

***Antepartum & Postpartum
Hemorrhage (APH & PPH)***

Antepartum & Postpartum Hemorrhage

- Obstetrics is "bloody business."
- Death from hemorrhage still remains a leading cause of maternal mortality.
- Hemorrhage was a direct cause of more than 18 percent of 3201 pregnancy-related maternal deaths.

Antepartum & Postpartum Hemorrhage

Causes of 763 Pregnancy-related Deaths Due to Hemorrhage

| Causes of Hemorrhage | Number (%) |
|---------------------------------------|------------|
| Abruptio placentae | 141 (19) |
| Laceration/uterine rupture | 125 (16) |
| Uterine atony | 115 (15) |
| Coagulopathies | 108 (14) |
| Placenta previa | 50 (7) |
| Placenta accreta / increta / percreta | 44 (6) |
| Uterine bleeding | 47 (6) |
| Retained placenta | 32 (4) |

ANTEPARTUM HEMORRHAGE

- Per vagina blood loss after 20 weeks' gestation.
- Complicates close to 4% of all pregnancies and is a **MEDICAL EMERGENCY!**
- Is one of the leading causes of antepartum hospitalization, maternal morbidity, and operative intervention.

What are the most common causes of Antepartum Hemorrhage ?

COMMON CAUSES

- Placenta Previa
- Placental Abruption
- Uterine Rupture
- Vasa Previa
- Bloody Show
- Coagulation Disorder
- Hemorrhoids
- Vaginal Lesion/Injury
- Cervical Lesion/Injury
- Neoplasia

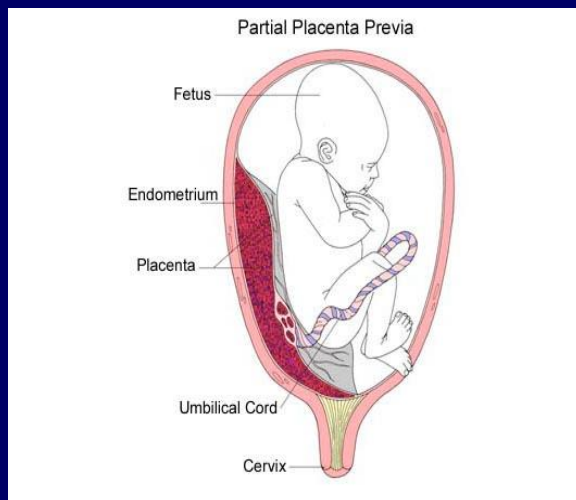
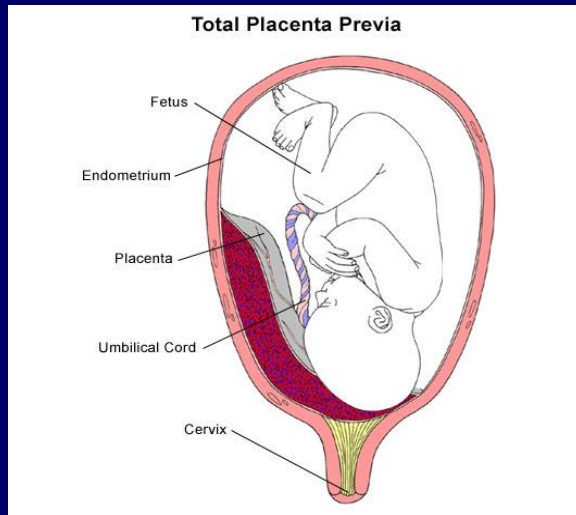
Key point to Remember

- The pregnancy in which such bleeding occurs remains at increased risk for a poor outcome even though the bleeding soon stops and placenta previa appears to have been excluded by sonography.

Placenta Previa

- Defined as a placenta implanted in the lower segment of the uterus, presenting ahead of the leading pole of the fetus.
 1. *Total placenta previa.* The internal cervical os is covered completely by placenta.
 2. *Partial placenta previa.* The internal os is partially covered by placenta.
 3. *Marginal placenta previa.* The edge of the placenta is at the margin of the internal os.
 4. *Low-lying placenta.* The placenta is implanted in the lower uterine segment such that the placenta edge actually does not reach the internal os but is in close proximity to it.

Placenta Previa



- Bleeding results from small disruptions in the placental attachment during normal development and thinning of the lower uterine segment

Placenta Previa

- *Incidence about 1 in 300*
- *Perinatal morbidity and mortality are primarily related to the complications of prematurity, because the hemorrhage is maternal.*

Placenta Previa

- ***Etiology:***
 - Advancing *maternal age*
 - *Multiparity*
 - *Multifetal gestations*
 - *Prior cesarean delivery*
 - *Smoking*
 - *Prior placenta previa*

Placenta Previa

- The most characteristic event in placenta previa is painless hemorrhage.
- This usually occurs near the end of or after the second trimester.
- The initial bleeding is rarely so profuse as to prove fatal.
- It usually ceases spontaneously, only to recur.

