

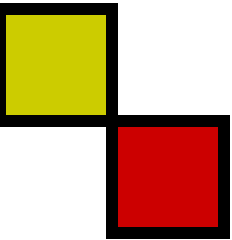
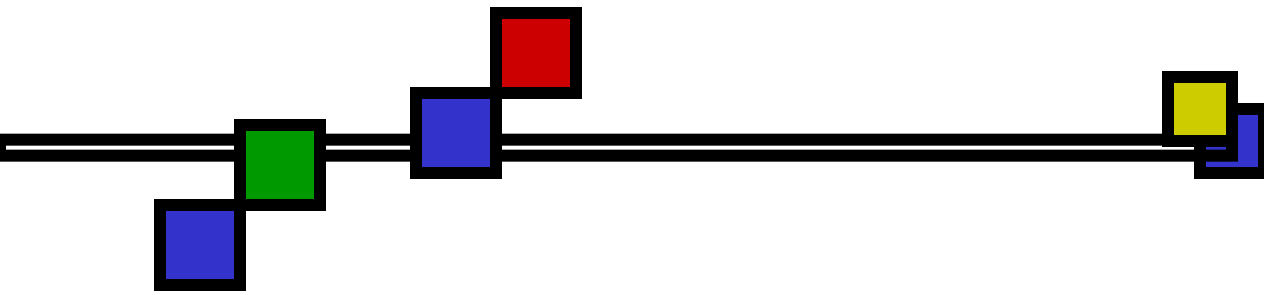
بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



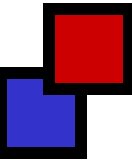
Dr. Sawsan Talib

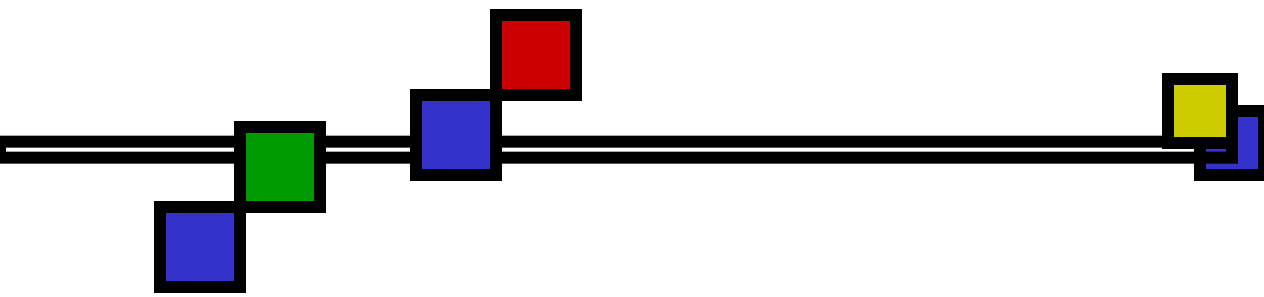
Lecturer & Decider of Department of
Obstetrics & Gynecology

College of Medicine/ Diyala University

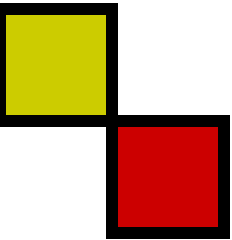


Antepartum & Postpartum Hemorrhage



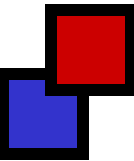


- Obstetrics is "bloody business."



- 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.



Obstetric Hemorrhage Can Be Challenging



Bleeding can be rapid

life threatening



Dilution with amniotic fluid

can be difficult to quantify

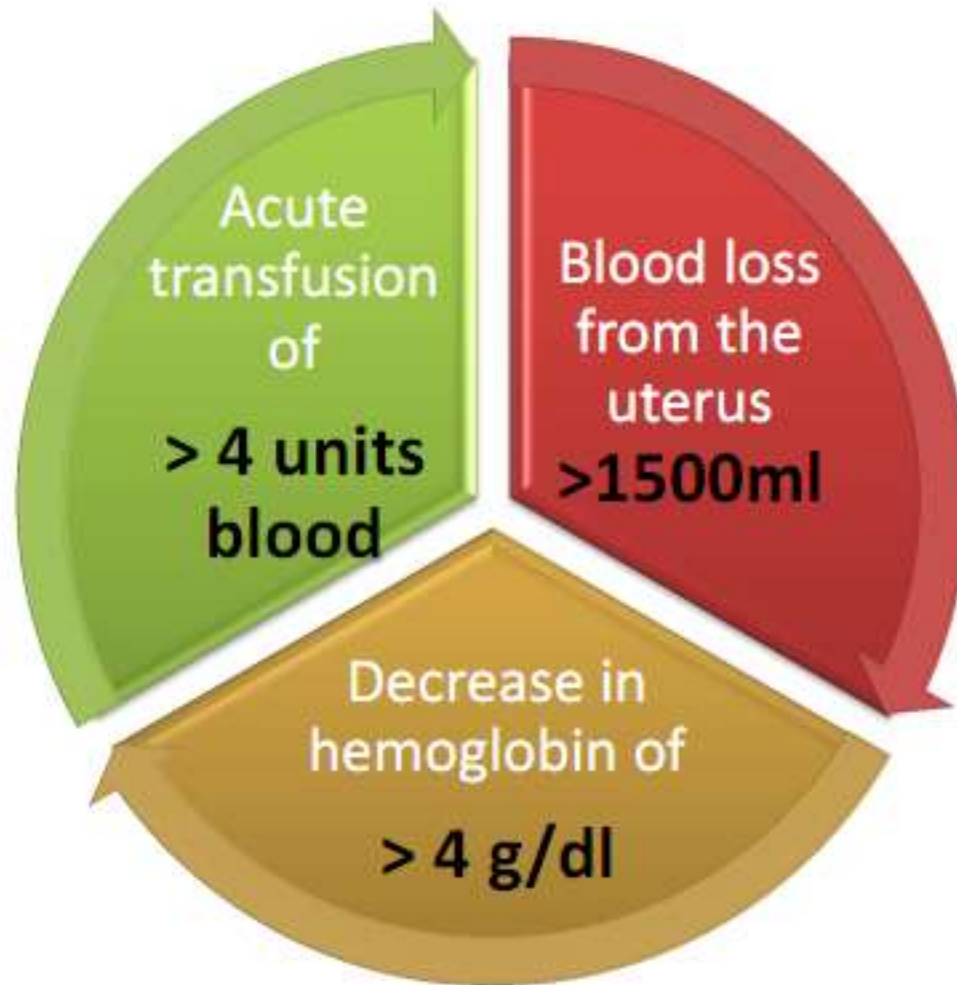
Blood loss may be concealed



Physiological changes of pregnancy

mask the normal clinical signs of hypovolemia

Definition of Massive Obstetric Hemorrhage



Definition

Antepartum

after 24th week
gestation
&
before delivery

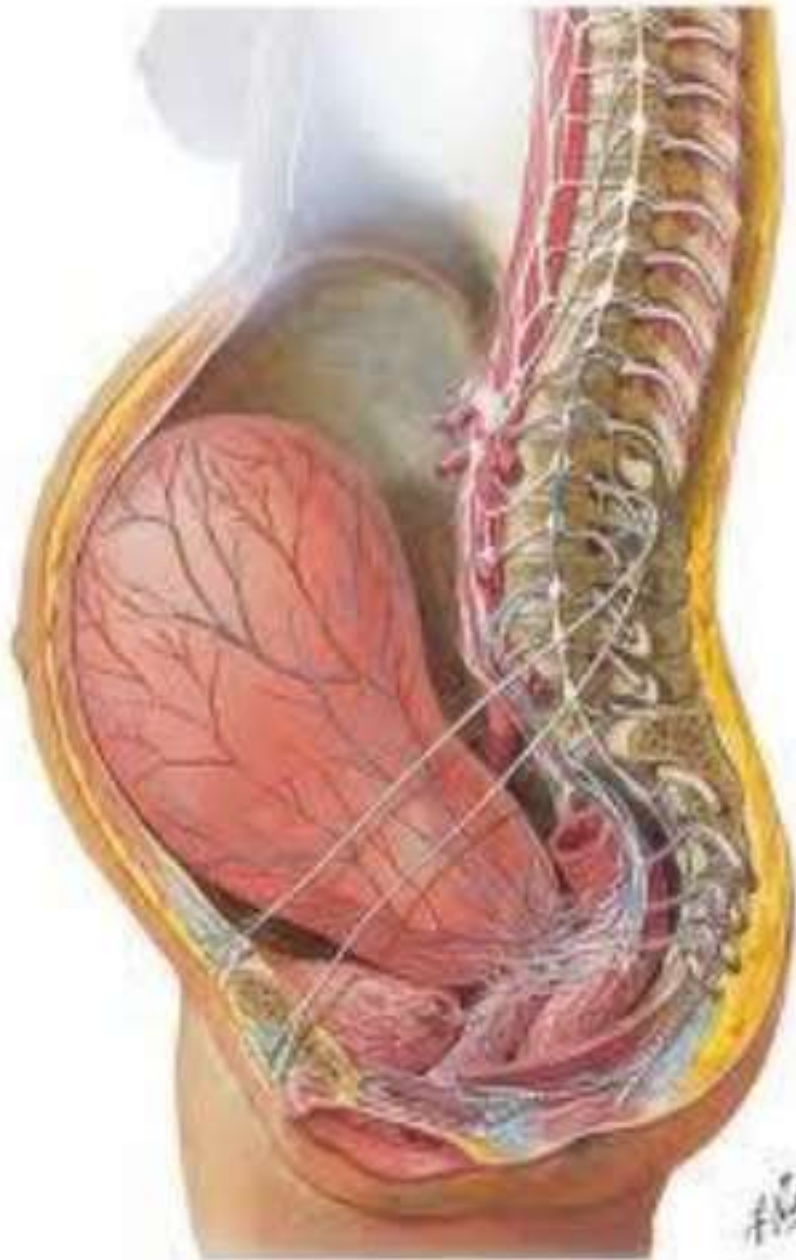
placenta previa
placental abruption
bleeding from vaginal or
cervical lesions

Postpartum:

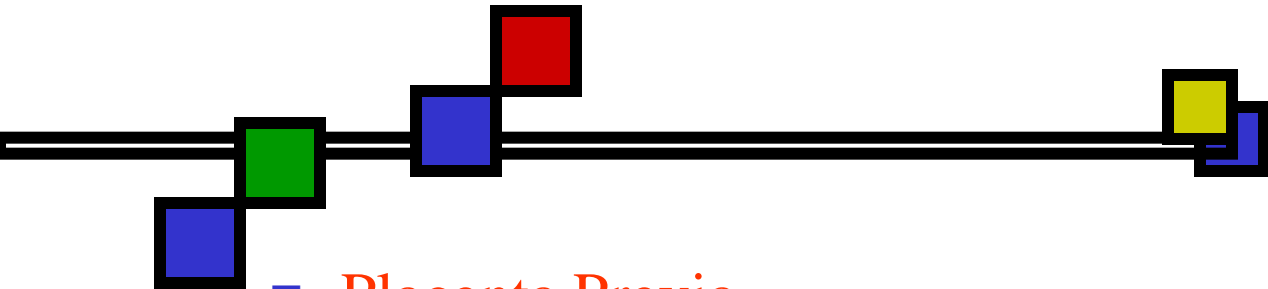
Primary: within 24 h of
delivery

Secondary: 24 h to 6 weeks
post delivery

uterine atony, retained
products, genital tract
trauma, uterine inversion

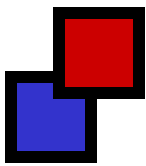
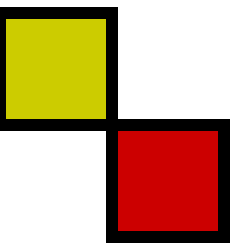


ANTEPARTUM HEMORRHAGE

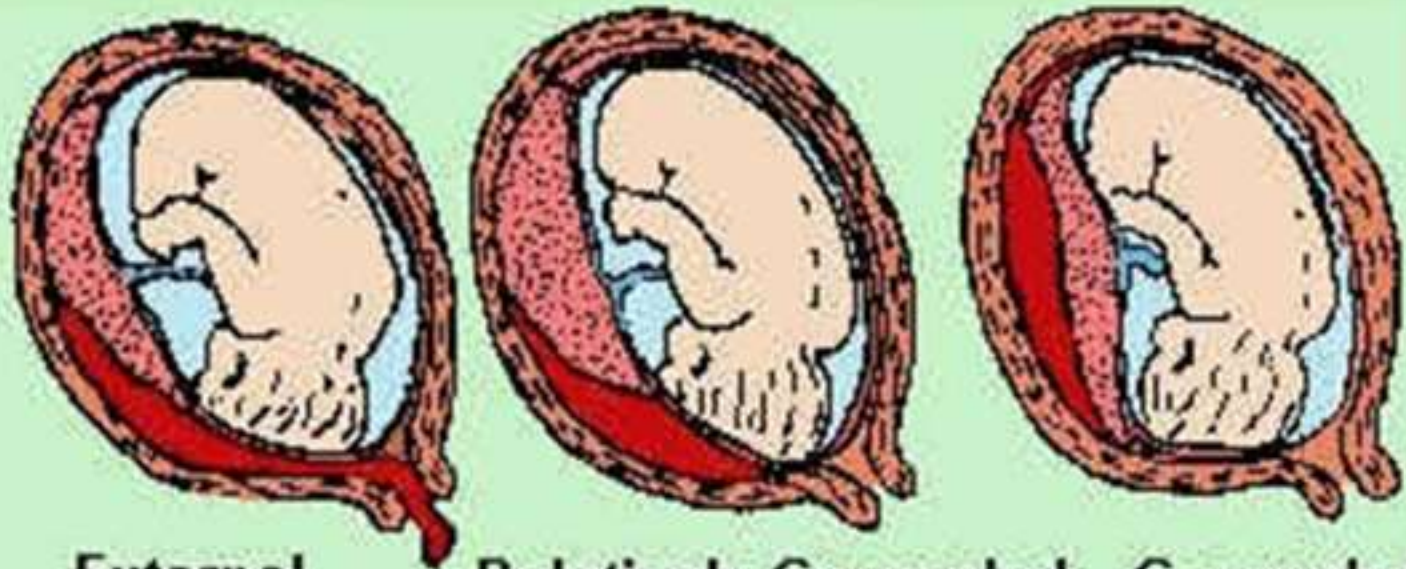


- Placenta Previa
- Placental Abruption
- Uterine Rupture
- Vasa Previa
- Bloody Show
- Coagulation Disorder
- Hemorrhoids
- Vaginal Lesion/Injury
- Cervical Lesion/Injury
- Neoplasia

COMMON CAUSES



Placenta Abruption



**External
Abruption**

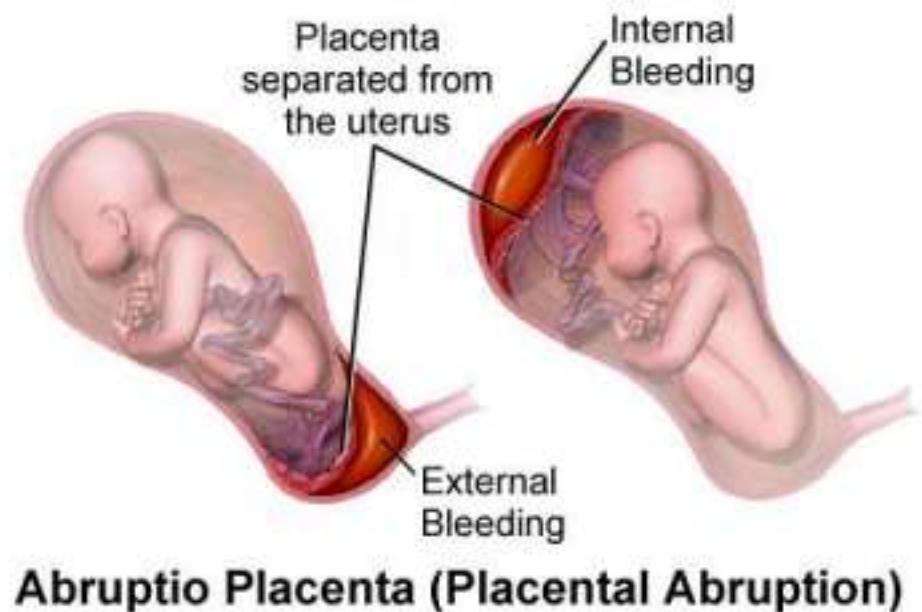
**Relatively Concealed
Abruption**

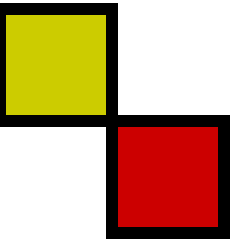
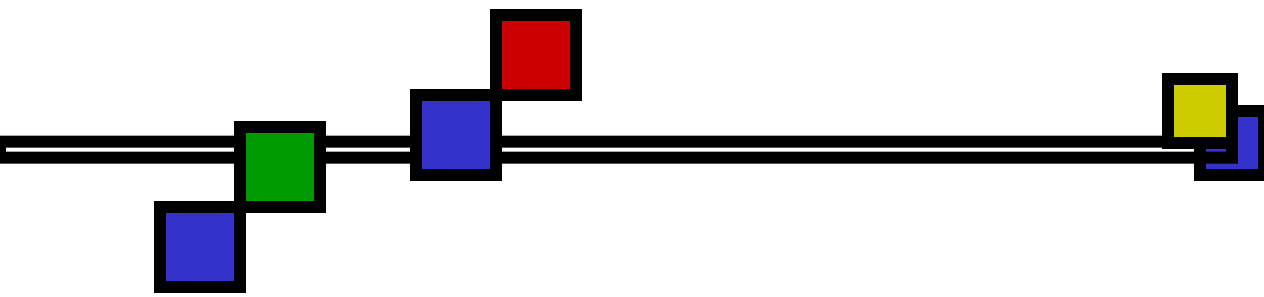
**Concealed
Abruption**

Classification of Abruptio Placentae

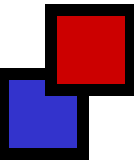
Placenta Abruption

Premature separation
of a normally sited
placenta from the
uterine wall after the
20th week of
gestation and **prior to**
delivery





- 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.



