

# Antepartum Hemorrhage

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WEN HONG

# CASE PRESENTATION

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Ms. Rouge is a 22-year-old G1 P0 at 25 *on* week of gestation who presents to OB triage complaining of painless vaginal bleeding

The patient states that she was watching TV on the couch when she felt some wetness.

When she went to the bathroom, she noted bright red blood in her underwear and on the toilet paper.

She did not feel any contractions or backpain.

Ms. Rouge reports that she has soaked a total of three perineal pads prior to arriving to the hospital. She denies previous problems in this pregnancy

Her past medical history is remarkable only for iron deficiency anemia.

She is a smoker. Today, the patient admits that she has been unable to stop smoking or to cut back on her cigarettes. She continues to smoke 8 to 10 cigarettes per day.

On physical examination, she is a thin Caucasian female who appears anxious

Her blood pressure is 110/60 mmHg, and her pulse is 95 bpm

She is afebrile. Her general physical examination is unremarkable.

# Common causes for third-trimester bleeding

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Obstetric cause	Non-obstetric cause
Bloody show	Cervical cancer or dysplasia
Placenta previa	Cervicitis
Abruptio placenta	Cervical polyps
Vasa preiva	Vaginal laceration
Uterine rupture	Vaginitis
Marginal sinus bleeding	

# NEED TO KONW

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Finally, nonvaginal bleeding may be mistakenly described as coming from the vagina; sources include rectal bleeding and hematuria

Placental abruption and placenta previa can lead to major hemorrhage and are life-threatening for the mother and fetus

# Cause

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First-trimester and Second-trimester

Third-trimester bleeding

- **Obstetric: Placental Previa (20%)**
- **Abruption placentae (30%)**
- Uterine Rupture
- Fetal: Fetal Vessel Rupture

Nonobstetric

**TABLE 31.1****RISK FACTORS FOR MAJOR CAUSES OF THIRD TRIMESTER VAGINAL BLEEDING**

<b>Placenta Previa</b>	<b>Placental Abruption</b>	<b>Vasa Previa</b>
Chronic hypertension	Chronic hypertension	In vitro fertilization
Multiparity	Multiparity	Second trimester placenta previa
Multiple gestation	Preeclampsia	Low-lying placenta
Advanced maternal age	Previous abruption	Marginal cord insertion
Previous cesarean delivery	Sudden decompression of an overdistended uterus	Multiple gestation
Tobacco use	Tobacco, cocaine, or methamphetamine use	Succenturiate-lobed and bilobed placenta
Uterine curettage	Trauma	
Male fetus	Uterine fibroids	
	Thrombophilias	
	Unexplained elevated maternal serum alpha-fetoprotein level	
	Short umbilical cord	

# NEED TO KNOW

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The fetal blood approximates 80 to 110 ml/kg fetal body weight, the fetal blood volume at term average -300 mL

Significant maternal bleeding exceeding this amount represents primarily maternal blood

Vasa previa can lead to rapid fetal exsanguination and death but does not affect the mother hemodynamically.

# Third trimester bleeding

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5%~10%

One of the three leading causes of maternal death

Major cause of perinatal morbidity and mortality

# Initial Evaluation

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TWO principles

Any woman experiencing vaginal bleeding in late pregnancy must be evaluated in **well equipped hospital**

**NO** vaginal or rectal examination should be performed until placenta previa has been ruled out

# Determination of the hemorrhage class

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The average 70kg pregnant woman maintains a blood volume of 6000 mL by 30 weeks of gestation (85 mL/kg)

# Determination of the hemorrhage class

**TABLE 18-1**

**HEMORRHAGE CLASSIFICATION AND  
PHYSIOLOGIC RESPONSE**

<b>CLASS</b>	<b>ACUTE BLOOD LOSS (mL)</b>	<b>% LOST</b>	<b>PHYSIOLOGIC RESPONSE</b>
1	1000	15	Dizziness, palpitations, minimal blood pressure change
2	1500	20-25	Tachycardia, tachypnea, sweating, weakness, narrowed pulse pressure
3	2000	30-35	Significant tachycardia and tachypnea, restlessness, pallor, cool extremities
4	≥2500	40	Shock, air hunger, oliguria or anuria

Modified from Baker RJ. Evaluation and management of critically ill patients. *Obstet Gynecol Annu.* 1977;6:295; and Bonnar J. Massive obstetric haemorrhage. *Baillieres Best Pract Res Clin Obstet Gynaecol.* 2000;14:1.

# Principles of Management

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Avoid vaginal exam before rule out placenta previa

Prepare for the management of massive hemorrhage

Vaginal or rectum exam is extremely hazardous

# ABCD for life-threatening hemorrhage

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A Airway

B Blood pressure

C Cross-match CBC

D Doppler monitor

□ Blood transfusion (whole blood or PRBC)

□ Vasoactive drugs ( $\alpha$  and  $\beta$  adrenergic stimulant)

# Placenta Previa

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# Definition

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**Abnormal implantation** of the placenta over the internal cervical os after 28wks