Placenta Previa

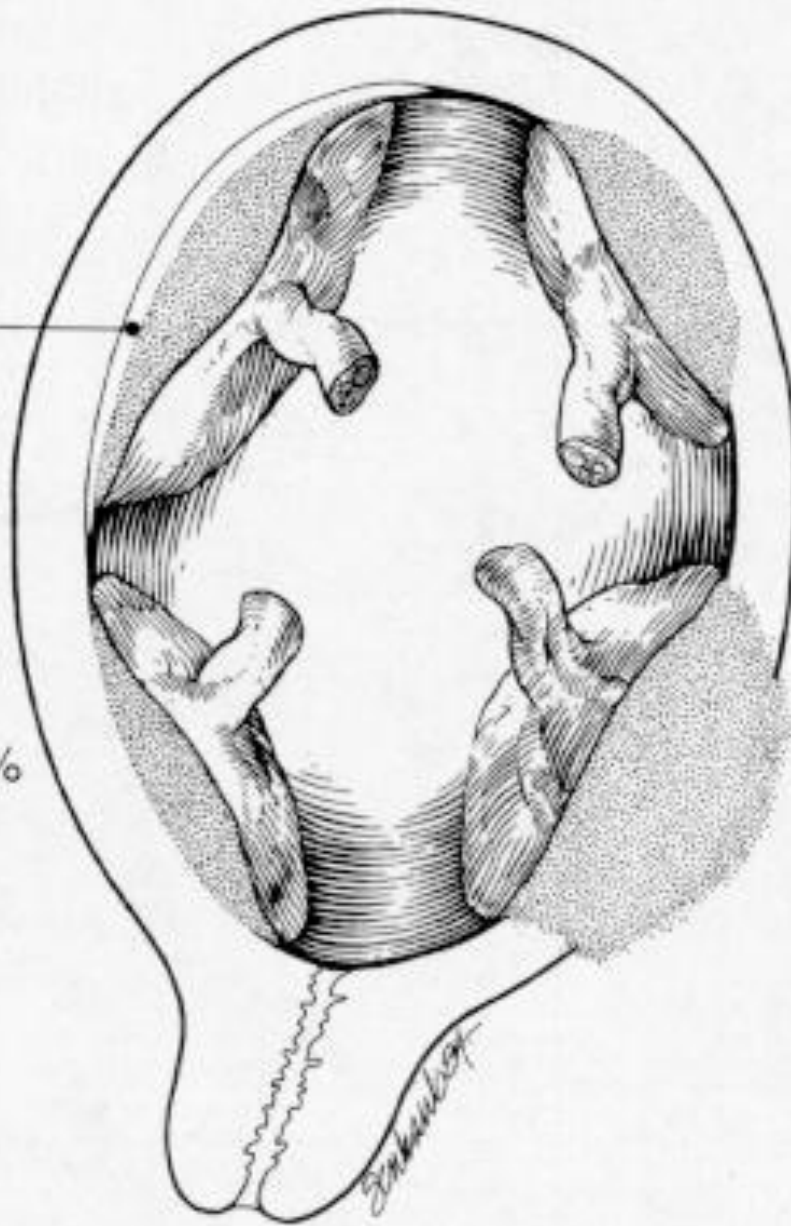
- Placenta previa may be associated with *placenta accreta*, *placenta increta* or *percreta*.
- Coagulopathy is rare with placenta previa.

NORMAL
decidua

INCRETA—17%

ACCRETA—78%

PERCRETA—5%



Placenta Previa

- *Diagnosis.*
 - Placenta previa or abruption should always be suspected in women with uterine bleeding during the latter half of pregnancy.
 - The possibility of placenta previa should not be dismissed until appropriate evaluation, including sonography, has clearly proved its absence.
 - The diagnosis of placenta previa can seldom be established firmly by clinical examination. **Such examination of the cervix is never permissible unless the woman is in an operating room with all the preparations for immediate cesarean delivery, because even the gentlest examination of this sort can cause torrential hemorrhage.**

