Birth Canal Injuries

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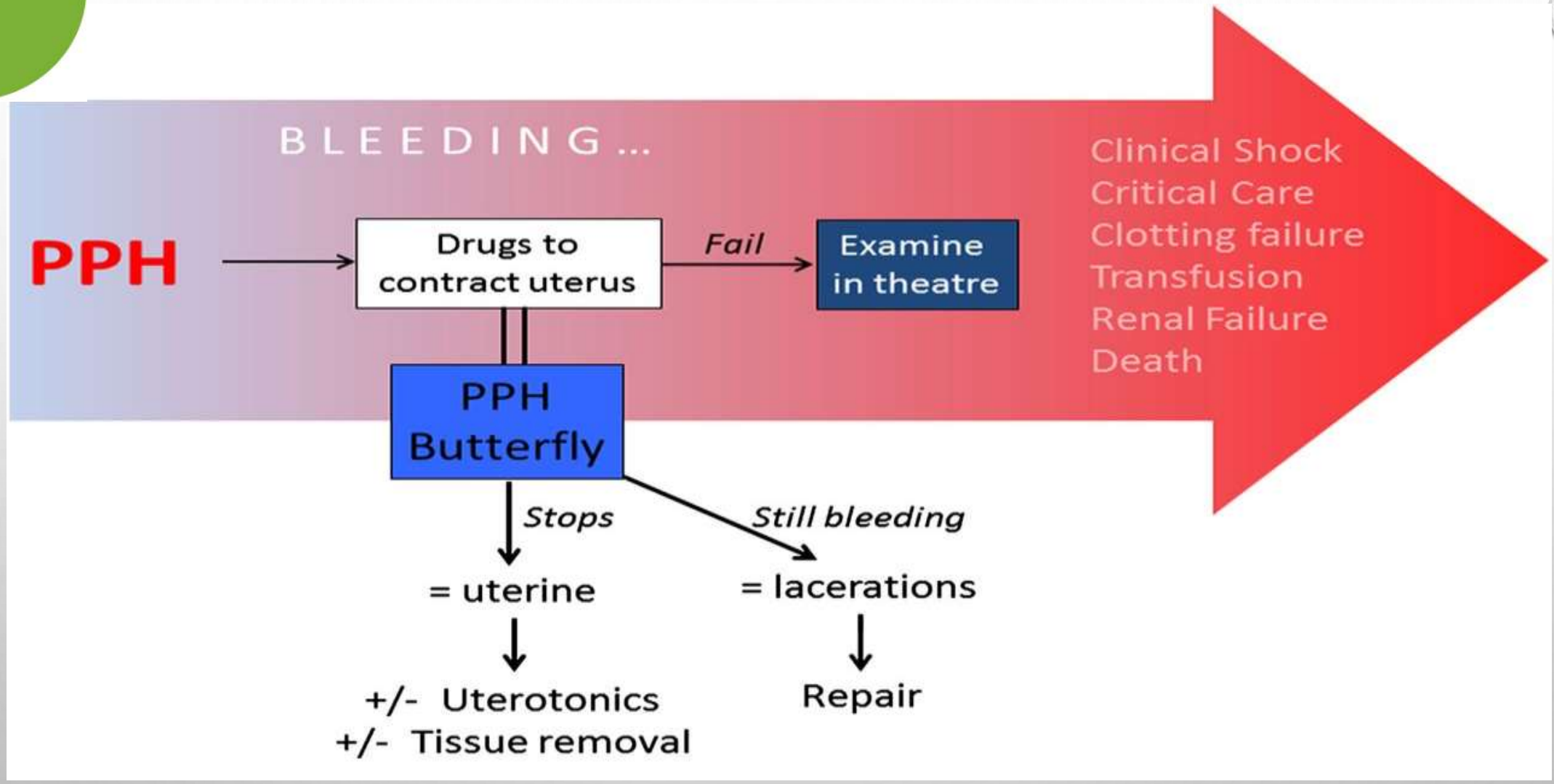
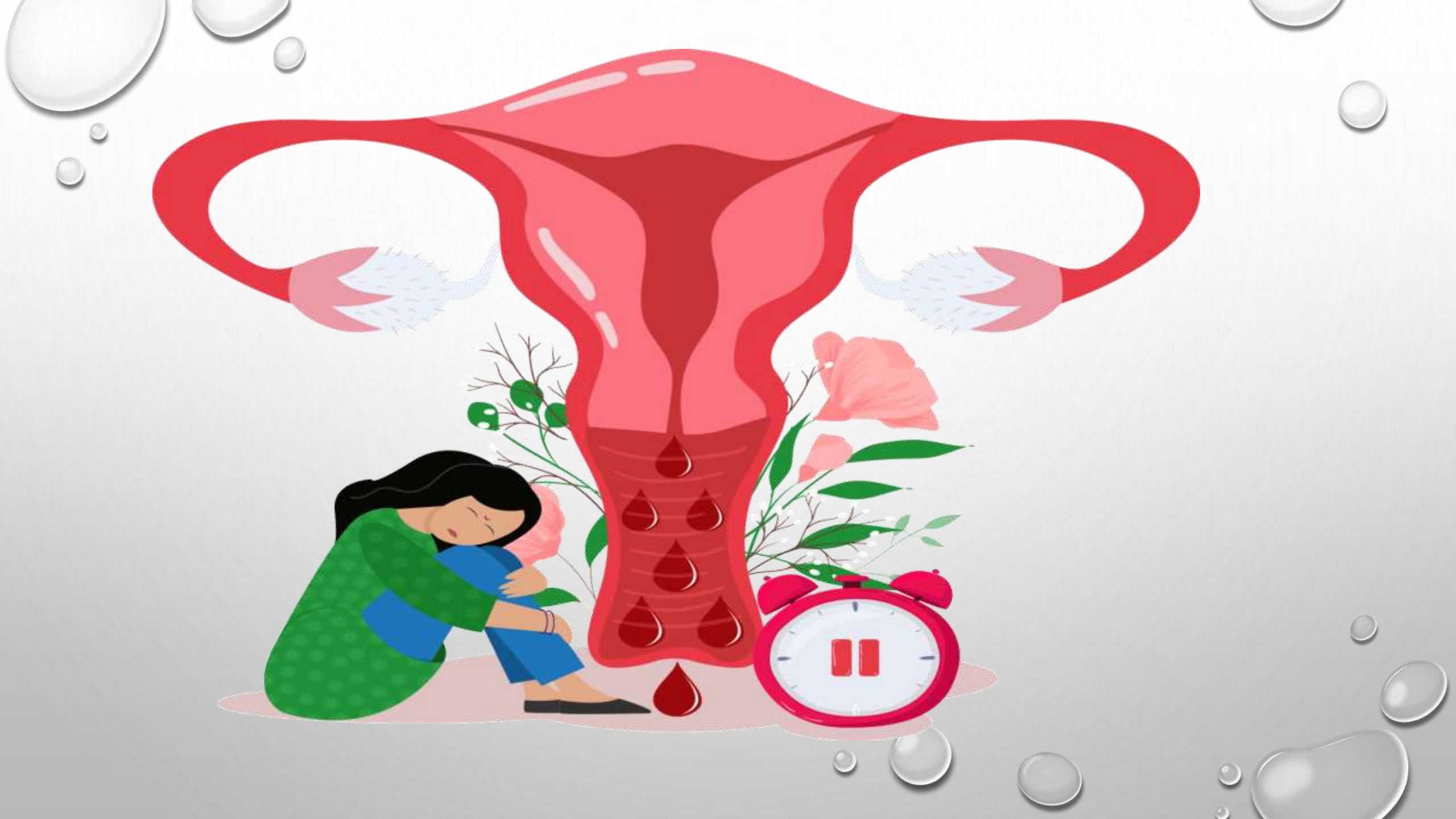

BLEEDING…
PPH
Drugs to contract uterus
Fail
Examine in theatre
PPH Butterfly
Stops
= uterine
+/- Uterotonics
+/- Tissue removal
Still bleeding
= lacerations
Repair
Clinical Shock
Critical Care
Clotting failure
Transfusion
Renal Failure
Death



Birth Canal - Definition

Genital tract through which delivery of the fetus occurs

Uterus

Cervix

Vagina

Vulva (& Perineum)

- The **pregnant uterus**, **vagina**, and **vulva** have **rich vascular supplies**

- Are at **risk of trauma** during the **birth process**, and trauma may result in formation of a **hematoma**.

- **Puerperal hematomas** occur in **1:300 to 1:1500** deliveries and,

- **Rarely**, are a potentially **life-threatening** complication of childbirth

- **Most** arise from bleeding lacerations related to **operative deliveries** or **episiotomy**;

- However, a **hematoma** may also result from **injury to a blood vessel** in the **absence of laceration/incision** of the surrounding tissue; eg, **pseudoaneurysm**, **traumatic arteriovenous fistula**).

- Women **at increased risk** of developing **puerperal hematomas** include:

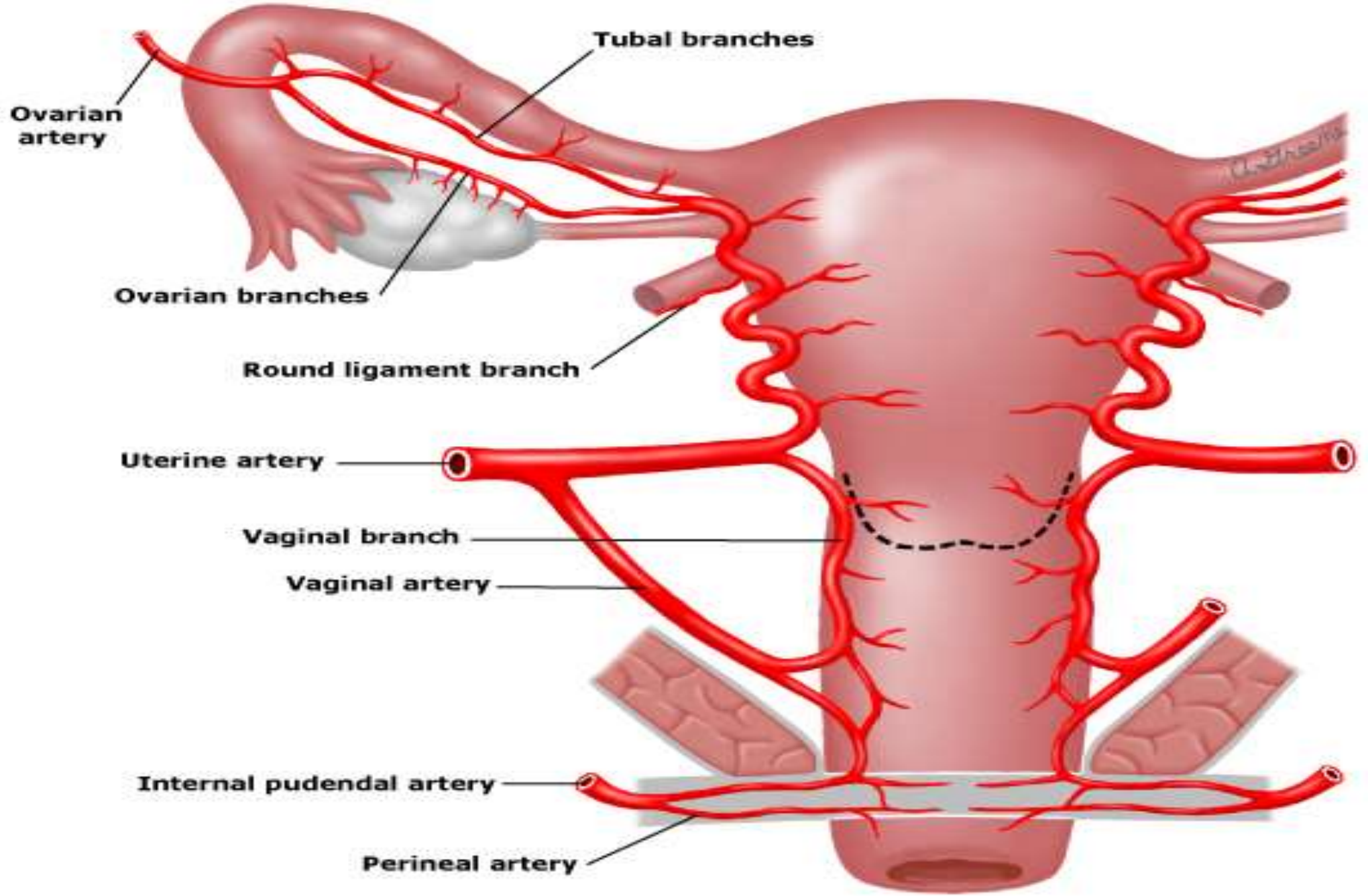
- **Nulliparous** or
- **Infant over 4000** grams,
- **Preeclampsia**,
- **Prolonged second stage of labor**,
- **Operative vaginal delivery**,
- **Multifetal pregnancy**,
- **Vulvar varicosities**, or
- **Clotting disorders**