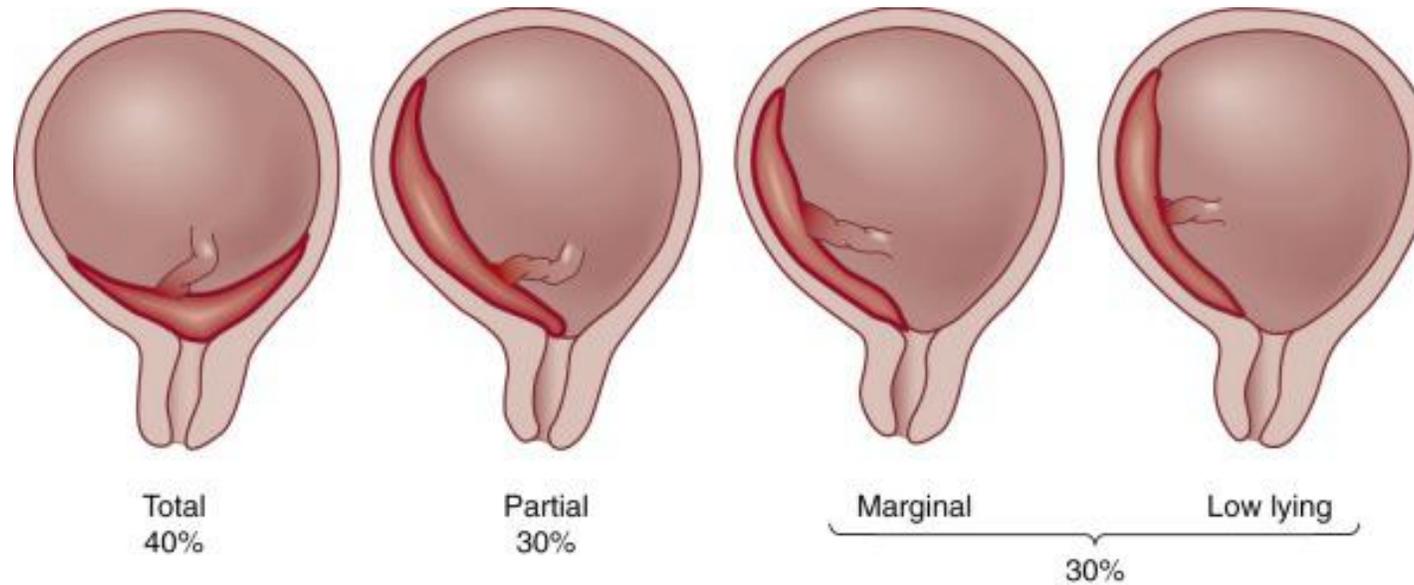
Low lying placenta before 28wks

Inevitable haemorrhage

Occurs in 0.5% of pregnancies

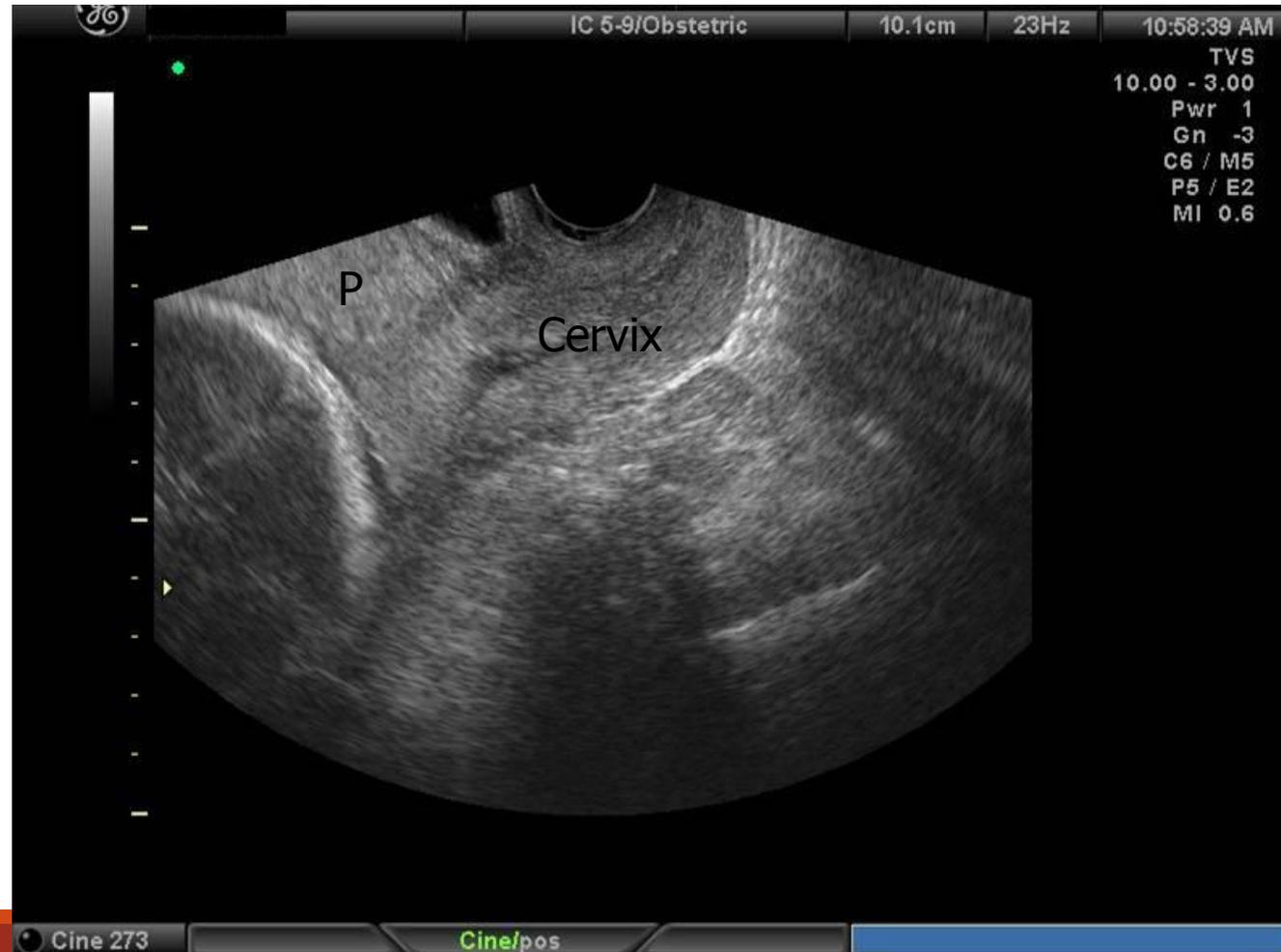
# Classification

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Types of placenta previa

# COMPLETE PLACENTA PRAEIVIA



# LOW LYING PLACENTA

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# Associations

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Increasing maternal age

Increasing parity

Smoking

Multiple gestations

Previous placenta previa

Therapeutic abortion/curettage

Prior cesarean section

# NEED TO KNOW

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- Placenta previa is found when the placenta implants in the lower uterine segment in advance of the fetal presenting part
- The classic presentation of placenta previa is painless, bright-red vaginal bleeding
- Placenta previa is a common incidental finding on second trimester obstetric ultrasonography
- 90% of previas found in the second trimester will resolve prior to delivery
- Previa complicates approximately 1/200 of pregnancies in the third trimester

# If a placenta previa or low-lying placenta is diagnosed in the second trimester

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Repeat in 32wks

**TABLE 18-2** POTENTIAL FOR PLACENTA PREVIA AT TERM BY GESTATIONAL AGE AT DIAGNOSIS

GESTATIONAL AGE AT DIAGNOSIS (WK)	PREVIA AT TERM (%)
15-19	12
20-23	34
24-27	49
28-31	62
32-35	73

From Dashe JS, McIntire DD, Ramus RM, et al. Persistence of placenta previa according to gestational age at ultrasound detection. *Obstet Gynecol.* 2002;99:692.

# NEED TO KNOW

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- Maternal morbidities include antepartum bleeding , Placenta accrete , intrapartum hemorrhage, hysterectomy, postpartum hemorrhage, blood transfusion and thrombophlebitis
- Women with a history of cesarean delivery who present with a placenta previa are at an especially high risk for placenta accrete, and may benefit from a focused evaluation for an accrete
- Fetal conditions associated with previa include malpresentation, intrauterine
- growth restriction and velamentous cord insertion

**TABLE 18-3****RISK OF PLACENTA ACCRETA WITH  
PLACENTA PREVIA AND PRIOR  
CESAREAN DELIVERY**

<b>NO. OF PRIOR CESAREAN DELIVERIES</b>	<b>PLACENTA ACCRETA RISK (%)</b>
0	3
1	11
2	40
3	61
≥4	67

From Silver RM, Landon MB, Rouse DJ, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. *Obstet Gynecol.* 2006;107:1226.

# Diagnosis

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Painless

Recurrent

After second trimester

Soft /Relax/ Non tender uterus

A high presenting

Fetal lie

Fetal heart rate

# Localization of placenta

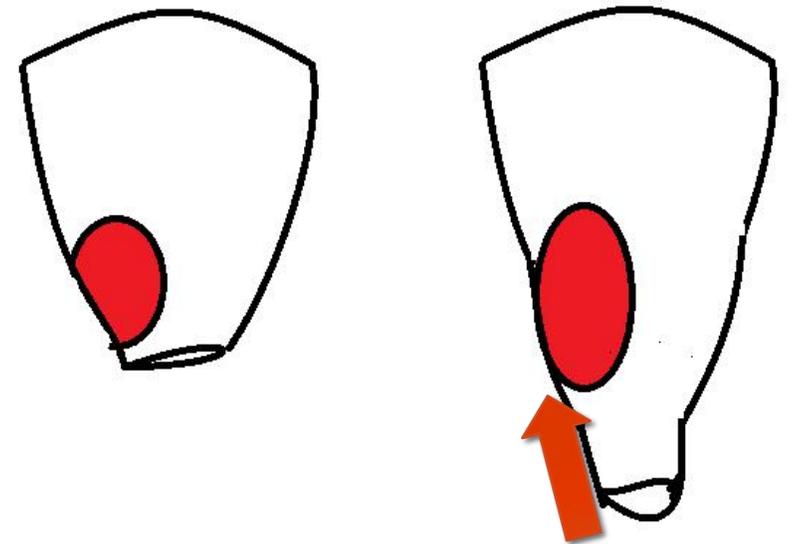
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Ultrasound

Placental migration

With development of the lower uterine segment almost all of these low implantation placenta will be carried to higher station

MRI



# Decision 1: Evaluation

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What workup should be done on admission?

- A. Bimanual examination
- B. Ultrasound examination
- C. NST
- D. Magnetic resonance imaging (MRI)

# NEED TO KNOW

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- Ultrasound is the most useful modality for evaluation of vaginal bleeding in the gravid patient
- Transvaginal sonography (TVS) is the gold standard for identifying a placenta previa
- Transabdominal imaging could be work
- The NST or fetal monitoring will assess the condition of the fetus and is advisable in a situation in which fetal well-being may be compromised
- A bimanual examination is contraindicated in a gravid patient presenting with vaginal bleeding
- An MRI is most useful for the diagnosis of placenta accreta
- MRI is not necessary for the diagnosis of placenta previa

# CASE CONTINUES

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- Both transabdominal and TVS are performed and a complete placenta previa is
- The cervical length is 3.8 cm
- No cervical dilatation or funneling is seen.
- There is a male fetus seen in a vertex presentation
- The estimated gestational age is 24+5 weeks, the estimated fetal weight is 700 g, and adequate amniotic fluid is noted
- A careful sterile speculum examination is performed: there is no evidence of active bleeding or cervical pathology, and the cervix appears closed by visualization
- The FHT is appropriate for gestational age and no contractions are visible on the monitor
- Laboratory examination reveals that Ms. Rouge's hemoglobin is 8g/dl, and her hematocrit is 24%

# Management

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Treatment depends on:

Gestational age

Amount of vaginal bleeding

Viability of fetus

Degree of placenta previa

Presentation position and status of the fetus

Maternal hemodynamic status

The status of the cervix

Onset of labor

# Management

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Expectant therapy

<34 wks

Rest

Monitoring of mother and fetus

Correcting anemia

Ultrasound localization of the placenta

Tocolysis

# Management

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Cesarean section

Correct shock

The choice of anesthetic

The operation technique

# Management

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Vaginal delivery

No a smart choice

# Decision 2: Management

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What should be considered next in this preterm patient?