Placenta abruption

- Risk factors :

Previous history
of abruption

Maternal
hypertension

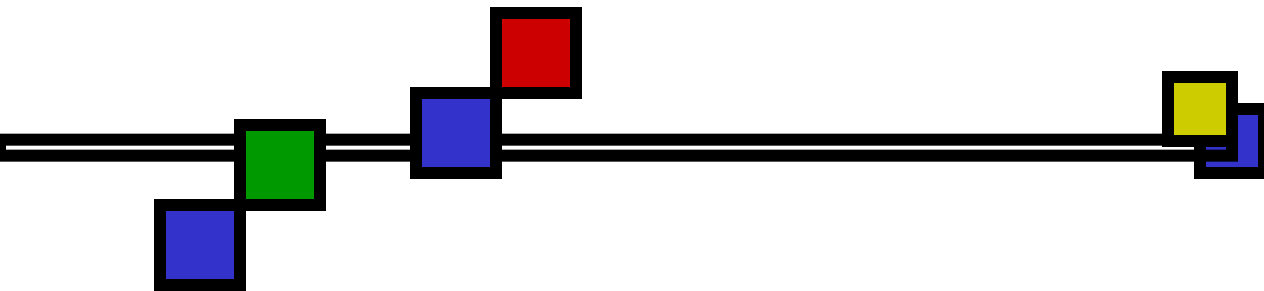
Smoking

History of
premature
rupture of
membranes

Abdominal
trauma

High parity

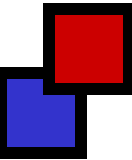
Cocaine use

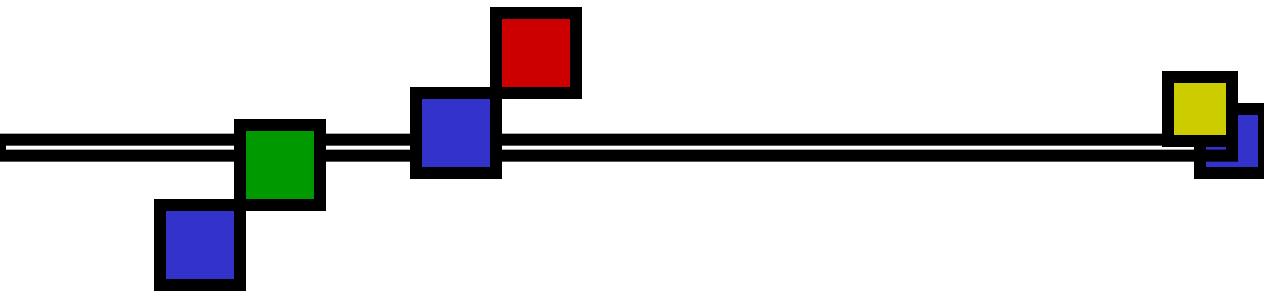


■ *Pathology*

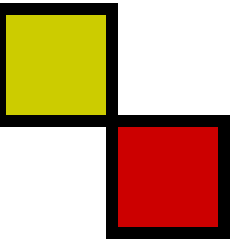
Placental Abruption

- 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.

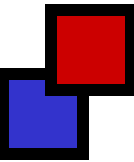




Placental Abruption



- 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

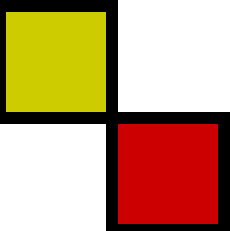
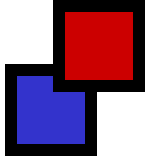
- The hallmark symptom of placental abruption is pain which can vary from mild cramping to severe pain.
 - A firm, tender uterus and a possible sudden increase in fundal height on exam.
 - The amount of external bleeding may not accurately reflect the amount of blood loss.
 - **Importantly, negative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

Table 1. Definition of different grades of placental abruption

Grade	Definition
0	Asymptomatic with a small retroplacental clot
1	Vaginal bleeding with no signs of maternal or fetal compromise
2	Vaginal bleeding with signs of fetal compromise
3	Vaginal bleeding accompanied by uterine tetany, abdominal pain, and signs of fetal and maternal compromise Coagulopathy in 1/3 of cases

Signs and symptoms



Vaginal bleeding.

Lower abdominal tenderness

Rapid abnormal uterine contractions

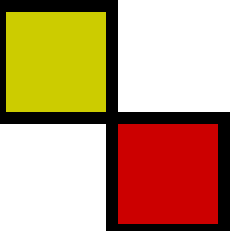
Fetal heart rate abnormalities : Intrauterine death..

Maternal cardiovascular collapse

Disseminated intravascular coagulation



Placental Abruption

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



Management

The management of placental abruption, including the timing and route of delivery, depends :

- degree of maternal & fetal compromise
- fetal presentation, gestational age.



Placenta Previa

Placenta previa occurs when the placenta is totally or partially inserted in the lower uterine segment



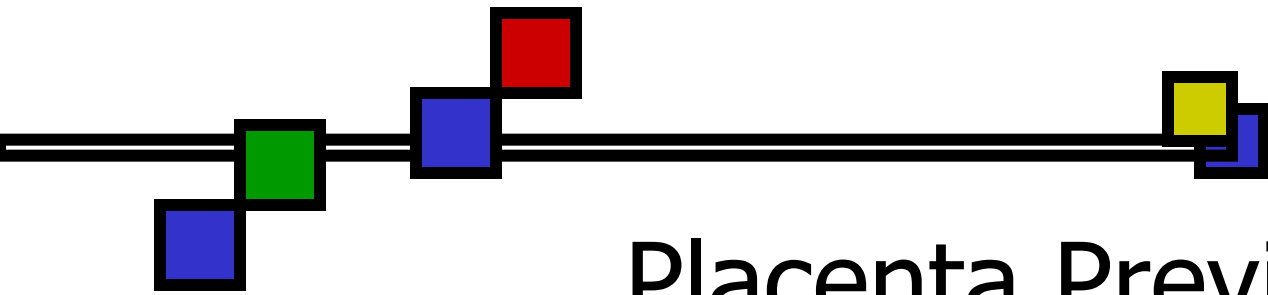
Marginal



Complete

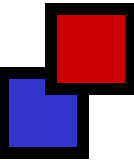
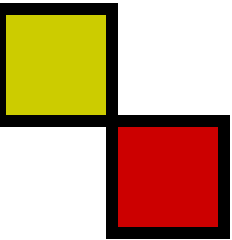


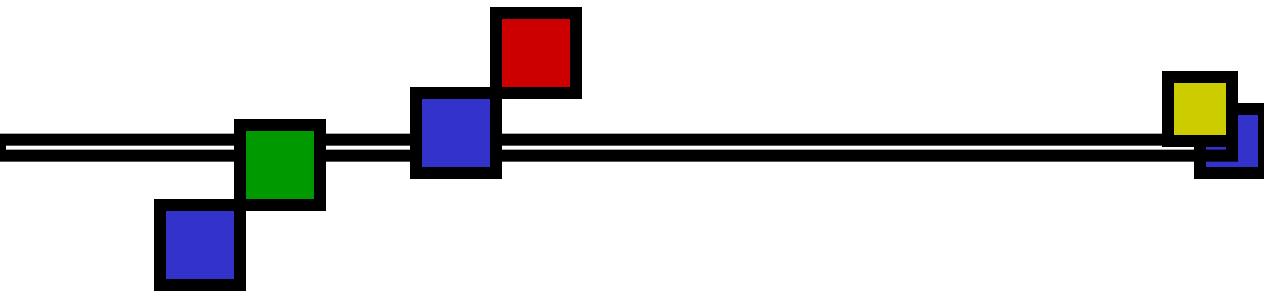
Low-lying



Placenta Previa

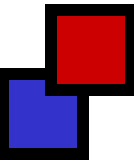
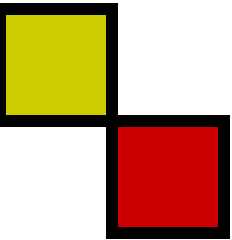
1. *Total placenta previa.* The internal cervical os is covered completely by placenta.
2. *Partial placenta previa.* The internal os is partially covered by placenta.
3. *Marginal placenta previa.* The edge of the placenta is at the margin of the internal os.
4. *Low-lying placenta.* The placenta is 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

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



Risk Factors for Placenta Previa^[1]

Smoking

Recurrent abortions

Multiparity

Prior uterine surgery

Cocaine use

Advancing age (> 35 years)

Erythroblastosis

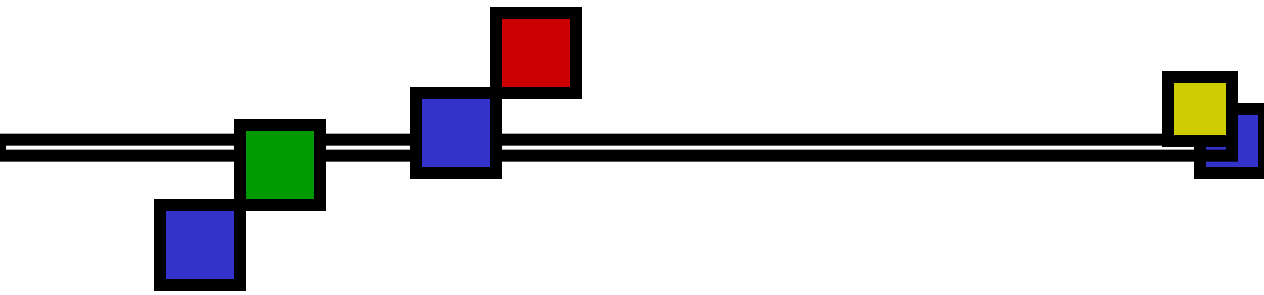
Low socioeconomic status

Nonwhite ethnicity

Short interpregnancy interval

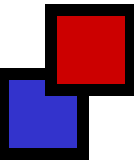
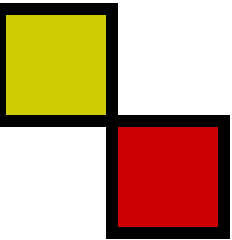
Infertility treatment

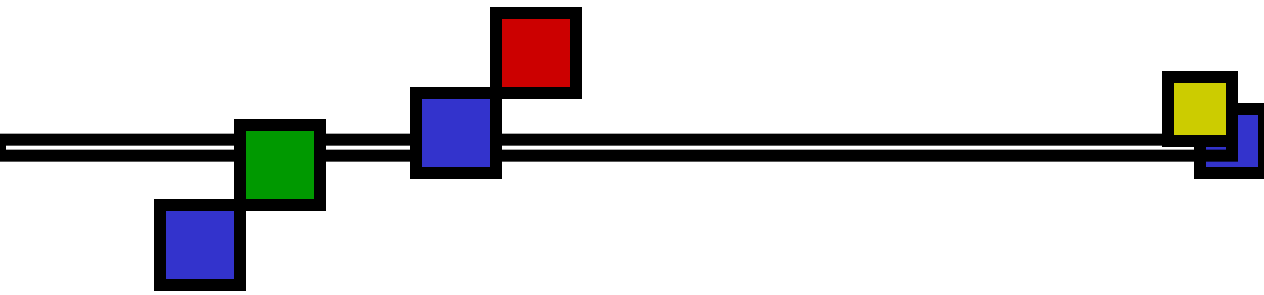
Multiple gestation (larger surface area of the placenta)



Placenta Previa

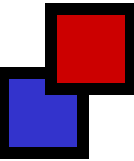
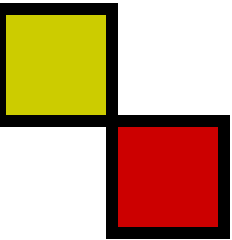
- The most characteristic event in placenta previa is painless hemorrhage.
- This usually occurs near the end of or after the second trimester.
- The initial bleeding is rarely so profuse as to prove fatal.
- It usually ceases spontaneously, only to recur.