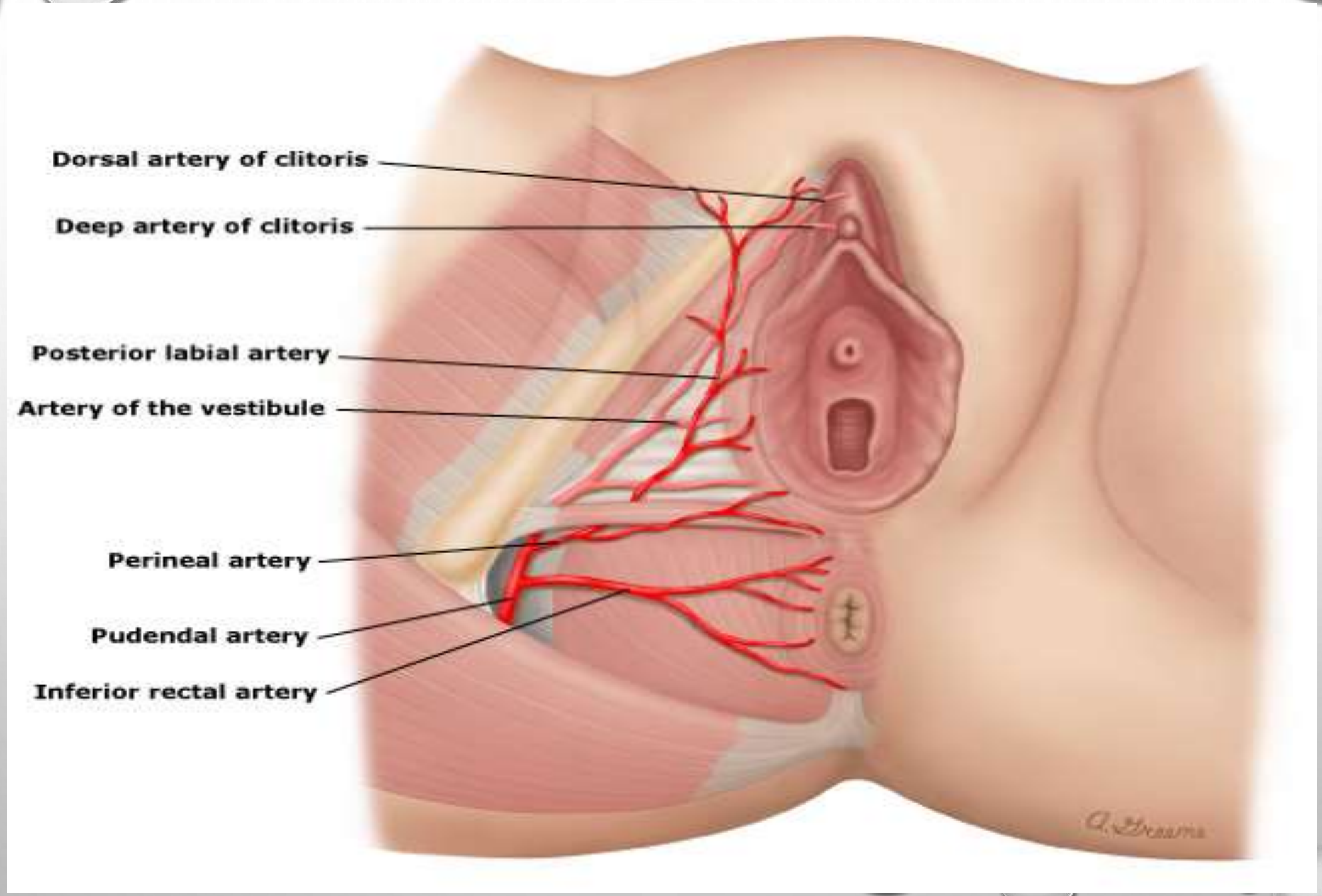
Common Locations

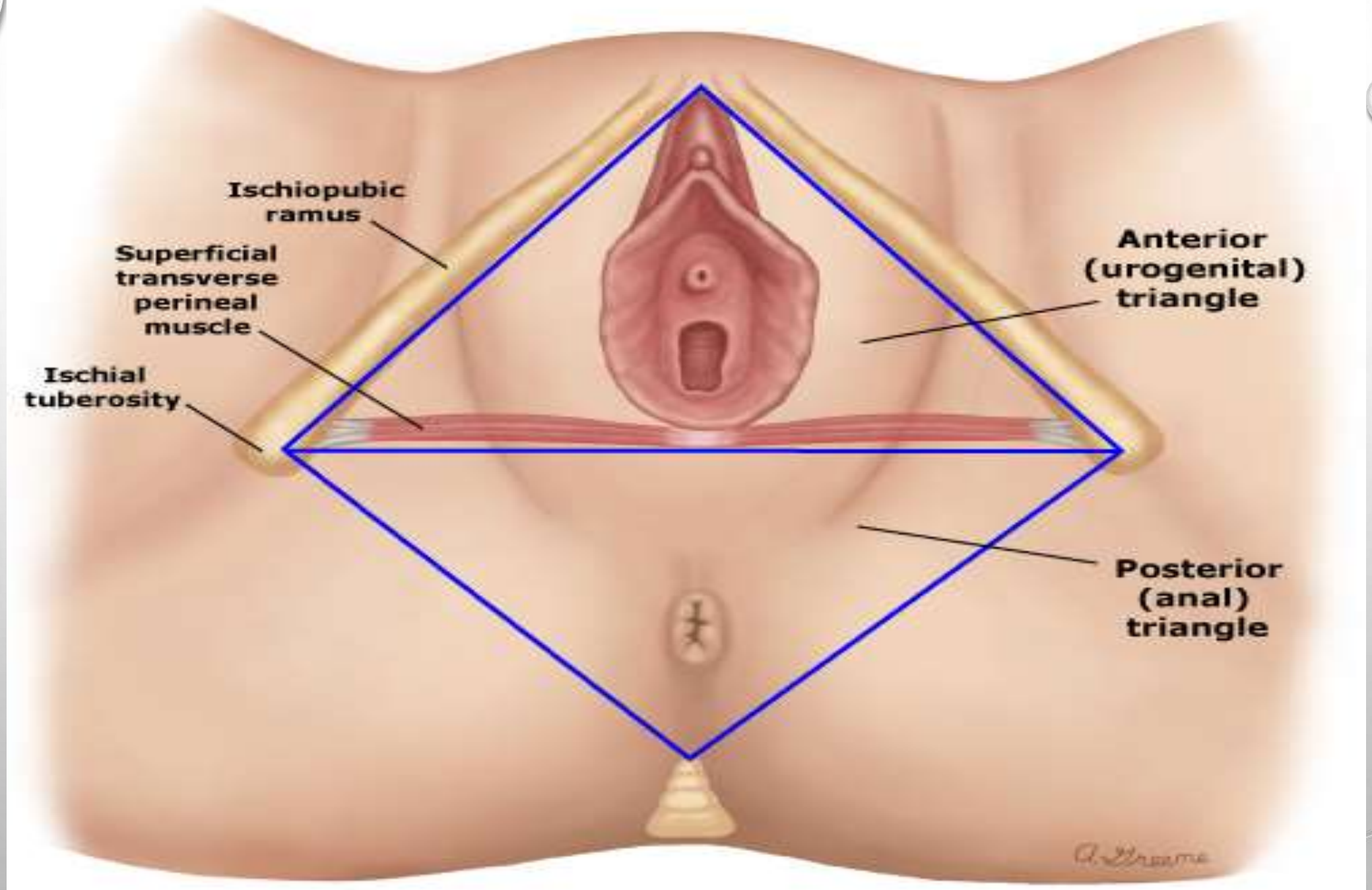
- The **most common locations** for puerperal hematomas are the

- **Vulva,**
- **Vaginal/paravaginal** area, and

- **Retroperitoneum**.
- **Bowel hematoma** (extremely rare)


Tubal branches
Ovarian artery
Ovarian branches
Round ligament branch
Uterine artery
Vaginal branch
Vaginal artery
Internal pudendal artery
Perineal artery


Dorsal artery of clitoris
Deep artery of clitoris
Posterior labial artery
Artery of the vestibule
Perineal artery
Pudendal artery
Inferior rectal artery


Ischiopubic ramus
Superficial transverse perineal muscle
Ischial tuberosity
Anterior (urogenital) triangle
Posterior (anal) triangle

Injuries of the Maternal Birth Canal

- ✓ One should suspect traumatic bleeding in women having **excessive bleeding after expulsion of placenta** and uterus is **well contracted**.

- ✓ In such cases the **perineum** and **lower genital tract** should be **explore** under good light.

- ✓ **Common birth canal injuries are:**

✓Perineal tear

✓Vaginal and cervical tear

Lacerations

- ✓**Periurethral** Lacerations
- ✓ **Periclitoral** Lacerations
- ✓ **Vaginal** Lacerations
- ✓ **Cervical** Lacerations/ Cervical Tear

Priurethral / Periclitoral Lacerations

- ✓ Occurs due to **pressure from delivering head** to the anterior perineum by the **intact posterior perineum**.
- ✓ If **light bleeding: pressure with a pad for 1-2 minutes** arrest the bleeding
- ✓ If **significant bleeding:** repair to be done using fine continuous sutures.
- ✓ If stitches are taken **urethral catheter** be placed.

