Obstetrical hemorrhage

Timing of hemorrhage

- Antepartum Hemorrhage
- postpartum hemorrhage
- Late postpartum hemorrhage

Antepartum Hemorrhage

- Abortion or ectopic pregnancy.
- Bloody show
- Placenta Previa
- Placental abruption
- Uterine tear
- Vasa Previa

Abortion:

Missed abortion

Treated abortion

Incomplete abortion

Complete abortion

Inevitable abortion

Ectopic pregnancy

1-Tubal 95%

2-3% Interstitial

70% Ampullary

12% Isthmic

11% Fimbrial

2-Ovarian3%

3-Cervicai<1%

4-Ceasarean scar<1%

5-Intraligamentous or abdominal 1%

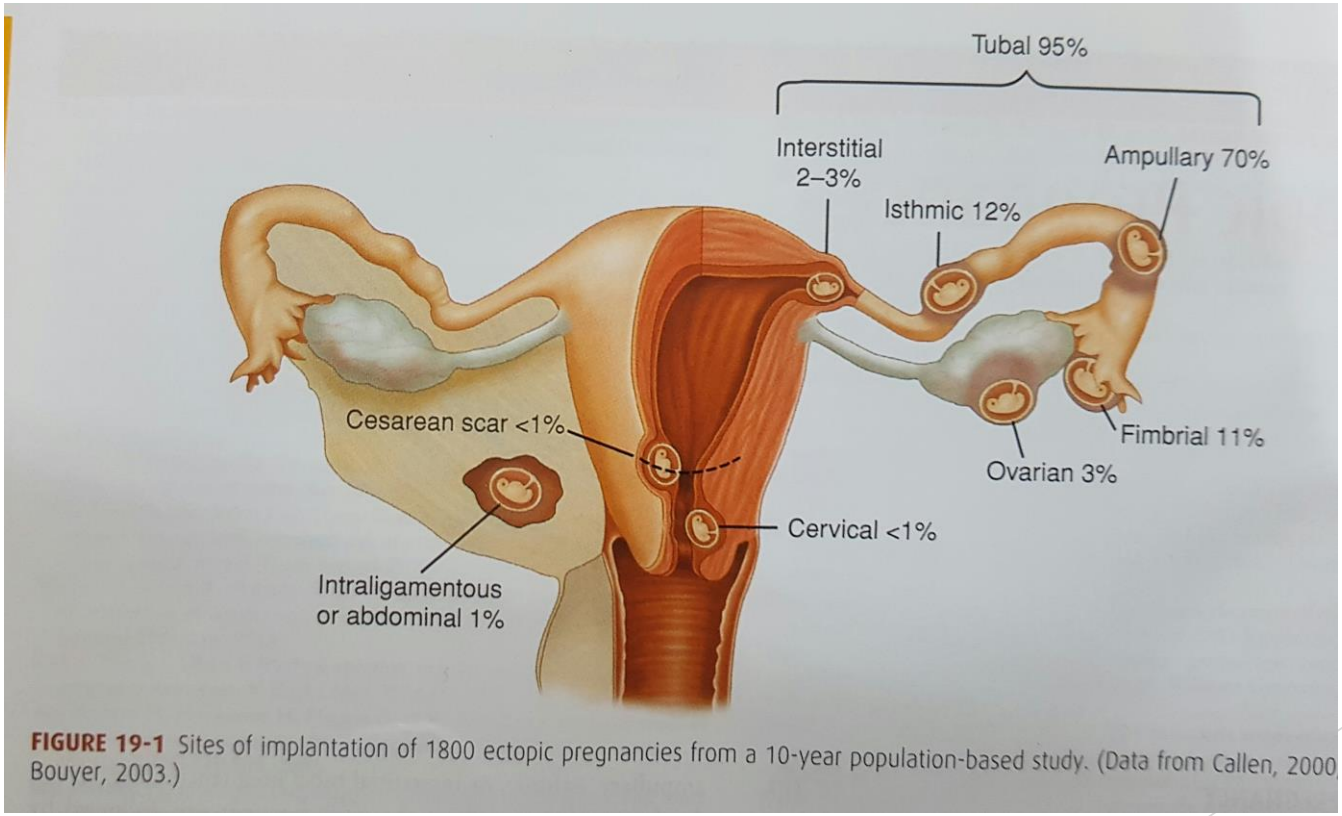


FIGURE 19-1 Sites of implantation of 1800 ectopic pregnancies from a 10-year population-based study. (Data from Callen, 2000 Bouyer, 2003.)

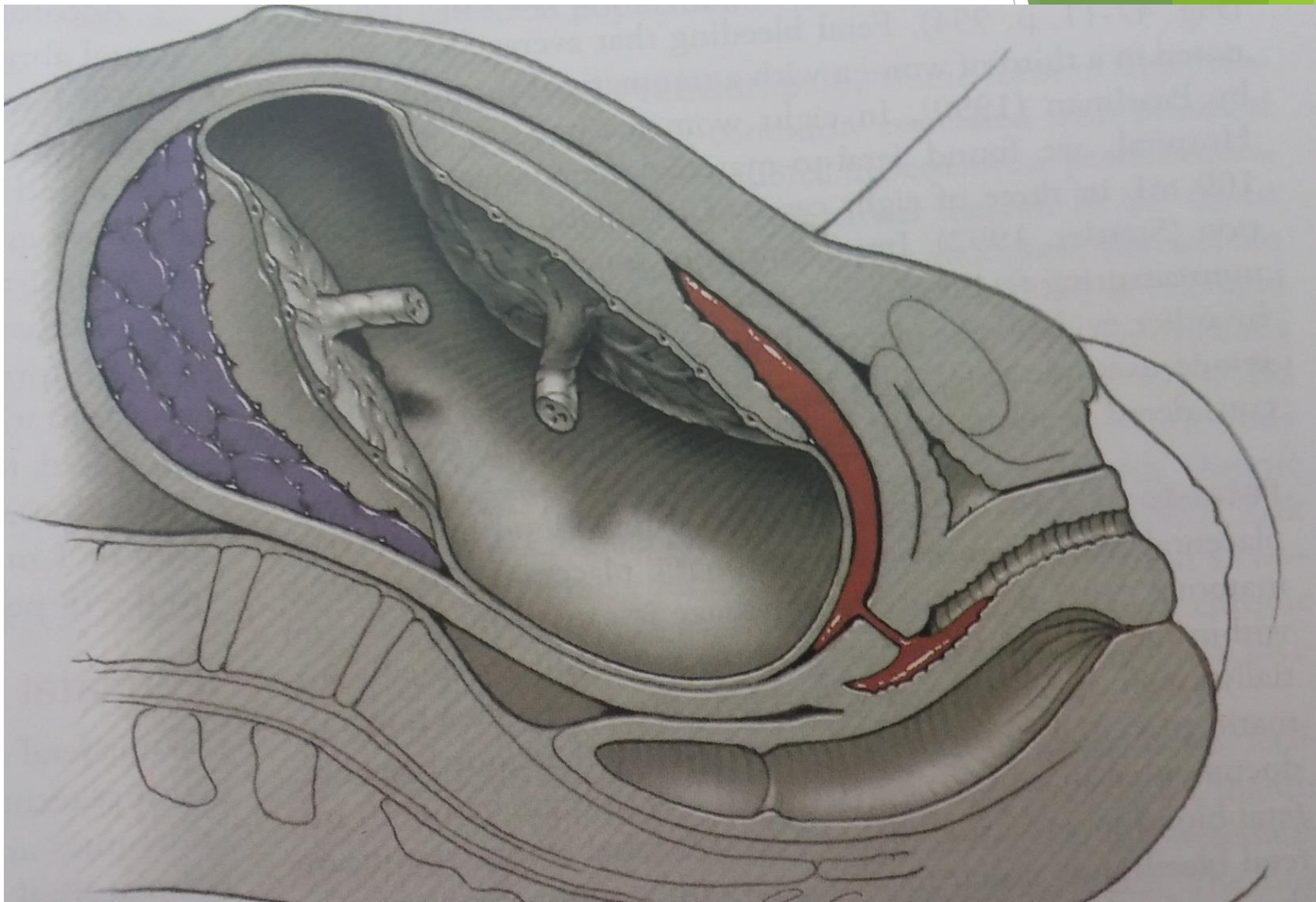
- Whenever there is uterine bleeding after midpregnancy , placenta Previa or abruption should always be considered