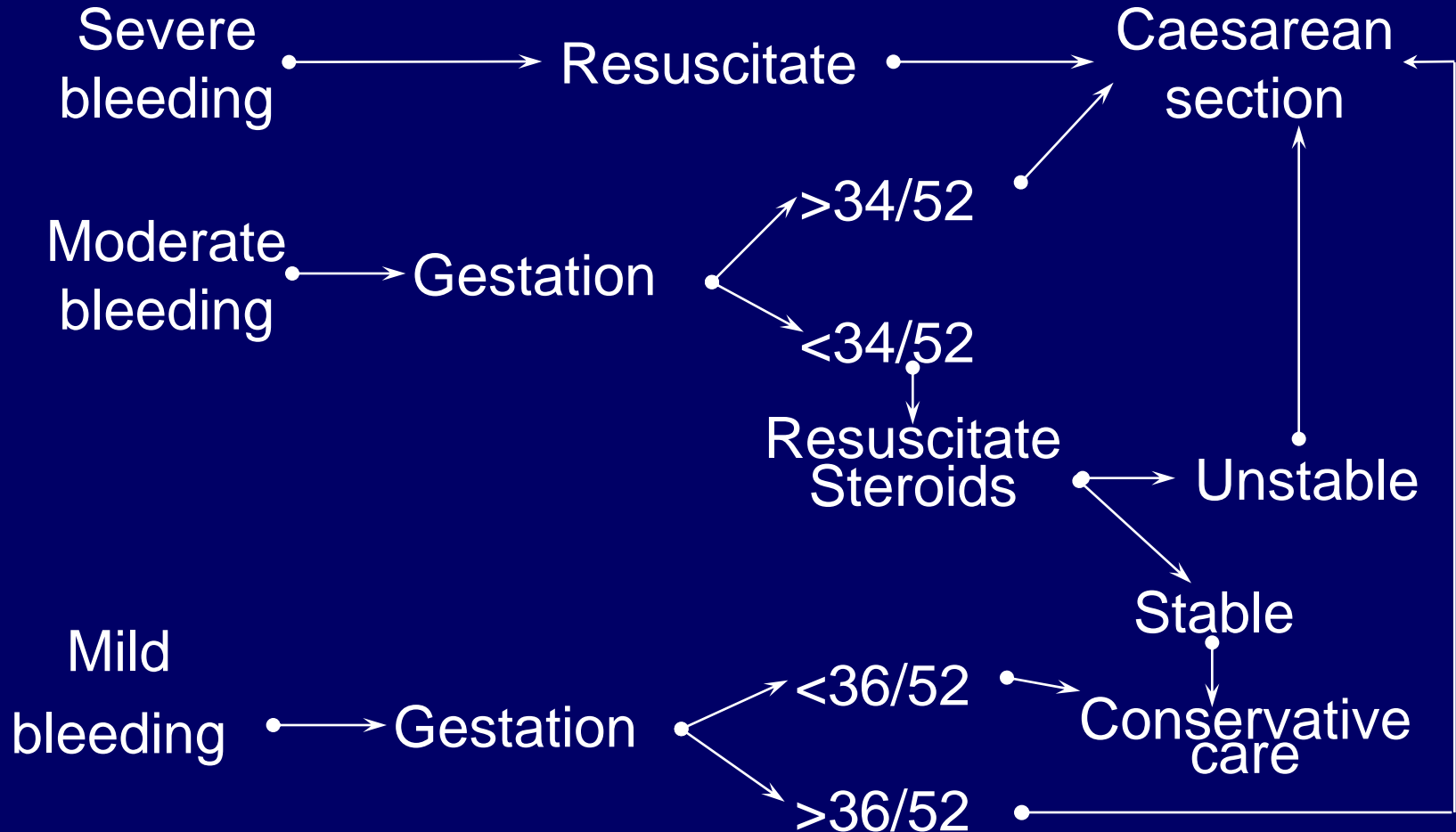
Placenta Previa

- The simplest and safest method of placental localization is provided by *transabdominal sonography*.
- *Transvaginal ultrasonography* has substantively improved diagnostic accuracy of placenta previa.
- MRI
- At 18 weeks, 5-10% of placentas are low lying. Most 'migrate' with development of the lower uterine segment.

Placenta Previa Management

- Admit to hospital
- *NO VAGINAL EXAMINATION*
- IV access
- Placental localization

Placenta Previa Management



Placenta Previa Management

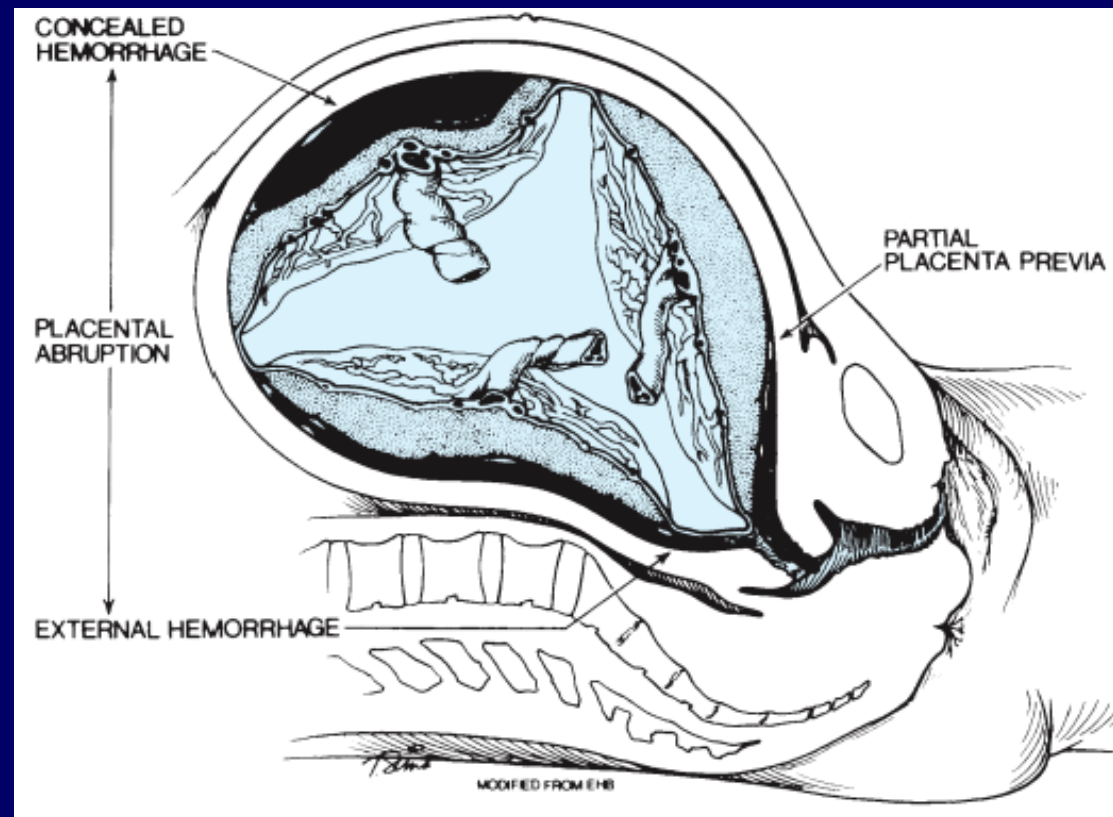
- Delivery is by Caesarean section
- Occasionally Caesarean hysterectomy necessary.

