Introduction & Definition

- The **postpartum period**, also known as **the puerperium** and the " **fourth trimester**," refers to the weeks after birth when the physiologic changes related to pregnancy return to the nonpregnant state.
- There is consensus that the postpartum period begins upon birth of the newborn. The end is less well defined, but is often considered the six to eight weeks after birth because the effects of pregnancy on many systems have largely returned to the prepregnancy state by this time.
- However, not all organ systems return to baseline within this period (6-8w).

Postpartum Findings and Changes

Mohammad Ibrahim Rbabaa
Mohammad suliman saraireh

General Changes

- **Postpartum shivering:**
  - Postpartum shivering or chills are observed in 25 to 50 % of women. Shivering usually starts 1 to 30 minutes post-delivery and lasts for 2 to 60 minutes. The cause is unknown.
  - Treatment is supportive with warm blankets and/or warm air.
- **Physiological Weight loss**
  - The mean weight loss from delivery of the fetus, placenta, and amniotic fluid is around 6 kgs.
  - Further loss of 2-7 kgs is due to:
    - Involution of the uterus
    - Loss of lochial fluid
    - Loss of intra- and extra-cellular fluid
  - Approximately one-half of gestational weight gain is lost in the first six weeks after birth.

General Changes

- **Hair and Skin:**
  - Striae: Fade from red to silvery, but are permanent.
  - The abdominal skin: May remain lax if there was extensive rupture of elastic fibers.
  - Chloasma: Resolves in the postpartum period, although the exact timing is not known.
  - During pregnancy, there is an increase in the percentage of "growing" or anagen hair relative to the "resting" or telogen hair.
    - This ratio is reversed in the puerperium.
    - Telogen effluvium is the hair loss commonly noted one to five months after delivery.
    - This is usually self-limited with restoration of normal hair patterns by 6 to 15 months after delivery.

Genital System

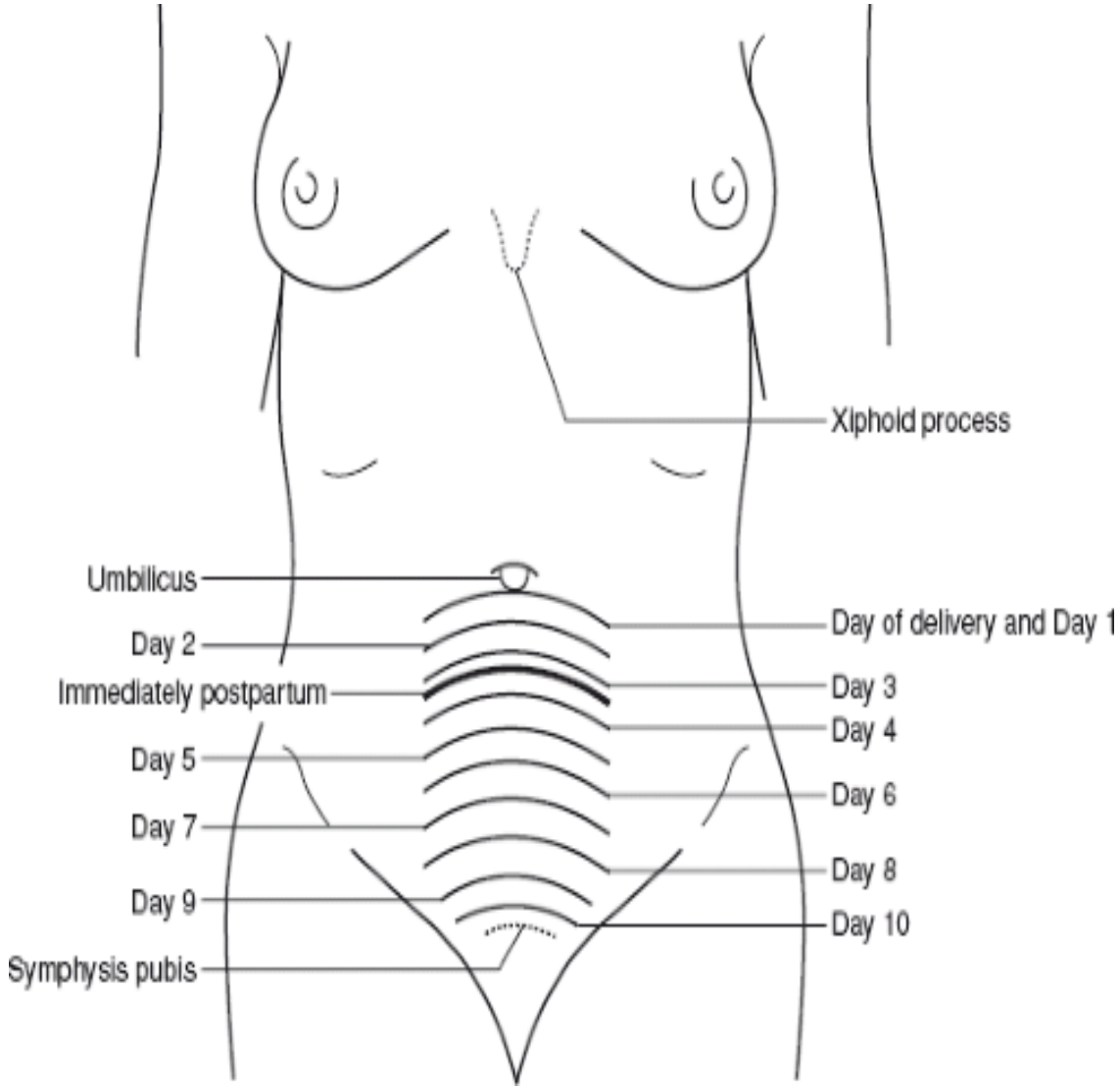
- Uterine involution
- Lochia
- Cervix
- Vagina, hymen, pelvic muscles