Placental abruption

- preterm separation of the normally implanted placenta.
- Placental abruption is initiated by hemorrhage into the Decidua basalis.
- Placental abruption can still be either total or partial

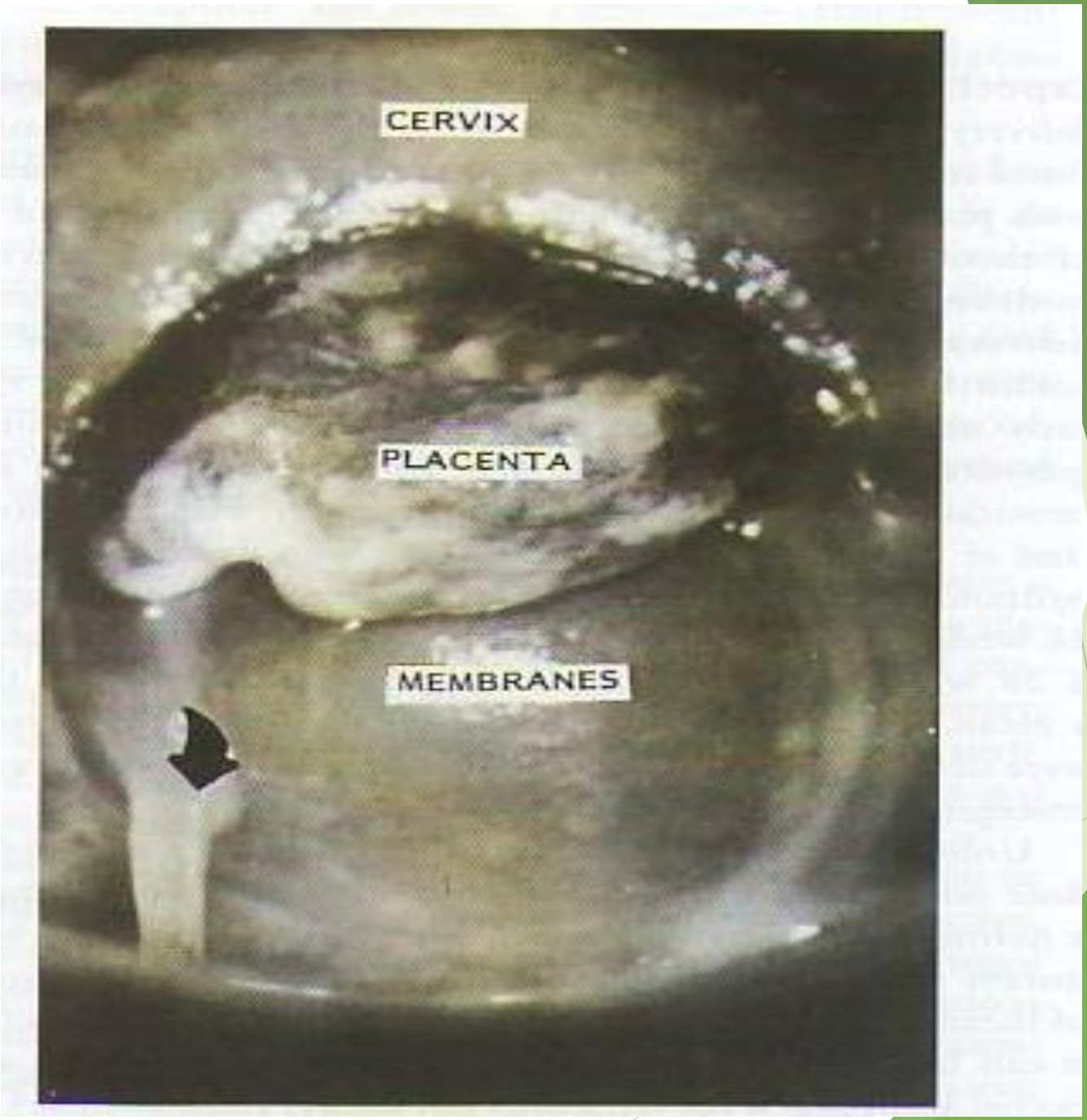
- With either, bleeding typically insinuates itself between the membranes and uterus , ultimately escaping through the cervix to cause external hemorrhage
- Less often, the blood is retained between the detached placenta and h uterus, leading to concealed hemorrhage

Placental abruption



Placenta Previa

- Placenta Previa : the internal so is covered partially or completely by placenta.
- Low lying: implantation in the lower uterine segment is such that the placental edge does not reach the internal os.


CERVIX
PLACENTA
MEMBRANES

Vasa previa

Postpartum Hemorrhage

Frequent causes are uterine atony with bleeding from the placental implantation site , genital tract trauma , or both

Mechanisms of normal hemostasis

Spiral arteries have no muscular layer because of endotrophobelastic remodeling, which creates a low pressure system . hemostasis is achieved first by myometrial contraction.

- Postpartum hemorrhage has been defined as the loss of 500 ml of blood or more after completion of the thirh stage of labor.
- Aproximately 5 percent of women delivering vaginally lose more than 1000 ml of blood.
- Estimated blood loss is commonly only approximateiy half the actual loss.
- The blood volume of a pregnant women with normal pregnancy-induced hypervolemia usually increases from 30 to 60 percent-1500 to 2000 ml.

Estimated of blood loss

- If blood loss is less than the pregnancy added volume, the hematocrit remains the same acutely and during the several days. It then increases as no pregnant plasma volume normalizes during the next week .
- Whenever the postpartum hematocrit is lower than one obtained on admission for delivery, blood loss can be estimated as the sum of the calculated pregnancy-added volume plus 500 ml for each 3 volume percent decrease of HCT.