Placental Abruption

- Defined as the premature separation of the normally implanted placenta.
- The Latin *abruptio placentae*, means "rending asunder of the placenta"
- Occurs in 1-2% of all pregnancies
- Perinatal mortality rate associated with placental abruption was 119 per 1000 births compared with 8.2 per 1000 for all others.

Placental Abruption

- *external hemorrhage*
- *concealed hemorrhage*
- *Total*
- *Partial*



Placental Abruption

- What are the risk factors for placental abruption?

Placental Abruption

The primary cause of placental abruption is unknown, but there are several associated conditions.

- Increased age and parity
- Preeclampsia
- Chronic hypertension
- Preterm ruptured membranes
- Multifetal gestation
- Hydramnios
- Cigarette smoking
- Thrombophilias
- Cocaine use
- Prior abruption
- Uterine leiomyoma
- External trauma

Placental Abruption

- *Pathology*

- Placental abruption is initiated by hemorrhage into the decidua basalis.
- The decidua then splits, leaving a thin layer adherent to the myometrium.
- development of a decidual hematoma that leads to separation, compression, and the ultimate destruction of the placenta adjacent to it.

Placental Abruption

- Bleeding with placental abruption is almost always maternal.
- Significant fetal bleeding is more likely to be seen with traumatic abruption.
- In this circumstance, fetal bleeding results from a tear or fracture in the placenta rather than from the placental separation itself.

Placental Abruption

- The hallmark symptom of placental abruption is pain which can vary from mild cramping to severe pain.
- A firm, tender uterus and a possible sudden increase in fundal height on exam.
- The amount of external bleeding may not accurately reflect the amount of blood loss.
- **Importantly, negative findings with ultrasound examination do not exclude placental abruption. Ultrasound only shows 25% of abruptions.**

Placental Abruption

- ***Shock***
- ***Consumptive Coagulopathy***
- ***Renal Failure***
- ***Fetal Death***
- ***Couvellaire Uterus***



Placental Abruption

- **Management:** Treatment for placental abruption varies depending on gestational age and the status of the mother and fetus.
 - Admit
 - History & examination
 - Assess blood loss
 - Nearly always more than revealed
 - IV access, X match, DIC screen
 - Assess fetal well-being
 - Placental localization

Uterine Rupture

- Reported in 0.03-0.08% of all delivering women, but 0.3-1.7% among women with a history of a uterine scar (from a C/S for example)
- 13% of all uterine ruptures occur outside the hospital
- The most common maternal morbidity is hemorrhage
- Fetal morbidity is more common with extrusion

Uterine Rupture

- Classic presentation includes vaginal bleeding, pain, cessation of contractions, absence/deterioration of fetal heart rate, loss of station of the fetal head from the birth canal, easily palpable fetal parts, and profound maternal tachycardia and hypotension.
- Patients with a prior uterine scar should be advised to come to the hospital for evaluation of new onset contractions, abdominal pain, or vaginal bleeding.

What are the risk factors associated with uterine rupture?

Uterine Rupture

- Excessive uterine stimulation
- Hx of previous C/S
- Trauma
- Prior rupture
- Previous uterine surgery
- Multiparity
- Non-vertex fetal presentation
- Shoulder dystocia
- Forceps delivery

Uterine Rupture

- Management: Emergent laparotomy

Vasa Previa

- Rarely reported condition in which the fetal vessels from the placenta cross the entrance to the birth canal.
- Incidence varies, but most resources note occurrence in 1:3000 pregnancies.
- Associated with a high fetal mortality rate (50-95%) which can be attributed to rapid fetal exsanguination resulting from the vessels tearing during labor

Vasa Previa

- There are three causes typically noted for vasa previa:
 1. Bi-lobed placenta
 2. Velamentous insertion of the umbilical cord
 3. Succenturiate (Accessory) lobe

Vasa Previa



Vasa Previa



Vasa Previa

- Risk Factors:
 - Bilobed and succenturiate placentas
 - Velamentous insertion of the cord
 - Low-lying placenta
 - Multiple gestation
 - Pregnancies resulting from in vitro fertilization
 - Palpable vessel on vaginal exam

Vasa Previa

- Management:
 - When vasa previa is detected prior to labor, the baby has a much greater chance of surviving.
 - It can be detected during pregnancy with use of transvaginal sonography.
 - When vasa previa is diagnosed prior to labor, elective caesarian is the delivery method of choice.

Kleihauer-Betke Test

- Is a blood test used to measure the amount of fetal hemoglobin transferred from a fetus to the mother's bloodstream.
- Used to determine the required dose of Rh immune globulin.
- Used for detecting fetal-maternal hemorrhage.

Apt test

- The test allows the clinician to determine whether the blood originates from the infant or from the mother.
 - Place 5 mL water in each of 2 test tubes
 - To 1 test tube add 5 drops of vaginal blood
 - To other add 5 drops of maternal (adult) blood
 - Add 6 drops 10% NaOH to each tube
 - Observe for 2 minutes
 - Maternal (adult) blood turns yellow-green-brown; fetal blood stays pink.
 - If fetal blood, deliver STAT.