- A. Blood transfusion
- B. Cesarean section
- C. Betamethasone
- D. Tocolysis

# NEED TO KNOW

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- Hct only 24%
- Maternal fluid resuscitation
- A prudent course of action might be to prophylactically administer packed red blood cells to a Hct of 30%, so as to provide a "BUFFER" in the event of further bleeding
- Immediate cesarean section would be contraindicated with this very premature fetus if lack of ongoing bleeding
- Without uterine contractions, tocolysis is probably not beneficial
- The use of steroid for fetal lung maturation is controversial when there is a low
- expectation of delivery within 7 to 14 days

# NEED TO KNOW

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Because of the high risk of maternal bleeding, it is usual to admit the patient with an episode of bleeding from a previa to labor and delivery for

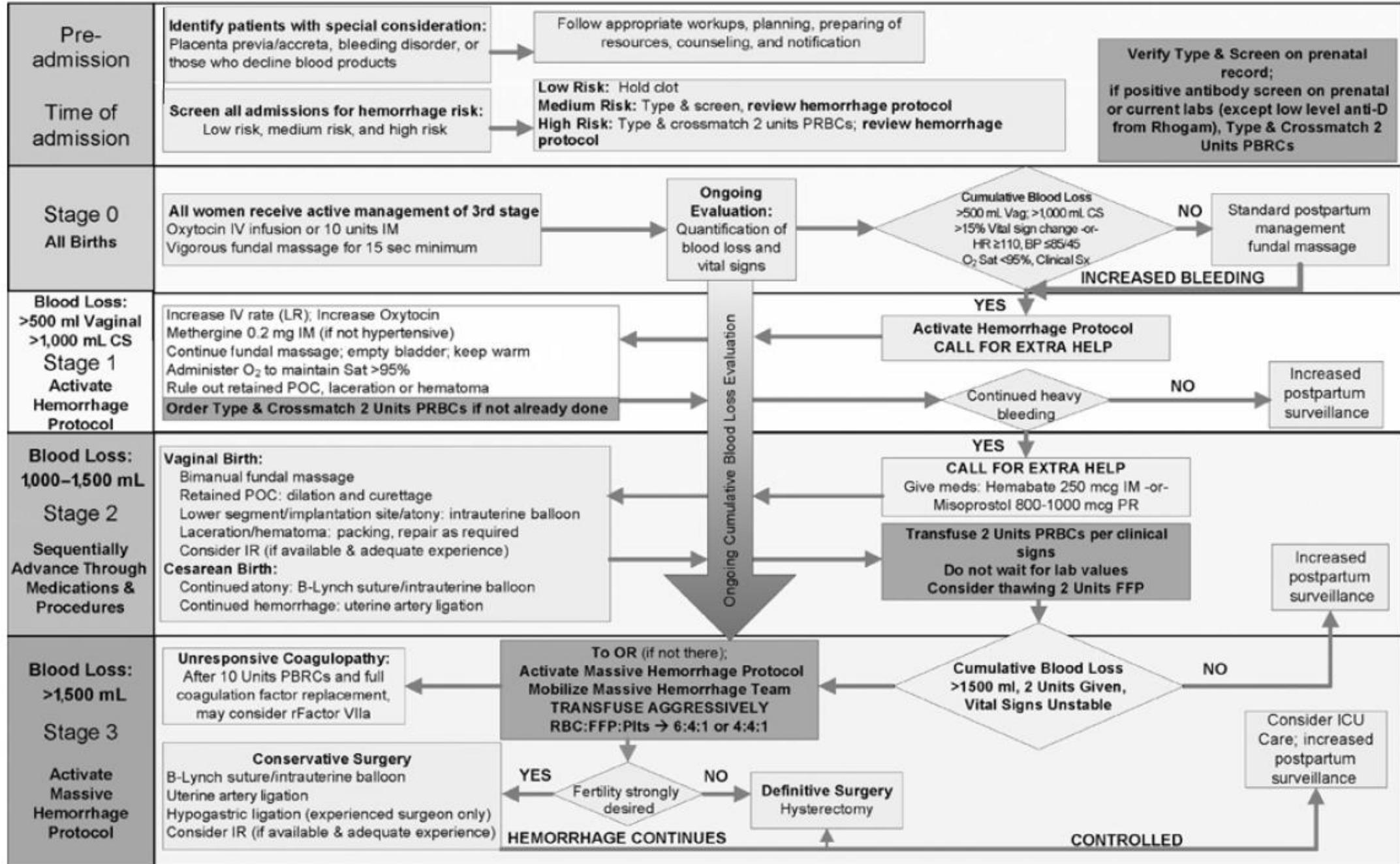
close maternal and fetal

surveillance

Two large bore intravenous lines

Crystalloid

Maintain hemodynamic stability and urine output



**TABLE 31.2****BLOOD COMPONENTS USED IN RESUSCITATION**

<b>Component</b>	<b>Indication</b>	<b>Notes</b>
Packed red blood cells	To improve O <sub>2</sub> carrying capacity	Raise Hb 1 g/dL
Fresh-frozen plasma	Replace clotting factors PT and /or PTT >1.5 × upper normal	Start with 2 U FFP or 15–20 mL/kg ideal body weight
Cryoprecipitate	Fibrinogen <75–100 μg	1 U/10-kg body weight with fibrinogen <75
Platelets	Platelets <50,000	Increase platelets 5,000–10,000/mm <sup>3</sup> per unit
Albumin	Volume replacement bind bilirubin in newborns albumin <1.0 g/dL (total protein <4.0)	Use 5% albumin

PT, prothrombin time; PTT, partial thromboplastin time; Hb, hemoglobin; FFP, fresh frozen plasma.

Santoso JT, Saunders BA, Grosshart K. Massive blood loss and transfusion in obstetrics and gynecology. *Obstet Gynecol Surv.* 2005;60(12):827–37. Review.

# Blood Transfusion

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A maternal blood sample is sent for immediate type and crossmatch for 4 to 6 units of PRBCs.

The need for transfusion of blood products should be guided by

- the rate of vaginal bleeding
- stability of maternal vital signs
- urine output
- laboratory values (CBC, coagulation profile of fibrinogen, PT, APTT)

RhD-immune globulin should be considered in RhD negative women at the initial bleeding episode.

# Maternal and Fetal Complications

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Maternal morbidity

Maternal shock

Severe postpartum hemorrhage (PPH)

*Renal failure, pituitary necrosis, DIC*

Placenta accreta

*Accreta, increta, percreta*

Fetal

□ preterm delivery

□ Fetal hypoxia

□ Fetal hemorrhage

# CAST CONTINUES

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- Ms. Rouge receives 2L of crystalloid, 2 units of PRBC, and 12 mg of betamethasone 24 hours apart for a total of two injections
- While on labor and delivery she is noted to have contractions and is started on magnesium sulfate tocolysis to administer the full course of antenatal steroids
- The FHT remains reassuring throughout this time
- The patient is ultimately stabilized and transferred to the antepartum unit where she remains for 4 days without any further vaginal bleeding or contractions
- After 4 days on the antepartum unit, Ms. Rouge is discharged home with instructions to maintain bed rest

# CAST CONTINUES

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- Ms. Rouge remains in home for 3 weeks and returns again with acute heavy vaginal bleeding at 28+47 weeks
- Laboratory values on admission are Hct=18%, fibrinogen =150 mg/dL. PT = 16 seconds, and APTT =46 second, and she has minimal vaginal bleeding

# Decision 3: Management

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What are options for immediate management of a recurrent acute bleed?

- A. Immediate IV access and crystalloids
- B. Tocolysis
- C. Fetal monitoring
- D. Cesarean section

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- Without ongoing bleeding, if maternal and fetal resuscitation and stabilization can be accomplished at this gestational age, the prolongation of the pregnancy would allow for further fetal maturation and decrease the morbidities of prematurity
  - In addition, resuscitation and stabilization of the mother is desirable, if possible, prior to a surgical delivery
  - Immediate cesarean section is indicated with placenta previa if there is uncontrollable excessive vaginal bleeding, nonreassuring fetal heart rate. or worsening maternal
  - hemodynamic instability despite aggressive resuscitation measures
  - Tocolysis is not utilized in the setting of acute severe vaginal bleeding

# CASE CONCLUSION

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- Ms. Rouge is successfully resuscitated with 3 L of crystalloid, 4 units of PRBCs, and 2 units of fresh frozen plasma
- Maternal vital signs improve from a blood pressure of 90/50 to 120/60 mm Hg, a pulse of 130 to 100 bpm, and O2 saturation varied from 92% to 95%
- The FHT initially has a baseline of 110 bpm with decreased variability and occasional late decelerations
- With aggressive resuscitation, the tracing improves to a baseline of 120 bpm with moderate variability, accelerations, and resolution of late decelerations

# CASE CONCLUSION

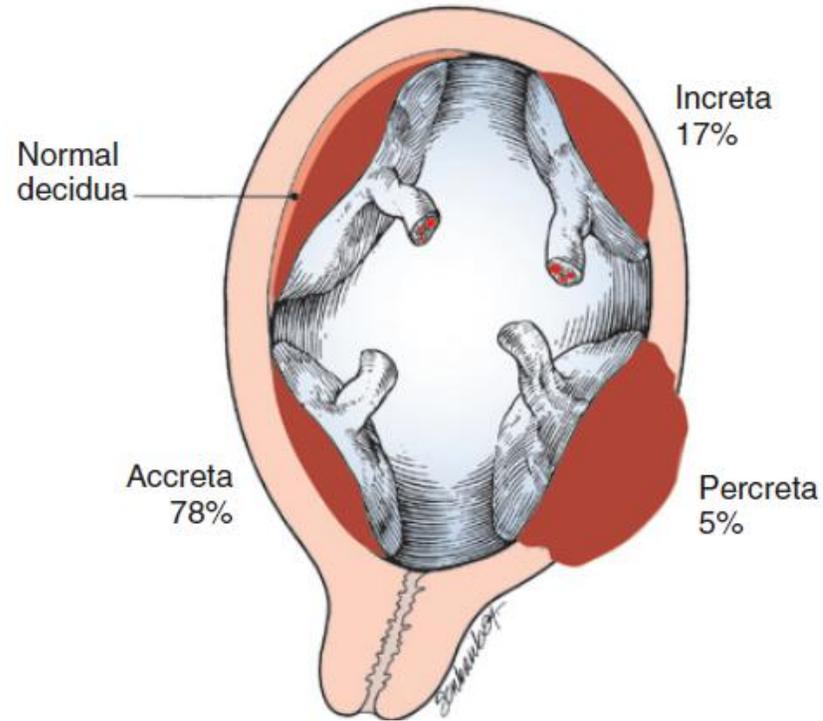
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- The patient is hospitalized until delivery
- The patient remains for an additional 3 weeks without further heavy bleeding
- she continues to have occasional episodes of scant-to-mild vaginal bleeding
- At 32+2 weeks, An urgent cesarean section is performed with delivery of a male infant weighing 1,750 g with Apgar score of 4/8
- The cesarean section was complicated by an intrapartum blood loss of 1,500 cc
- for which the patient received 2 units of PRBCs and 2L of crystalloid
- she was discharged home on the fourth postpartum day. Her baby did well in nursery, and was discharged on the 12th day of life