Placenta Previa

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

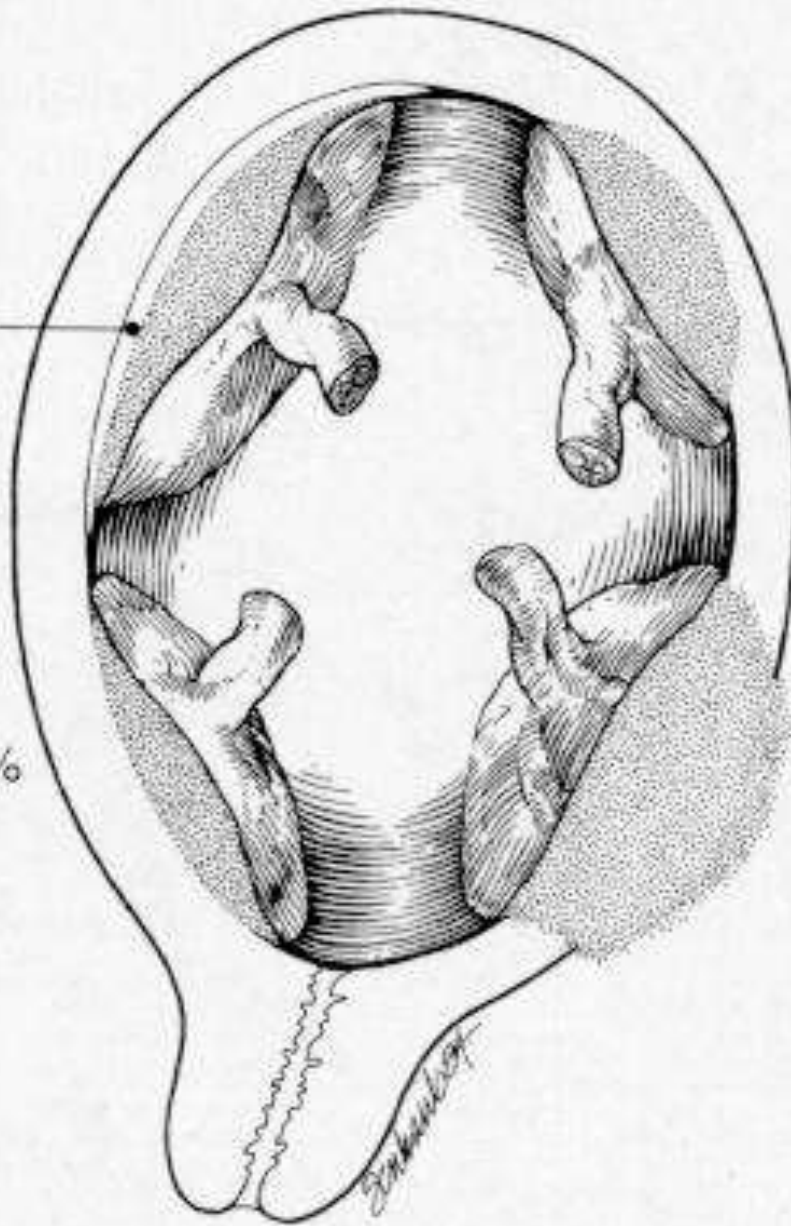


NORMAL
decidua

INCRETA—17%

ACCRETA—78%

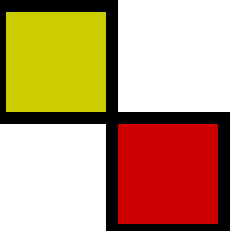
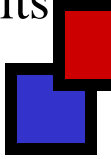
PERCRETA—5%

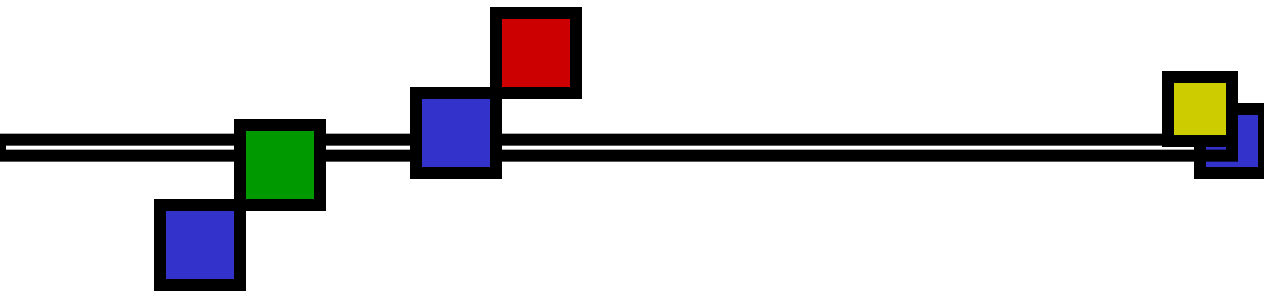




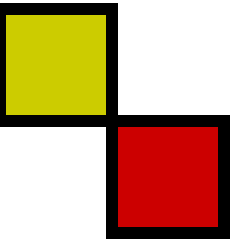
Placenta Previa

- *Diagnosis.*

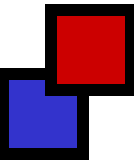
- 
- Placenta previa or abruption should always be suspected in women with uterine bleeding during the latter half of pregnancy.
 - The possibility of placenta previa should not be dismissed until appropriate evaluation, including sonography, has clearly proved its absence.
 - The diagnosis of placenta 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.**
- 

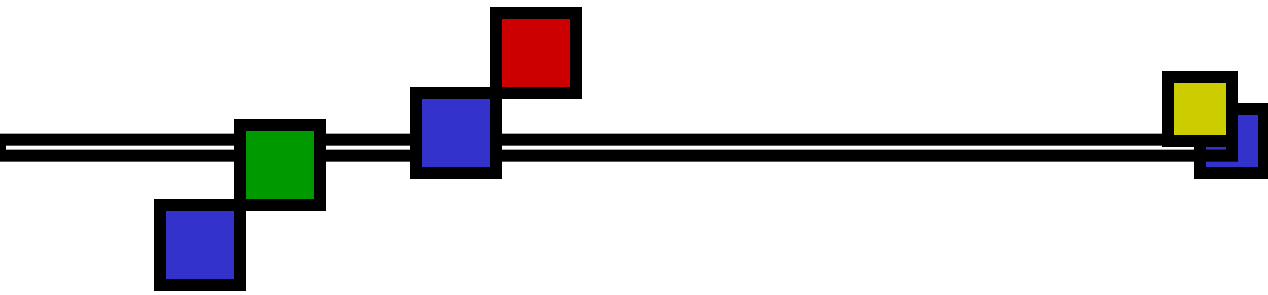


Placenta Previa



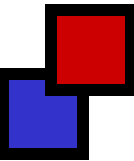
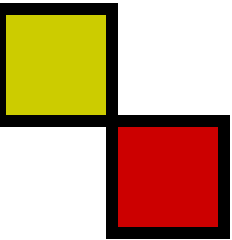
- The simplest and safest method of placental localization is provided by *transabdominal sonography*.
- *Transvaginal ultrasonography* has substantively improved diagnostic accuracy of placenta previa.
- MRI
- At 18 weeks, 5-10% of placentas are low lying. Most 'migrate' with development of the lower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

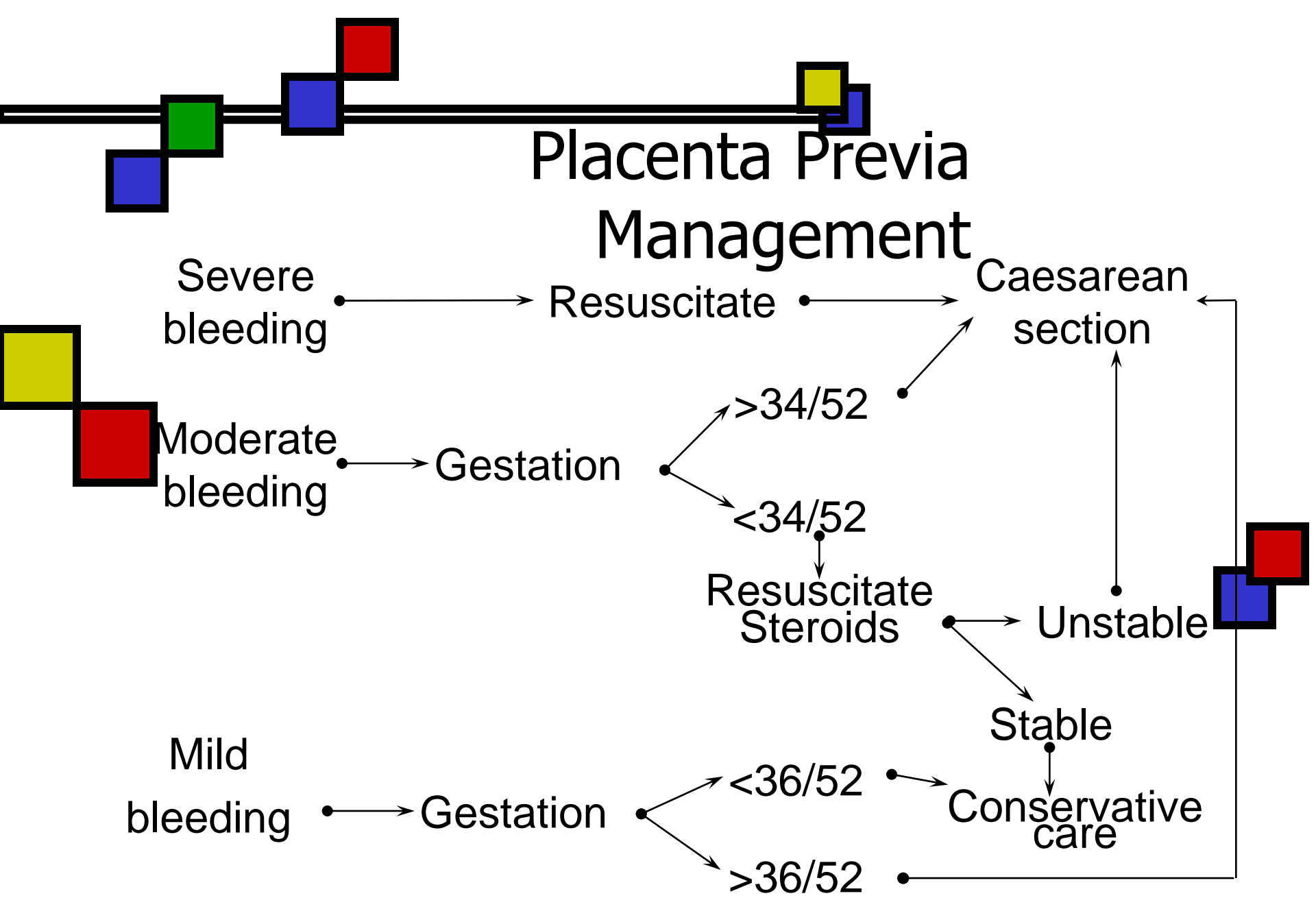


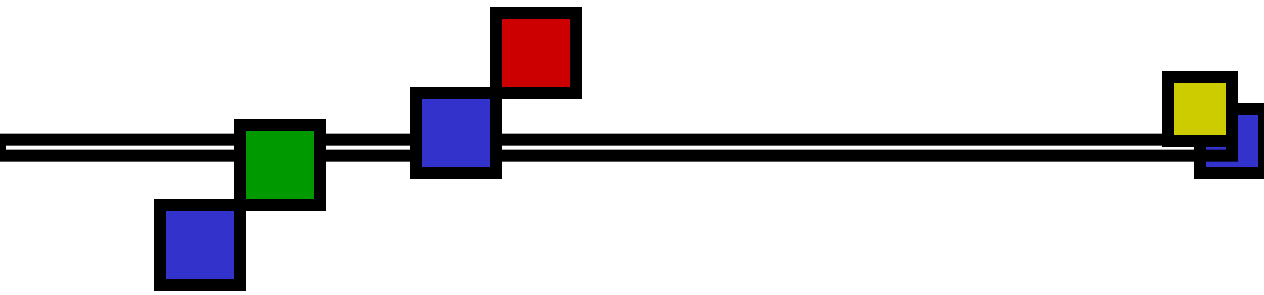


Placenta Previa Management

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

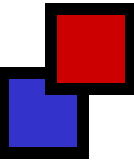






Placenta Previa Management

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



Uterine Rupture

- Incidence : 1/2000 deliveries

Complete



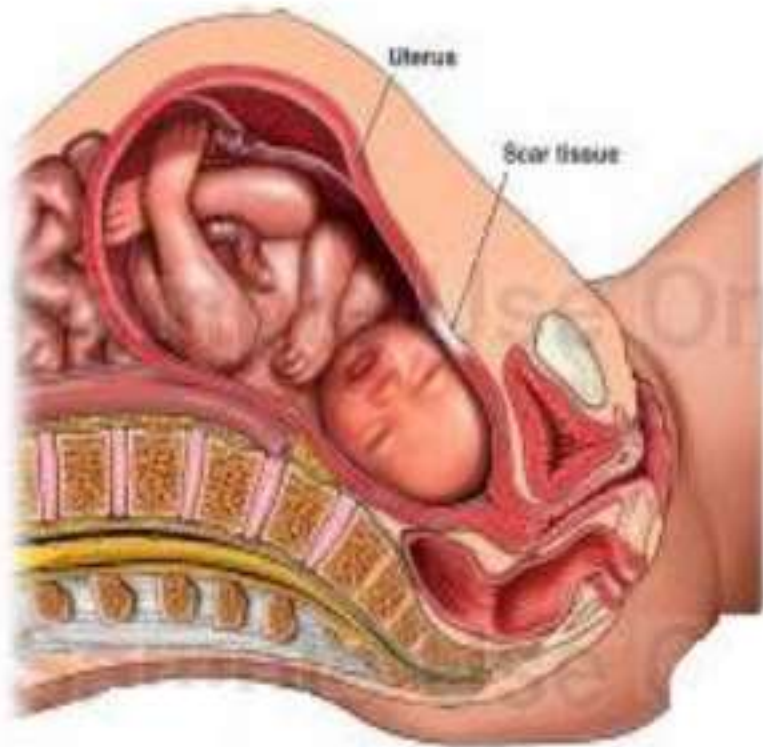
All the 3 layers are involved

Incomplete



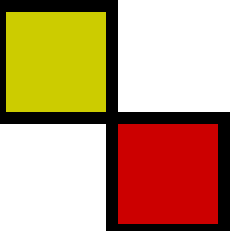
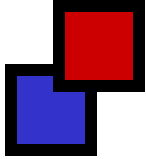
Peritoneum remains intact

Uterine Rupture





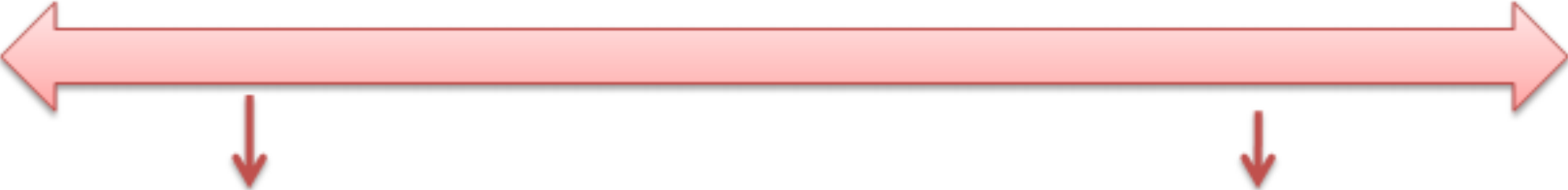
Uterine Rupture

- 
- 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.
- 

Uterine Rupture

Most life-threatening emergencies in obstetrics

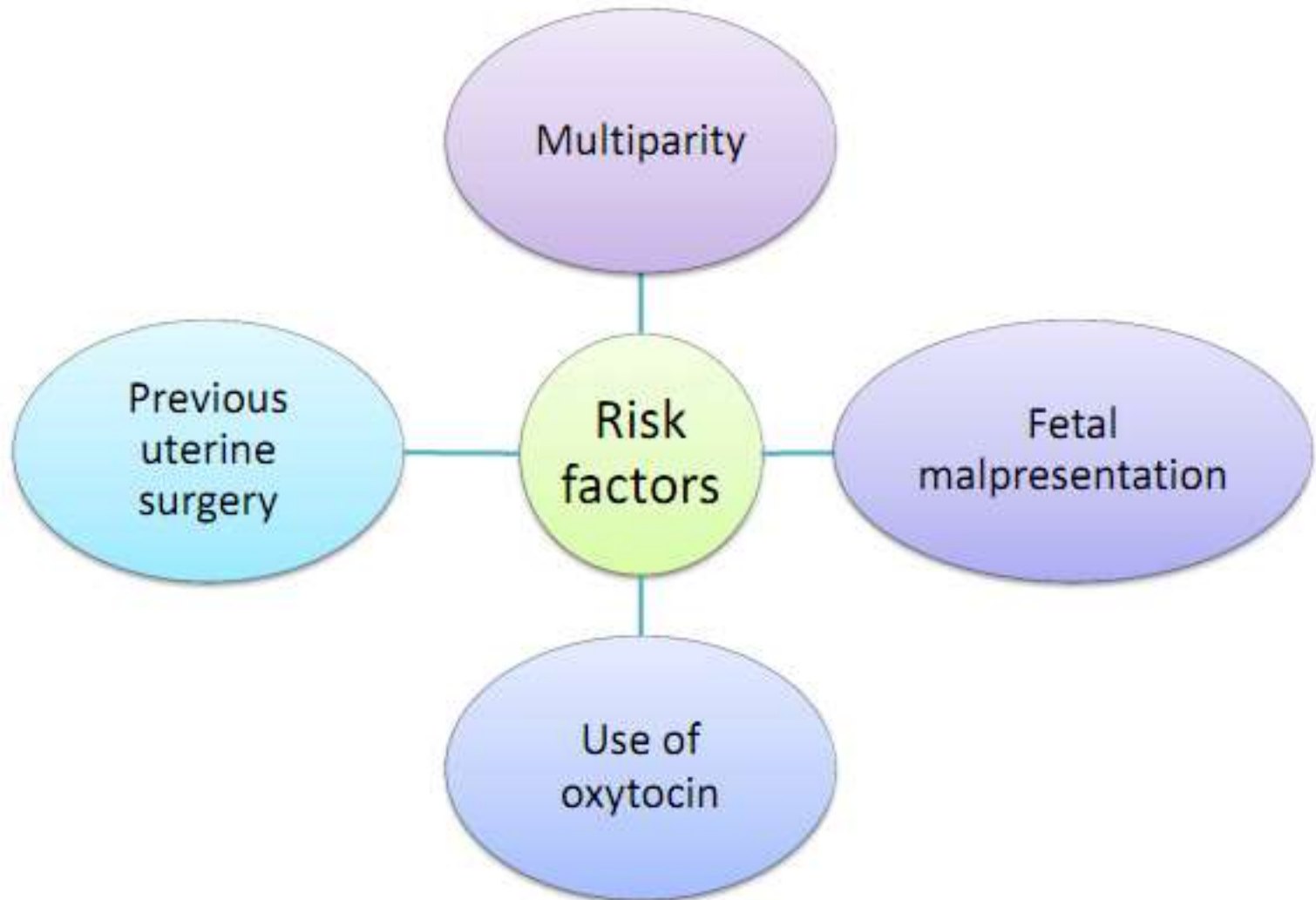
Associated with high maternal and peri-natal morbidity and mortality.