Perineal Tear

- ✓ Gross **perineal tear** is usually due to **mismanaged 2nd stage of labour**.
- ✓ **1st degree** perineal tear: It involves the vaginal **mucosa** and **subcutaneus** tissue and forchette.
- ✓ **2nd degree** perineal tear: It involves the **vaginal mucosa** , **subcutaneous** tissue (connective tissue) varying degree of **perineal body tear** but it is **not reaching** up to **external anal sphincter**.
- ✓ **1st & 2nd** perineal tears are termed as **incomplete perineal tear.**

- **3rd degree** perineal tear: post vaginal wall tear of whole of the perineum as well as **complete transection** of **anal sphincter .**

- **4th degree** perineal tear: involving the vaginal mucosa, perineum, anal sphincter, **anal** and **rectal mucosa**

- **3rd & 4th degree** perineal tear are **complete perineal tear.**

Treatment of the Perineal Tears

- ✓ **Prevention:**
- ✓ **Proper conduction of 2nd stage** of labour is preventive:

- ✓ **Early extension** of head during delivery to be **avoided**
- ✓ **Slow delivery** of fetal **head** in **between contraction**

- ✓ To perform **timely episiotomy** when **indicated**
- ✓ To **take care of perineum** during delivery of **shoulder**.

Repair of Perineal Tears

- **Recent perineal tear** should be **repaired immediately** following **delivery** of **placenta**.
- In case of **delay more than 24 hrs. immediate repair** to be **withheld.**
- Care of in **2nd degree** it should done **after antibiotic coverage** and whenever **wound become clean**.
- In case of **complete perineal tear** when **delay is >24 hrs.** then repair to be done **after 3rd month of delivery**.

Repair of Recent Complete Perineal Tear i.e, Within 24 hrs.

- Patient is to be put in **lithotomy position**

- All **aseptic** precaution to be taken
- **Local anesthesia** or **preferable GA**.
- Suture material used is **1-0 vicryl** or **chromic cut gut**

- The **rectal mucosa** is sutured **1st** from above downward with **interrupted suture.**
- Then stitch the **rectal muscle** and **para-rectal fascia** by **interrupted suture.**

Repair of Recent Complete Perineal Tear i.e, Within 24 hrs.

- Now explore the **torn end** of **anal sphincter** with the help of **allies forceps**
- **Torn end of sphincter** are sutured in **midline** by **figure of eight stitch.**
- It is **supported by another layer of interrupted suture.**
- Stitch the **vaginal mucosa**, **perineal muscles** and **skin** by **interrupted suture.**

Cervical Tear

- **Minor degree** of cervical tear is during **1st delivery** is common.
- It is **commonest cause of traumatic PPH**
- **Left lateral cervical** tear is **more common**

Cause of Cervical Tear

✓ **Iatrogenic:**

I. In case of **operative vaginal delivery**
II. Or **breech extraction** through **incomplete dilatation** of **cervix**

III. Rigid cervix following **previous cervical operation**

✓ **Precipitate labor**

Diagnosis

- **Cervical** tear or **vaginal** tear should be **suspected** when PPH is there **in-spite of well contracted uterus**.

- **Explore** the **cervix** and **vagina** for tear under **good light.**
- **Exploration of cervix; With all aseptic precaution**

- **Evacuation** of **bladder**
- **Place** the **patient** in **lithotomy position**
- **Insert speculum** and **retract** the **posterior vaginal wall**

How To Explore Cont…..

- Ask the **assistant** to **push down the fundus** of uterus gently.
- Hold the **anterior lip of cervix** with **sponge** holder and trace whole of the cervix with another sponge holder forceps in clock wise manner and **identify the cervical tear**
- Now **grasped** the **both margin** of the tear of cervix by the **sponge holder**.

How To Explore Cont….

- ✓ **Stitch** the cervical tear by **interrupted mattress** suture by taking the **whole thickness of cervix**, suture material is **1-0 chromic catgut** with **round body needle.**

- ✓ The **repair** should be started **1 cm above** the **apex** of the **tear**.

How To Explore Cont…..

- **Mattress** suture prevents rolling of the edges.

- If the cervical tear is **extending** to the **lower segment** or **vault** with **broad ligament hematoma** needs **laparotomy.**

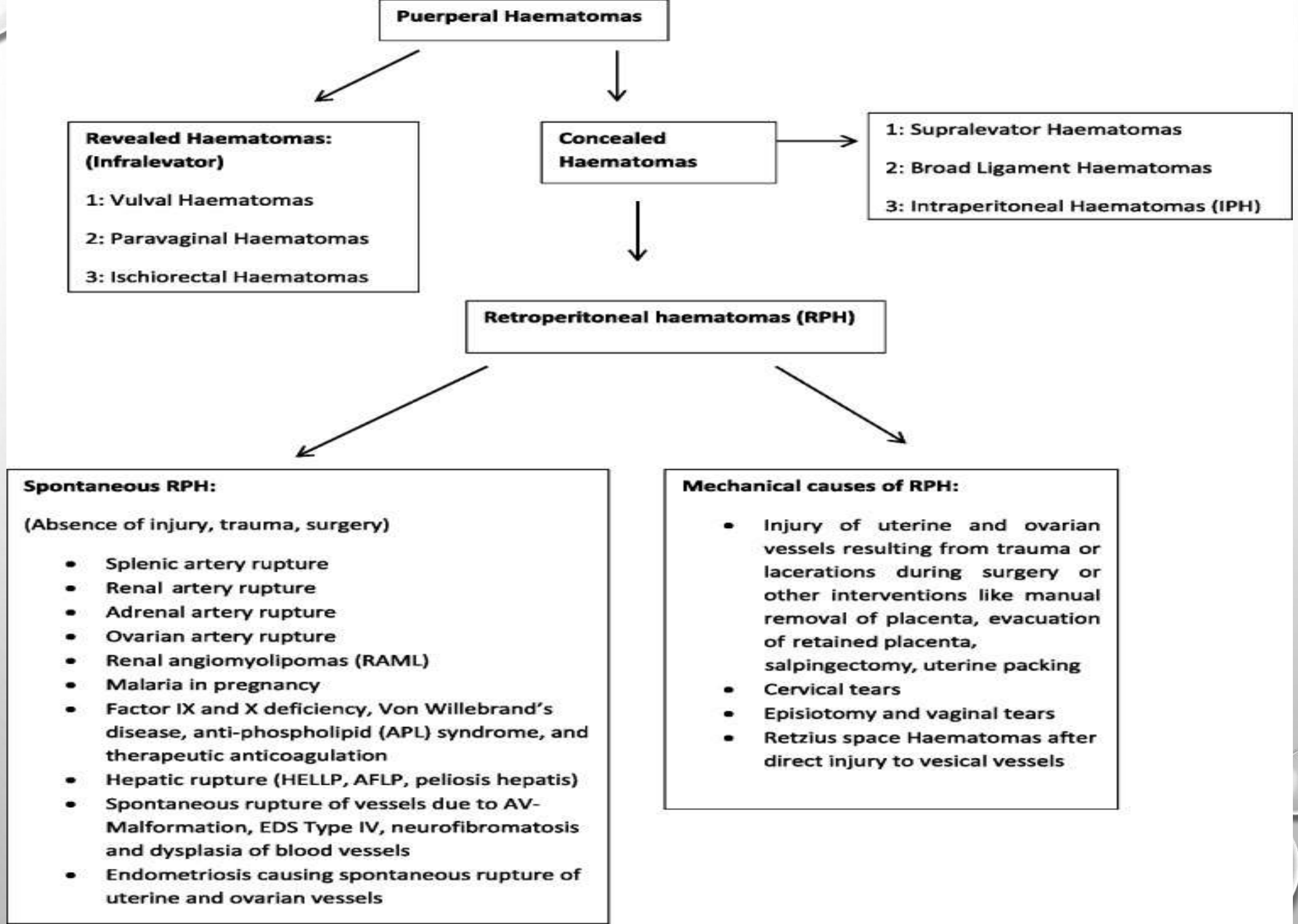
Vaginal Tear

- After the **proper exposure** hemostatic suture and **vaginal tear suturing** to be done if multiple laceration,
- Then **pack the vagina for 24 hrs.**
- After **removing** the packing see for bleeding

Hematomas

- ✓ Vulval hematoma
- ✓ Paravaginal haematoma
- ✓ Broad ligament and retroperitoneal haematoma

Classification of puerperal and retroperitoneal hematomas in obstetrics.



Vulvar hematomas

- **Most result** from **injuries** to branches of the **pudendal artery**

(inferior rectal, perineal, posterior labial, and urethral arteries; the artery of the vestibule; and the deep and dorsal arteries of the clitoris)

- That **occur during episiotomy** or from **perineal lacerations** .

- These vessels are typically **located** in the **superficial fascia** of the **anterior (urogenital**) or **posterior pelvic triangle** .

Vulvar hematomas

- Extension of bleeding in the **anterior triangle** is limited by **colles' fascia** and the **urogenital diaphragm**,

- **Extension of bleeding** in the **posterior triangle** is limited by **the anal fascia limits** .

- As a result, bleeding is **directed toward the skin** where the **loose subcutaneous tissues** afford **little resistance** to **hematoma formation**.

Vulvar hematomas

- **Superficial hematomas** can **extend** from the **posterior margin** of the **anterior triangle** (at the level of the transverse perineal muscle) **anteriorly over the mons** to the **fusion of fascia at the inguinal ligament**.

- **Necrosis** caused by **pressure** and **rupture** of the tissue surrounding the hematoma may lead to **external hemorrhage.**

Vaginal/Paravaginal Area(Vaginal/paravaginal hematomas)

- Result from **injuries** to branches of the **uterine artery**, mainly the **descending branch** .

- Are **commonly associated** with
- **Forceps delivery**,
- But may also occur during **spontaneous** delivery.

- **In contrast to the vulva**, **vessels in the vagina** are surrounded by **soft tissue** and do **not lie** in the **superficial fascia**; therefore, **trauma to these vessels** can lead to a **large accumulation of blood** in the **paravaginal space** or **ischiorectal fossa.**

Vaginal/Paravaginal Area(Vaginal/paravaginal hematomas)

- **Most** vaginal/paravaginal hematomas also **extend** into the **upper portion** of the **vaginal canal**, and may **occlude its lumen**.

- **Extension** and **dissection** into the r**etroperitoneum** may **occur** and form a **palpable tumor above poupart's ligament**.

- **Dissection** may also **extend cephalad**, potentially **reaching** the **lower margin** of the **diaphragm.**

Retroperitoneal Hematomas

- A **rare** complication of childbirth.
- Caused by **injury** to **branches** of the **hypogastric** (ie, internal iliac) artery.

- The **most common** childbirth-related causes are
- (1) **Laceration** of a **uterine artery** during **hysterotomy** or from **uterine rupture** and
- (2) **Extension** of a **paravaginal hematoma**.