تشخیص میزان خونریزی با توجه با علائم

طبقه بندی شدت خونریزی	مرحله ۱	مرحله ۲	مرحله ۳	مرحله ۴
میزان خونریزی از دست رفته	<1000cc	۱۰۰۰–۱۵۰۰ cc	۱۵۰۰ ـ۲۰۰۰cc	بیش از ۲۰۰۰cc
تعداد ضربان قلب	< ۱۰۰	۱۰۰–۱۱۹	۱۲۰ ـ ۱۴۰	> ۱۴۰
فشار خون	طبیعی	طبیعی، ارتواستاتیک متغیر	کاهش	کاهش
فشار نبض	طبیعی	کاهش	کاهش	کاهش
برون ده ادراری (ml/hr)	طبیعی (۵۰–۳۰)	۳۰ ـ ۲۰	۱۵ ـ ۵	آنوری/ بسیار جزیی
تعداد تنفس در دقیقه	طبیعی (۲۰–۱۴)	۳۰– ۲۰	۴۰– ۳۰	> ۳۵
وضعیت هوشیاری	کمی مضطرب	مضطرب (anxious)	گیج (confused)	گیج و لتارژیک
مایع جایگزین جبرانی موردنیاز	کریستالویید	کریستالویید	کریستالویید و خون	کریستالویید و خون

TABLE 41-1. Calculation of Maternal Total Blood Volume

Nonpregnant blood volume[a]:

$$\frac{[\text{Height (inches)} \times 50] + [\text{Weight (pounds)} \times 25]}{2} = \text{Blood volume (mL)}$$

Pregnancy blood volume:

Average increase is 30 to 60 percent of calculated nonpregnant volume

Increases across gestational age and plateaus at approximately 34 weeks

Usually larger with low normal range hematocrit (~30) and smaller with high normal range hematocrit (~40)

Average increase is 40 to 80 percent with multifetal gestation

Average increase is less with preeclampsia—volumes vary inversely with severity

Postpartum blood volume with serious hemorrhage:

Assume acute return to nonpregnant total volume after fluid resuscitation

Pregnancy hypervolemia cannot be restored postpartum

[a]Formula arrived at by measuring blood volume and blood loss in more than 100 women using ^{51}Cr-labeled erythrocytes.

Modified from Hernandez, 2012.

CAUSES OF OBSTETRICAL HEMORRHAGE

- Placental Abruption
- Placenta Previa
- Uterine Atony
- Uterine Inversion
- Injuries of the Birth Canal
- Puerperal Hematomas
- Rupture of the Uterus
- Placenta accrete syndromes

TABLE 41-2. Obstetrical Hemorrhage: Causes, Predisposing Factors, and Vulnerable Patients

Abnormal Placentation
- Placenta previa
- Placental abruption
- Placenta accreta/increta/percreta
- Ectopic pregnancy
- Hydatidiform mole

Injuries to the Birth Canal
- Episiotomy and lacerations
- Forceps or vacuum delivery
- Cesarean delivery or hysterectomy
- Uterine rupture
  - Previously scarred uterus
  - High parity
  - Hyperstimulation
  - Obstructed labor
  - Intrauterine manipulation
  - Midforceps rotation
  - Breech extraction

Obstetrical Factors
- Obesity
- Previous postpartum hemorrhage
- Early preterm pregnancy
- Sepsis syndrome

Vulnerable Patients
- Preeclampsia/eclampsia
- Chronic renal insufficiency
- Constitutionally small size

Uterine Atony
- Uterine overdistention
  - Large fetus
  - Multiple fetuses
  - Hydramnios
  - Retained clots
- Labor induction
- Anesthesia or analgesia
  - Halogenated agents
  - Conduction analgesia with hypotension
- Labor abnormalities
  - Rapid labor
  - Prolonged labor
  - Augmented labor
  - Chorioamnionitis
- Previous uterine atony

Coagulation Defects—Intensify Other Causes
- Massive transfusions
- Placental abruption
- Sepsis syndrome
- Severe preeclampsia syndrome
- Acute fatty liver
- Anticoagulant treatment
- Congenital coagulopathies
- Amnionic-fluid embolism
- Prolonged retention of dead fetus
- Saline-induced abortion

Uterine Atony

- The most frequent cause of obstetrical hemorrhage is failure of uterus to contract sufficiently after delivery.

- **اکسی توسین(پیتوسین)**

۴۰-۱۰ واحد در ۱۰۰۰-۵۰۰ سی سی محلول سرعت ۶۰ قطره در دقیقه

۸۰ واحد در ۵۰۰ سی سی محلول در مواردی که منع مصرف مایع به میزان زیاد وجود دارد(احتمال کلاپس قلبی- عروقی، پره اکلامپسی، افت شدید فشار خون...)

- **متیل ارگونوین(مترژن)**

۰/۲ میلیگرم عضلانی و تکرار آن پس از ۱۵ دقیقه حداکثر ۱ میلی گرم، در صورت هیپرتانسیون تزریق نگردد.