# Placenta previa accreta

Placenta accreta: the abnormal invasion of the placenta into the uterine wall

1/2500      1/250 now



# Placenta previa accreta

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Accreta – superficial invades the uterine myometrium

Increta: invades the uterine myometrium

Percreta: invades through the myometrium to the uterine serosa

# Management

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Predicated by maternal status and fetal gestational age

Expectant approach will gain fetal maturity and increase chance of placental “migration”

C Section in persistent cases

Prepare for severe hemorrhage

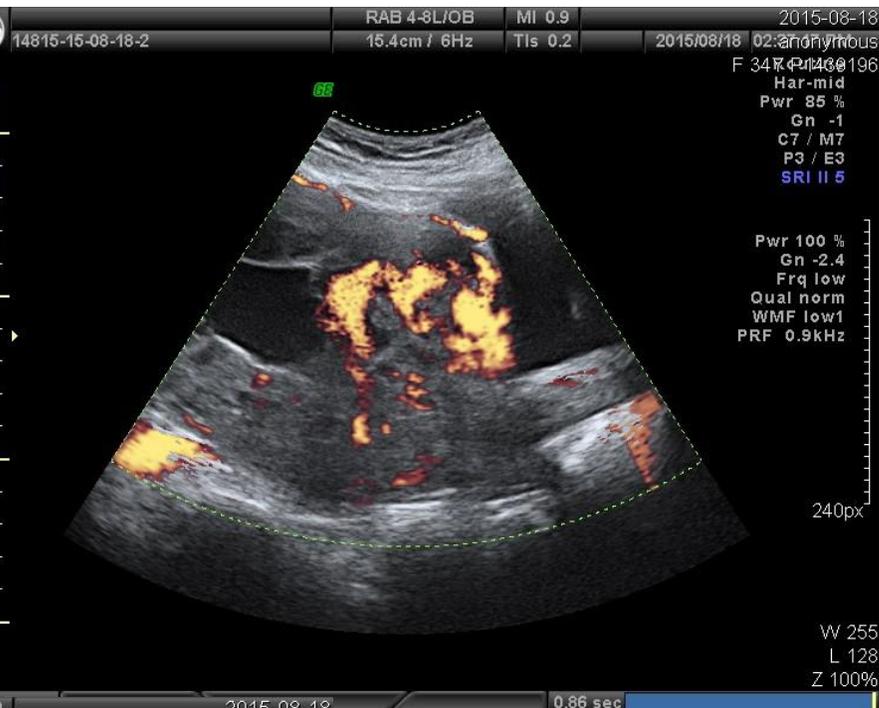
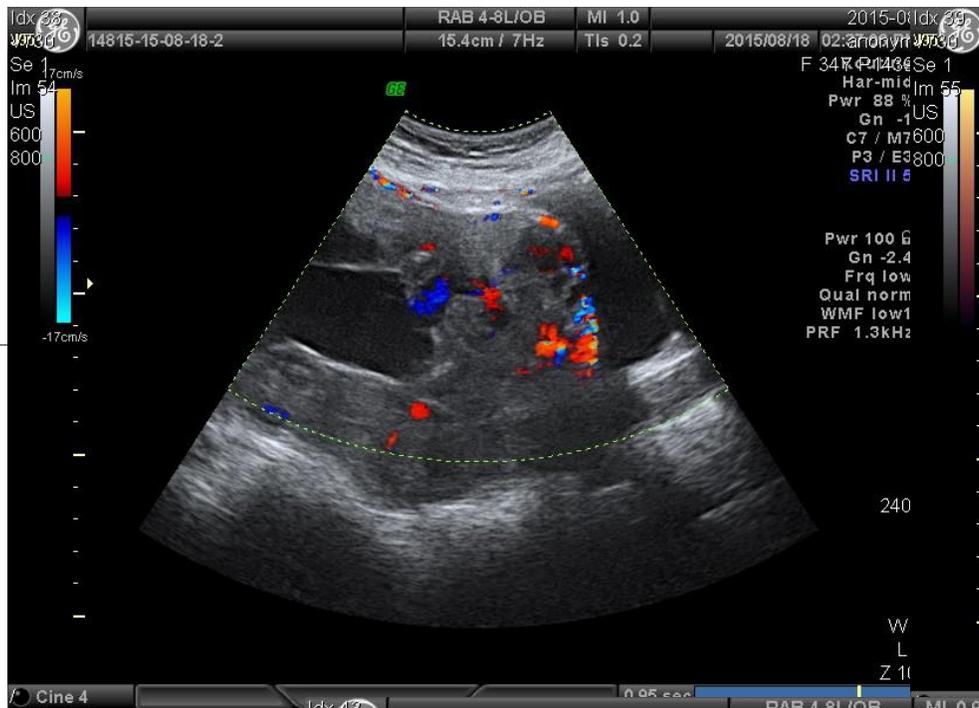
Prepare for preterm delivery