Genital System - Uterine involution

- Immediately after delivery of the placenta, the uterus begins to involute (ie, contract).
- Involution occurs by a process of **autolysis**, whereby muscle cells diminish in size as a result of enzymatic digestion of cytoplasm.
- **Contraction** of the interlacing myometrial muscle bundles constricts the intramyometrial vessels and impedes blood flow, which is the major mechanism preventing hemorrhage. In addition, large vessels at the placental site **thrombose**, which is a secondary hemostatic mechanism for preventing blood loss at this site.
- A soft uterus in the presence of heavy vaginal bleeding suggests inadequate contraction of the uterus (ie, **atony**).

Genital System - Uterine involution

- **Immediately after delivery**, the fundus is normally firm, nontender, globular, and located midway between the symphysis pubis and umbilicus.
- **In the next 12 hours**, it rises to just above or below the umbilicus, then recedes by approximately 1 cm/day to again lie midway between the symphysis pubis and umbilicus by the end of the first postpartum week.
- It is not palpable abdominally by **two weeks postpartum** and attains its normal nonpregnant **size** by **six to eight weeks postpartum**.
- The weight of the uterus decreases from approximately 1000 g immediately postpartum to 60 g six to eight weeks later.


Xiphoid process
Umbilicus
Day 2
Immediately postpartum
Day 5
Day 7
Day 9
Symphysis pubis
Day of delivery and Day 1
Day 3
Day 4
Day 6
Day 8
Day 10

Afterpains

- Afterpains occur in 50 percent of individuals within 48 hours of vaginal or cesarean birth due to **hypertonic uterine contractions**.
- The pain is intermittent and often more intense during Lactation due to the release of oxytocin associated with suckling.
- Afterpains usually spontaneously resolve by the end of the first postpartum week. Mild analgesics (eg, acetaminophen [paracetamol], ibuprofen, diclofenac suppositories) are effective.
- Nonsteroidal anti-inflammatory drugs (NSAIDs) appear to be as effective as acetaminophen (paracetamol), and the two drugs can be used in combination if a single drug is inadequate.
- Severe afterpains after vaginal birth are atypical and should prompt an evaluation for another source.