Retroperitoneal Hematomas

- Other causes include:
- **Trauma**,
- **Anticoagulation**,
- **Ruptured ectopic pregnancy**, and
- **Rupture** of an **aneurysm** in the abdominopelvic vasculature.

- The resulting **hemorrhage** can be quite **severe** and lead to **immediate hemodynamic instability.**

Clinical Manifestations and Diagnosis

- **Symptoms** usually develop in the **first 24 hours after delivery**.
- Vary **depending** upon the **location** of the **hematoma**.

- Although **small hematomas** may be **asymptomatic**,
- **Most hematomas** are associated with **pain** and **mass effects**.

- A **large mass** may **displace** the **vagina** or **rectum** or **both**
- **Hemodynamic instability** may result from **continued significant bleeding**.

Clinical Manifestations and Diagnosis

- **Vulvar** hematomas usually present with **rapid development** of a **severely painful**, **tense**, **compressible mass** covered by **skin** with **purplish discoloration**.
- A **vulvar hematoma** may be an **extension** of a **vaginal hematoma** .

- **Vaginal** hematomas **often** present with **rectal pressure**; however, **hemodynamic instability** due to bleeding into the **ischiorectal fossa** and **paravaginal space** may be the **first indication** of a **vaginal hematoma**, and can result in **hypovolemic shock**.
- On **physical examination**, a **large mass** protruding into the **vagina** is usually obvious

Clinical Manifestations and Diagnosis

- **Retroperitoneal** hematomas extending between the folds of the **broad ligament** may be **asymptomatic initially**.

- Due to the **significant amount of blood** that can **accumulate in the retroperitoneal** space, these patients often present with **symptoms of hemodynamic instability**, including **tachycardia**, **hypotension**, or, in the **most severe cases**, **shock**.

- **Retroperitoneal** hematoma **usually do not** present with **pain unless** the **hematoma** is associated with **trauma**.

- **Palpation** of an **abdominal mass** or **fever** can also be signs of a retroperitoneal hematoma.

Clinical Manifestations and Diagnosis

- A **bowel hematoma** may be **diagnosed** on the basis of:

- **Diagnostic imaging** performed to evaluate a suspected obstetric hematoma
- Or **bowel symptoms** such as **nausea**, **vomiting**, **cramping**, **abdominal pain and/or obstipation**.

- **<u>Of Note</u>,**

- The patient may **require analgesia** in order to **allow a thorough examination**, as **vulvar** and **perineal trauma** can be associated with **pain** and discomfort **out of proportion** to the **size** of the **injury** due to the sensitivity of this area.

Diagnostic Imaging

- Diagnostic imaging of suspected **vulvar** or **vaginal** hematomas is **unlikely** to provide **clinically important information unobtainable** by a thorough **physical examination**, and is **rarely necessary**.

- **Diagnostic** imaging **may be useful** in the **following settings**:
- To evaluate the **expanding hematoma**.
- To identify **rare cases of arterial bleeding** in patients with a **rapidly expanding hematoma.**
- To **identify non-palpable hematomas** in puerperal women with **pain** or **pressure** suggestive of a hematoma, particularly **retroperitoneal hematomas .**

Diagnostic Imaging

- ✓**Puerperal hematomas** should be suspected in **all postpartum patients** who demonstrate **signs of acute blood loss** or **hypovolemia**, such as **unexplained tachycardia** or **decreased urine output**.

- ✓As with **all cases of hemorrhage** (both obstetric and non-obstetric), **imaging studies** should **not delay appropriate intervention** to **stabilize** the patient and **control bleeding** if the patient is **hemodynamically unstable**.

Diagnostic Imaging

- **Sonography for initial evaluation**, followed by
- **Computed tomography** if there is a **suspicion** for a **retroperitoneal hematoma** that **cannot** be **visualized** on **ultrasound**.
- **Intravenous contrast** at the time of **CT** can **aid** in **diagnosis** in these cases.
- **MRI** is **more time-consuming**, **expensive**, and **less readily available** than **ultrasound or CT**, but **not necessarily more useful**.

Initial Approach and Patient Preparation

- **Recognition** of a hematoma
- **Prompt stabilization**

- Thorough **physical examination** of the **abdomen**, **vulva**, **vagina**, and **rectum** (including **visual inspection** of the external genitalia, vagina, and cervix) to determine the **location** and **size** of the hematoma.

- **Hemodynamically stable** patients **almost always have venous bleeding**;
- **Arterial bleeds** invariably result in **hemodynamic instability.**

Initial Approach and Patient Preparation

- Hemodynamically **stable**, a **large-bore IV line** to administer **crystalloid**.
- Hemodynamically **unstable**, **two large-bore IV lines** and **volume resuscitation** with **crystalloid** and **blood products.**
- **Surgical intervention or Embolization**.

Initial Approach and Patient Preparation

- **CBC,**
- **Fibrinogen level,**
- **PT, PTT** (to determine **baseline levels** and whether a bleeding diathesis is present.

- Initial **hemoglobin** value does **not reflect** the amount of **acute blood loss**.
- **4 units of packed red blood cells** available for **transfusion.**

- **Consultation** with an **anesthesiologist** is important, as **repair** of large and expanding puerperal hematomas **almost always requires regional or general anesthesia to control pain** from retraction to expose the **surgical field** and from **extensive suturing**.

Initial Approach and Patient Preparation

- **Incision of a vulvar hematoma:**
- Can be attempted using **local anesthesia alone** (subcutaneous infiltration with 1% lidocaine);
- However, the **surgical team** should be **prepared** for **more aggressive anesthesia** if **heavy bleeding** is encountered or **deep suturing** becomes **necessary**.

- The use of **pudendal block** is generally **not practical**,
- Given the **physical difficulty** of getting around the hematoma to **appropriately administer the block**.

Initial Approach and Patient Preparation

- An **obstetrician/gynecologist** with **expertise in the management** of patients with **expanding hematomas** should be **available**,
- As **first line therapy** is usually **surgical intervention** and **control** of bleeding **can be difficult**.

- **Consultation** with an **interventional radiologist** is **another option**, especially for **retroperitoneal hematomas** .

- Percutaneous trans-catheter **interventional procedures** (ie, **angiographic embolization**) have been used in the management of **vulvovaginal hematomas** and for **retroperitoneal** bleeding as a **first-line therapy**.

Initial Approach and Patient Preparation

- There are **no data** regarding the value of placing **all patients** with **hematomas** on **antibiotics**.
- We generally **administer antibiotics** (for surgical site prophylaxis) to patients undergoing **surgical intervention**.
- If **signs of infection** are present, treatment with **broad spectrum antibiotics** is **initiated** and **continued until resolution** of the **infection**.
- Generally, **endocarditis prophylaxis** is **not indicated** for **minor vaginal or vulvar procedures** in the **absence** of **clinical infection**.

Management

✓The **three primary approaches** for **managing** puerperal **hematomas** are

✓(1) **Conservative management** with **observation** and **supportive care**,

✓(2) **Surgical intervention**, and

✓(3) **Selective arterial embolization**.

✓The literature is **inconclusive regarding** the **benefits** of **conservative** treatment **versus surgical** intervention.

Management

- In general, patients who are **conservatively managed** should be **observed closely**.

- It is **essentia**l to **monitor** for **signs** of **hypovolemia**, suggestive of **persistent** and **severe hemorrhage**.

- Monitoring should be undertaken in an **acute care area**, such as an **obstetric unit recovery area** where vital signs (including **urinary output**) can be **monitored at least hourly.**

Management

- It is important to **keep in mind** the usual **hemodynamic change**s that occur in the **postpartum period**.
- Patients can **experience significant blood loss without changes in blood pressure**.
- Therefore, signs of **decreased end-organ perfusion** (such as **lethargy** and **decreased urinary output**) should **prompt reexamination** of the patient.

Management

- **Most patients** will require administration of **analgesia (including narcotics**) since hematomas can be quite **painful**.

- While the **effects of these medications** need to be taken into account when **assessing** overall status,

- **Changes in mental status** should **not automatically be attributed to these medications**, especially when other signs point toward **continued blood loss**.

Management

- ✓**Laboratory studies** may be needed **every 4 - 6 hours**,
- ✓**Imaging modalities**, such as **ultrasound**, are performed **serially, as needed**,
- ✓**Advantage** of **ultrasound over CT** is that ultrasound allows **rapid bedside** evaluation and makes **serial imaging** examination more **feasible**.
- ✓**Surgery** should be performed in an **operating room** to optimize **positioning**, visualization, and access to other **resources.**

Management

- **First line therapy** is usually **surgical** intervention
- **Control** of **bleeding** can be **difficult.**

- **Consultation** with an **interventional radiologist** is another option, especially for **retroperitoneal hematomas**.

- **Angiographic embolization** have been used in the management of **vulvovaginal hematomas** and for **retroperitoneal bleeding** as a **first-line therapy.**

Vulvar Hematomas

- **Small**, **nonexpanding hematomas** will **often resolve** with **conservative management** (**analgesia** + **cold packs**; **Ice packs** for the **first 24 hours**)

- Are **best left undisturbed** to **avoid:**
- **Introducing bacteria**
- And undertaking a **potentially difficult** and **unnecessary** surgical procedure.

- The **rationale** for **conservative** management is that soft tissue **swelling** and **space limitations** will result in **tamponade of bleeding vessels**.

Vulvar Hematomas

- **Patients** may be **uncomfortable** with such **swelling**, but they should be **reassured** the body will **naturally reabsorb the blood** and **edema over time**.

- Some hematomas may **rupture spontaneously.**

Vulvar Hematomas

- **Ice packs** for the **first 24 hours** help to **minimize** swelling,
- And **narcotic or nonnarcotic analgesia** to manage **pain**.

- **Large vulvar hematomas** often **interfere with urination**
- So a **Foley catheter** should be placed upon initial evaluation.
- **Placement after obstruction** has occurred may **not be possible without sedation** or **anesthesia.**

- These patients should be **monitored closely**, otherwise bleeding that **tracks posteriorly**, **vaginally**, or into the **retro-peritoneum** may **not be recognized promptly.**

Vulvar Hematomas

- There are **no proven criteria** that can be **used to select** vulva hematomas likely to have a **better outcome** with **surgical intervention** rather than **supportive care** .

- One group **suggested surgical intervention** when:
- The patient had **significant pain**
- Or **expansion** of the **hematoma**,
- Or if the **hematoma was >5 cm** or had **estimated volume >200 mL.**

- **Another group** advised surgical intervention if the **product** of the **longitudinal** dimension and **transverse** dimension **is ≥15 cm2** .

Vulvar Hematomas

- There is a **general consensus** that **prompt surgical intervention** is **necessary** if:

- There is **expansion** of the **hematoma** on **physical examination** or **imaging** studies
- Or a **falling hematocrit**,

- As **persistent hemorrhage** can lead to **hemodynamic instability** or **put the tissue at risk of necrosis.**

Vulvar Hematomas

- The **skin over** the hematoma is **incised** and the **clot evacuated**.
- A **suction/irrigation device** may be helpful in clearing the clot and debris.
- **Detectable bleeding points** should be **ligated** if identified; however, **in most cases**, the **lacerated vessel cannot be identified**.
- Bleeding leading to a vulvar hematoma is **often venous** and **from multiple sites**.
- The **specific vessels** may be **difficult to isolate** to control the bleeding surgically.
- **Re-approximate** the space created by the hematoma using **interrupted or figure-of-eight stitches** of a fine, **rapidly absorbable**, synthetic suture such as **monocryl** or polyglactin.