- **۱۵- متیل پروستاگلاندین F2α (Hemabate, Carboprost)**

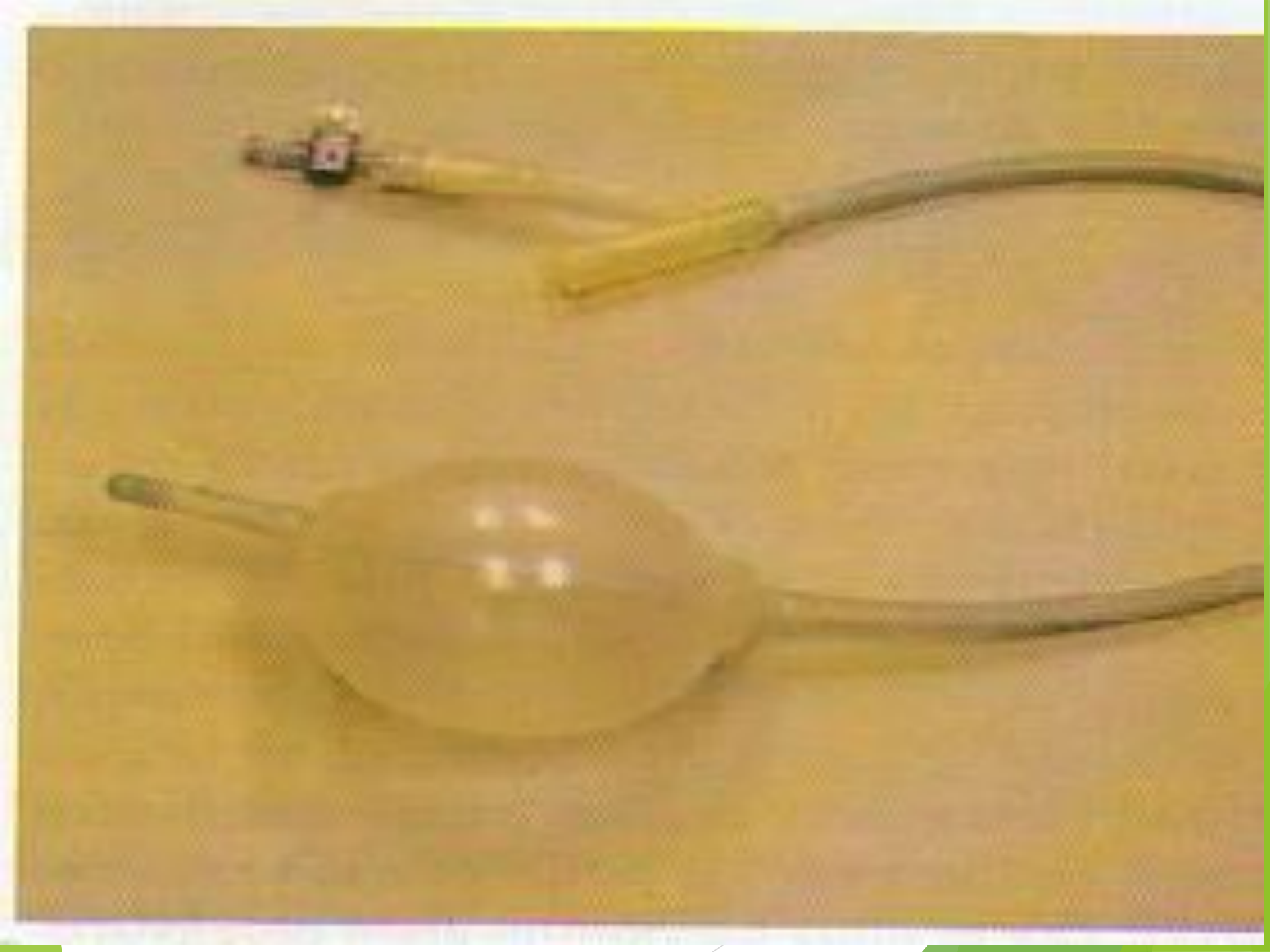
۲۵۰میکروگرم عضلانی و در صورت نیاز تکرار آن هر ۱۵ دقیقه . حداکثر ۸ دوز(در موارد آسم استفاده نشود و در صورت هیپرتانسیون با احتیاط استفاده شود). بهتر است اگر تا دو دوز موثر نبود روش دیگری انتخاب شود.

- **میزوپروستول (Cytotec):**

  - ۱۰۰۰-۸۰۰ میکروگرم PR
  - ۶۰۰ میکروگرم خوراکی یا ۸۰۰ میکروگرم زیر زبانی

- **ترانکزامیک اسید(TXA)**

یک گرم IV در ۱۰ دقیقه(اضافه کردن یک ویال یک گرمی در ۱۰۰ میلی لیتر نرمال سالین در حداکثر ده دقیقه، در صورت نیاز ۳۰ دقیقه بعد تکرار شود)



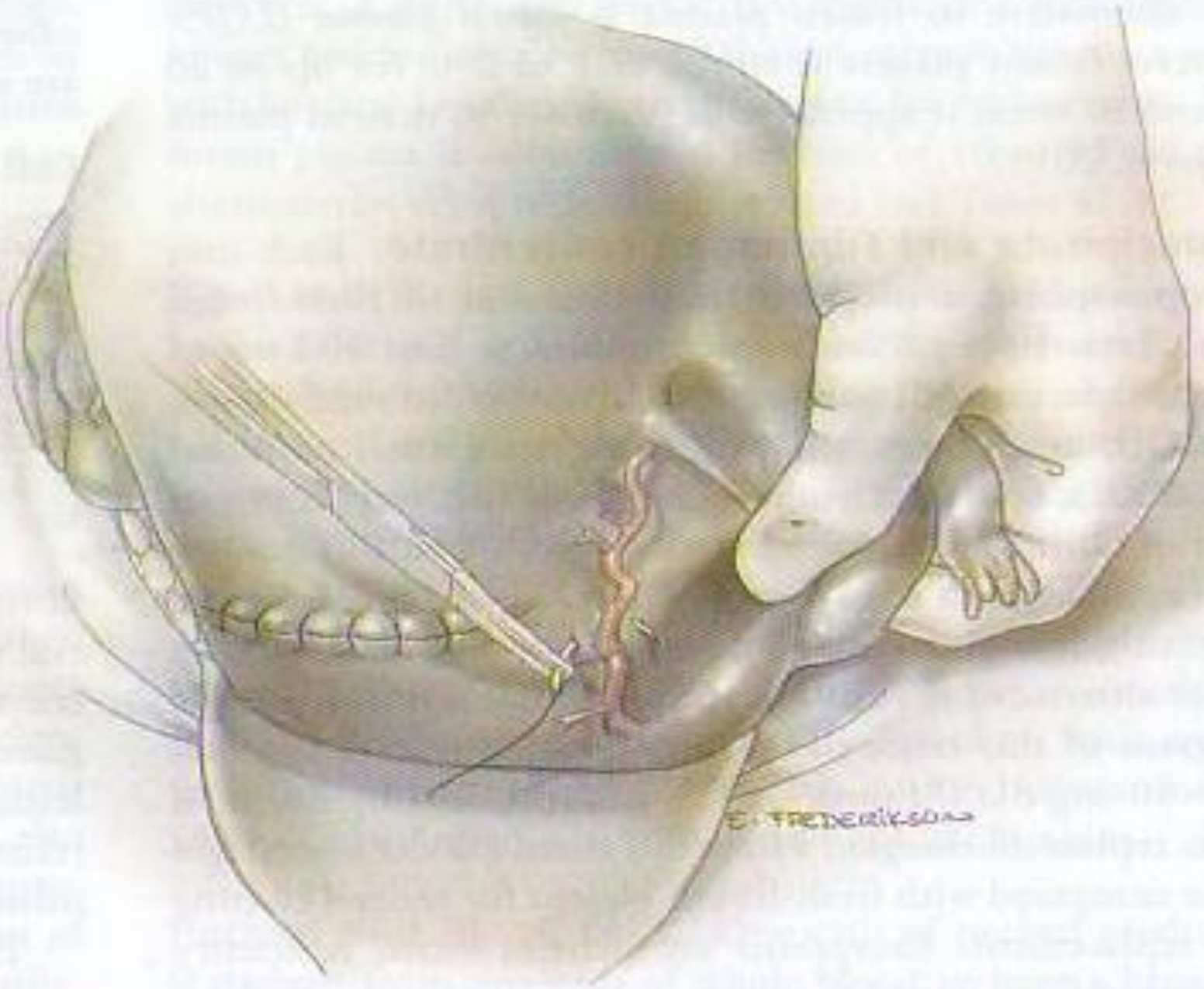
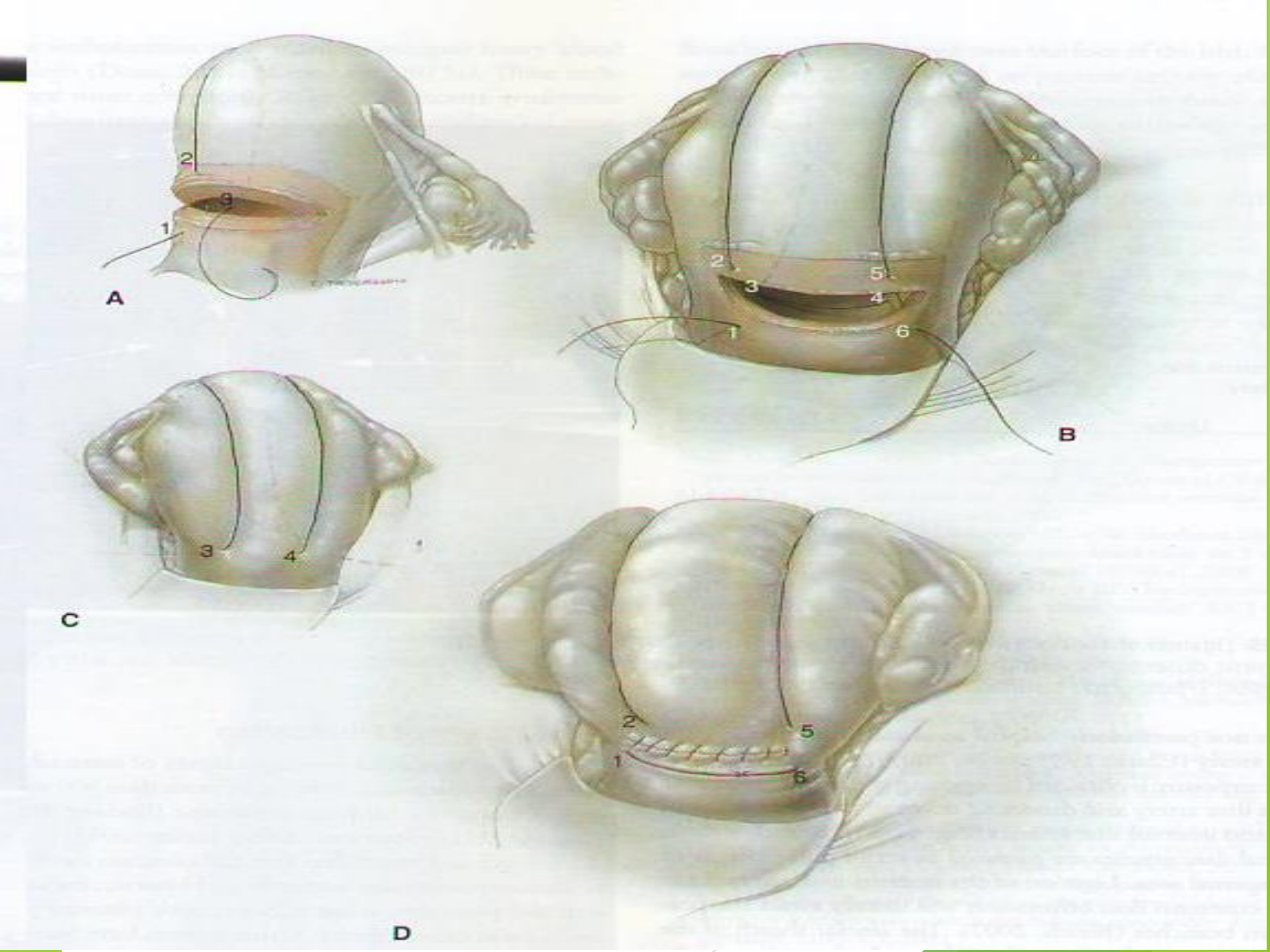