Genital System - Lochia

- The basal portion of the decidua remains after the placenta separates.
- This decidua divides into two layers: Superficial layer is **shed** & Deep layer regenerates new endometrium, which covers the entire endometrial cavity by the 16th postpartum day
- Normal shedding of blood and decidua is referred to as **lochia rubra** (red, red brown), and lasts for the first few days following delivery.
- Vaginal discharge then becomes increasingly watery, called **lochia serosa** (pinkish brown), which lasts for two to three weeks.
- Ultimately, the discharge turns yellowish-white, the **lochia alba**.
- The total volume of postpartum lochial secretion is 200 to 500 mL over a mean duration of just over one month.

The Normal Stages Of Lochia (Postpartum Bleeding And Discharge)

TheLeakyBoob.com

Lochia types

Lochia rubra

Dark red blood

Lochia serosa

Pinkish-brownish discharge

Lochia Alba

Yellowish-white discharge

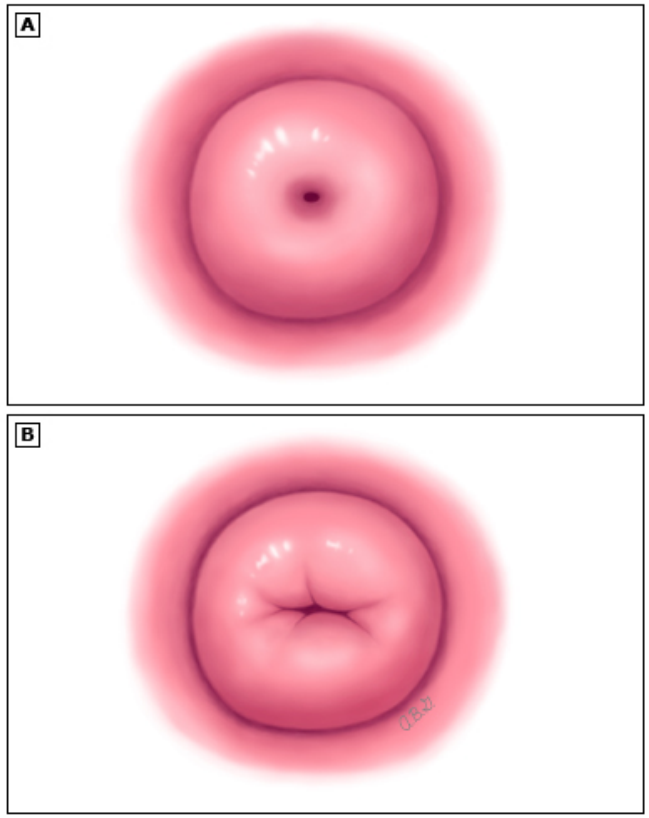
Lochia Rubra	Lochia Serosa	Lochia Alba
Dark Red	Pinkish Brown	Whitish Yellow
Lasts 3 - 4 Days	Lasts 4 - 10 Days	Lasts 10 - 28 Days
Occurring a few days after delivery, it is mainly made up of blood, bits of fetal membranes, decidua*, meconium, and cervical discharge	It contains less red blood cells and has more white blood cells, wound discharge from the placental and other sites, and mucus from the cervix.	For about another 1 - 2 weeks, whitish turbid fluid drains from the vagina which mainly consists of decidual cells, mucus, white blood cells, and epithelial cells.

**part of the uterine lining in pregnancy.*

Genital System - Cervix

- After delivery, the cervix is soft and floppy and there are small lacerations at the margins of the external os.
- The cervix contracts slowly, remaining two to three centimeters dilated for the first few postpartum days,
- Less than 1 centimeter dilated at one week.
- **The external os never resumes its pregravid shape**; the small, smooth, regular circular opening of the nulligravida becomes a large, transverse, stellate slit after childbirth.
- The external os can remain open permanently, giving a characteristic funnel shape to the parous cervix.

Parous and nonparous cervix



(A) Normal nulligravid cervix. The external os is a small, smooth, circular opening.

(B) Normal parous cervix. The external os is a large, transverse, stellate slit.