Vulvar Hematomas

- It is important to **avoid putting extra foreign material** into the wound, as this **increases** the risk of **infection**.
- **Pressure** is maintained by placing a **sandbag** or a **one liter bag of intravenous fluid** over the area for **12 hours**.
- These maneuvers usually **prevent recurrence of the hematoma**, even though a **causative vessel was not identified** and ligated.
- We do not pack or drain the hematoma cavity **(UP to DATE 2023).**
- **Suturing** near the **clitoris** or on the **labia** may result **in more postoperative discomfort** than if the area of the **evacuated hematoma** is **left to heal** by secondary intention;
- Therefore, **these areas** are **sutured only if there is persistent bleeding or the defect is large.**

Vaginal Hematomas

- The approach Is **similar** to that for **vulvar hematomas**.
- Vaginal hematomas **larger than approximately 4 cm** may need to be **evacuated**.

- **Good surgical exposure** is important, as these hematomas are **less accessible than vulvar hematomas.**

- **Evacuation** usually needs to be **done** under **general or regional anesthesia** in an **operating room** (rather than a labor or procedure room), where **good lighting**, appropriate surgical instruments, and a **surgical assistant should be available**.

Vaginal Hematomas

- The **proximity** of the **bladder anteriorly**, **small bowel and rectum posteriorly**, and the **ureters and uterine vessels deep** in the **lateral vaginal fornices** are **important to consider** when **closing the defect**.

- If **electrocautery** is used to achieve **hemostasis**, it is important to **avoid deep or** widespread **thermal injury** because of the **vagina's proximity** to the **bowel and bladder**, as well as **risk of infection** in the resulting **necrotic tissue**.

- Close the **vaginal epithelium** with a **running locked absorbable suture**.

- The **anchoring stitch** is placed **above the apex** of the laceration, and each **stitch extends** to the **base of the opening** to **avoid creating** pockets for **hematoma/seroma formation**.

Vaginal Hematomas

- **Vaginal packing** with **gauze** or a **balloon** (eg, Bakri, Sengstaken-Blakemore, balloon rectal tube) for **12 to 24 hours** may **aid in tamponade**.

- We do **not routinely** place **drains** in the **absence of infection**, although others may use a **closed system drainage** .

- A **Foley catheter is necessary** to drain the **bladder** in the presence of a vaginal pack or significant edema.

- The possibility of **retroperitoneal bleeding** from torn and **retracted vessels** should also be **considered** if the patient becomes **hemodynamically unstable**.

- Usually **diffuse oozing** is noted, **rather than bleeding from a single vessel**.

Postoperative Care

- **Perineal hygiene** with **sitz baths** and gentle **cleansing with saline** after vulvar surgery.
- Adequate **analgesia**.
- **Pelvic rest** (**no vaginal coitus** or **placement of tampons** or **vaginal medications**) **for 4-6 weeks**, depending upon the extent of the injury, to **avoid disruption** of **healing** tissues

- **Pressure necrosis** of the **swollen external genitalia** may be prevented by having the patient **rest primarily on her side or back**.

- At discharge, patients should be counseled **to call** their **provider promptly** if
- They develop **fever**, **new** or **worsening pain**, or **bleeding**.

Retroperitoneal Hematomas

- There are **no large or randomized trials** comparing **surgical versus angiographic** approaches to **management** of **retroperitoneal** hematomas.

- Because the **retroperitoneal space** is **large**, **many patients require either surgical or angiographic** intervention**.**

- **However**, since it is a **confined** space, **conservative management** may **suffice** because the **hematoma tamponades slowly bleeding vessels**.

Retroperitoneal Hematomas

- **Surgery**
- **Laparotomy** is required in virtually **all cases** of puerperal retroperitoneal bleeding.
- **Most** of these patients are **hemodynamically unstable** and **most cases** are associated with **uterine rupture** or **cesarean delivery**, **both require** laparotomy for repair of the uterus.
- Hemostasis can be achieved after **opening** the **retroperitoneal space** by **identifying** and **ligating** the lacerated **blood vessel or** by **ligating** the **hypogastric artery**.
- **Identification** of a **bleeding vessel** may be **difficult.**

Retroperitoneal Hematomas

- **Ligation** of the **ipsilateral hypogastric artery** usually **stops** the bleeding and **avoids** the **delay** associated with **searching** for the discrete **source of bleeding**.

- If bleeding does **not respond** to **ipsilateral hypogastric** artery **ligation**, then **bilateral hypogastric artery ligation** should be **performed**.

- Although **hypogastric** artery **ligation reduces pelvic blood** flow by approximately **one-half**, it has a **greater impact on pulse pressure distal to the ligation** (85 % reduction), **reducing** pulse pressures to that of the **venous circuit** which **promotes hemostasis** .

Consider Retroperitoneal Packing for Postpartum Hemorrhage [1]

- ✓ For **intractable bleeding**, this technique, borrowed from **pelvic trauma surgery**, allows you to **stabilize** the **patient** until her **underlying injury** can be addressed
- ✓ **Retroperitoneal packing** is a **technique used by trauma surgeons** to **tamponade** retroperitoneal hemorrhage related to **pelvic fracture**;
- ✓ It can also **be useful** to control **retroperitoneal bleeding** in **obstetric** patients.

1: OBG Management | July 2008 | Vol. 20 No. 7

Retroperitoneal Hematomas; Retroperitoneal Packing for Postpartum Hemorrhage

- Through a **midline incision** just **above the symphysis pubis**, the **fascia is divided** and the **space of retzius** accessed, **with care to avoid cystotomy**.
- **2 - 3 laparotomy sponges** are placed sequentially in the **retroperitoneal space**, beginning at the sacroiliac joint and staying deep to the pelvic brim.
- The **same procedure** is then performed on the **opposite side**.
- The **resulting tamponade** generally **leads to prompt cessation of blood loss.**
- The packs are **removed** or exchanged **24 to 48 hours later**, with care to avoid disruption of clot.

Extraperitoneal pelvic packing Acute pelvic treatment [1]

Packing versus angio-embolization

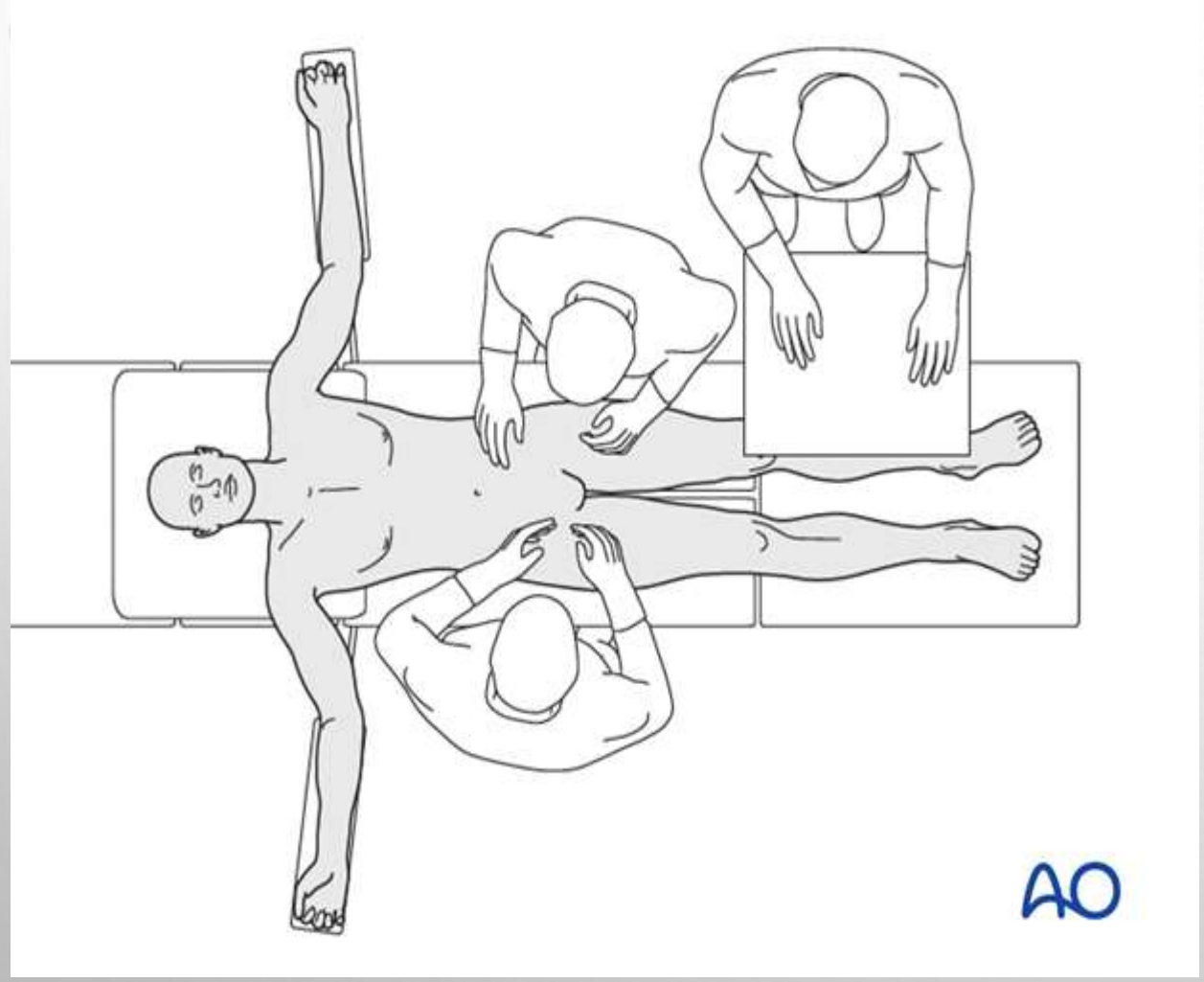
- ✓ In an **emergency situation** the **decision whether** to go for packing or angiography with embolization **depends** on **several factors**.