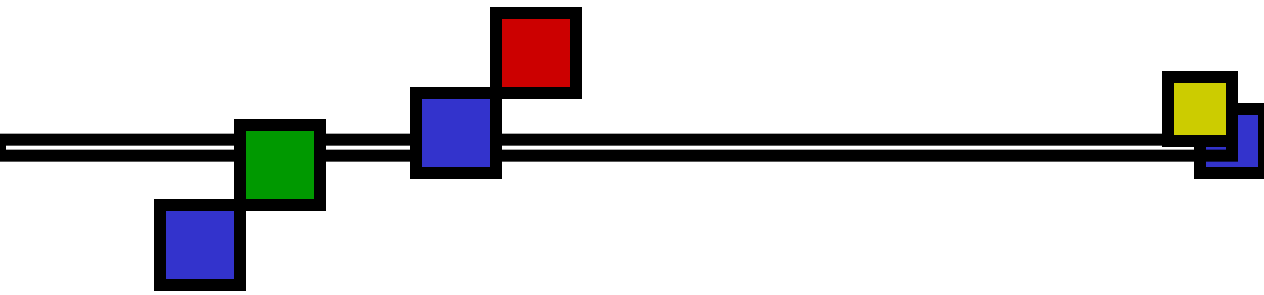


Uterine tenderness
Non-reassuring fetal heart patterns

Localized abdominal pain
Rapid onset of maternal hypovolemic shock

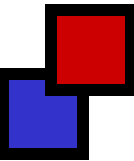
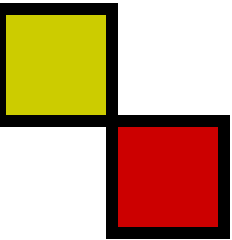
Uterine Rupture

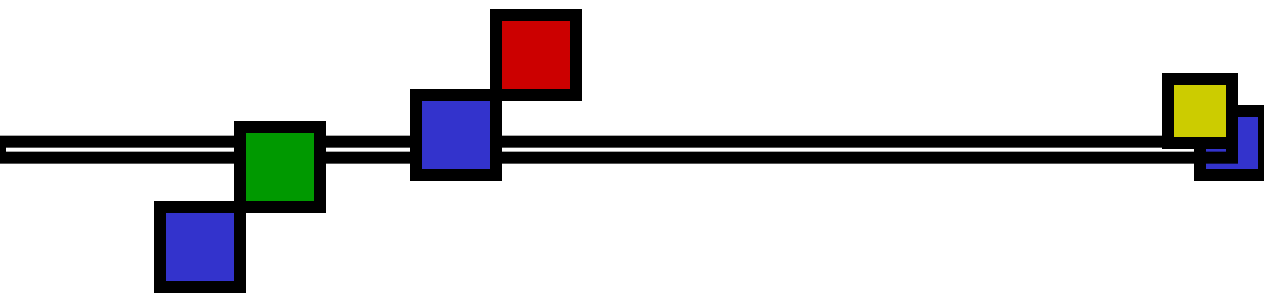




Uterine Rupture

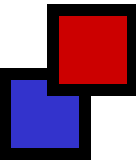
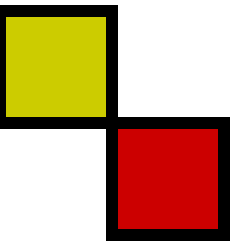
- Management: Emergent laparotomy

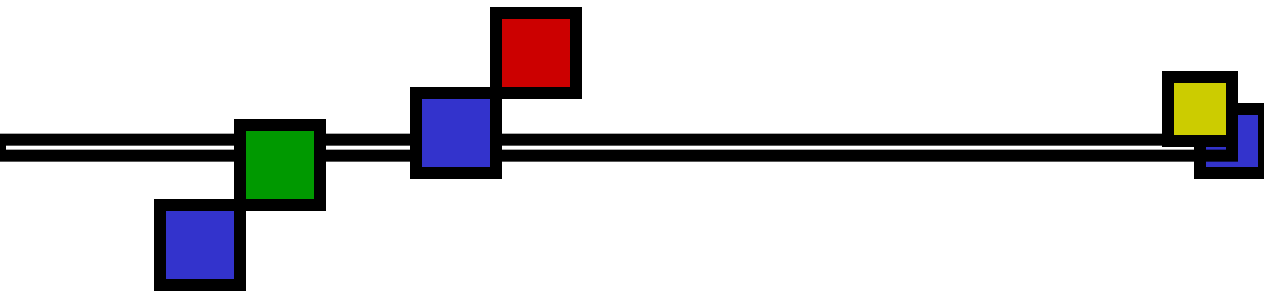




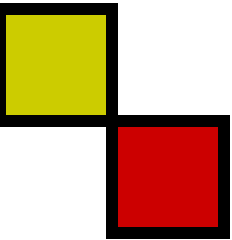
Vasa Previa

- 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



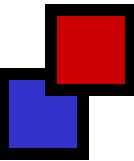


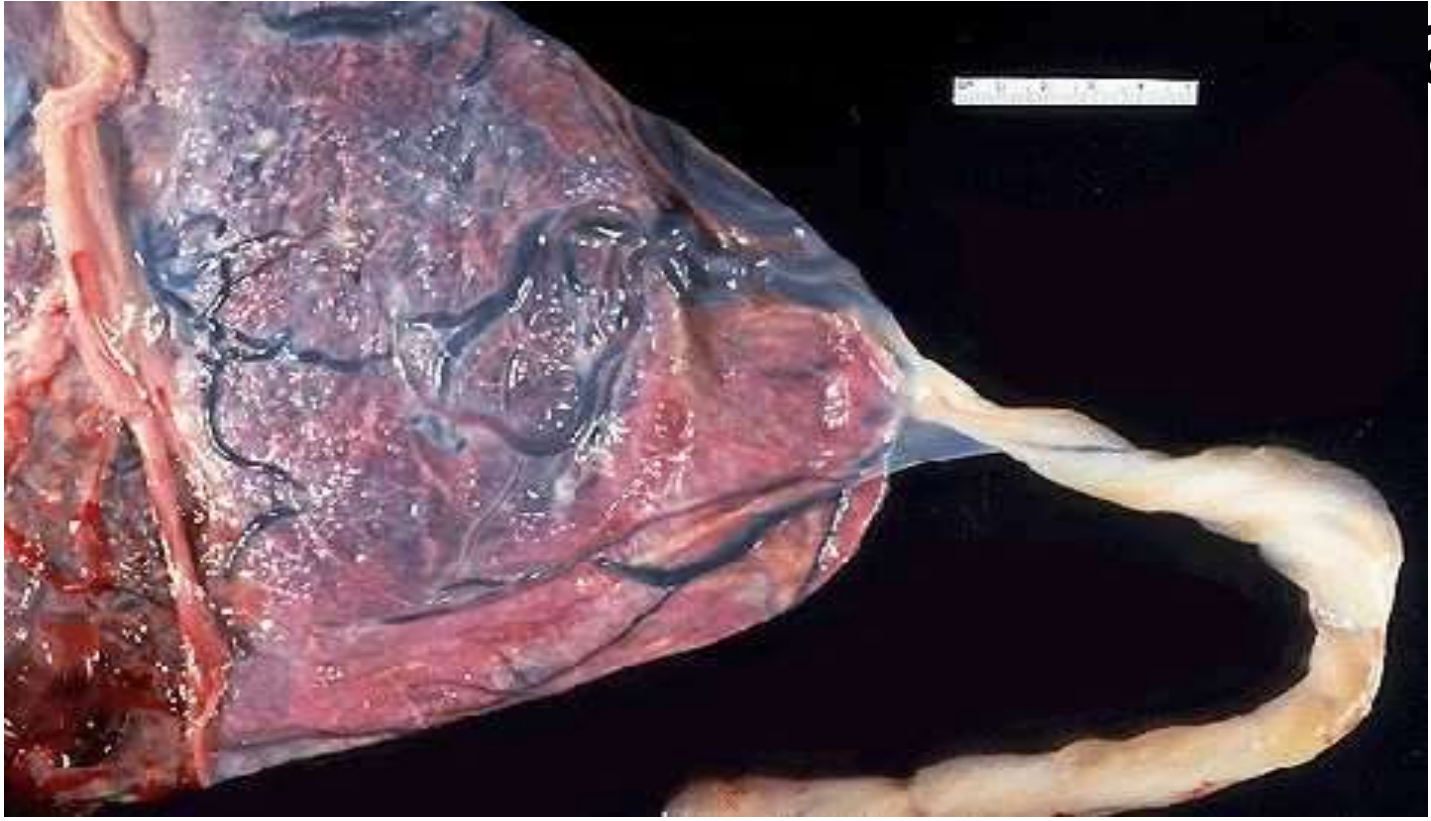
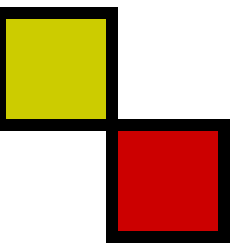
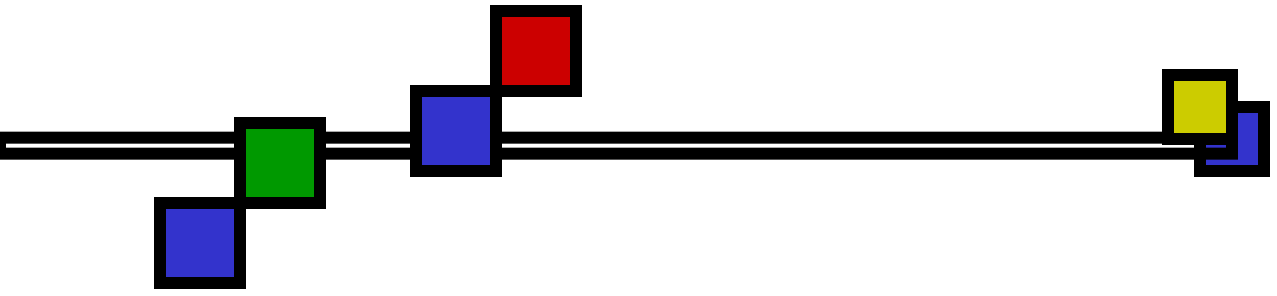
Vasa Previa



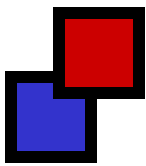
- There are three causes typically noted for vasa previa:

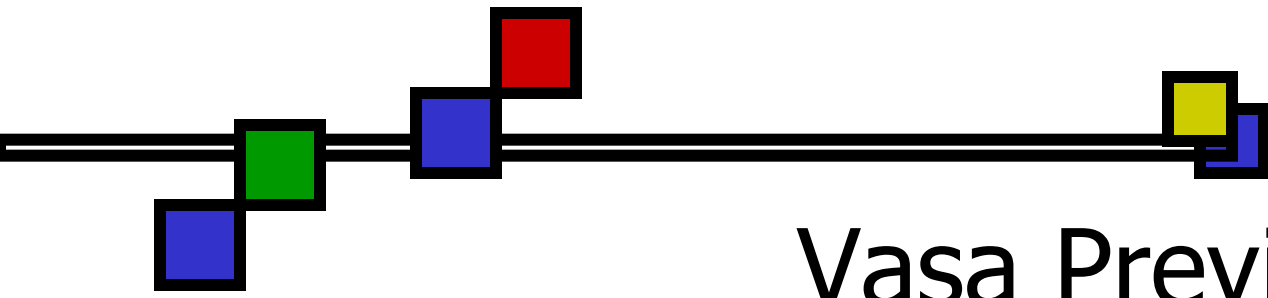
1. Bi-lobed placenta
2. Velamentous insertion of the umbilical cord
3. Succenturiate (Accessory) lobe



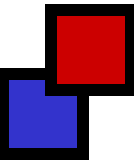
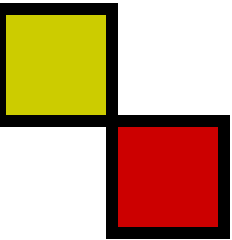


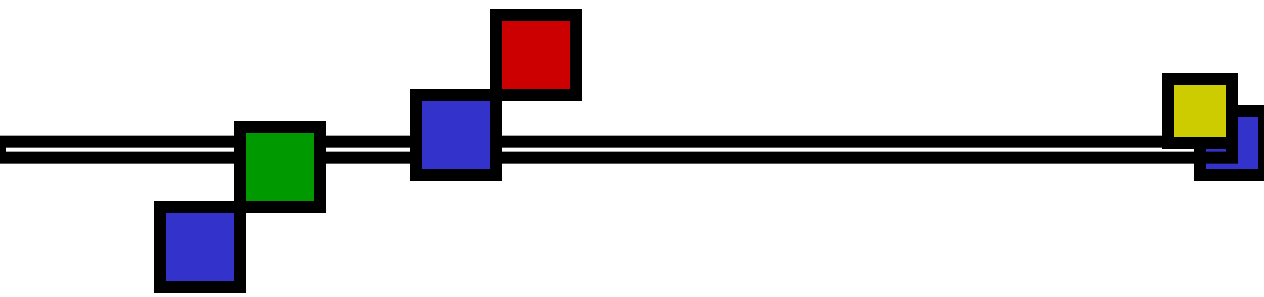
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Vasa Previa

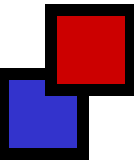


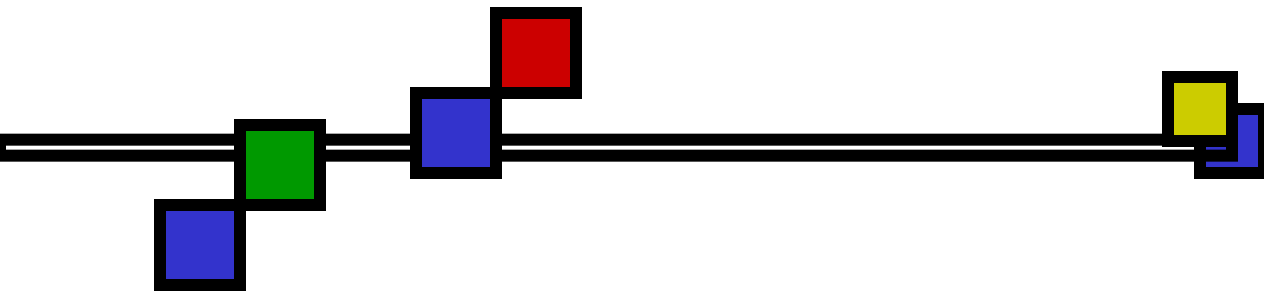


■ Risk Factors:

Vasa Previa

- 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

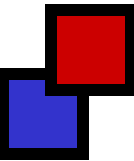
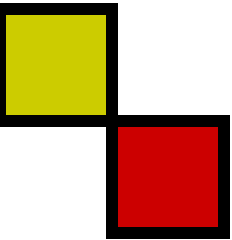


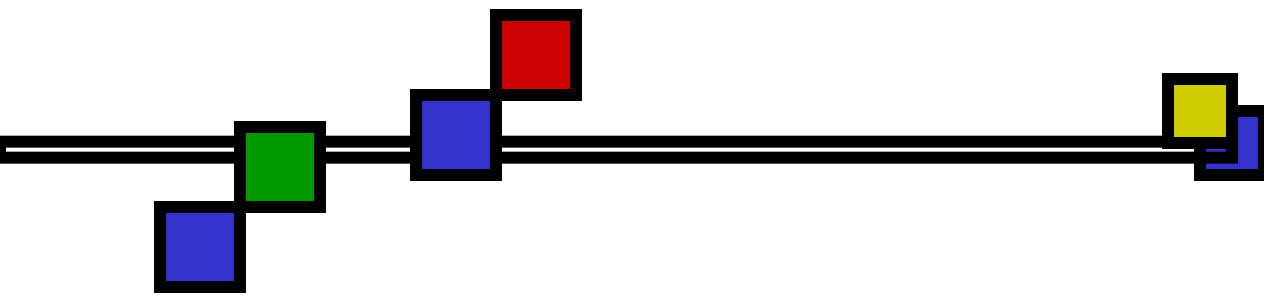


Vasa Previa

- Management:

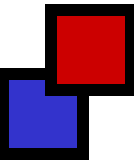
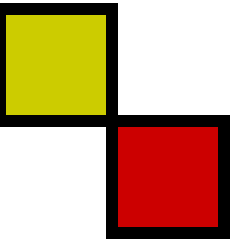
- When vasa previa is detected prior to labor, the baby has a much greater chance of surviving.
- It can be detected during pregnancy with use of transvaginal sonography.
- When vasa previa is diagnosed prior to labor, elective caesarian is the delivery method of choice.