Genital System - Vagina, hymen, pelvic muscles

- The vagina is capacious and smooth immediately after birth.
- It slowly contracts, but not to its nulligravid size; rugae are restored in the third postpartum week as edema and vascularity subside.
- The hymen is replaced by multiple tags of tissue called the carunculae hymenales (myrtiformes).
- Fascial stretching and trauma during childbirth result in **pelvic muscle relaxation(?)**, which may not return to the pregravid state.

Cardiovascular System

- Immediately following delivery, there is **marked increase in peripheral vascular resistance** due to the removal of the low-pressure uteroplacental circulatory shunt

- The **cardiac output and plasma volume** gradually returns to normal during the first 2 weeks of puerperium.

- Rises of pulse may indicate presence of hemorrhage or infection.

Hematologic system

- Leukocytosis and thrombocytosis occur during and after labour.

- **Hematocrit** drops because of blood loss during delivery, rises after 3 to 7 day of postpartum.

- **Blood volume** returns nearly to pre-pregnant state in about 1 week.

- **Hypercoagulable state** of pregnancy continues in the first 2 weeks of puerperium (risk of DVT and PE)

Endocrine - hCG

- **Human chorionic gonadotropin (hCG) levels:**
  - The normal fall and disappearance of hCG postpartum has an initial rapid phase and then a more gradual decline.
  - HCG values typically return to normal nonpregnant levels two to four weeks after term delivery, but can take longer.
  - The most serious concern in patients with rising hCG levels postpartum is gestational trophoblastic disease.

Endocrine - Prolactin

- Levels of prolactin during pregnancy gradually increase towards term, and remain elevated for up to 6 weeks post partum.
- By six weeks after delivery, estradiol secretion has decreased, and the basal serum prolactin concentration is usually normal, even when the mother is breastfeeding.
-

Endocrine - Estrogen

- **Estrogen - Hot flashes**
  - Some individuals report hot flashes in the postpartum period, with resolution over time.
  - The cause is unknown but may be due to thermoregulatory dysfunction, initiated at the level of the hypothalamus by **estrogen withdrawal** after delivery of the placenta. In addition, the initial hyperprolactinemic state associated with **breastfeeding** depresses estrogen production.

Resumption of ovulation

- Gonadotropins and sex steroids are at low levels for the first two to three weeks postpartum.
- In non lactating women:
  - Return of menstruation following delivery ranges from 45 to 64 days postpartum
  - Time to ovulation ranged from 45 to 94 days,
- 70 percent of women will menstruate by the 12th postpartum week
- Women who breastfeed have a delay in resumption of ovulation postpartum.
  - This is believed to be due to **prolactin-induced inhibition of pulsatile gonadotropin-releasing hormone release** from the hypothalamus

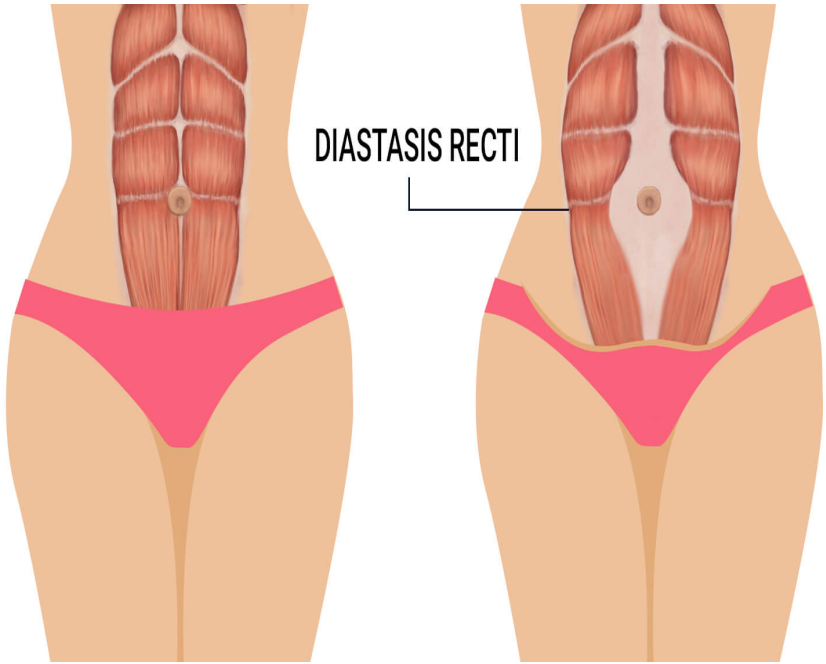
GI & Abdominal wall

Constipation : due to:

- Low fiber diet , dehydration during labour
- Fear of evacuation due to pain from :
  - Sutured perineum
  - Prolapsed haemorrhoids
  - Anal fissure

GI & Abdominal wall

- **Abdominal wall:**
  - The abdominal wall is lax postpartum
  - Regains most, if not all, of its normal muscular tone over several weeks.
  - Separation (diastasis) of the rectus abdominis muscles may persist.
  - Long-term sequelae may include:
    - Low back pain,
    - Abdominal discomfort,
    - Cosmetic issues.



Urinary system

- ***Urinary retention***
  - The first 24 hours after childbirth, especially with difficult, traumatic or instrumental delivery, or if regional anesthesia (spinal/epidural) is used

- ***There is diuresis*** during the first five days after delivery .
  - Increase urine production in puerperium
  - Diuresis body's mechanism of getting rid of the excess fluid retained during pregnancy
  - Increased fluid intake of breastfeeding mothers

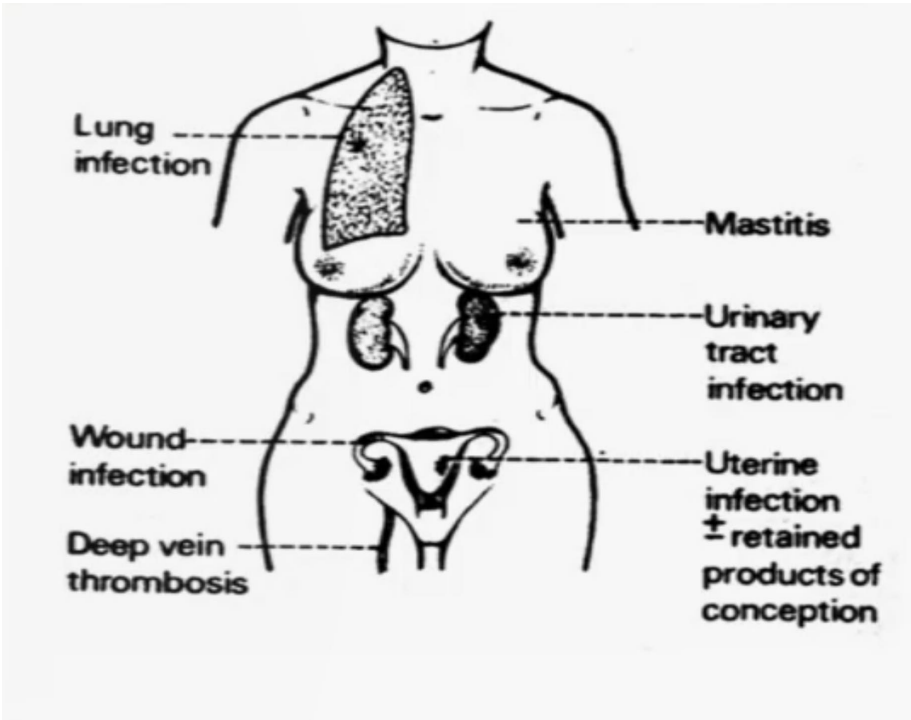
Puerperal Pyrexia

Abeer al Jufout

Puerperal Pyrexia

A 25-year-old P2 woman presented to the casualty 10 days after her delivery, with complaint of feeling unwell and h/o high grade fever for the past 4 days:

- High grade fever.
- Lower abdominal pain.
- Foul smelling bloody lochia for past 4 days.
- h/o leaking for 2 days prior to delivery.