Prepare for internal iliac artery ligation or hysterectomy

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CASE



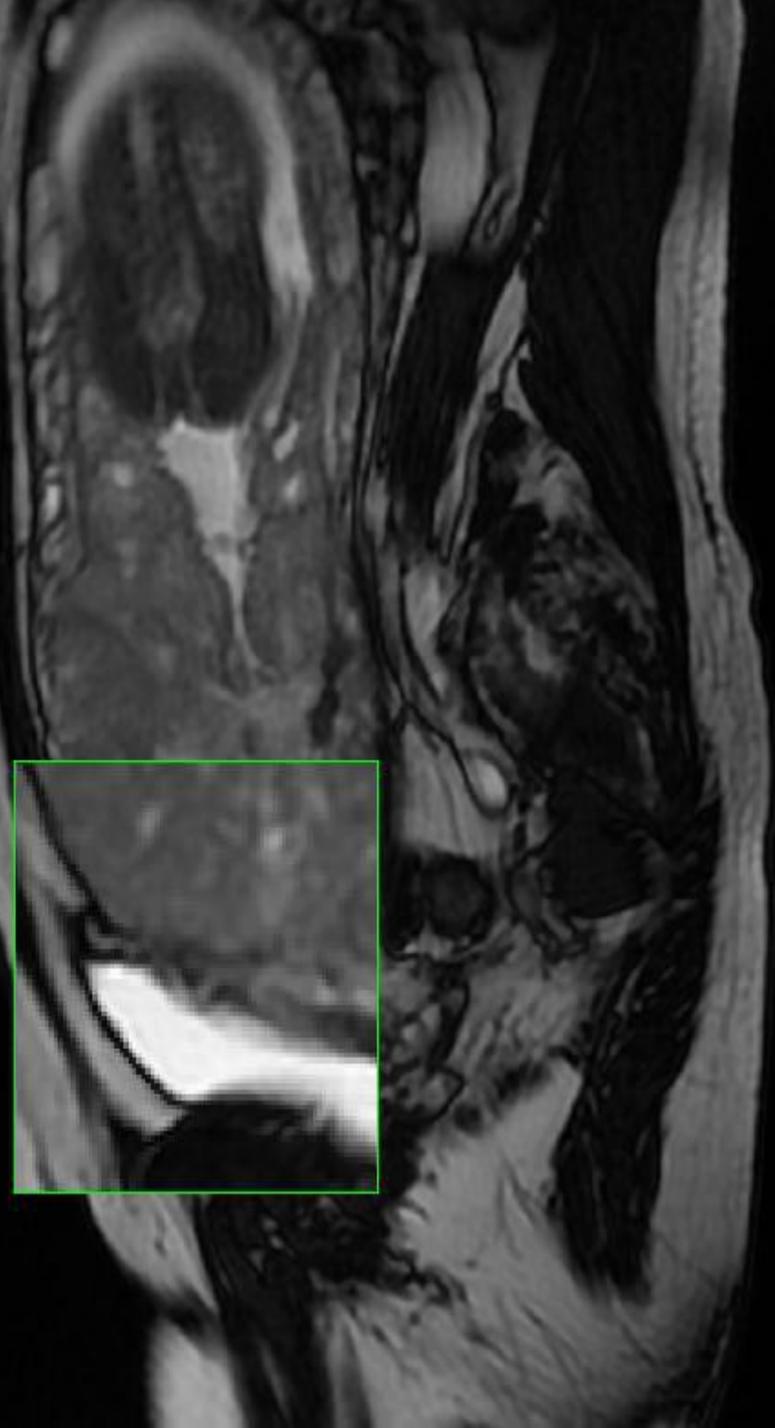


Doppler examination the placenta

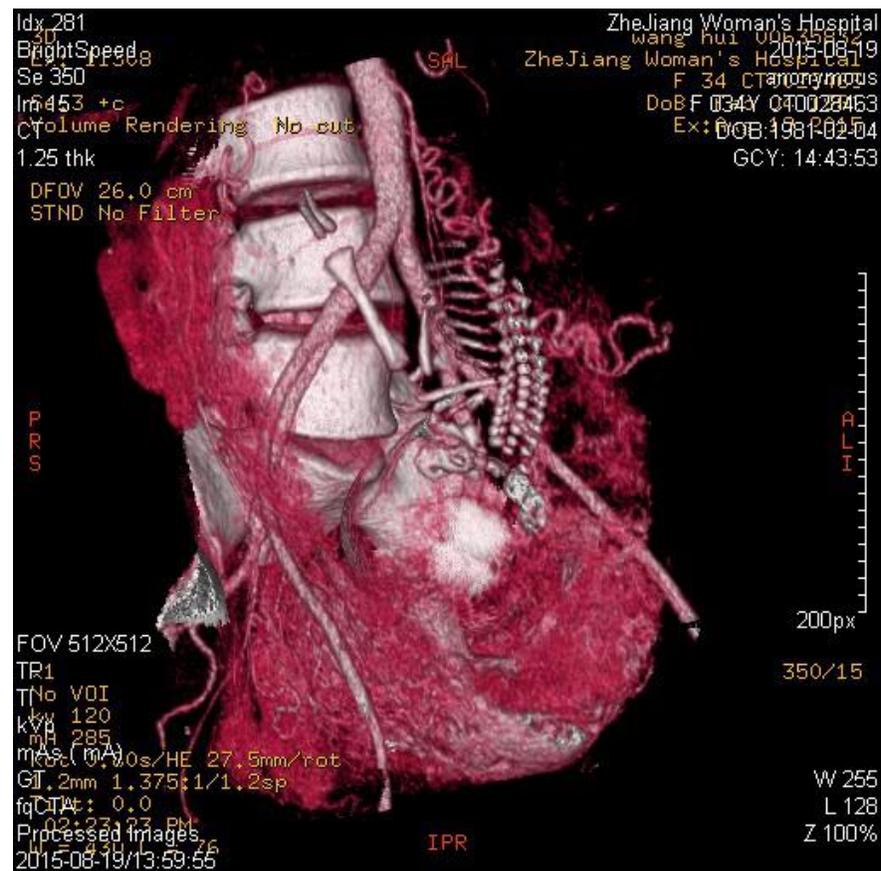
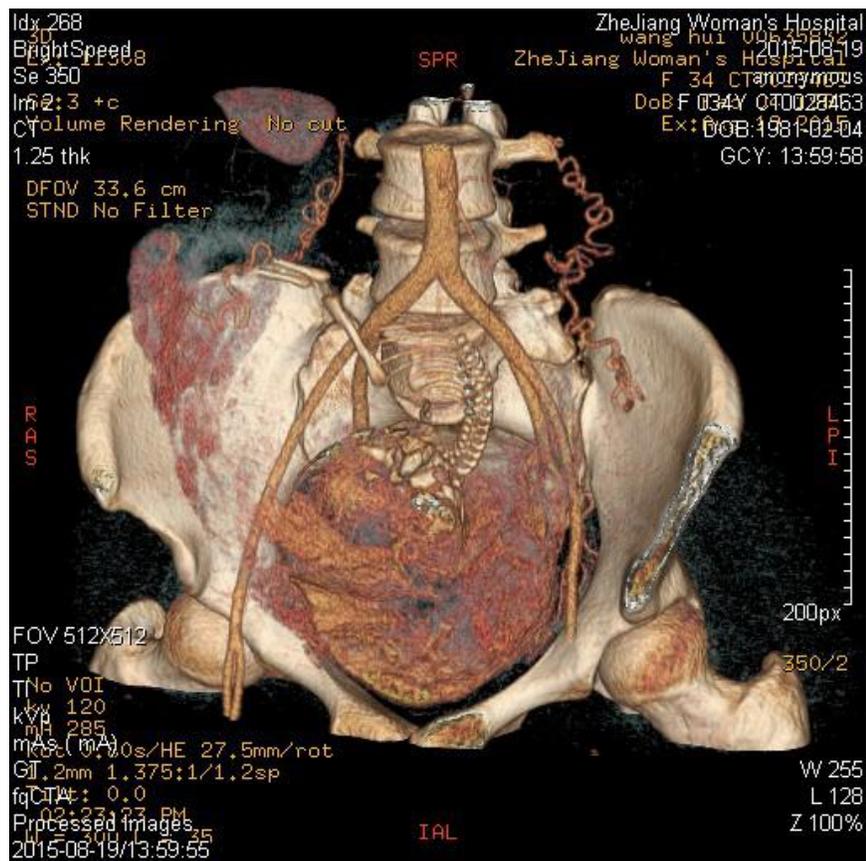


Doppler illustrating persisting vascularity, including in the region of bladder invasion (arrow)