- ✓ The **condition** of the **patient**
- ✓ When the **patient is in extremis**, angiography takes **too long**
- ✓ **Availability** of direct angiography or an operating room
- ✓ Availability of **adequate personnel** to perform **angio-embolization**
- ✓ When a **laparotomy is mandatory**, extra-peritoneal packing could be part of the **same procedure**

- ✓ **Combining the two techniques** (extra-peritoneal pelvic packing and angio-embolization) is an **option.**

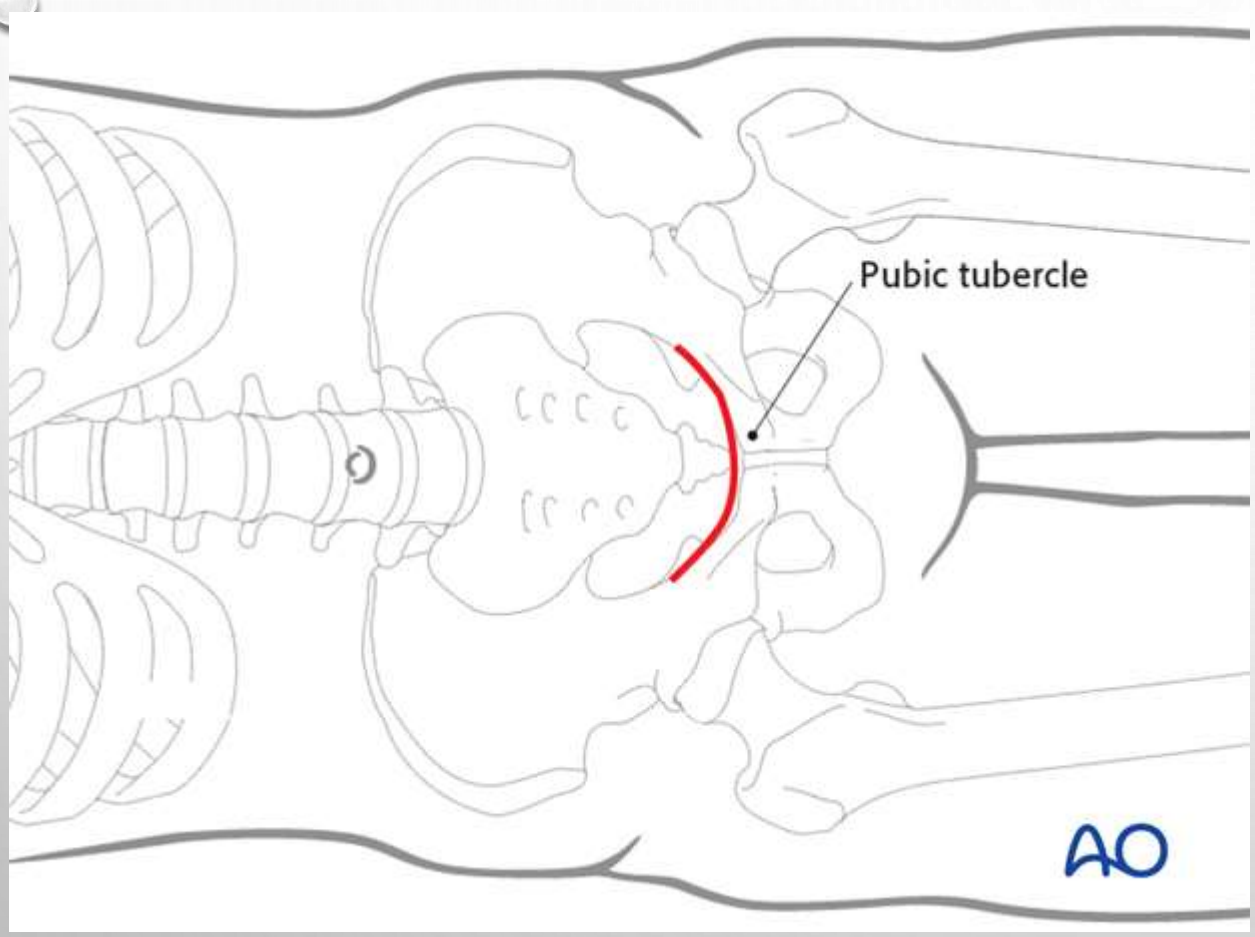
1: https://surgeryreference.aofoundation.org/orthopedic-trauma/adult-trauma/pelvic-ring/acute-pelvic-treatment/extraperitoneal-pelvic-packing

Patient positioning



- ✓ Place the patient in **supine position.**
- ✓ A urinary catheter should be inserted **prior to beginning the procedure.**

Skin incision

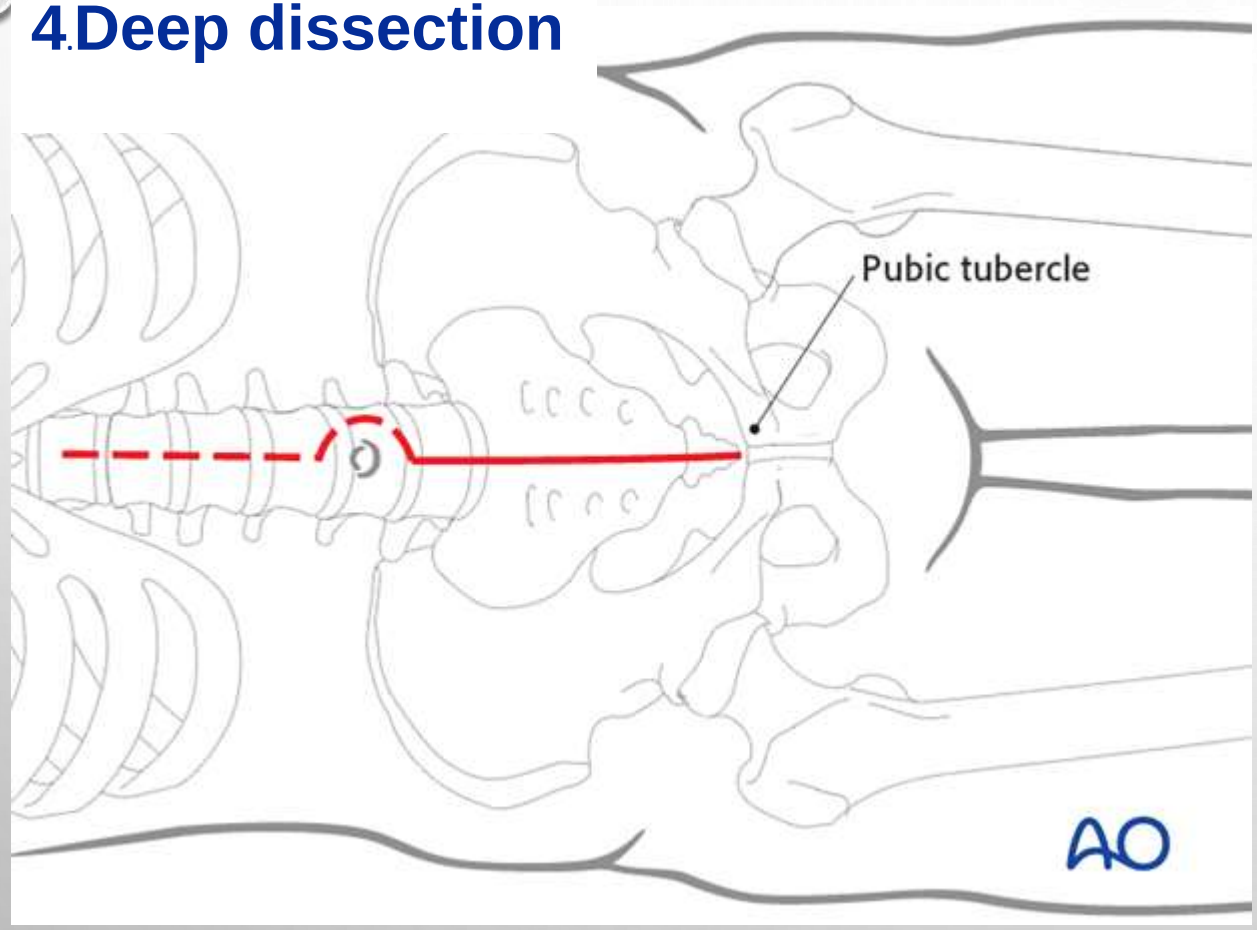


Horizontal incision (“Pfannenstiel”)

- ✓ A Pfannenstiel incision can be used when there is **no obvious bleeding** in the **abdomen.**
- ✓ Perform a horizontal incision about 2 fingerbreadths proximal to the pubic tubercle.
- ✓ The length of this incision is typically **5-10 cm.**
- ✓ It can be **extended** further laterally on **one or both sides** depending on the **needed exposure**.