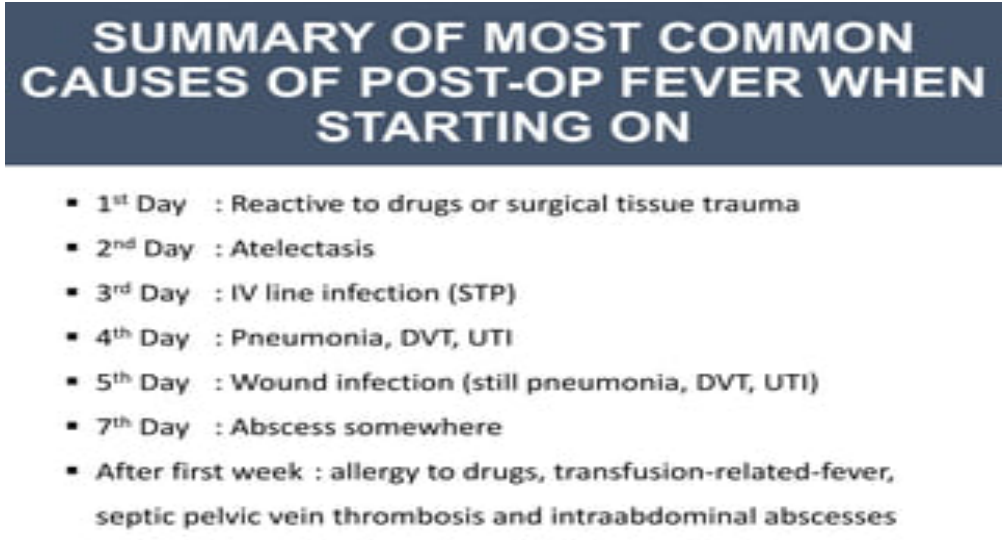


Puerperal Pyrexia

Definition: temperature of 38°C or higher on any two of the first 10 days postpartum exclusive of the first 24 hours (orally) "

DDX :

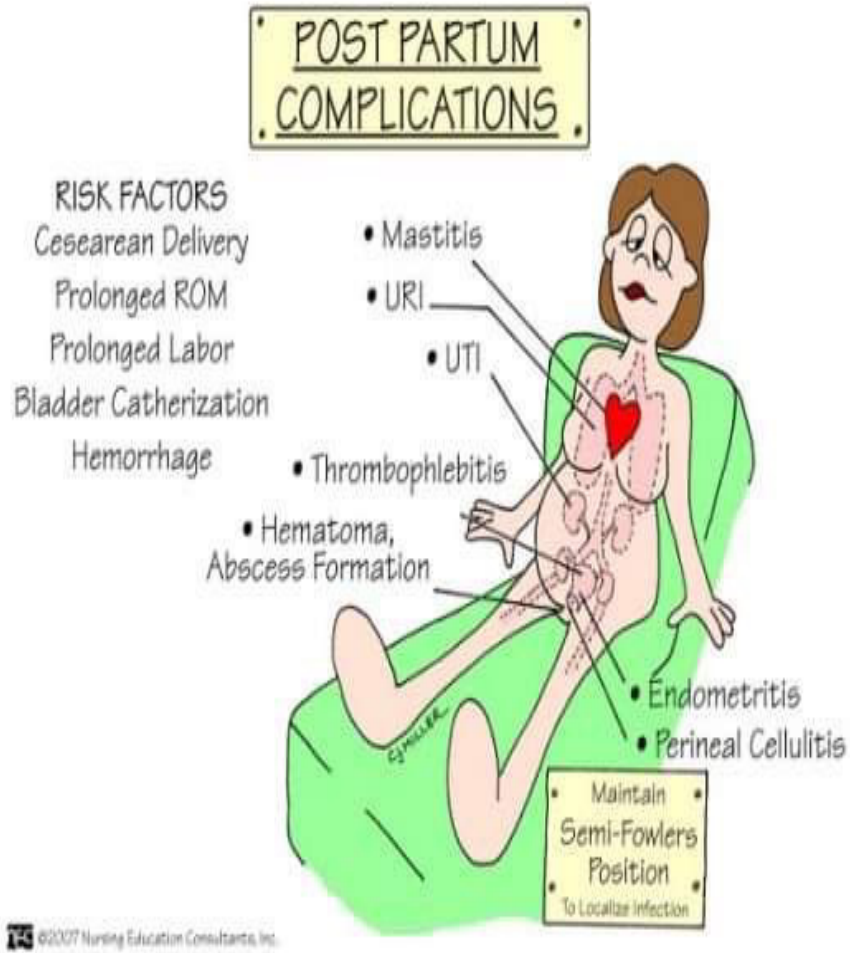
- Breast infection (Mastitis or breast abscess)
- Puerperal Sepsis
- Surgical site infection (eg, episiotomy, laceration, abdominal incision)
- Respiratory infections
- Urinary tract infection (cystitis, pyelonephritis)
- Deep Venous thrombosis
- Septic pelvic thrombophlebitis
- Other medical causes of fever