Postpartum Hemorrhage

- In spite of marked improvements in management, PPH remains a significant contributor to maternal morbidity and mortality both in developing and developed countries.
- One of the most challenging complications a clinician will face.
- Prevention, early recognition and prompt appropriate intervention are the keys to minimizing its impact.

Hematological Changes in Pregnancy

- 40% expansion of blood volume by 30 weeks
- 600 ml/min of blood flows through intervillous space
- Appreciable increase in concentration of Factors I (fibrinogen), VII, VIII, IX, X
- Plasminogen appreciably increased
- Plasmin activity decreased
- Decreased colloid oncotic pressure secondary to 25% reduction in serum albumin

PPH

- Excessive bleeding affects approximately 5 to 15 percent of women after giving birth.
- Hemorrhage that occurs within the first 24 hours postpartum is termed early postpartum hemorrhage.
- While excessive bleeding after 24 hours is referred to as late postpartum hemorrhage.
- In general, early PPH involves heavier bleeding and greater morbidity.

PPH

- The mean blood loss in a vaginal delivery is 500 ml & 1000 ml for cesarean section.
- Definition:
 - Blood loss greater than 500 ml for vaginal and 1000 ml for cesarean delivery.
 - However, clinical estimation of the amount of blood loss is notoriously inaccurate.
 - Another proposed definition for PPH is a 10% drop in haematocrit.

Reduced Maternal Blood Volume

- Small stature
- Severe preeclampsia/eclampsia
- Early gestational age

PPH

| TABLE 1 CLINICAL FINDINGS IN PPH | | | | |
|--|--|-------------------------------------|------------------------------------|----------------------------------|
| Degree of Shock | | | | |
| | Compensation | Mild | Moderate | Severe |
| Blood loss | 500-1000 ml 10-15% | 1000-1500 ml 15-25% | 1500-2000 ml 25-35% | 2000-3000 ml 35-45% |
| Blood Pressure Change (systolic pressure) | none | slight fall (80-100 mmHg) | marked fall (70-80 mmHg) | profound fall (50-70 mmHg) |
| Symptoms and Signs | palpitations dizziness tachycardia | weakness sweating tachycardia | restlessness pallor oliguria | collapse air hunger anuria |

PPH

- The etiologies of early PPH are most easily understood as abnormalities of one or more of four basic processes.
- Bleeding will occur if for some reason the uterus is not able to contract well enough to arrest the bleeding at the placental site.
- Retained products of conception may cause large blood losses postpartum
- Genital tract trauma may cause large blood losses postpartum
- Coagulation abnormalities can cause excessive blood loss alone or when combined with one of the other processes.
- The four “T” processes.

The Four “T”

Tone

Tissue

Trauma

Thrombin

PPH Risk Factors

- Many factors affect a woman's risk of PPH.
- Each of these risk factors can be understood as predisposing her to one or more of the four "T" processes.

PPH Risk Factors

| | Etiology Process | Clinical Risk factors |
|--|--|--|
| Abnormalities of uterine contraction <i>(Tone)</i> | - over distended uterus | - polyhydramnios - multiple gestation - macrosomia |
| | - uterine muscle exhaustion | - rapid labour - prolonged labour - high parity |
| | - intra amniotic infection | - fever - prolonged ROM |
| | - functional/anatomic distortion of the uterus | - fibroid uterus - placenta previa - uterine anomalies |

PPH Risk Factors

| | Etiology Process | Clinical Risk factors |
|---|--|---|
| Retained Products of conception (Tissue) | <ul style="list-style-type: none">- retained products- abnormal placenta- retained cotyledon or succinturiate lobe | <ul style="list-style-type: none">- incomplete placenta at delivery- previous uterine surgery- high parity- abnormal placenta on U/S |
| | <ul style="list-style-type: none">- retained blood clots | <ul style="list-style-type: none">- atonic uterus |

PPH Risk Factors

| | Etiology Process | Clinical Risk factors |
|--|--|--|
| Genital Tract Trauma <i>(Trauma)</i> | - lacerations of the cervix, vagina or perineum | - precipitous delivery - operative delivery |
| | - extensions, lacerations at caesarean section | - malposition - deep engagement |
| | - uterine rupture | - previous uterine surgery |
| | - uterine inversion | - high parity - fundal placenta |

PPH Risk Factors

| | Etiology Process | Clinical Risk factors |
|--|---|--|
| Abnormalities of Coagulation (Thrombin) | <ul style="list-style-type: none"> - pre-existing states <ul style="list-style-type: none"> - hemophilia A - von Willebrand's Disease | <ul style="list-style-type: none"> - hx of hereditary coagulopathies - hx of liver disease |
| | <ul style="list-style-type: none"> - acquired in pregnancy <ul style="list-style-type: none"> - ITP - thrombocytopenia with pre-eclampsia - DIC <ul style="list-style-type: none"> - pre-eclampsia - dead fetus in utero - severe infection - abruption - amniotic fluid embolus | <ul style="list-style-type: none"> - bruising - elevated BP - fetal demise - fever, WBC - antepartum haemorrhage - sudden collapse |
| | <ul style="list-style-type: none"> - therapeutic anti-coagulation | <ul style="list-style-type: none"> - hx of blood clot |

PREVENTION OF PPH

- Although any woman can experience a PPH, the presence of risk factors makes it more likely.
- For women with such risk factors, consideration should be given to extra precautions such as:
 - IV access
 - Coagulation studies
 - Crossmatching of blood
 - Anaesthesia backup
 - Referral to a tertiary centre

PREVENTION OF PPH

- **UTEROTONIC DRUGS**

- Routine oxytocic administration in the third stage of labour can reduce the risk of PPH by more than 40%
- The routine prophylaxis with oxytocics results in a reduced need to use these drugs therapeutically
- Management of the third stage of labour should therefore include the administration of oxytocin after the delivery of the anterior shoulder.