Skin incision

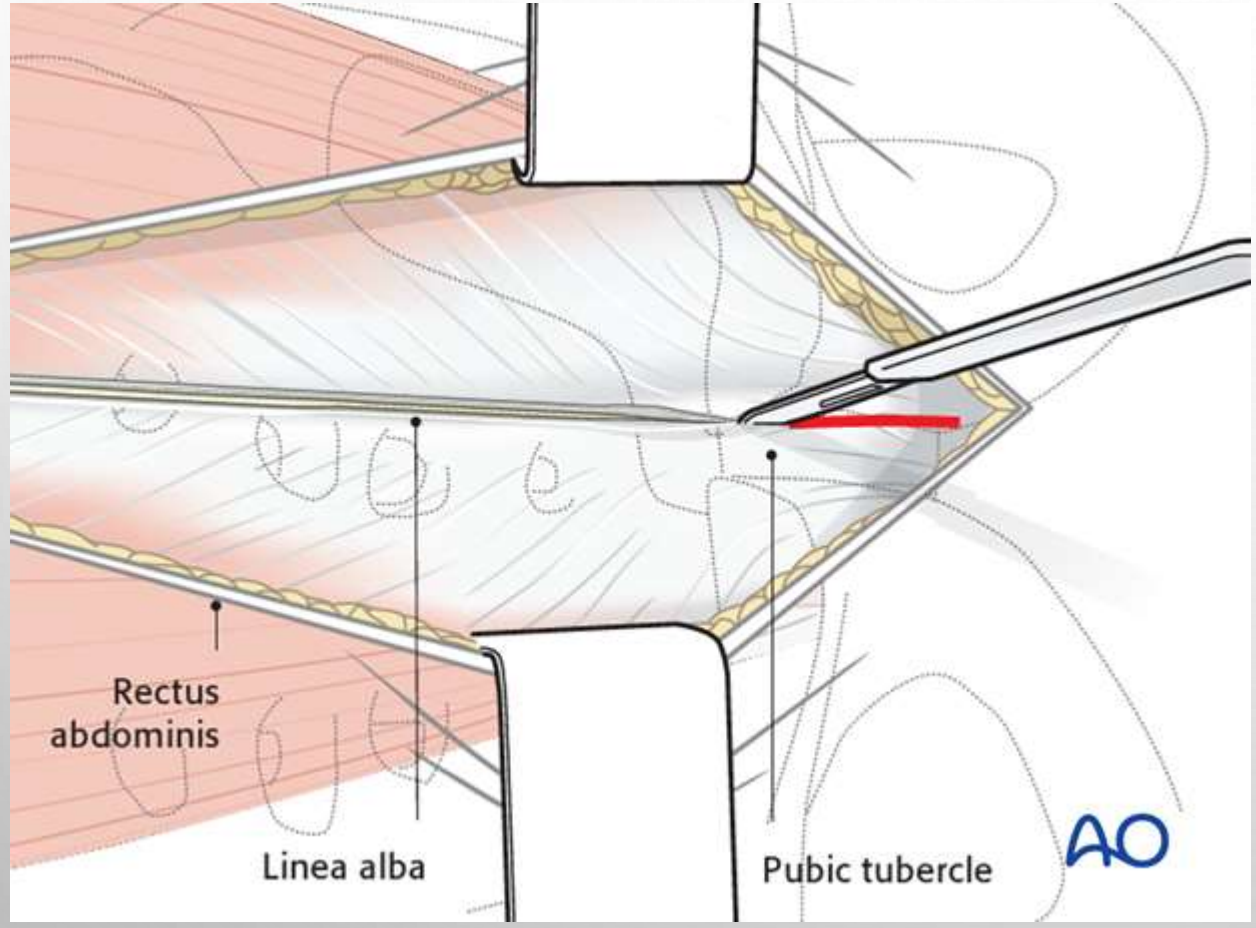
4.Deep dissection



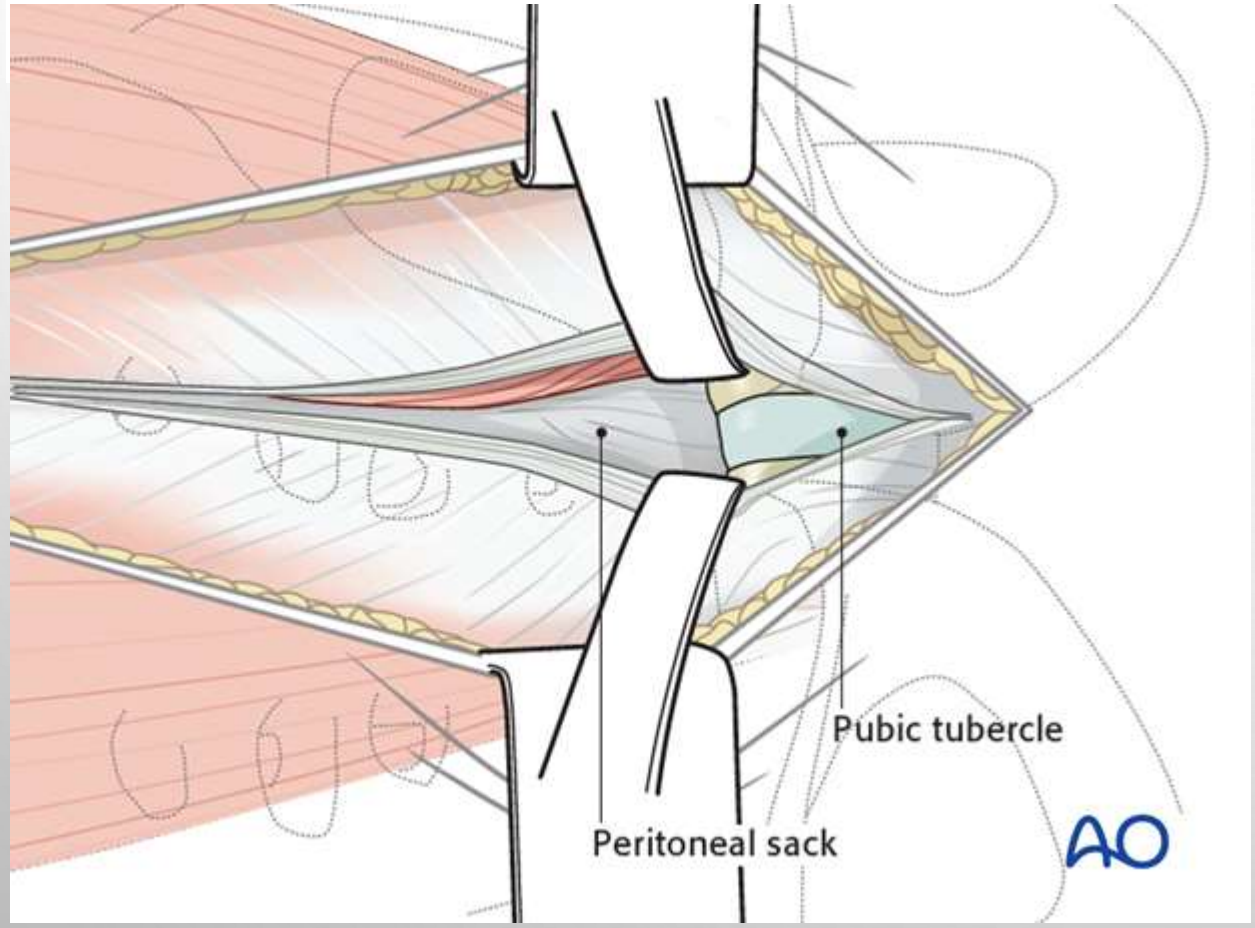
Vertical incision

- ✓ There may be a **need** for **extension** of the incision **cranially** in case of **abdominal bleeding**.
- ✓ In this case a **vertical incision** is preferred.

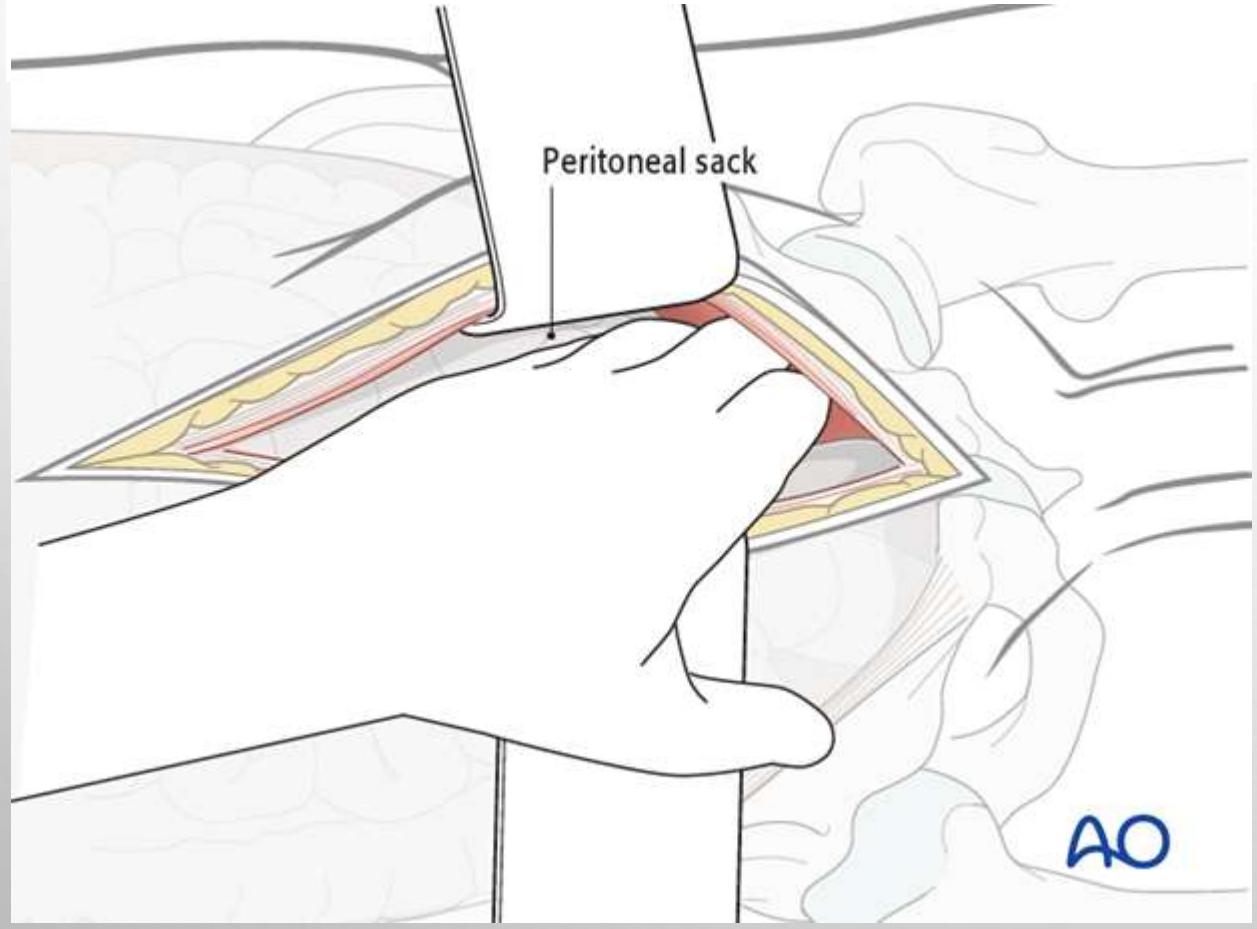
Deep dissection



- ✓ Dissect the subcutaneous tissue and identify the anterior rectus fascia.
- ✓ Locate the linea alba and incise it longitudinally.

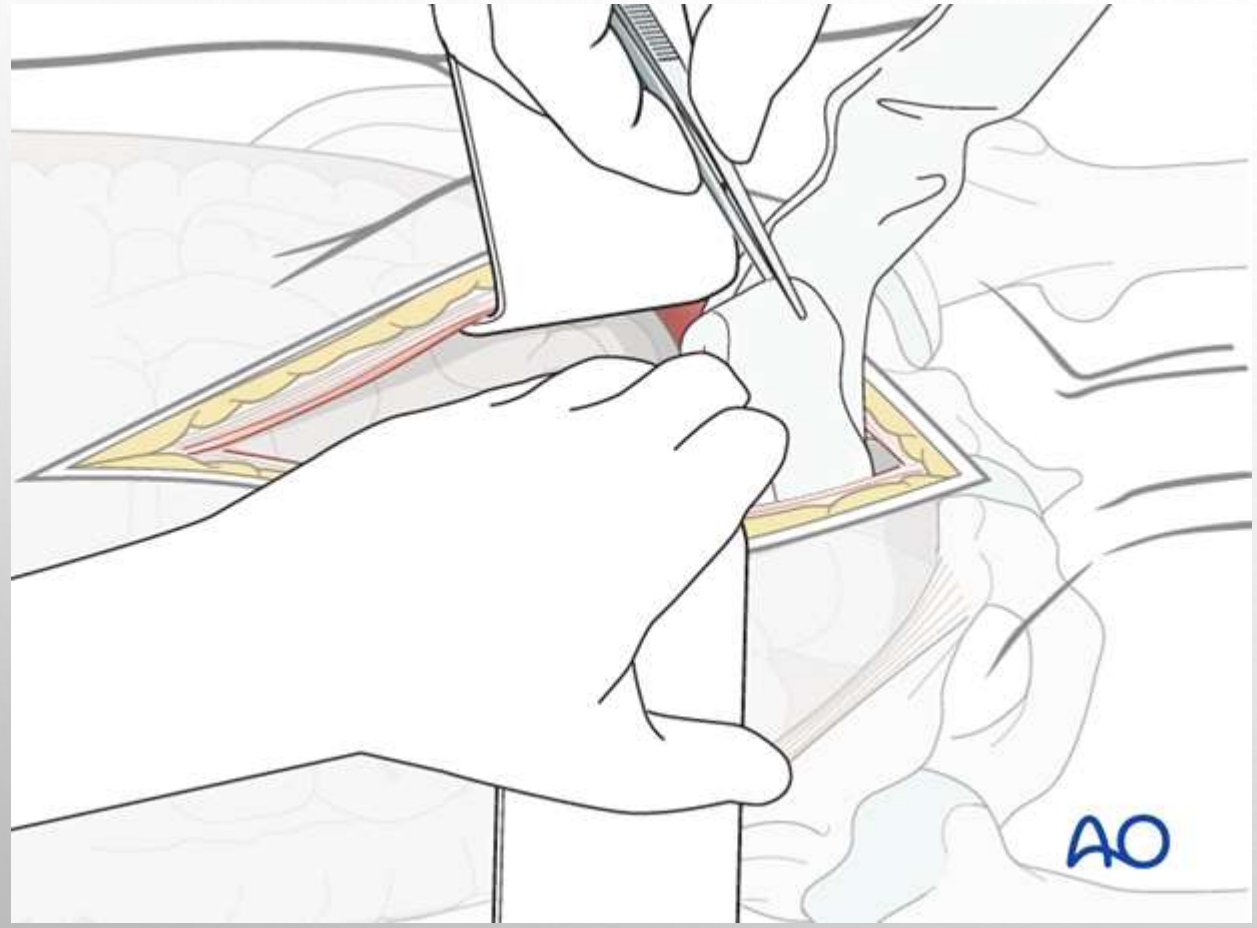


- ✓ Both bellies of the rectus abdominis muscle are gently retracted laterally.
- ✓ Identify the **peritoneal sack** but **do not open it.**