MRI



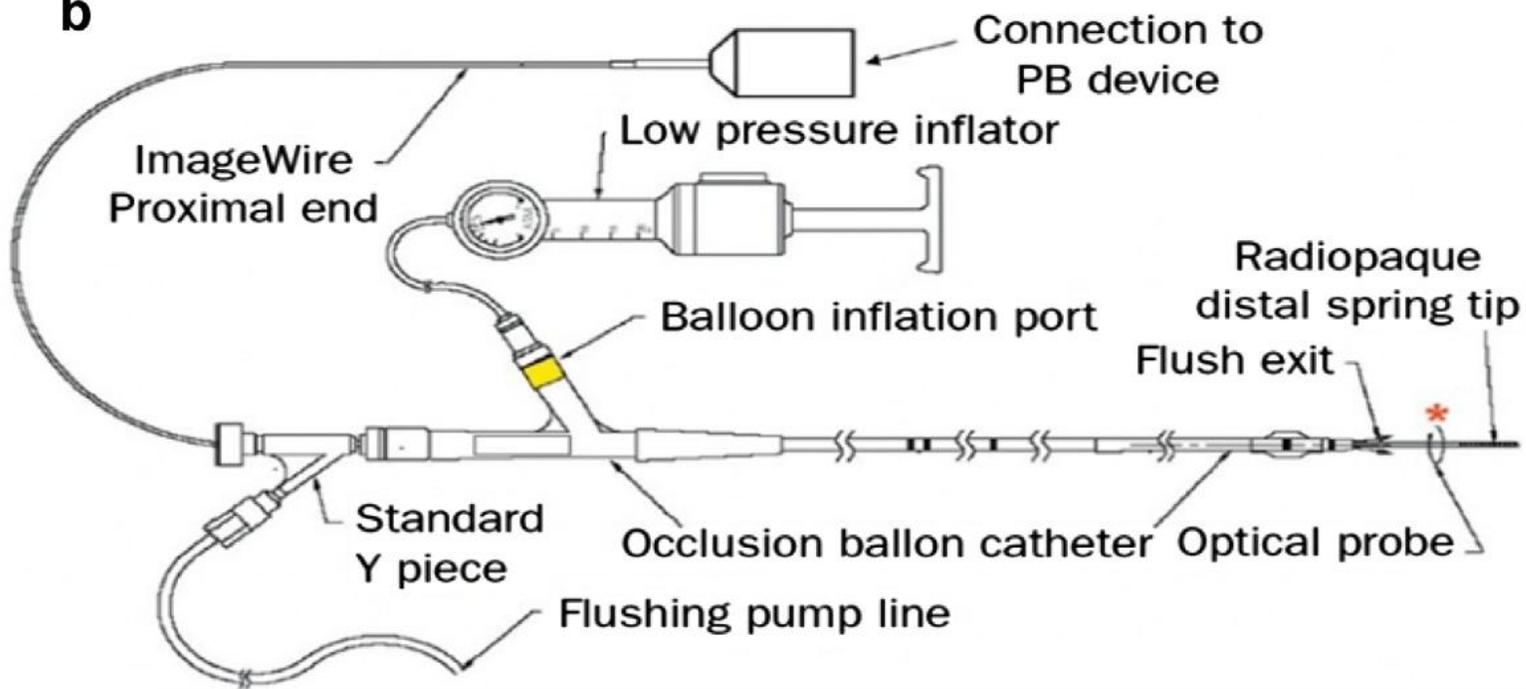
# CTA

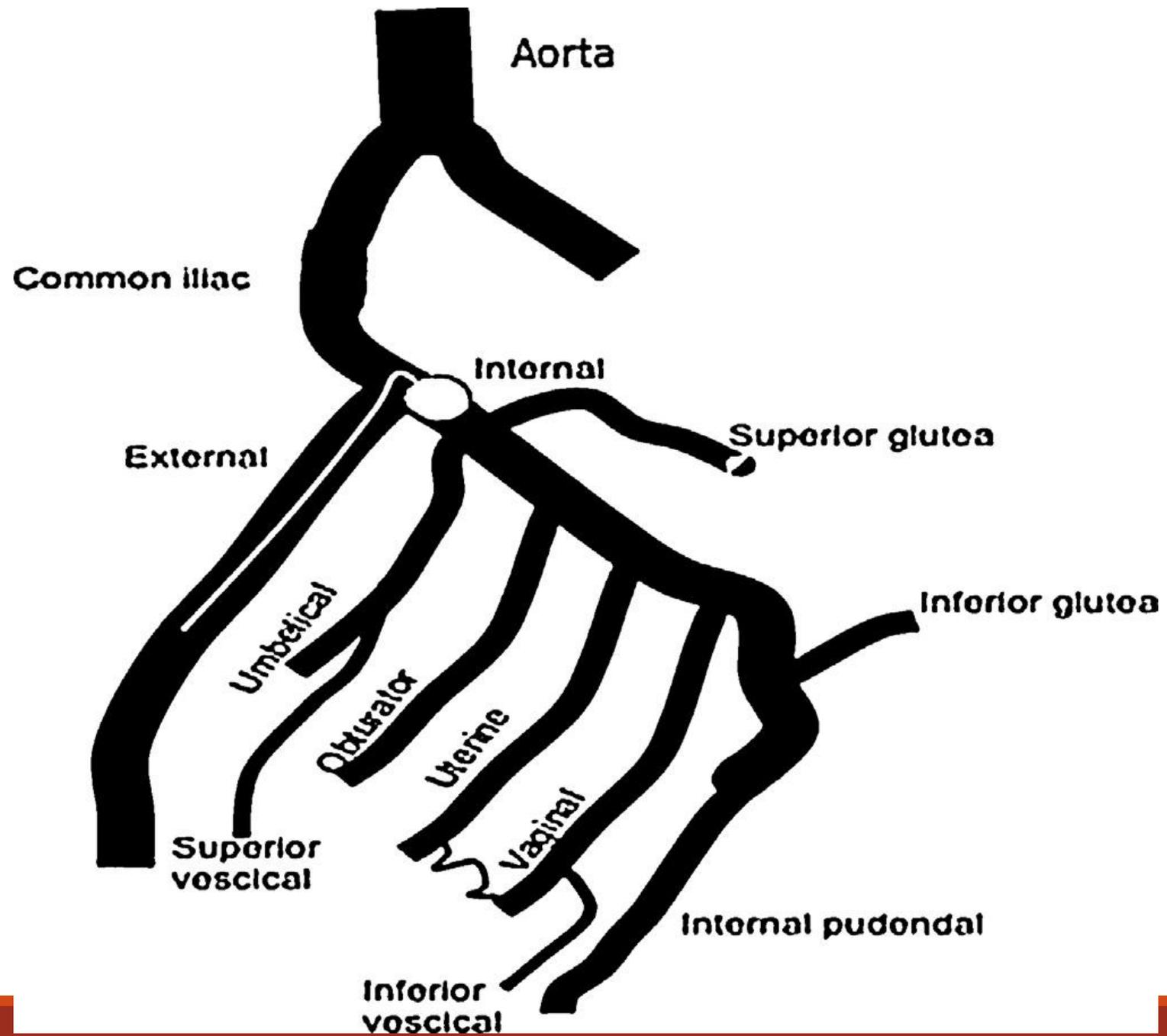


**a**



**b**





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## Delivery care plan (St George's Healthcare NHS Trust)

### DELIVERY CARE PLAN

Morbidly Adherent Placenta  
(Placenta accreta, increta or  
percreta with or without placenta praevia)

Name: \_\_\_\_\_

Attach Patient Label.

**Named Obstetric Consultant:** \_\_\_\_\_

(Consultant planning and directly supervising delivery).

**Named Consultant Anaesthetist:** \_\_\_\_\_

(Ob Anaesthetist directly supervising anaesthesia at delivery).

#### Multidisciplinary Team involved in pre-op planning.

	Informed.	
Patient	Y/N	
Consultant Obstetrician	Y/N	
Obstetric Anaesthetist:	Y/N	
Interventional Radiology Team:	Y/N	
Prof Belli:	Y/N	
Haematologist:		
Urologist (if applicable):	Y/N	N/A
Labour Ward Co-ordinator/Matron:	Y/N	
Neonatologists:	Y/N	N/A
Labour Ward Lead (Edwin C):	Y/N	
Obstetric Anaesthetic Lead:	Y/N	
Others (Advocates/interpreters):	Y/N	N/A

All the relevant members of the  
multidisciplinary team and the  
patient agree to the  
management plan Y/N

#### Discussion and informed Consent:

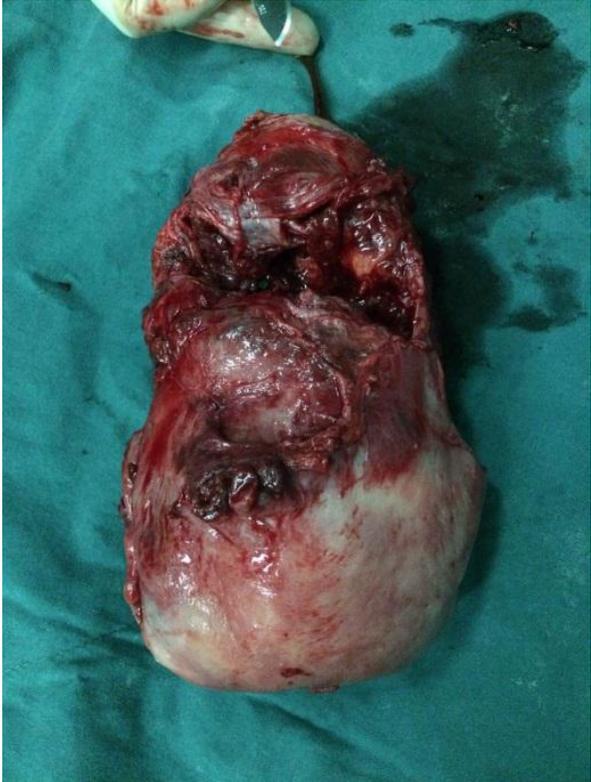
Includes possible interventions (such as hysterectomy, leaving placenta in situ, cell salvage and Interventional Radiology) – Please see Management Plan.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Blood and blood products available on site:	Y/N		
Patient is willing to accept blood products.	Y/N	Advanced directive signed.	Y/N N/A
Local availability of Level 2 critical care bed:	Y/N		EDD double checked Y/N
Ultrasound scan / MRI checked	Y/N	Patient information Leaflet given.	Y/N

# Post-Operation

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# Conservative management of morbidly adherent placenta

# Uterine-sparing techniques

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Leaving the placenta in situ: expectant management

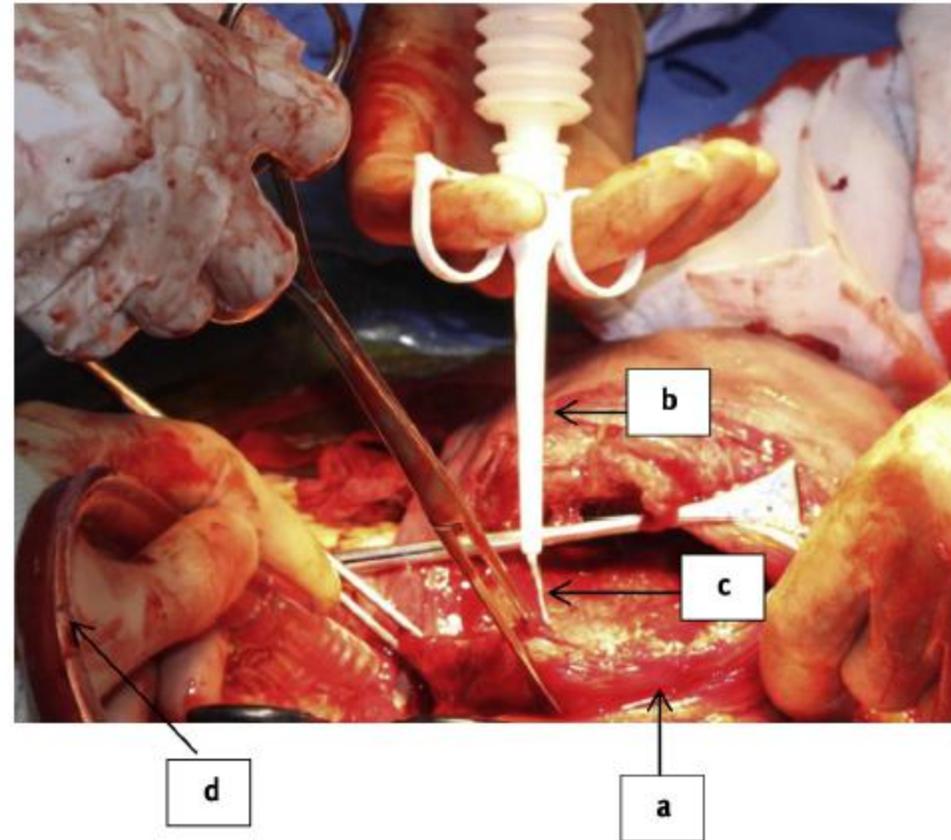
Hysteroscopic resection of retained  
adherent placenta

Placental-myometrial en bloc excision  
and repair

## Steps of 'Triple P Procedure' for percreta

- Peri-operative placental localization and delivery of the fetus via transverse uterine incision above the upper border of placenta, which is determined pre-operatively (in the operating theatre) by a trans-abdominal ultrasound.
- Pelvic devascularization: once the fetus is delivered, uterine blood supply is reduced by inflation of pre-positioned occlusion balloons in the anterior division of the internal iliac artery.
- Placental non-separation with myometrial excision and reconstruction of the uterine wall. The entire myometrial layer overlying the placental bed is excised together with the adherent placenta and the myometrial defect is repaired.

Chandrabaran E. The Triple-P procedure as a conservative surgical alternative to peripartum hysterectomy for placenta percreta. *Int J Gynaecol Obstet* 2012;117:191-194.