MANAGEMENT OF PPH

- Early recognition of PPH is a very important factor in management.
- An established plan of action for the management of PPH is of great value when the preventative measures have failed.

MANAGEMENT OF PPH

Step 1 Initial Assessment and Treatment

Resuscitation

- large bore IV (s)
- oxygen by mask
- monitor BP, P, R, U/O
- +/- catheter
- +/- oxygen saturation

Assess Etiology

- explore uterus (*tone, tissue*)
- explore LGT (*trauma*)
- review history (*thrombin*)
- observe clots

Laboratory Tests

- CBC
- coagulation screen
- group and cross

MANAGEMENT OF PPH

Step 2 Directed Therapy

"Tone"

- massage
- compress
- drugs

"Tissue"

- manual removal
- curettage

"Trauma"

- correct inversion
- repair laceration
- identify rupture

"Thrombin"

- reverse
- anticoagulation
- replace factors

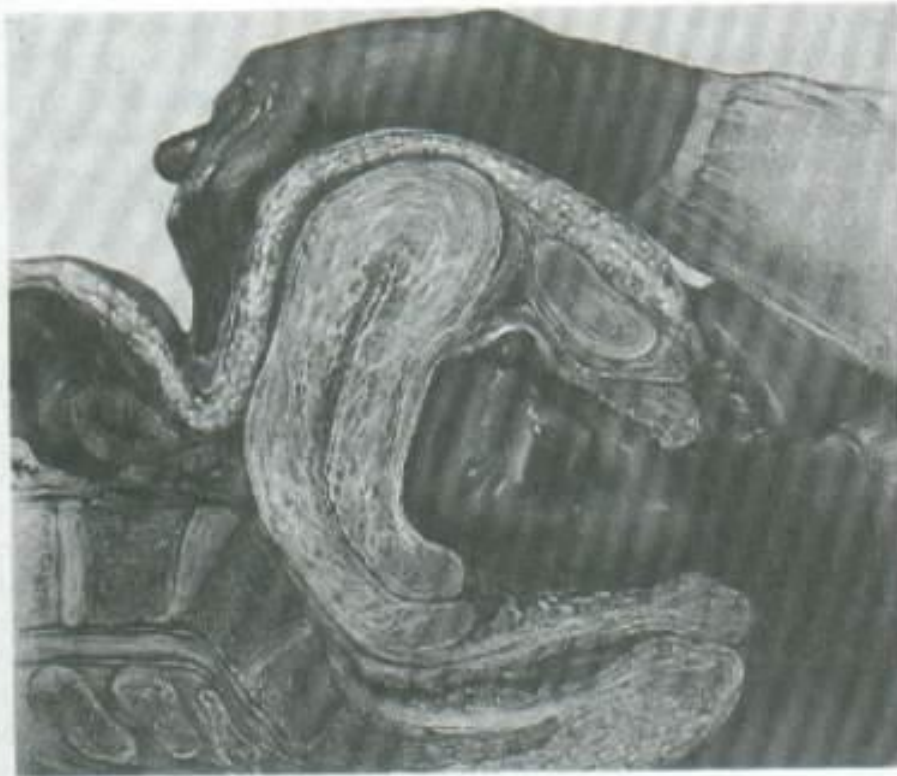


FIGURE 70-1 Bimanual compression of the uterus. Note the position of the hands. (Reproduced by permission from Cunningham, F. G., et al. *Williams Obstetrics*, 19th ed. Norwalk, CT: Appleton & Lange, 1993, p. 619.)