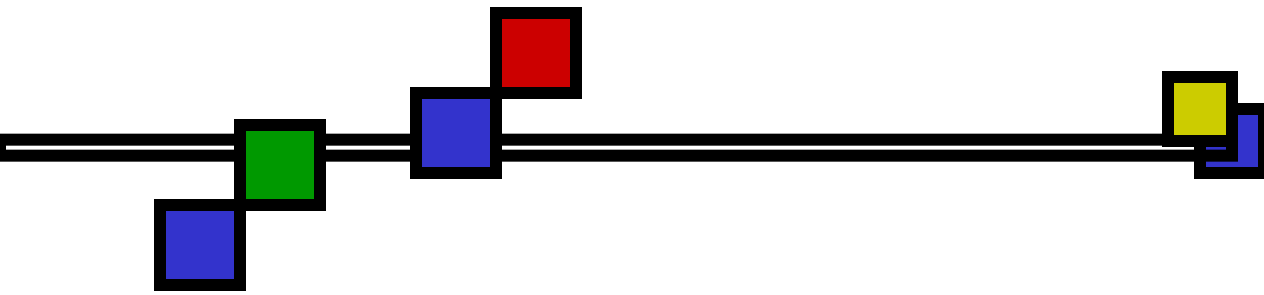




Kleihauer-Betke Test

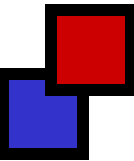
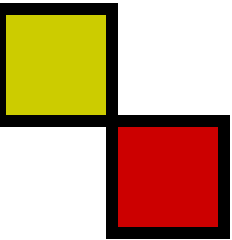
- Is a blood test used to measure the amount of fetal hemoglobin transferred from a fetus to the mother's bloodstream.
- Used to determine the required dose of Rh immune globulin.
- Used for detecting fetal-maternal hemorrhage.





Apt test

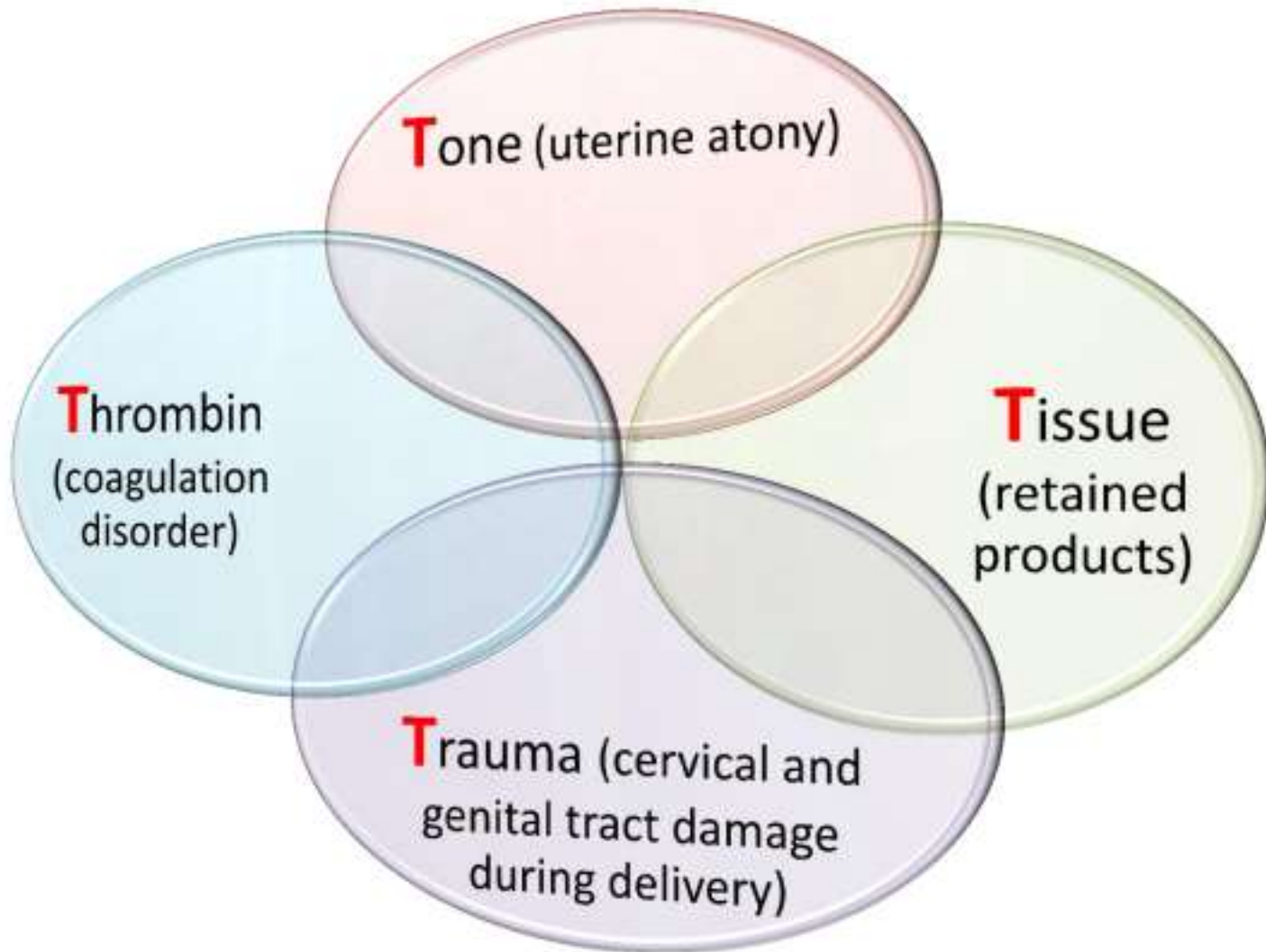
- The test allows the clinician to determine whether the blood originates from the infant or from the mother.
 - Place 5 mL water in each of 2 test tubes
 - To 1 test tube add 5 drops of vaginal blood
 - To other add 5 drops of maternal (adult) blood
 - Add 6 drops 10% NaOH to each tube
 - Observe for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



Postpartum Hemorrhage



4 T's RULE :



Other risk factors

Abnormal placentation

Obesity

Previous cesarean
delivery

Puerperal sepsis

Uterine Atony

- Lack of efficient uterine contractility after placental separation
- Risk factors :

*Overdistended
uterus

*Polyhydramnios

*Multiple
gestation

*Macrosomia

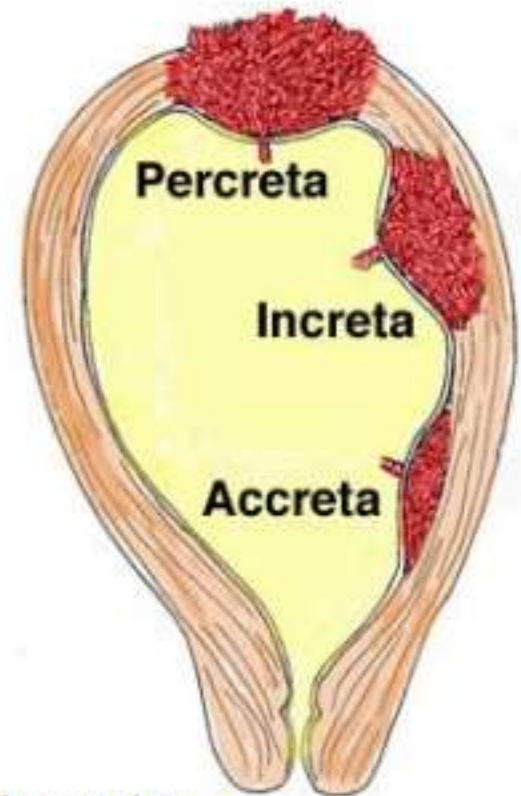
*Unable to
contract due to
tocolytics

Or

* General
anesthesia

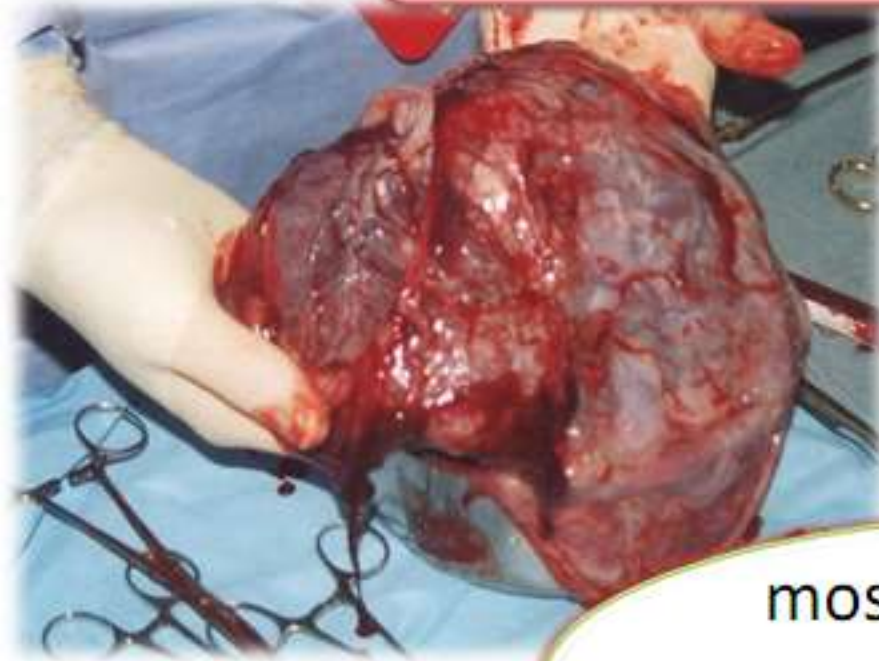
Abnormal placentation

Abnormal placentation refers to abnormal attachment of the placenta to the uterine wall



Classification \longrightarrow degree of myometrial invasion

Abnormal Placentation
+
Uterine atony



> 1 litre of
blood

most common cause
of postpartum
hysterectomy

Risk of Placenta Accreta by Number of Previous Cesarean Deliveries

(Silver RM et al, Obstet Gynecol 2006)

Prior CD	MFMU Accreta % (N=143)
None	0.2
One	0.3
Two	0.6
Three	2.1
Four	2.3
Five or More	6.7

Obstetric Trauma

Lacerations & Hematomas

most common injuries at
delivery

Advanced maternal age

Operative
delivery

Breech
presentation

Multiple
gestation

Episiotomy

Obstetric Trauma

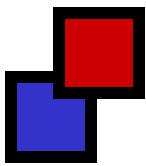
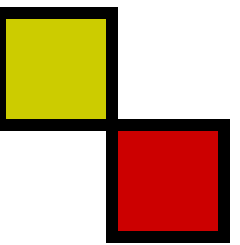
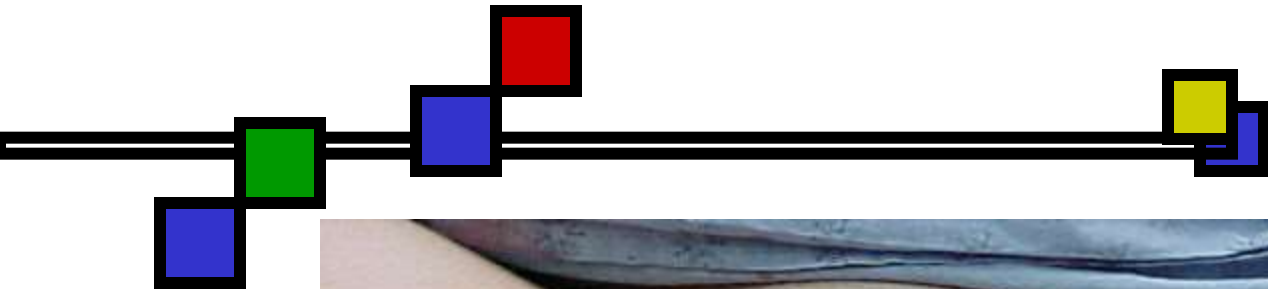