FIGURE 41-33 Uterine artery ligation. The suture goes through the lateral uterine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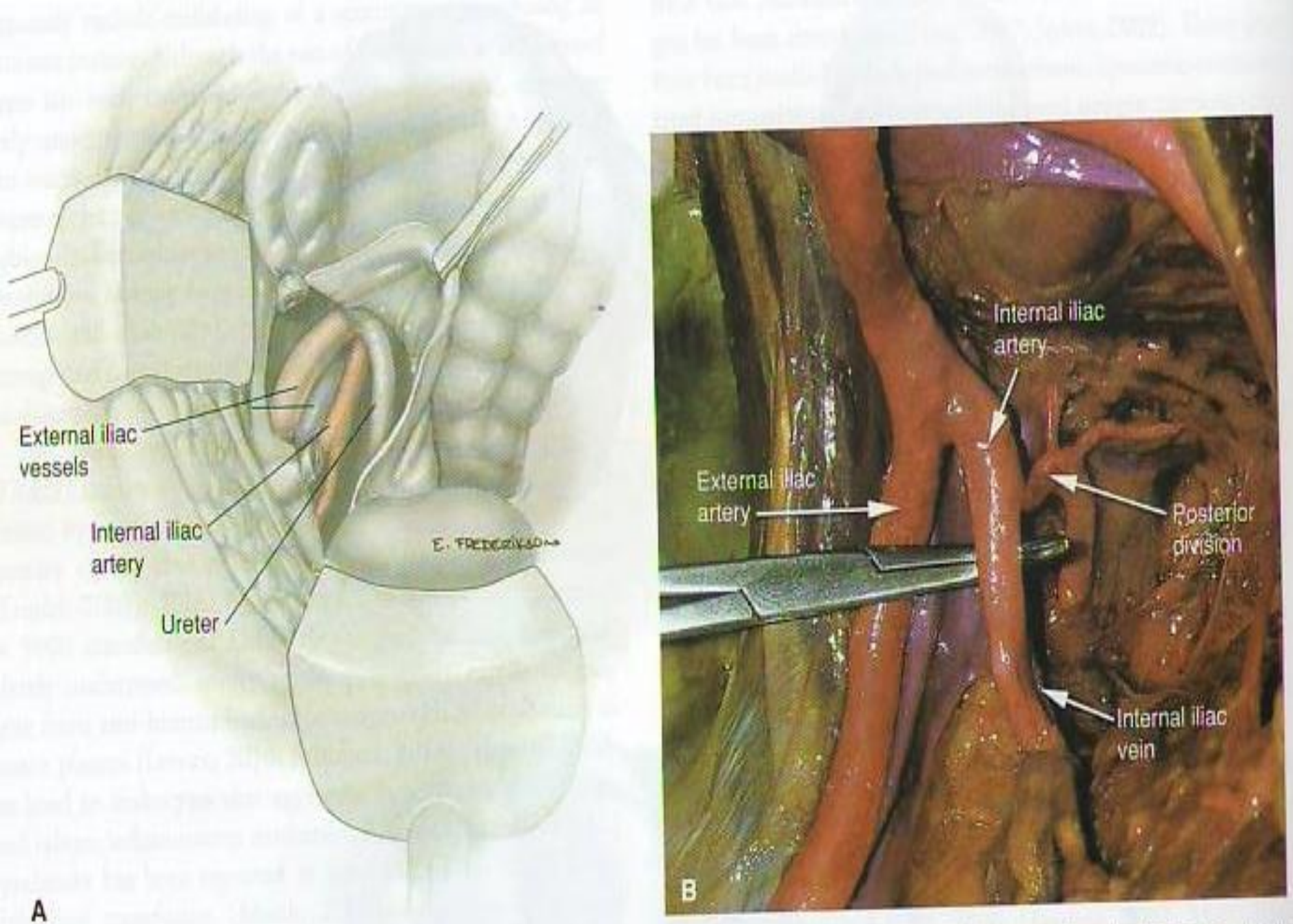