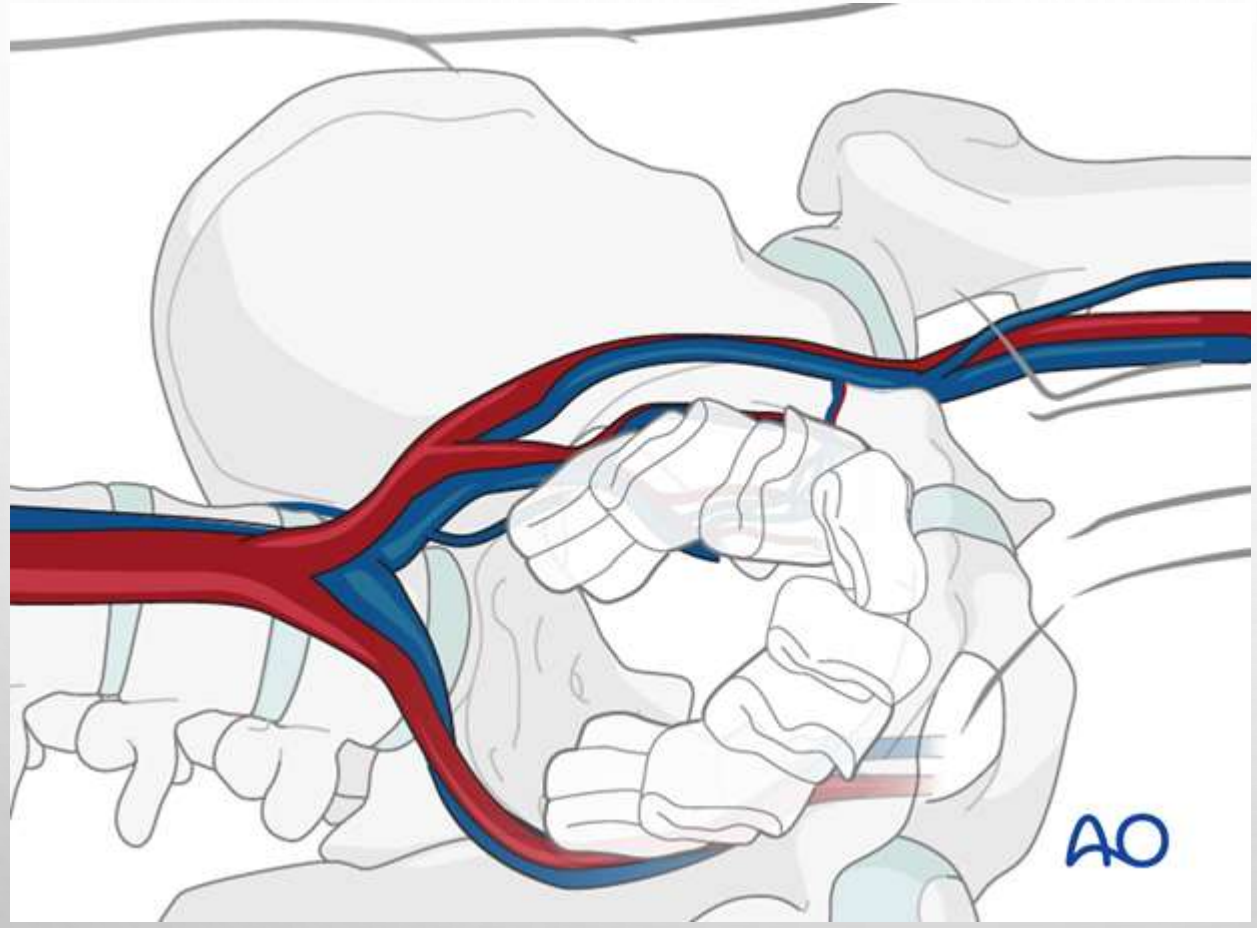


- ✓ Use your fingers to **bluntly retract the peritoneal sack superiorly**.
- ✓ It can be **dissected** as far **posteriorly** as the SI joints **to create retroperitoneal spaces bilaterally**.
- ✓ **Care** is taken **not to tear the peritoneum**.

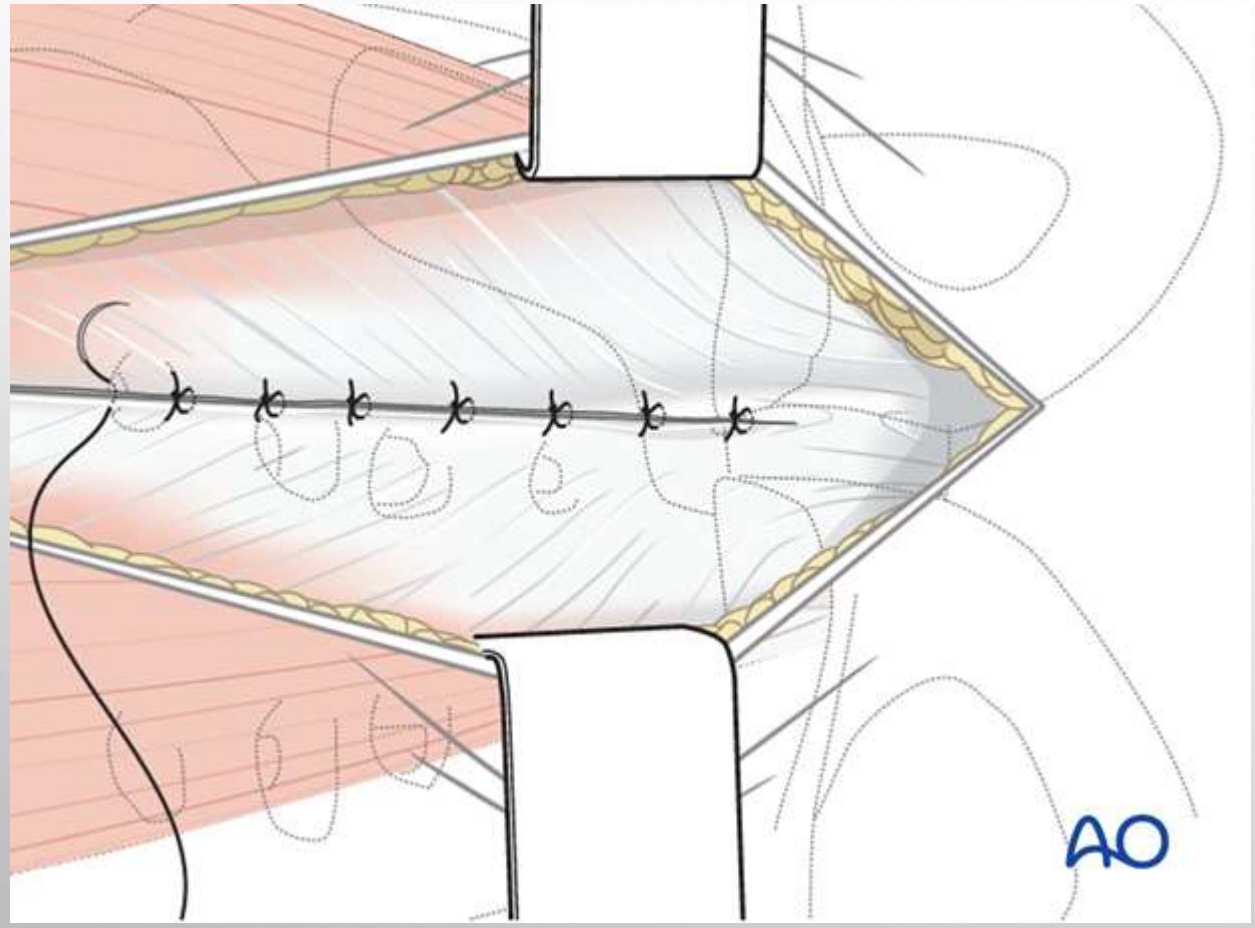
Extra-peritoneal pelvic packing



- ✓ Fill the retroperitoneal spaces with as many **big gauzes** as **possible** to create a **good pressure** on **both sides** of the **retroperitoneal** region.


AO

Temporary closure



- ✓ Prior to closure the wound is irrigated and the **bladder** is **inspected** for any **signs of injury**.
- ✓ The **urine** in the Foley catheter **bag** is inspected to ensure there is **no bleeding**.
- ✓ The **fascia** of the abdomen is temporarily **closed**.
- ✓ **Skin** incision can be **left open** and **dressed** with a **large plastic adhesive drape.**

Packing removal

- ✓ A "**second look**" must be done between **24 and 48 hours.**
- ✓ If **bleeding** has **stopped**, the **packs** soaked and **gently removed.**
- ✓ If **bleeding persists**, they should be **replaced**.

Final closure

- ✓ The midline incision in the rectus abdominis is closed in one or two layers.
- ✓ The subcutaneous tissues and skin are then closed in layers.

Selective Arterial Embolization

- Selective arterial **embolization** is an **effective technique** for control of PPH and hemorrhage related to pelvic soft tissue and/or vascular trauma.
- Generally **after conventional suture** and **packing methods** had **failed** .

- We consider this procedure for the **hemodynamically stable** patient who
- (1) has **evidence** of **continued bleeding**
- (2)And in whom there is a **high suspicion** of **retroperitoneal bleeding**
- (3) or has **failed** surgical intervention.

- There is **minimal information** on subsequent **pregnancy outcome** after this procedure.

Bowel Hematomas

- There are **insufficient data** on bowel hematomas after delivery to guide management.
- Treatment should be guided by whether the bowel hematoma is an **isolated finding** or is found in the setting of a **retroperitoneal hematoma**.

- If the bowel hematoma is an isolated finding, is nonexpanding, and was diagnosed during an evaluation for suspected bowel obstruction, we recommend managing the patient according to tenets of management of mechanical small bowel or colorectal obstruction.