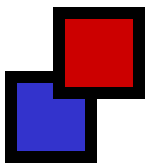
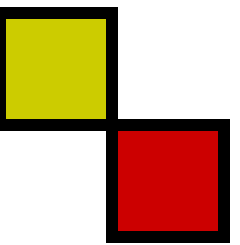
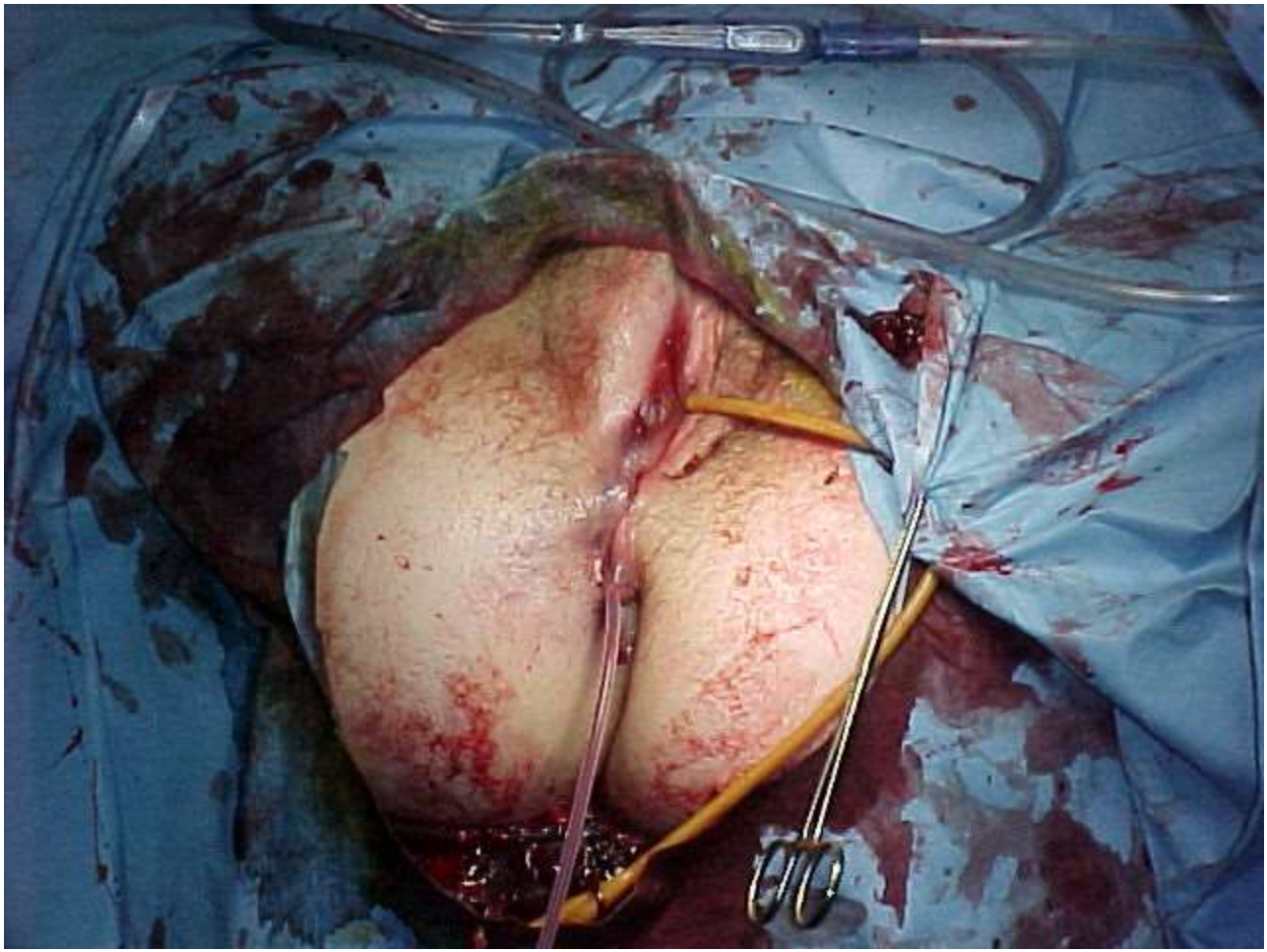
small pelvic
hematoma

- No evidence of hemodynamic compromise
- Conservative management

Large
hematoma

- Surgical exploration, evacuation
- Ligation of vessels
- Avoid infection, septicemia, pressure necrosis, profuse hemorrhage.



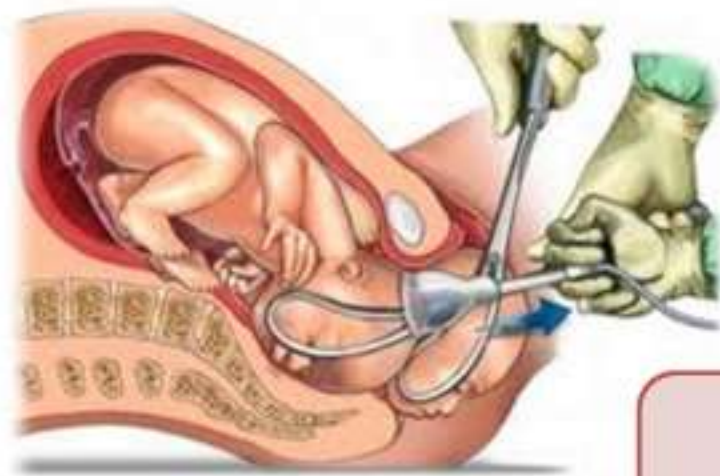


Coagulopathy

- PPH can be the first indication of Von Willebrand's disease (VWD).
- Less common, bleeding disorders associated with PPH include deficiencies in prothrombin, fibrinogen, and factors V, VII, X, and XI.



Prevention of Obstetric
Hemorrhage



Avoidance of prolonged labor

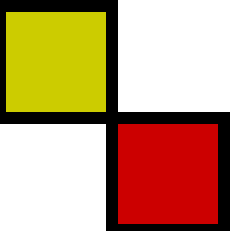
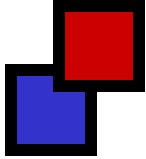
Minimal trauma during assisted vaginal delivery

Detection and treatment of anemia during pregnancy

Identification of placenta previa by ante-natal ultrasound examination



SHOCK

- 
- 
- Shock is a critical condition and a life threatening medical emergency.
 - Shock results from acute , generalised , inadequate perfusion of tissues; below that needed to deliver the oxygen and nutrients for normal function.
 - Prompt recognition and management can improve maternal and fetal outcome in obstetrical shock.



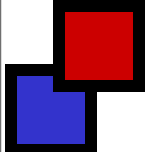
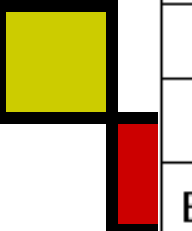
PATHOPHYSIOLOGY

TABLE 1

CLINICAL FINDINGS IN PPH

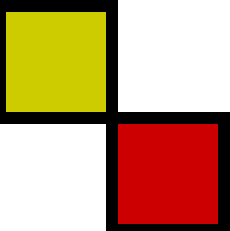
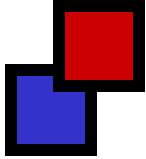
Degree of Shock

	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





DIAGNOSIS

- A high index of suspicion and physical signs of inadequate perfusion and oxygenation are the basis of initiating prompt treatment.
 - Initial management does not rely on knowledge of the underlying cause.
 - There are no laboratory tests for shock.
 - Basic investigations should be sent e.g.Hb, BT,CT,PCV. Blood for grouping and cross matching , FB Sugar , routine urine analysis.
- 
- 



MANAGEMENT OF PPH

Call For Help!!

Step 1 Initial Assessment and Treatment

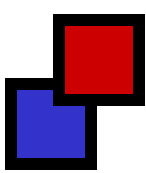
Resuscitation

- 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
- 

First line management

Volume replacement

Fluid

- Crystalloids
- Colloids

Blood:

- Blood once available.
- 'O' Rh-negative or group specific blood if life threatening blood loss.

Coagulopathy

- Fresh frozen plasma if PT/APTT > 1.5x normal.
- Cryoprecipitate if fibrinogen < 1 g/L.
- Platelet concentrates if platelet level < $50 \times 10^9/L$



MANAGEMENT OF PPH



Step 2 Directed Therapy

"Tone"

- massage
- compress
- drugs

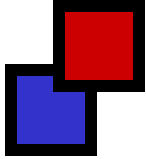
"Tissue"

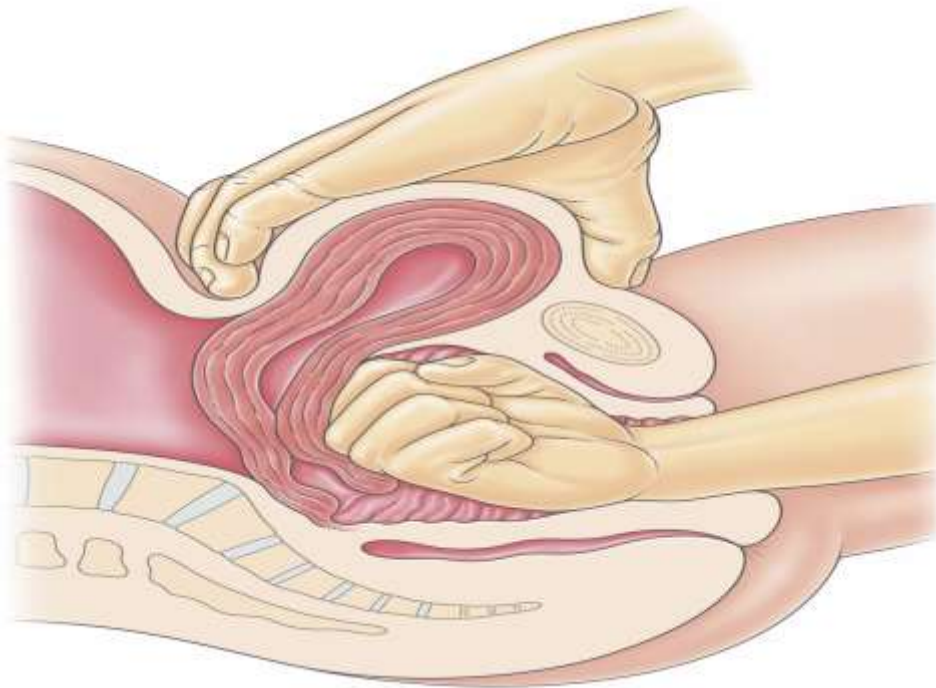
- manual removal
- curettage

"Trauma"

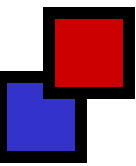
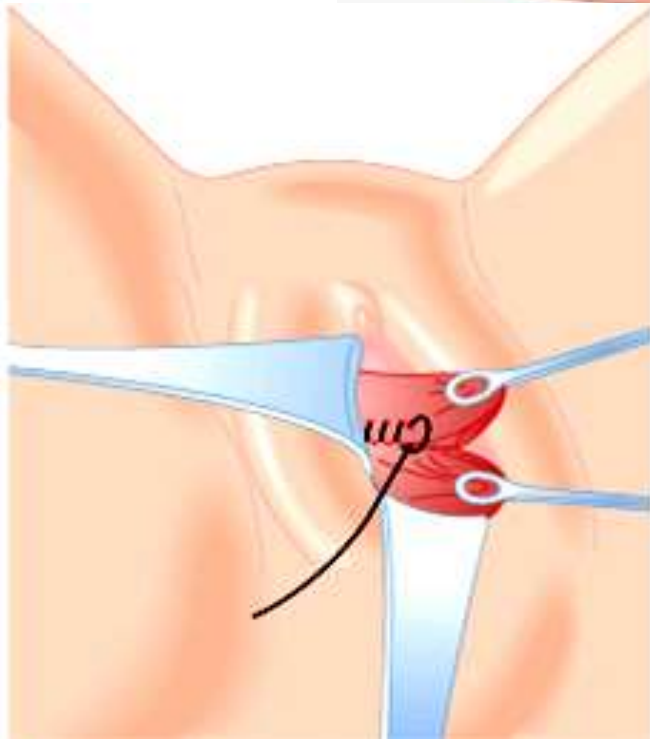
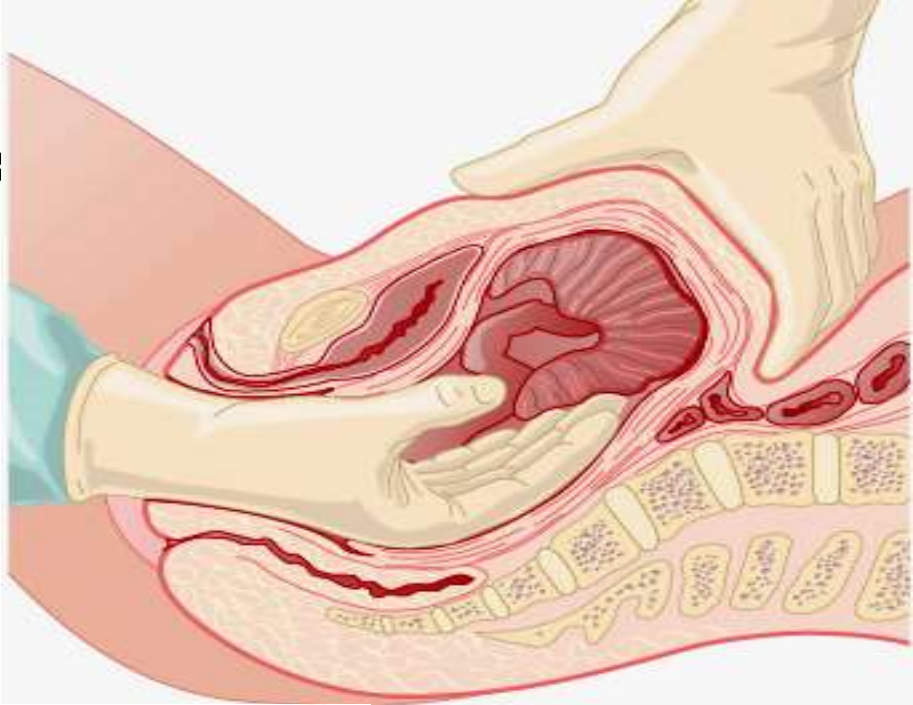
- correct inversion
- repair laceration
- identify rupture

"Thrombin"

- reverse
 - antiacoagulation
 - replace factors
- 



=

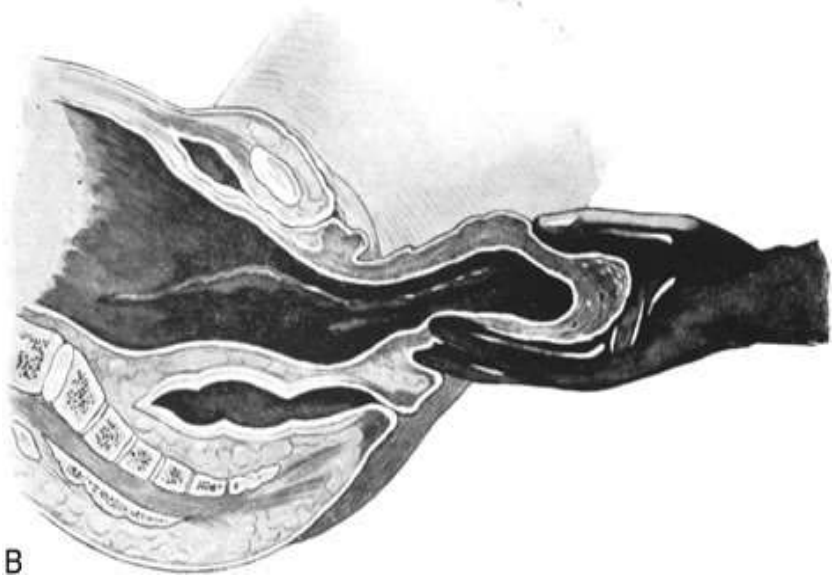




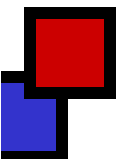
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C