MANAGEMENT OF PPH

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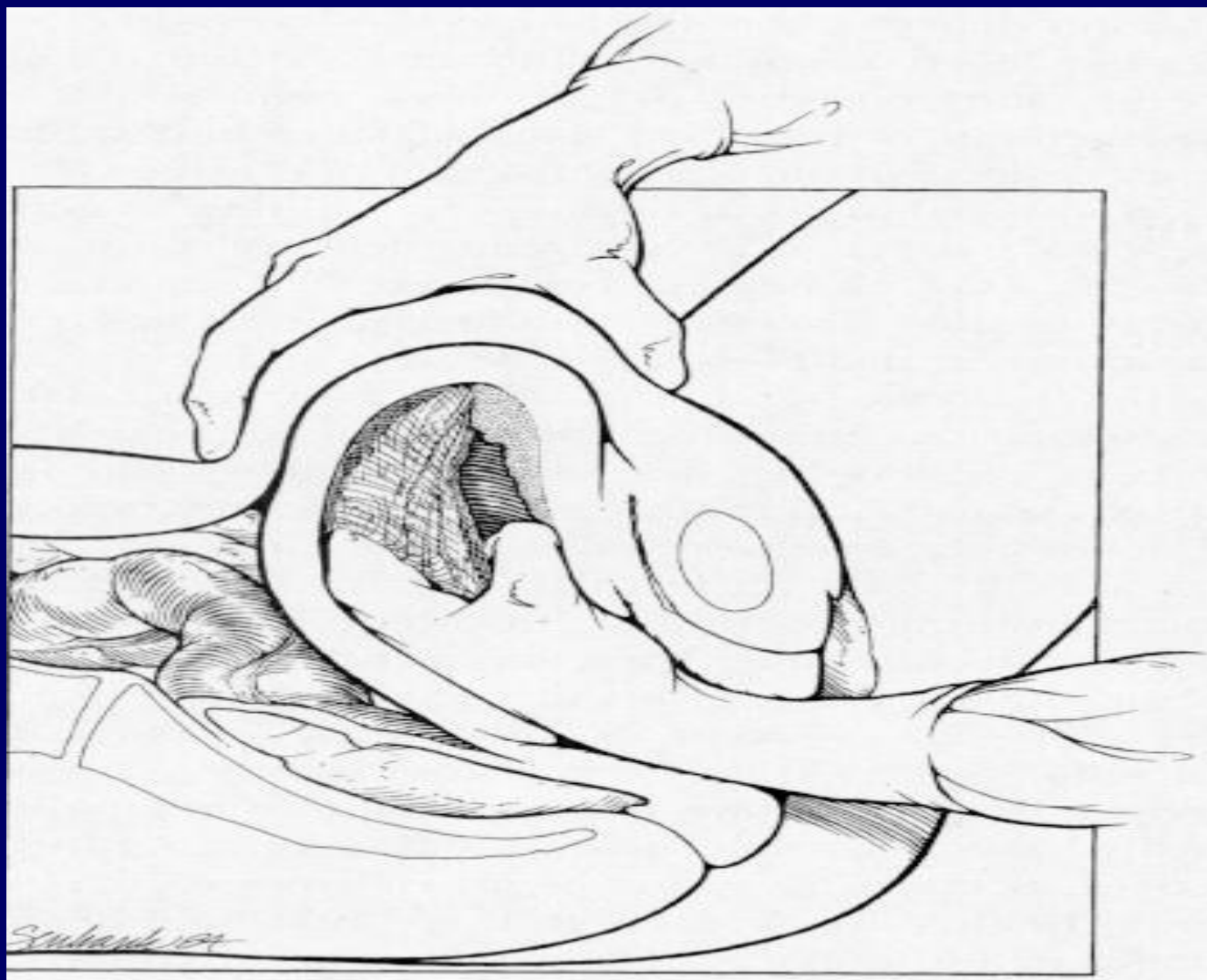
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MANAGEMENT OF PPH