FIGURE 41-35 Ligation of the right internal iliac artery. **A.** The peritoneum covering the right iliac vessels is opened and reflected. **B.** Unem-

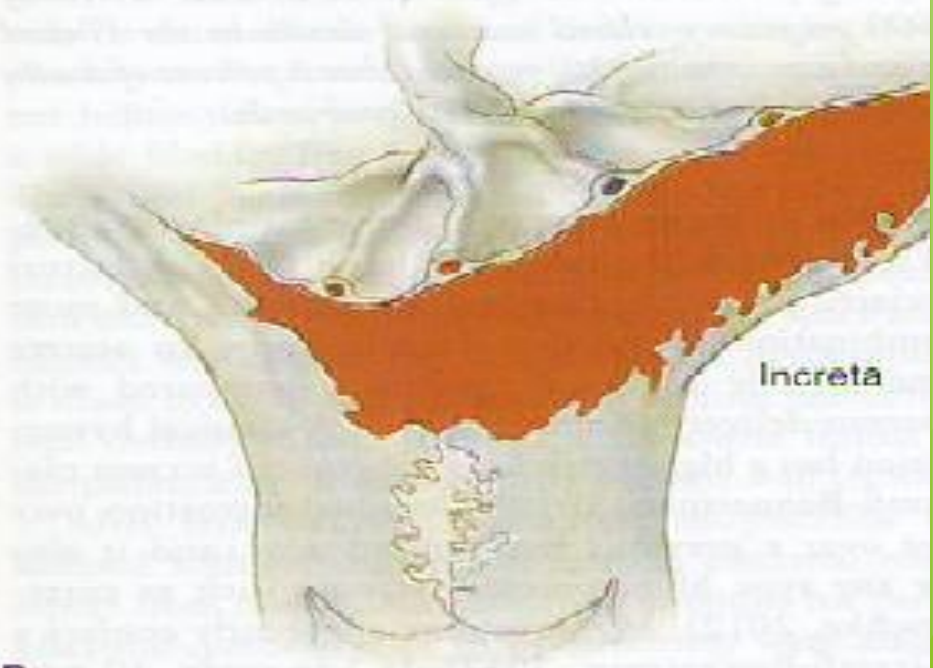
Placenta accrete syndromes

These syndromes describe the abnormally implanted , invasive, or adhered placenta.

Classification:

Variants of placenta accrete syndrome are classified by the depth of trophoblastic growth.

- Accrete
- Increta
- pretreat



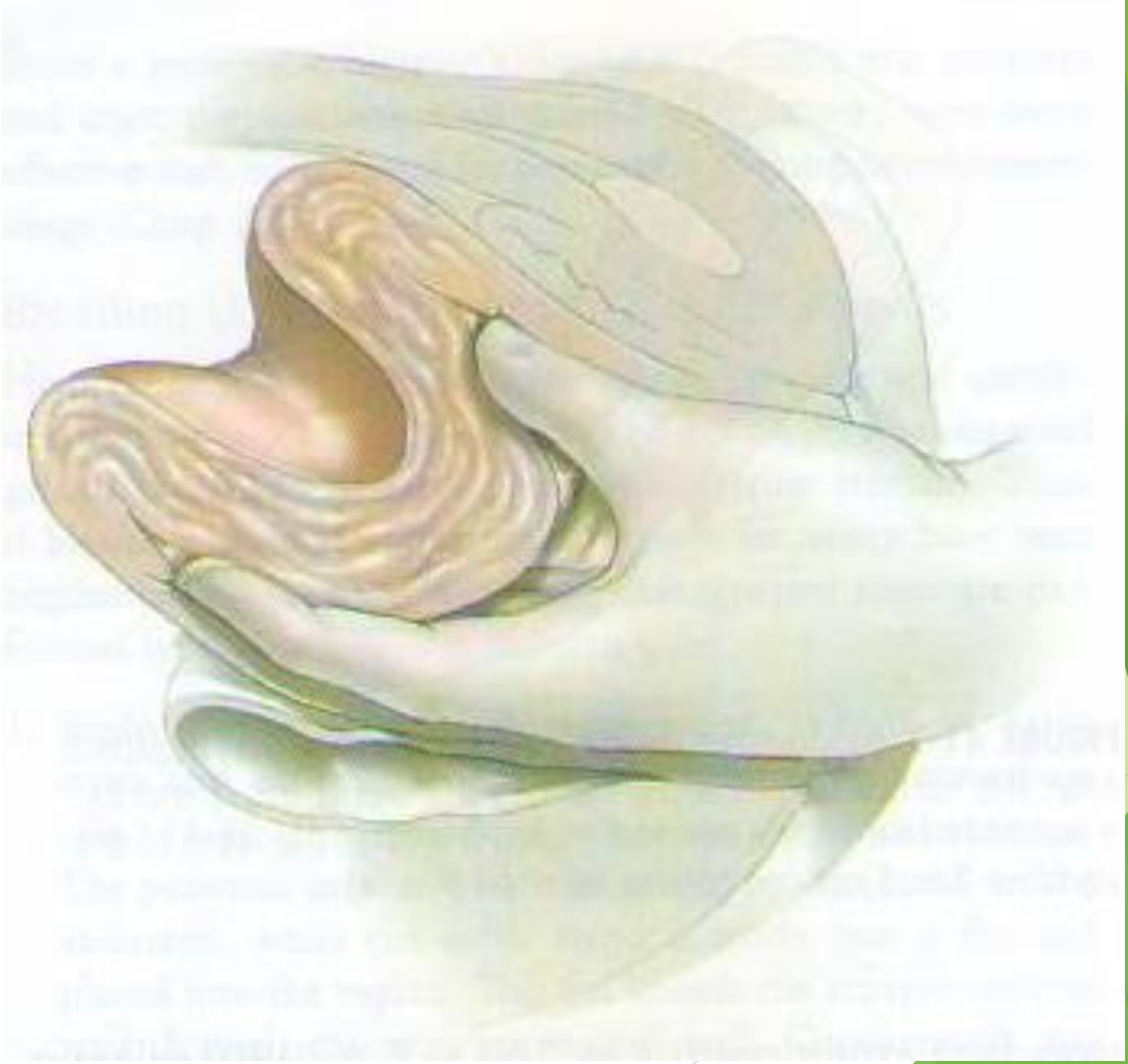
B

Uterine inversion:

- Puerperal inversion of the uterus is considered to be one of the classic hemorrhage

Risk factors include alone or in combination:

1. Fundal placental implantation
2. Delayed-onset or inadequate uterine contractility after delivery of the fetus.
3. Cord traction applied before placental separation.
4. Abnormally adhered placentation