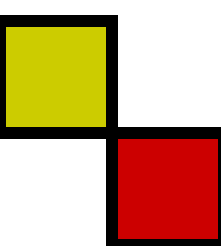
B



D



MANAGEMENT OF PPH



Step 3 Intractable PPH

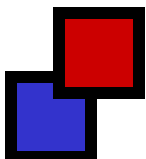
Get Help

- obstetrician/surgeon
- anaesthesiologist
- lab and ICU

Local Control

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

BP and Coagulation

- crystalloid
 - blood products
- 

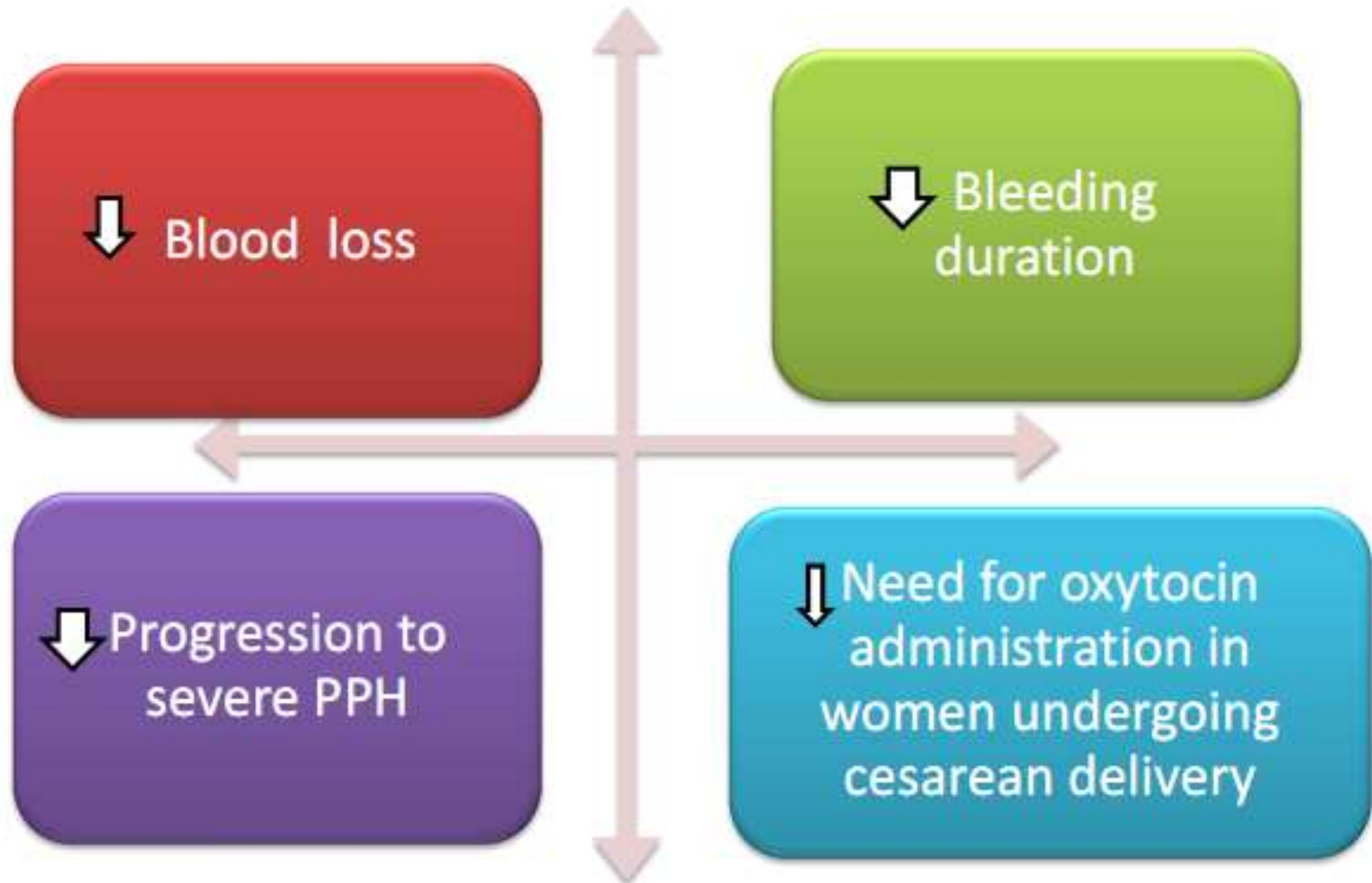
Role of Tranexamic Acid .

- The use of TXA in women with PPH decreases blood loss and maternal morbidity.

High-dose tranexamic acid reduces blood loss in postpartum haemorrhage. Crit Care 2011;15(2):R117

The initial dose is a slow IV bolus of 1g followed by a further 1g 4 hours later.

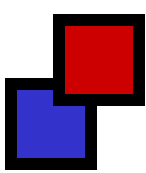
Role of Tranexamic Acid





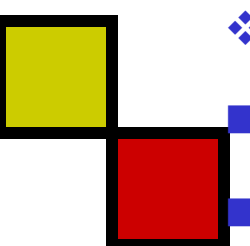
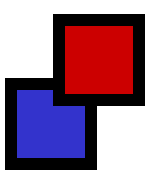
DEVELOPMENTS IN MANAGEMENT OF SHOCK

➤ A. CELL SALVAGE

- Auto transfusion with salvaged red cells avoids the hazards of homologous transfusion. Blood is removed from operative site through heparinised suction tubing and a filter collecting reservoir and processed by washing and centrifugation to remove contaminating debris.
 - The resulting RBC have a haematocrit of 55-80 % and can be returned to patient quickly.
 - The risk of amniotic fluid is obviously a concern. Use of separate suction for amniotic fluid and leukocyte depletion filter has been found in
- 



MANAGEMENT

- 
- ❖ Disadvantages of salvaged cell transfusion-
 - 1 Units have capital and maintenance cost.
 - 2 Staff require training and regular CME/workshops to update itself.
 - 3 Technique is of no use in PPH as faecal and urine contamination with blood.
- 

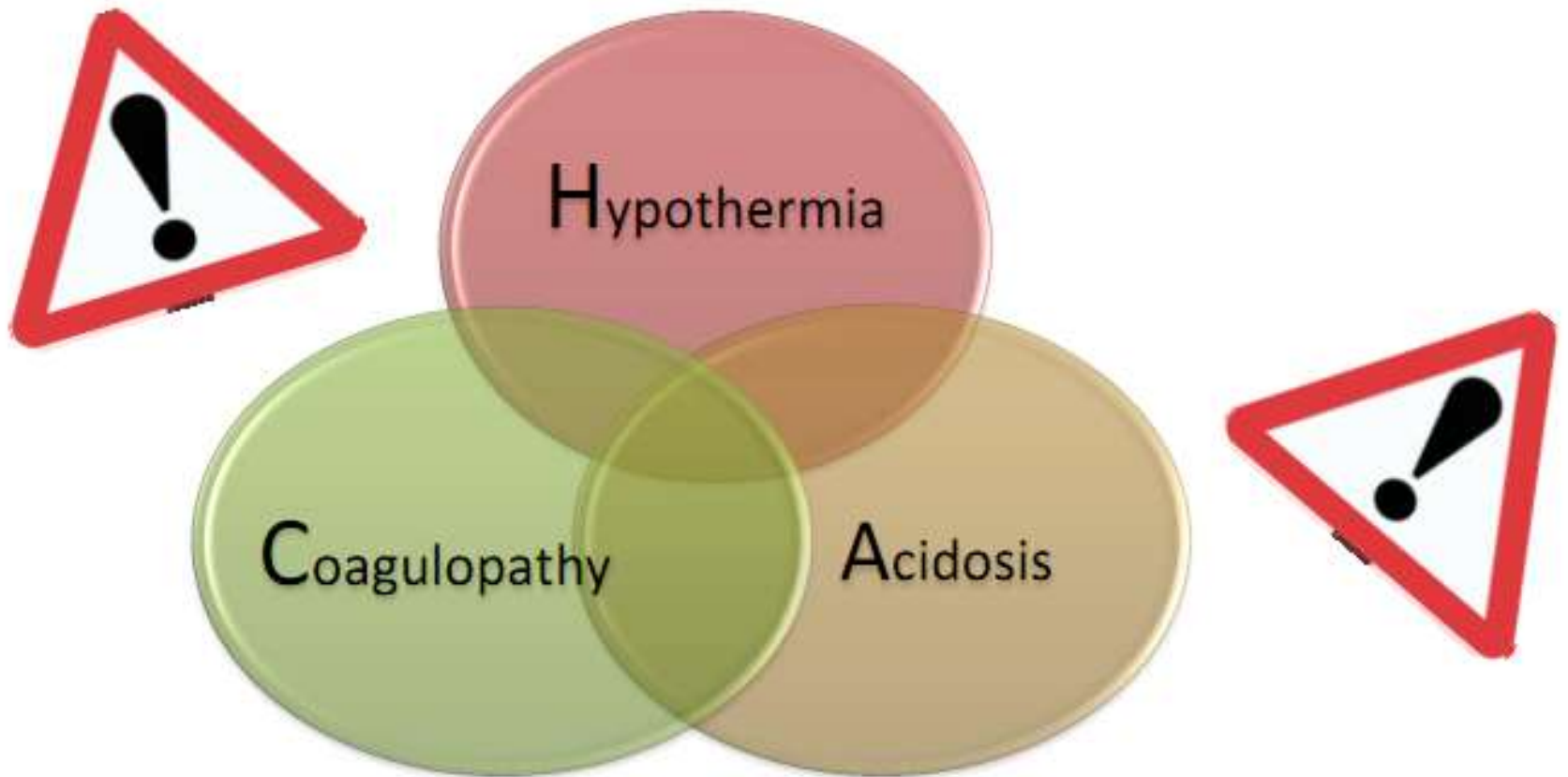
Recombinant factor VIIa (Novoseven[®])

Treatment of uncontrolled
obstetric hemorrhage

Promote clotting in open
vessels.

Effectiveness diminished by
hypothermia, acidosis

Given in a dose of 90 mcg/Kg
every 3 hrs for a maximum of
9 doses



Correction of electrolyte imbalance include :

- Hyperkalemia (transfused blood)
- Hypocalcemia (chelated by the citrate found in transfused FFP).

Oxytocin



Acts within 2-3 minutes ; Effect lasts about 15 – 30 min

- Give slowly : Do **NOT** give as an IV bolus

Causes vasodilation and may be especially harmful in the hemodynamically unstable patient.

- Dose and Route : IV: Infuse 20 -30 units in 1 L IV fluids at 60 drops per minute .

Ergometrine

- * Causes nausea , vomiting, headache
- * May precipitate severe hypertension

Avoid in PRE- ECLAMPSIA



Typical dose of 500 mcg can be given either intravenously (**slowly**) or intramuscularly

Prostaglandin F2 Alpha (e.g. Carboprost)

- 0.25 mg dose can be given **intramuscularly**, repeated to a total dose of 2 mg
- Side effects include:
 - Hypertension
 - Pulmonary hypertension
 - Bronchospasm
- Intramyometrial administration has a more rapid onset but is an 'off-label' use.



Misoprostol

- A prostaglandin E1 analogue
- Often overlooked but can prove useful in combination with the other uterotonic agents
- Can be used rectally, orally or sublingually
- The recommended dose is 800 mcg.
- Shivering and transient elevated temperature is common.

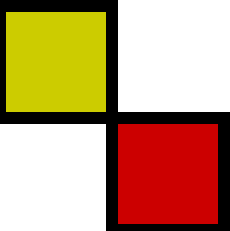
Failure to control bleeding...



Invasive procedures must be performed



MANAGEMENT OF PPH

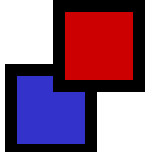


**Step 4
Surgery**

**Repair
Lacerations**

Ligate Vessels
- uterines
- internal iliac artery
- ovarians

Hysterectomy





MANAGEMENT OF PPH



Step 5
Post Hysterectomy Bleeding

Abdominal Packing

Angiographic Embolization



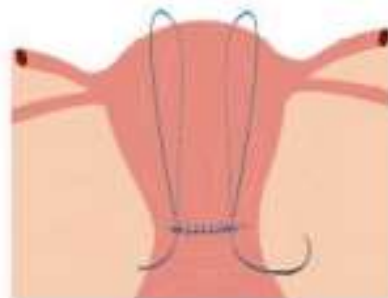
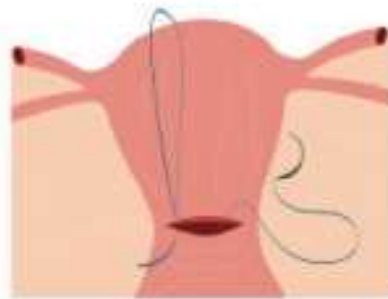
Surgical Management

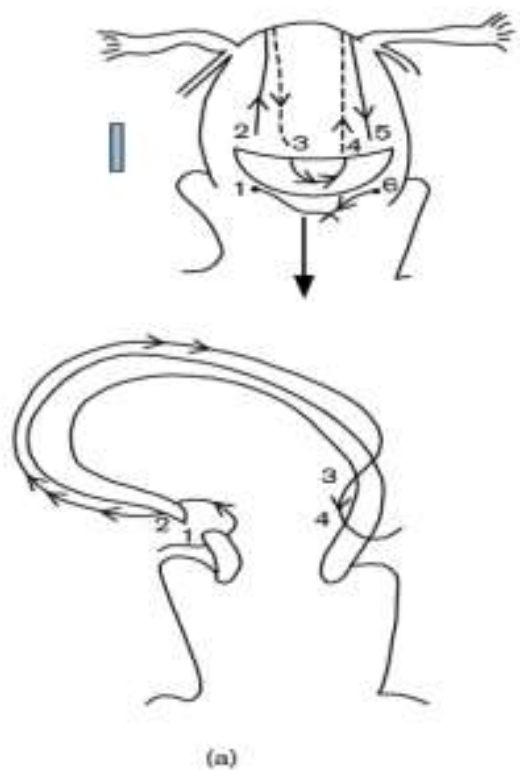
- Provide hydrostatic intra-uterine balloon tamponade :
 - Bakri tamponade balloon
 - Rusch urological balloon
 - Sengstaken-Blakemore tube.



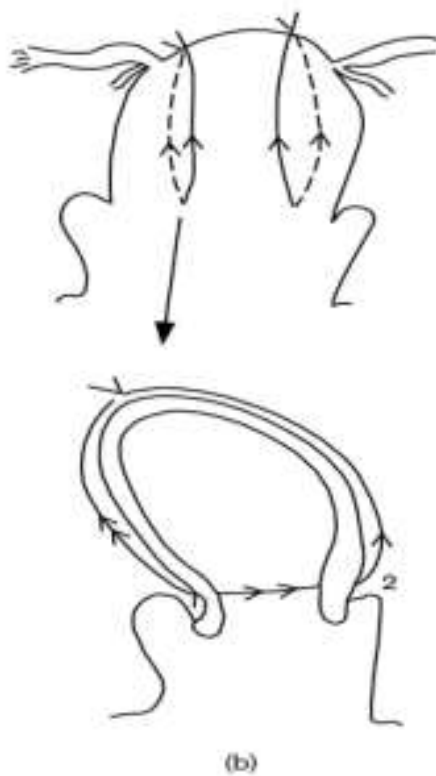
Surgical Management

- Perform a uterine compression suture (e.g. B-Lynch suture).