Step 3 Intractable PPH

Get Help

- obstetrician/surgeon
- anaesthesiologist
- lab and ICU

Local Control

- manual compression
- +/- pack uterus
- +/- vasopression
- +/- embolization

BP and Coagulation

- crystalloid
- blood products

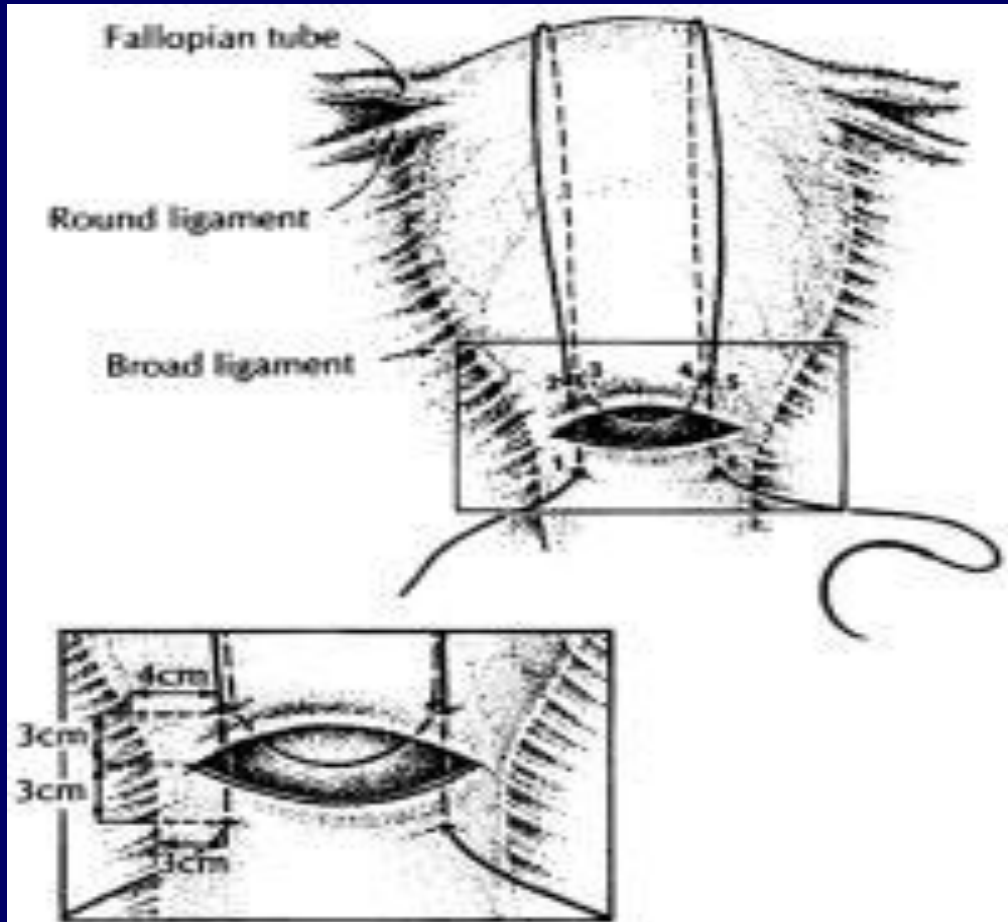
MANAGEMENT OF PPH

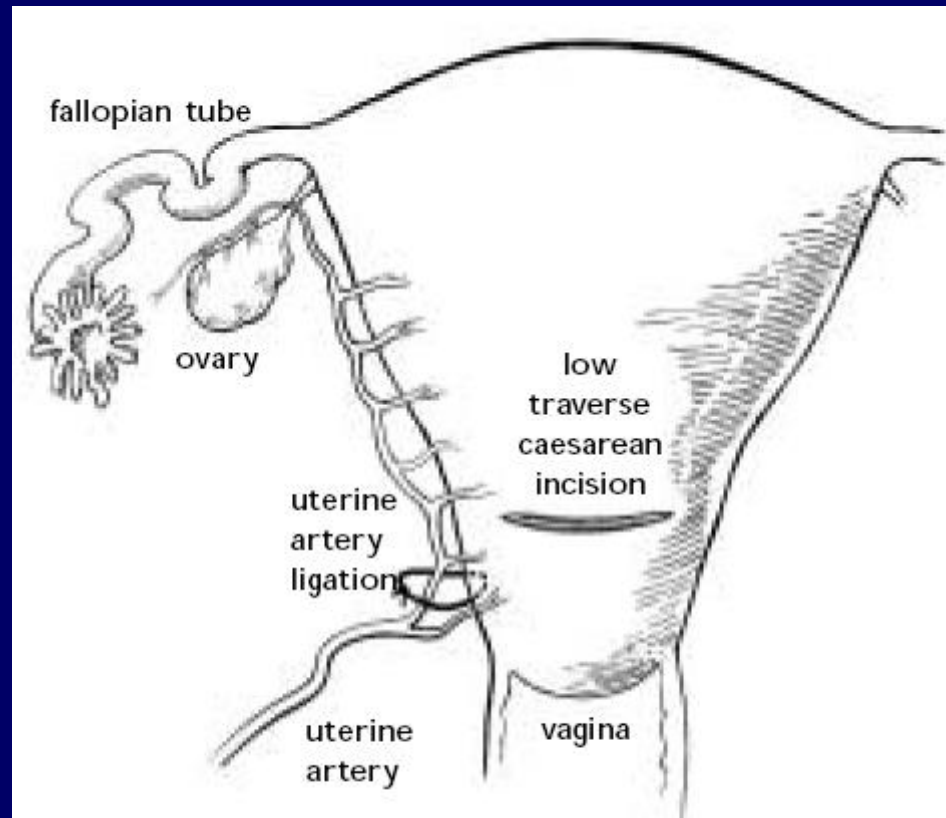
Step 4 Surgery

**Repair
Lacerations**

Ligate Vessels
- uterines
- internal iliac artery
- ovarians

Hysterectomy





MANAGEMENT OF PPH

Step 5
Post Hysterectomy Bleeding

Abdominal Packing

Angiographic Embolization

Summary: Remember 4 Ts

- Tone
- Tissue
- Trauma
- Thrombin

Summary: remember 4 Ts

- “TONE”
- Rule out Uterine Atony
- Palpate fundus.
- Massage uterus.
- Oxytocin
- Methergine
- Hemabate

Summary: remember 4 Ts

- “Tissue”
- R/O retained placenta
- Inspect placenta for missing cotyledons.
- Explore uterus.
- Treat abnormal implantation.

Summary: remember 4 Ts

- “TRAUMA”
- R/O cervical or vaginal lacerations.
- Obtain good exposure.
- Inspect cervix and vagina.
- Worry about slow bleeders.
- Treat hematomas.

Summary: remember 4 Ts

- “THROMBIN”
- Check labs if suspicious.

Assessments**Meds/Procedures****Blood Bank****Stage 3**

Total blood loss over 1500ml, or >2 units PRBCs given or VS unstable or suspicion of DIC

Stage 3 is focused on the Massive Transfusion protocol and invasive surgical approaches for control of bleeding.

- **Mobilize team**
 - Advanced GYN surgeon
 - 2nd Anesthesia Provider
 - OR staff
 - Adult Intensivist
- **Repeat labs** including coags and ABG's
- Central line
- Social Worker/ family support

- **Activate Massive Hemorrhage Protocol**
- Laparotomy:
 - B-Lynch Suture
 - Uterine Artery Ligation
 - Hysterectomy
- Patient support
 - Fluid warmer
 - Upper body warming device
 - Sequential compression stockings

Transfuse Aggressively
 Massive Hemorrhage Pack

- Near 1:1 PRBC:FFP
- 1 PLT pheresis pack per 6units PRBCs

Unresponsive Coagulopathy:
 After 10 units PRBCs and full coagulation factor replacement: may consider **rFactor VIIa**