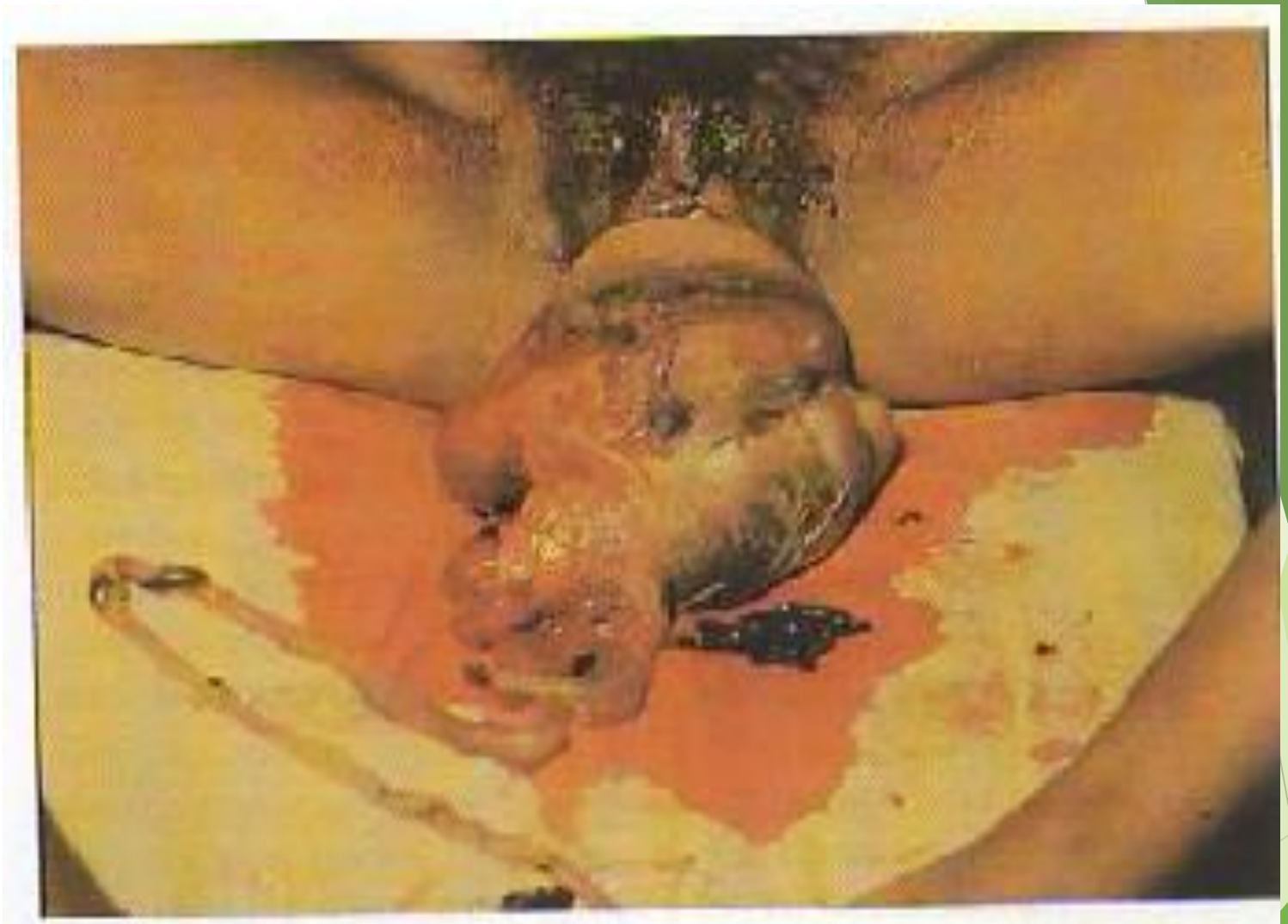


FIGURE 41-6 Maternal death from exsanguination caused by uterine inversion associated with a fundal placenta accreta du a home delivery.