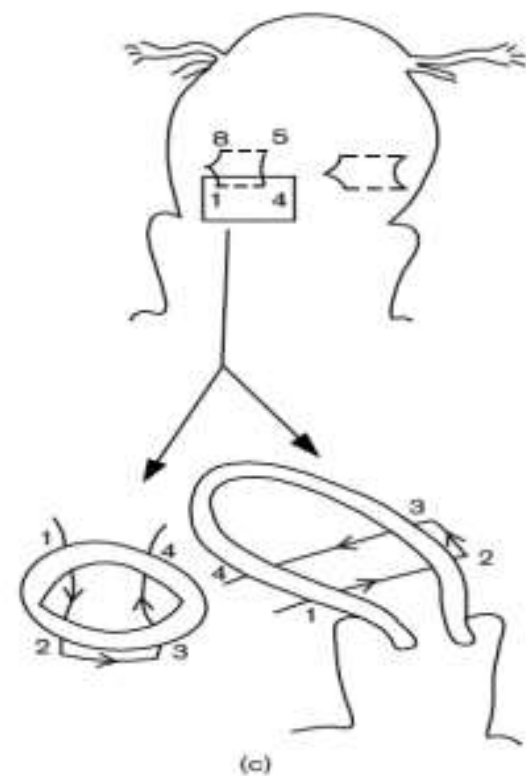




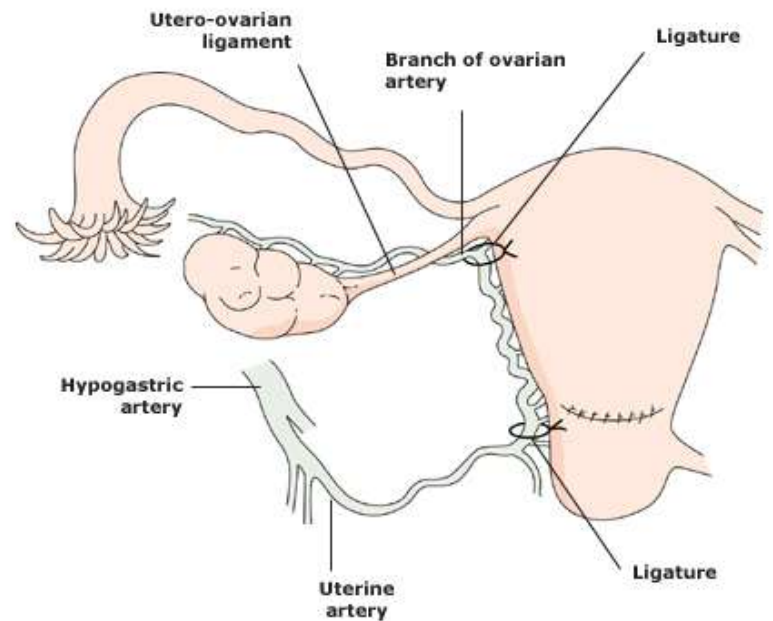
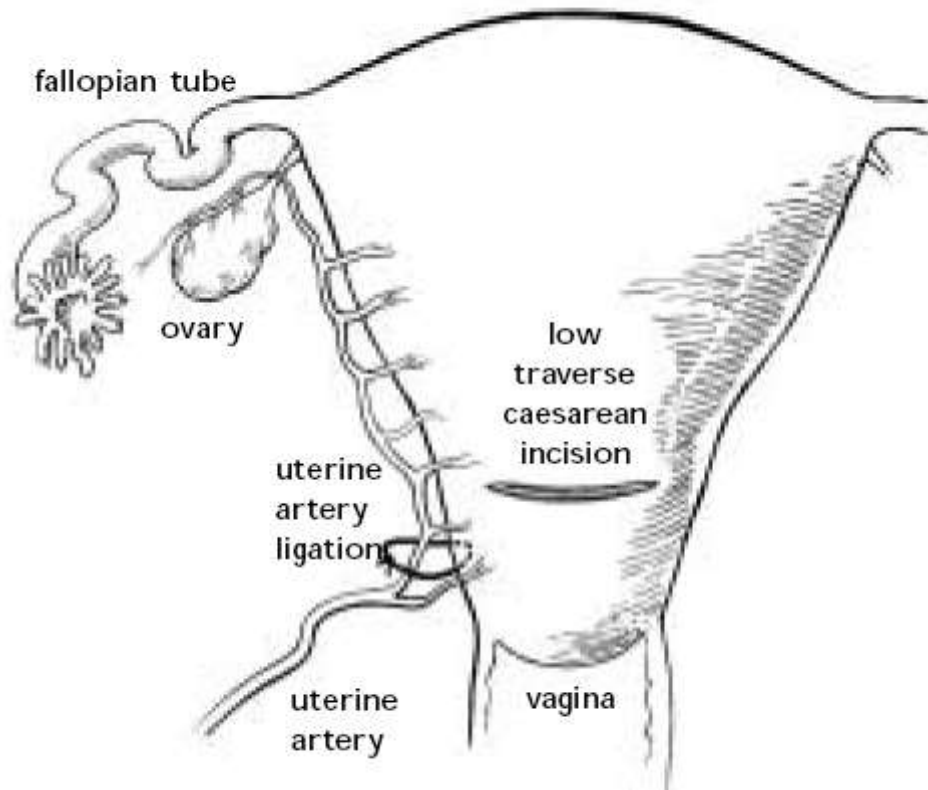
B lynch
suture



Modified B lynch
suture



Multiple square



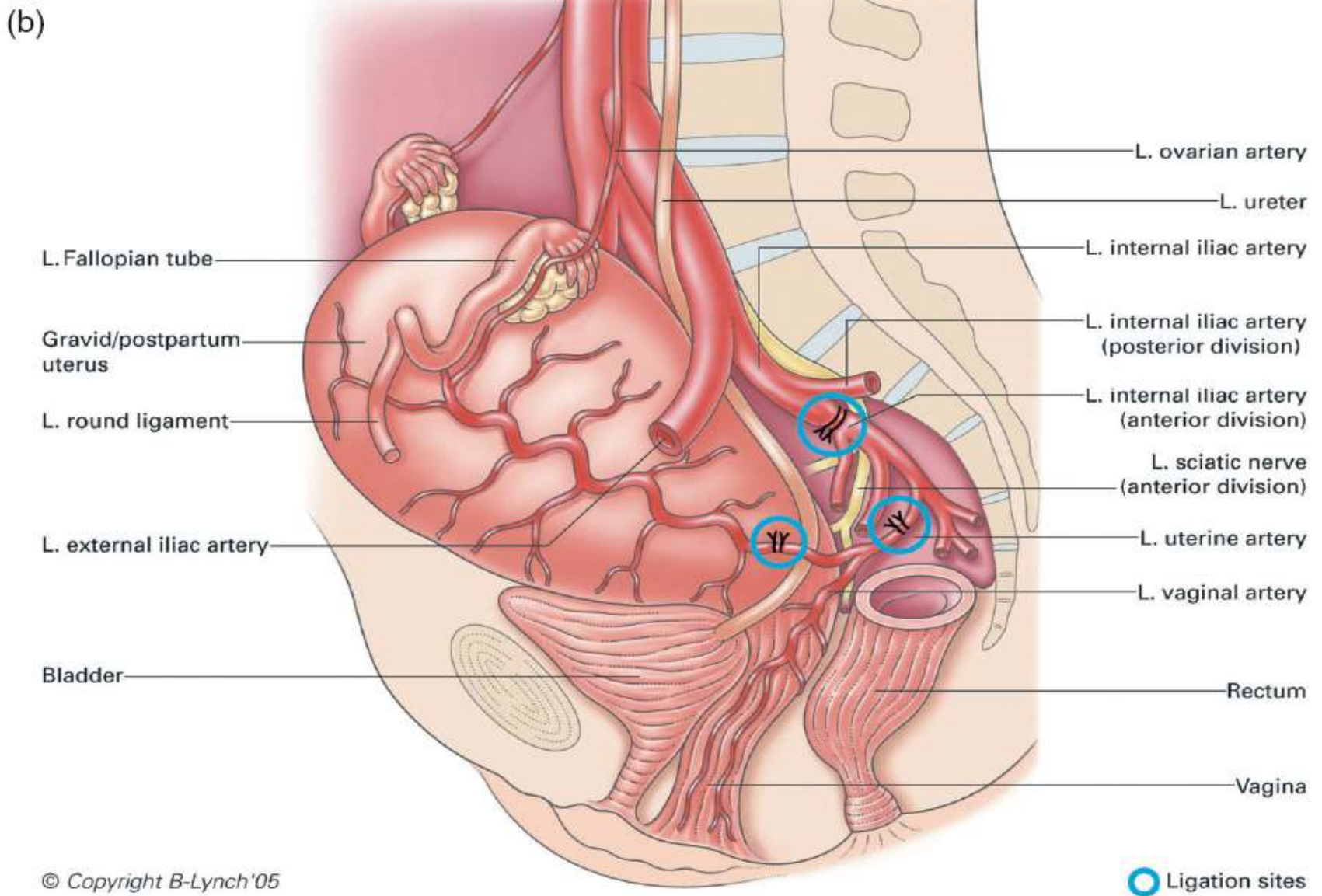
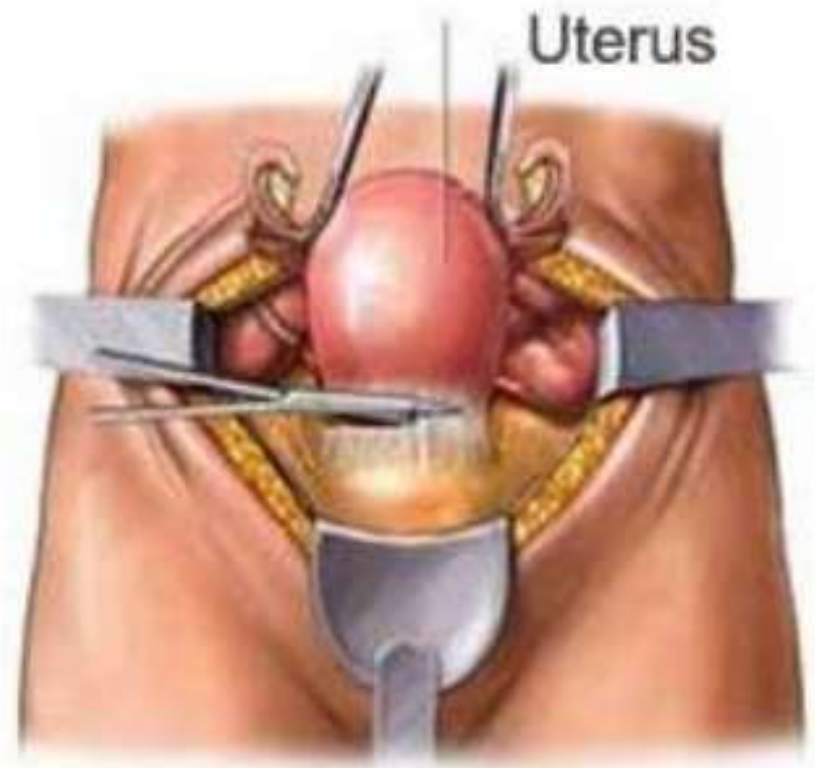


Figure 1 Ligation of the anterior branch of the internal iliac artery with its associated vein.
 (a) Demonstrable vulnerability of internal iliac vein and obturator nerve in close proximity; (b) A 'skeletal' anatomy, showing proximity of external iliac artery, ureter and anterior branches of sciatic nerve

Surgical Management

- Perform a peripartum hysterectomy.



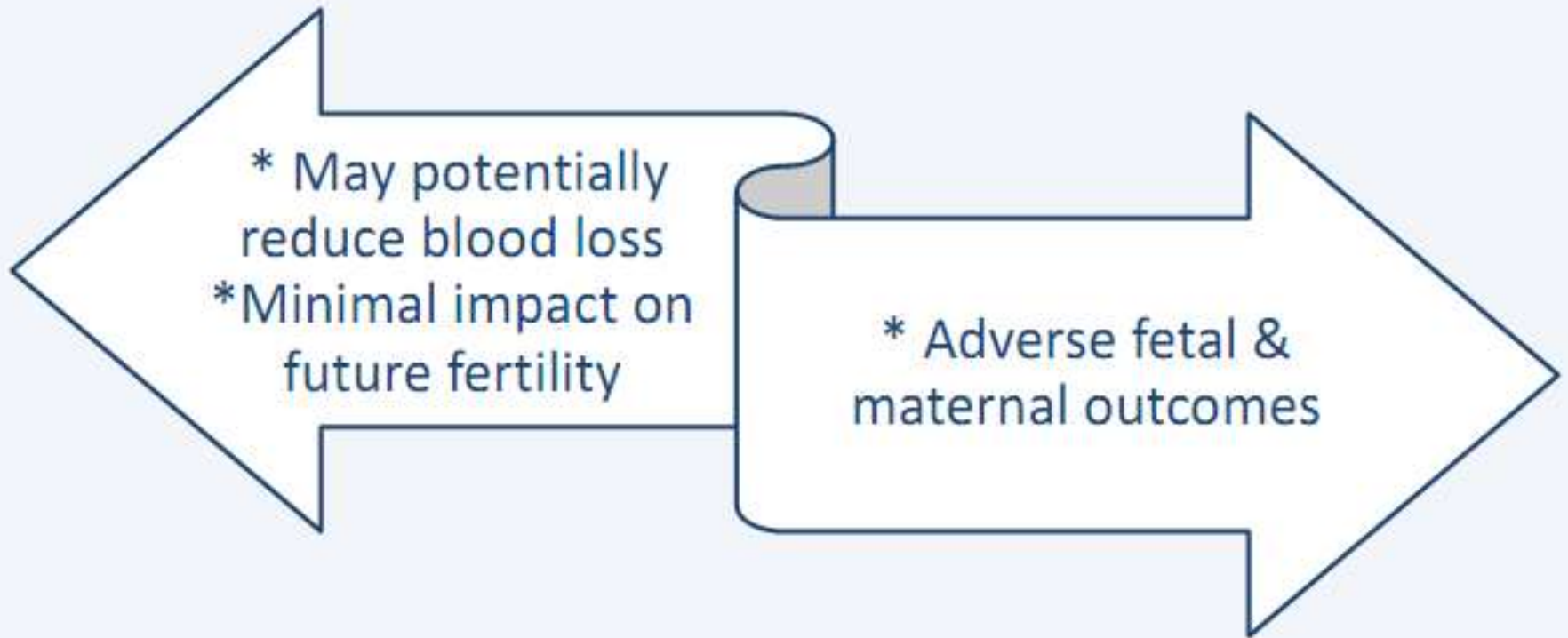


RADIOLOGICAL MANAGEMENT

RADIOLOGICAL MANAGEMENT

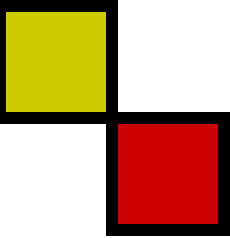

- Requires the mother to be stable enough to be transferred to a radiology suite
- **Embolisation** requires fluoroscopic guidance and Availability of an interventional radiologist with appropriate facilities and team.

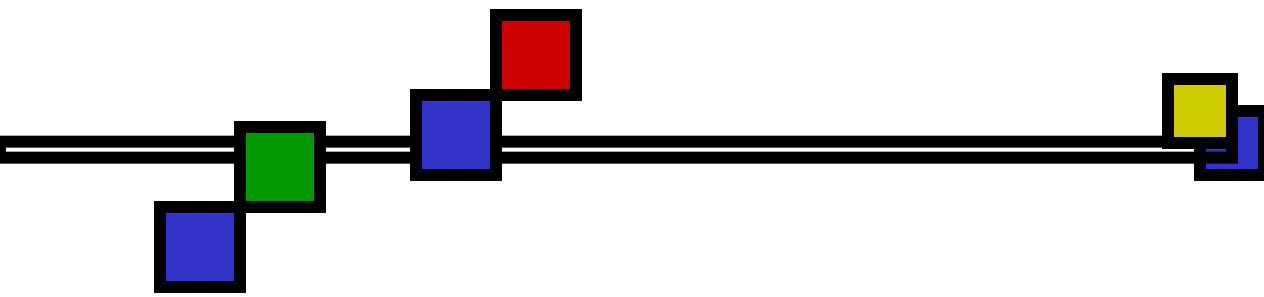
RADIOLOGICAL MANAGEMENT





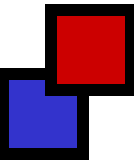
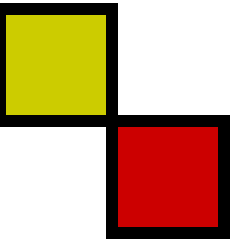
Evaluation of response

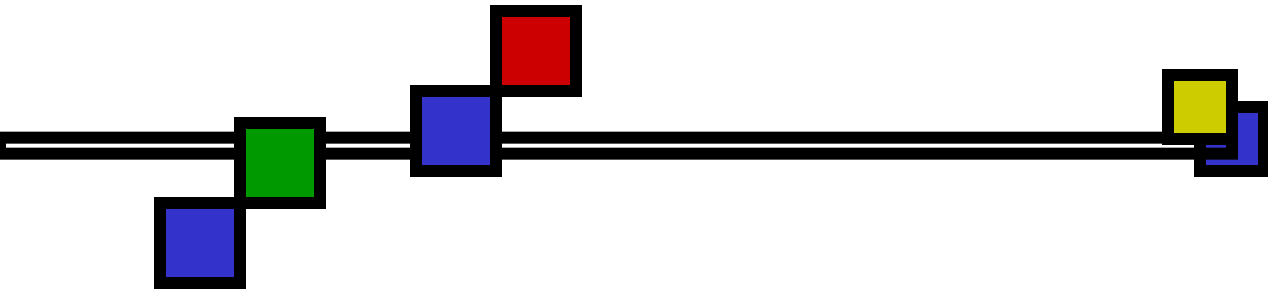
- 
- Monitor pulse, blood pressure, blood gas status, & acid-base status \pm monitoring central venous pressure.
 - Measure urine output using an indwelling catheter
 - Order regular FBC counts and coagulation tests to guide blood component therapy
- 



Secondary PPH

- Infection
- Retained placenta
- Trophoblastic disease
- Antibiotics
- Evacuation of retained products if bleeding persistent or significant amount of tissue retained.





THANK YOU

