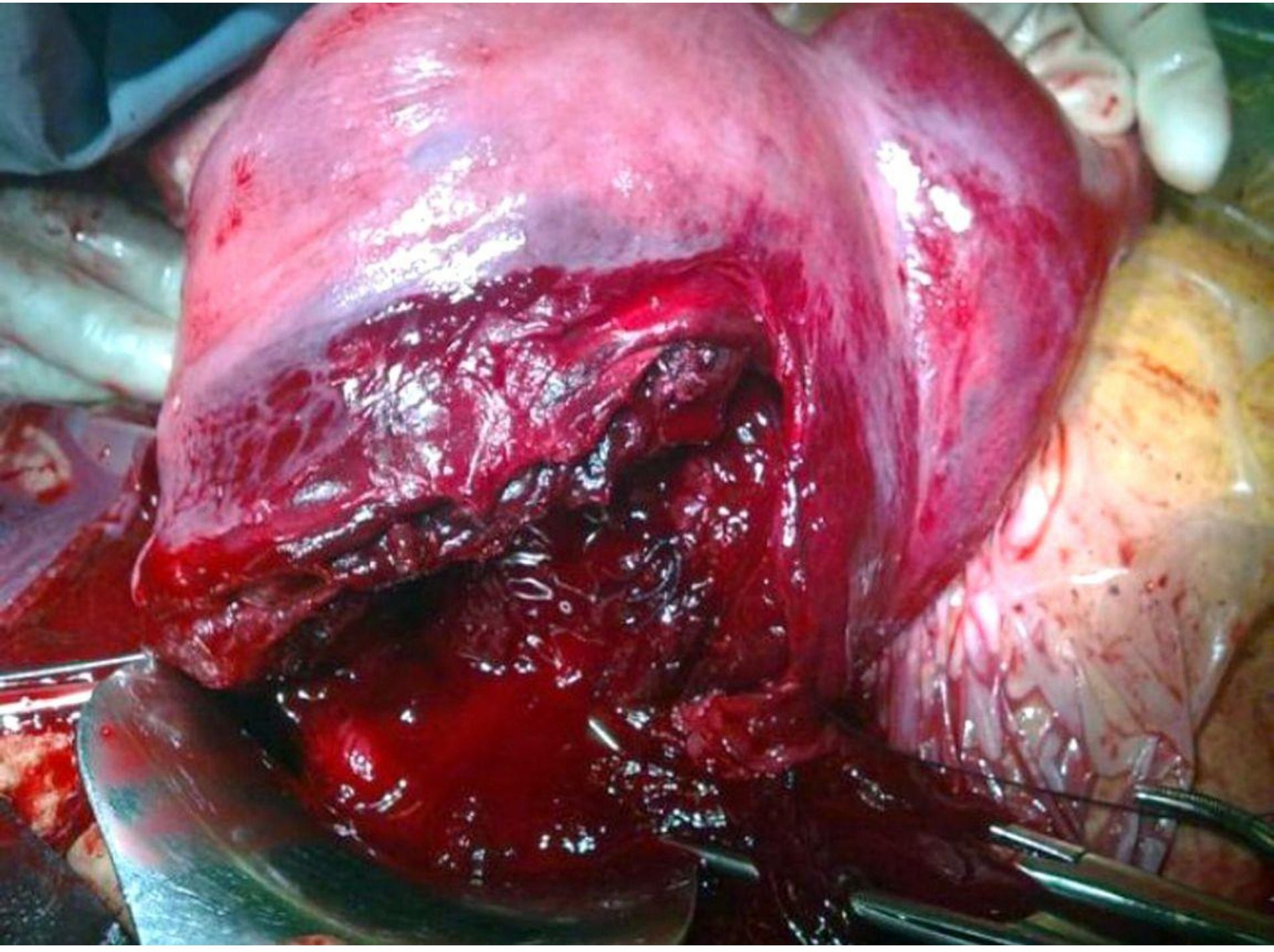
Case 3

- 25 G4 P 2 A 2
- Arrived unconscious. Term pregnancy as per ANC. Uternine height just above umbilicus

FAST: FF++++ dead foetus

- HR:130
- BP:80/60
- Currently not bleeding vaginally
- suspicion?

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TAKE HOME MESSAGE

- CALL FOR HELP
- DAMAGE CONTROL STRATEGY must be used in exanguinating PPH
- Stop the bleed and resuscitate
- 4 T
- In case of uterine rupture: laparotomy+ repair or Hysterectomy
- May be needed packing as an adjunct

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Post Partum Haemorrhage

Management for surgeons



Dr. Carlos Pilasi Menichetti MD MSc FACS
Consultant General and Trauma surgeon
Obstetrician &Gynecologist