Injuries of the Birth Canal

1. Vulvovaginal laceration
2. Levator sling injuries
3. Cervical laceration

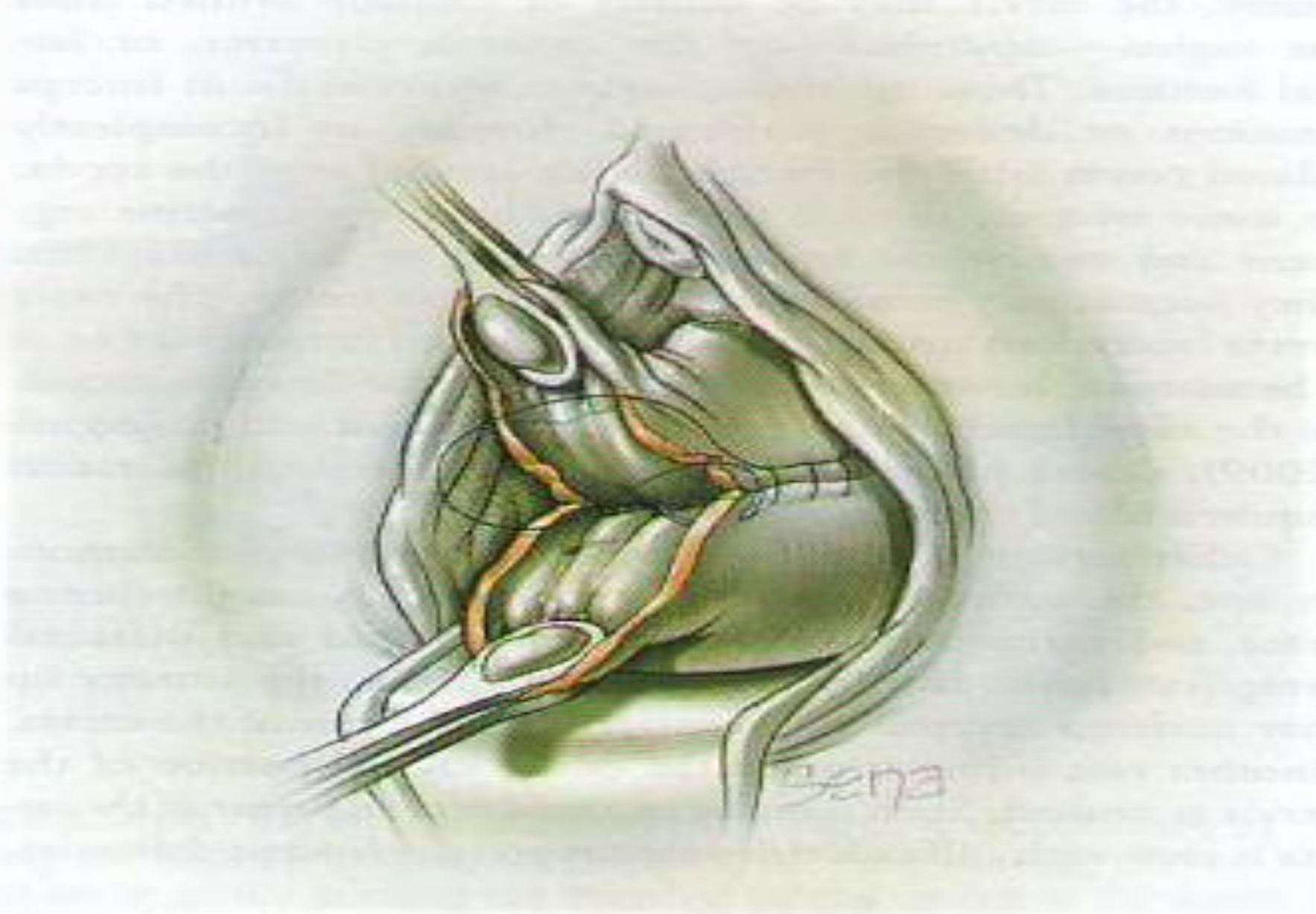
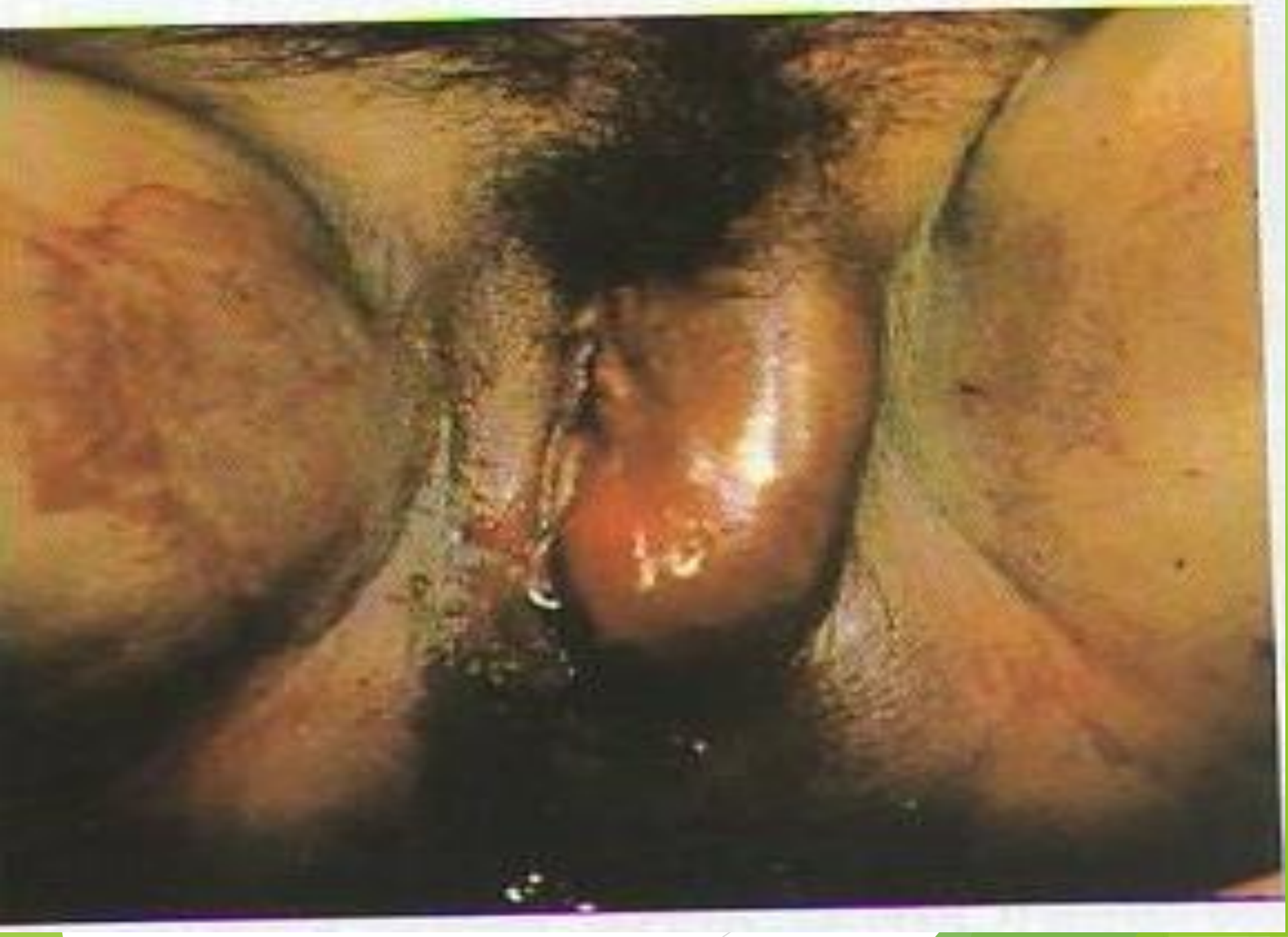


FIGURE 41-10 Repair of cervical laceration with appropriate surgical exposure. Continuous absorbable sutures are placed beginning at the upper angle of the laceration.

Puerperal Hematomas

They are most often associated with a laceration , episiotomy or an operative delivery



Rupture of the Uterus

In addition to the prior cesarean hysterotomy incision already discussed, risks for uterine rupture include other previous operations or manipulations that traumatize the myometrium. Examples are: uterine curettage , perforation , endometrial ablation , myomectomy , hysteroscopy

TABLE 41-3. Some Causes of Uterine Rupture

Preexisting Uterine Injury or Anomaly	Uterine Injury or Abnormality Incurred in Current Pregnancy
Surgery involving the myometrium: Cesarean delivery or hysterotomy Previously repaired uterine rupture Myomectomy incision through or to the endometrium Deep cornual resection of interstitial fallopian tube Metroplasty	**Before delivery:** Persistent, intense, spontaneous contractions Labor stimulation—oxytocin or prostaglandins Intraamnionic instillation—saline or prostaglandins Perforation by internal uterine pressure catheter External trauma—sharp or blunt External version Uterine overdistention—hydramnios, multifetal pregnancy
Coincidental uterine trauma: Abortion with instrumentation—sharp or suction curette, sounds Sharp or blunt trauma—assaults, vehicular accidents, bullets, knives Silent rupture in previous pregnancy	**During delivery:** Internal version second twin Difficult forceps delivery Rapid tumultuous labor and delivery Breech extraction Fetal anomaly distending lower segment Vigorous uterine pressure during delivery Difficult manual removal of placenta
Congenital: Pregnancy in undeveloped uterine horn Defective connective tissue—Marfan or Ehlers-Danlos syndrome	**Acquired:** Placental accrete syndromes Gestational trophoblastic neoplasia Adenomyosis Sacculation of entrapped retroverted uterus

Late postpartum hemorrhage

- Bleeding after the first 24 hours

Adjunctive surgical procedures to treat hemorrhage

- Uterine artery ligation
- Uterine compression sutures
- Internal iliac artery ligation
- Angiographic embolization
- Preoperative pelvic arterial catheter placement
- Pelvic umbrella pack


THANKS FOR
YOUR
ATTENTION