**Figure 4** Triple P Procedure: After 'placental non-separation and myometrial excision'. (a) Leaving 2 cm 'myometrial margin' to aid closure of the myometrial defect after 'placental non-separation and myometrial excision'. (b) Applicator for the local haemostatic agent 'PerClot'. (c) 'PerClot' being applied to the line of invasion of the placenta into the posterior bladder wall. (d) Tubing for the cell saver to aid 'auto-transfusion'.

# Abruptio Placenta

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# Definition

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premature separation of a normally implanted placenta from the uterus before delivery of the fetus

# Risk factors

## BOX 18-1 RISK FACTORS FOR PLACENTAL ABRUPTION

Increasing parity and maternal age

Maternal substance use

- Cigarette smoking
- Cocaine abuse

Trauma

Maternal diseases

- Hypertension
- Hypothyroidism
- Asthma

Preterm premature rupture of membranes

Rapid uterine decompression associated with multiple gestation and polyhydramnios

Uterine and placental factors

- Anomalies
- Synechiae
- Fibroids
- Cesarean scar
- Abnormal placental formation
- Chronic ischemia

Prior abruption

Hyperhomocysteinemia

# Essentials of diagnosis

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Unremitting abdominal or back pain

Irritable, tender, hypertonic uterus

Visible or concealed hemorrhage

# Incidence

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1/100

Complicates 1 in 75 to 1 in 226 deliveries

About **one third** of all antepartum bleeding can be attributed to placental abruption.

About 50% of separations occur before the onset of labor

10%~15% are not diagnosed before the second stage of labor

# Associations

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Hypertension

Smoking

Cocaine use

Multiparity

Social disadvantage

Sudden release of intrauterine pressure

Inherited or acquired thrombophilia

Uterine malformations or fibroids

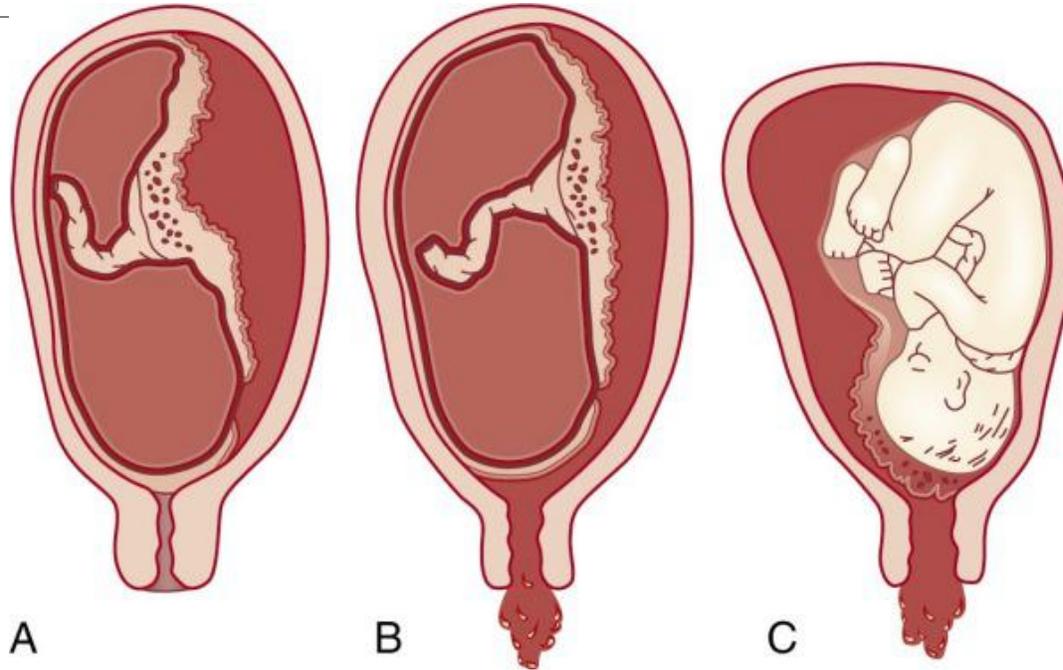
Age

Trauma

Prior history

# Types

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A

B

C

- A Concealed bleeding
- B Apparent bleeding
- C Complete placental separation

# Features

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## Pain

Bleeding

Uterine tenderness

Maternal compromise – hypovolaemia

Fetal compromise

Uterine contractions / labour

# Maternal Complications

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Cardiovascular collapse

Coagulopathy – hypofibrinogenemia

DIC

Multi organ failure

Renal failure

# Fetal Complications

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Fetal asphyxia

Fetal demise (9 folds)

Preterm birth (4 folds)

Growth restriction (2 folds)

# Investigations

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CBC, platelets, coagulation profile

Urine output, creatinine, urea

Fetal gestational age

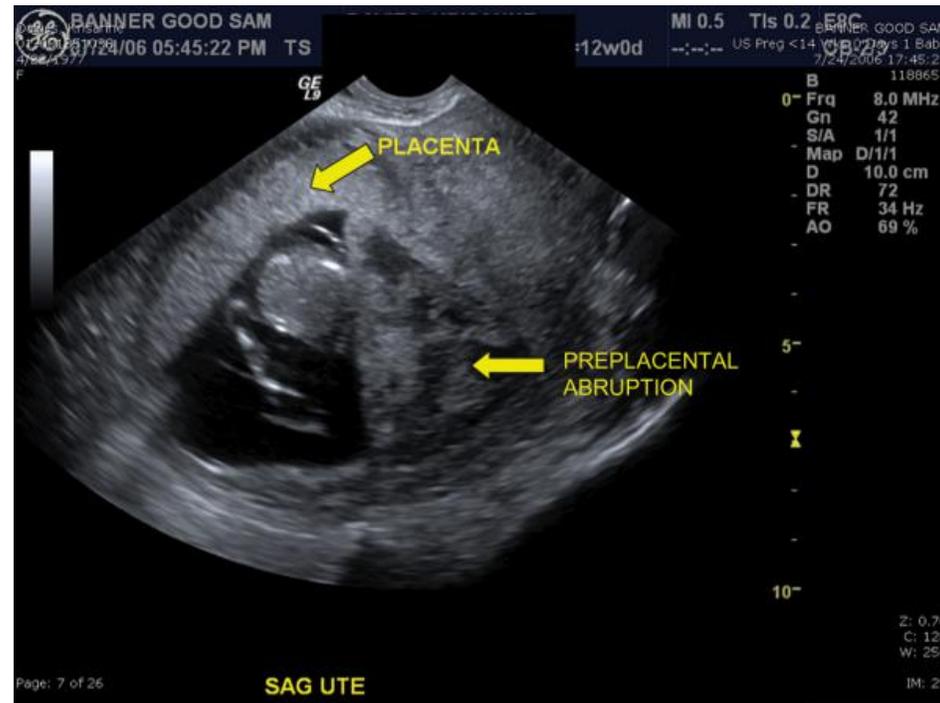
Fetal well being

FH , non-stress test

est. fetal weight

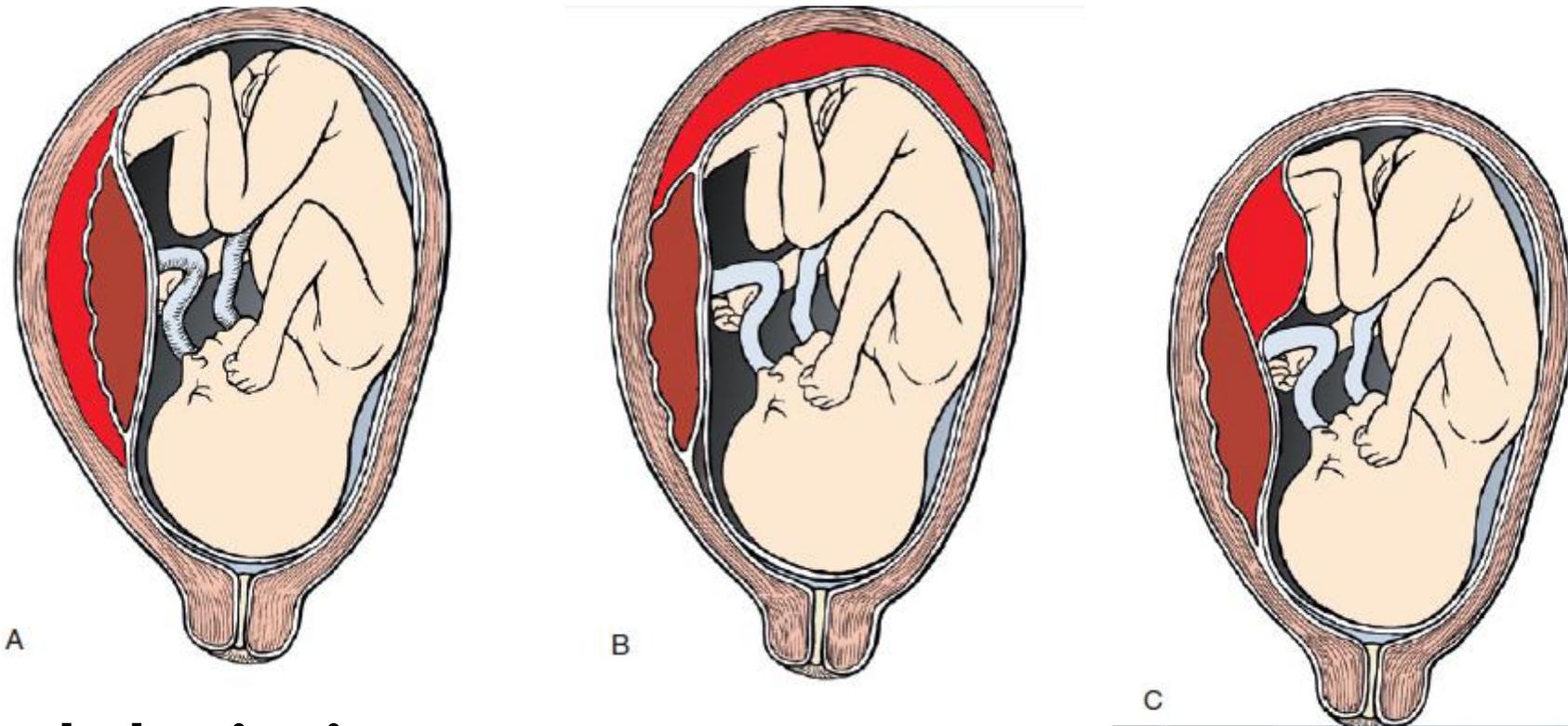
Placental localisation

# Sonography



# RADIOLOGY

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**subchorionic** (between the placenta and the membranes),  
**retroplacental** (between the placenta and the myometrium)  
**preplacental** (between the placenta and the amniotic fluid)

# Clinical Manifestations

- The temporal nature of the abruption  
(acute vs. chronic)
- 

- Clinical presentation (overt vs. concealed)
- Severity

# Clinical Manifestations

- The amount of vaginal bleeding correlates poorly with the extent of placental separation and its potential for fetal compromise. In fact, concealed abruption occurs in 10% to 20% of cases
- Chronic abruption may be insidious in its presentation and is often associated with ischemic placental disease

# Management

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Treatment depends on:

**Condition** of the mother and fetus

**Gestational age** of the fetus

Cervical examination

# Management

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Mature fetus

Deliver

Compromised mother

Deliver

Immature fetus

Expectant, if mother stable

# Grades : mild abruption

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40%

slight vaginal bleeding

minimal uterine irritability

maternal blood pressure and fibrinogen levels are unaffected,  
the fetal heart rate pattern is normal

# Grades :Moderate/partial

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45%

mild to moderate vaginal bleeding

significant uterine irritability or contractions

Normal maternal blood pressure

the pulse is often elevated

postural blood volume deficits may be present

the fibrinogen level decreased

fetal compromise

# Grades: Severe/complete

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15%

moderate to severe vaginal bleeding

uterine bleeding with painful, tetanic uterine contractions

maternal hypotension

coagulopathy present along

fetal death

# Mild placental abruption: Clinical / pathological correlations

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Many women with antepartum bleeding will carry a presumptive diagnosis of “mild abruption”

based on the symptoms , signs and investigations

# Mild placental abruption: Clinical / pathological correlations

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At delivery no obvious evidence of placental separation is found

on gross inspection or microscopy of the placenta

These are the “cases of uncertain aetiology”.

# Mild placental abruption: Clinical / pathological correlations

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associated with an increased incidence of fetal compromise

care and attention

# Moderate placental abruption: Expectant Management

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Bed rest

Ongoing maternal monitoring

Fetal assessment: age, growth, well being

Deliver if recurrent signs / symptoms

Deliver at fetal maturation

# Severe placental abruption: Management

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I / V resuscitation

Evaluate and treat coagulation defect

Deliver the fetus

Be ready for PPH

Monitor renal status closely

# Essentials of diagnosis

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Unremitting abdominals or back pain

Irritable, tender and often hypertonic uterus

Visible or concealed hemorrhage

Evidence of fetal distress may or may not present depending on the severity of the process

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# Rupture of the uterus



# Essential of diagnosis

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Increased suprapubic pain and tenderness with labor

Sudden cessation of uterine contractions

Vaginal bleeding

Blood urine

Recession of the fetal presenting part

Disappearance of fetal heart tones

# General Considerations

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1:1148 ~ 1:2250

0.5%~1.5% in scar pregnancy

# Risk factors

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History of prior hysterotomy

Trauma

Uterine overdistention

Uterine anomalies

Placenta percreta

# Clinical Findings

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No reliable signs

Local pain and tenderness

Small amount of vaginal bleeding

Fetal distress

# Treatment

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Hysterectomy

Rupture Repair

# Prevention

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Obstetric assessment and technique

Evaluate fetal weight

Poorly supervised Administration of oxytocin

Poor closure of a cesarean section incision

# Complications

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Hemorrhage

Shock

Postoperative infection

Ureteral damage

Thrombophlebitis

Amniotic fluid embolus

DIC

Pituitary failure

Death

# Essentials of Diagnosis

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Increased suprapubic pain and tenderness with labor

Sudden cessation of uterine contractions with a “tearing “sensation

Vaginal bleeding (or bloody urine)

Recession of the fetal presenting part

Disappearance of fetal heart tones

# Fetal vessel rupture

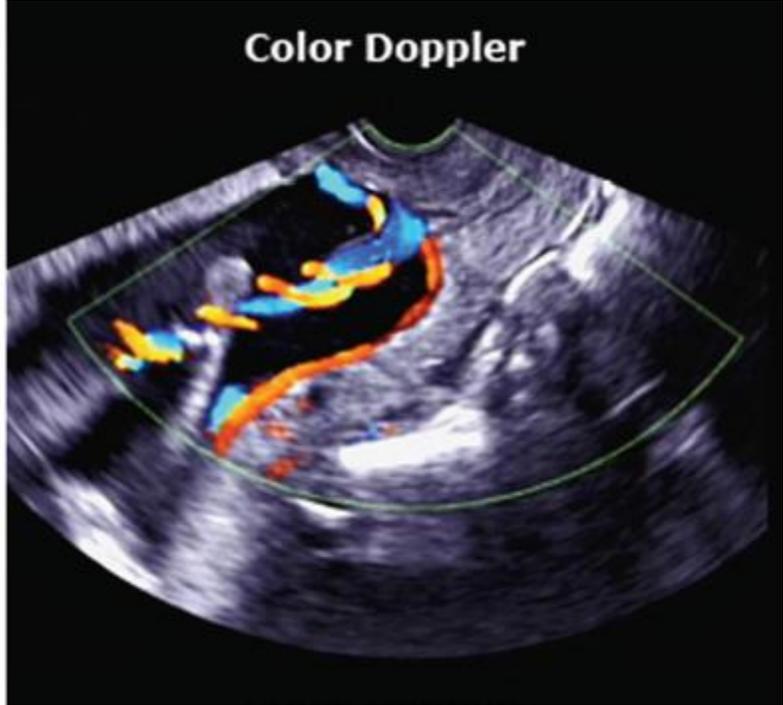
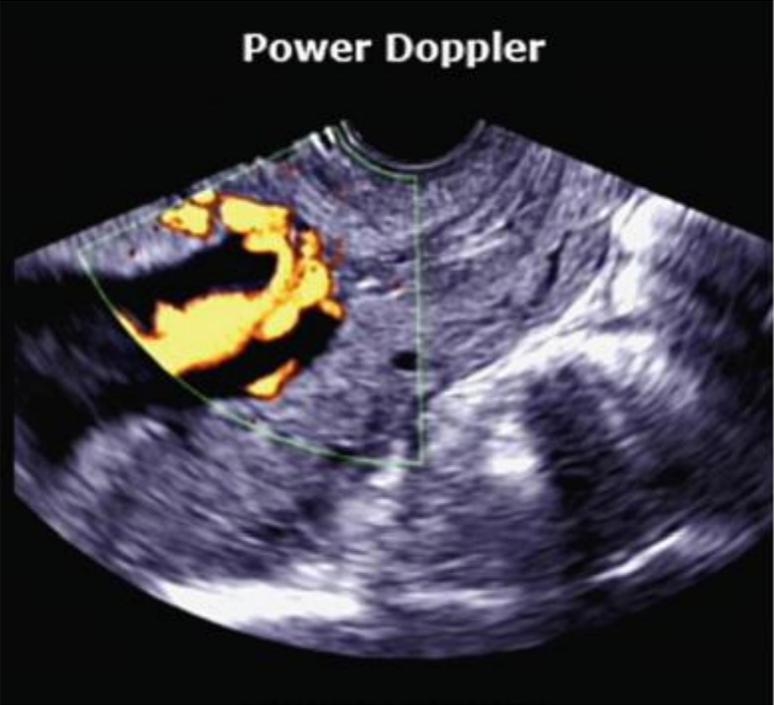
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Velamentous cord insertion

Vasa previa

1:2500~1:5000

Perinatal mortality 60%



# Vasa previa

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Cesarean delivery

34+0~ 36+7 weeks

# Clinical manifestations

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Palpated the vessels through vaginal exam

Bleeding + FHR



# Diagnosis

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Ultrasound cord insert - placenta margin  $>3\text{cm}$

Color Doppler

Apt test 1% NaOH+blood

Fetal



Maternal



# Management

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Emergent cesarean section

Elective CS after 34wks

# Case Discussion

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A 34 year old G3P2 has been attending the Midwifery clinic for regular care through pregnancy. There have been no complications. She is healthy, but a smoker. She presents at The emergency room with a history of having “bleed a jug full of blood!”

How would you evaluate the situation?

What are the likely causes of her condition?

Outline a plan of treatment.