Puerperal Pyrexia

History:

- When the membranes ruptured.
- The length of labor.
- The instrumentation used.
- Sutures required.
- Whether the placenta was complete.
- Whether there was any bleeding during or after delivery.
- Abdominal pain
- Bleeding and discharge from vagina
- History of breast feeding
- History of Nausea, vomiting and diarrhea
- History of fatigue, loss of appetite
- History of urinary complaint and output
- History of lower limb pain and swelling
- History of respiratory complaints



Puerperal Pyrexia

Examination:

- Take the patient's temperature and blood pressure.
- Palpate the uterus to assess size and tenderness.
- Assess any perineal wounds and lochia.
- Examine the breasts.
- Examine the chest for signs of infection.
- Examine the abdomen.
- Examine the legs for possible thrombosis.

Pelvic examination:

- Lochia
- Genital lacerations
- Size of the uterus, tenderness
- Cervical motion tenderness
- Any tender adnexal mass or swelling Bogginess or fullness through the fornices?

Investigations:

- High vaginal swab.
- Urine culture and microscopy.
- Other swabs as felt necessary - eg, wound swabs, throat swabs.
- CBC
- Blood culture .
- Ultrasound scan may be required to assist diagnosis of retained products of conception.
- Sputum culture if indicated.

Management:

General measures

Ice packs may be helpful for pain from perineal wounds or mastitis. Rest and adequate fluid intake are required, particularly for mothers who are breastfeeding.

Puerperal sepsis

- •The following signs and symptoms should prompt urgent referral for hospital assessment
- Pyrexia (greater than or equal to 38°C).
- Sustained tachycardia (≥90 beats/minute).
- Breathlessness (respiratory rate ≥20 breaths/minute).
- Abdominal or chest pain.
- Diarrhoea and/or vomiting - may be due to endotoxins.
- Uterine or renal angle pain and tenderness.

Systemic Inflammatory Response Syndrome
Temperature >38.3°C, or <36°C
Heart Rate >90 bmp
Respiratory rate >20 breaths/min
White cell count <4 or >12 g/L
Blood glucose >7.7 mmol/L not diabetic
New altered mental state

Case scenario :

A 25-year-old P2 woman 10 days postpartum h/o high grade fever for the past 4 days / Lower abdominal pain /Foul smelling lochia Eating and drinking well, Passing urine normally

- Febrile 38.6c , Mild pallor • HR 114/min, BP 110/70 mm Hg,
- RR 18/min, chest clear • Breasts healthy • Abdomen soft, uterus 16 weeks size tender normal bowel sounds • P/S - purulent discharge - external os is patulous, tenderness in the vaginal fornices, no adnexal mass, no fullness in the POD

Puerperal sepsis (genital tract infection)

- Onset: usually 2-3 days after delivery (in severe cases group A strep infection mainly may develop in the first 24 hrs)

Predisposing factors:

- General factors:
- that lead to decreased immunity such as anemia
- antepartum or postpartum hemorrhage
- diabetes or septic focus
- Local factors "in the genital tract"
- Lack of antiseptic measures
- Premature rupture of membranes.
- Prolonged labor with excessive vaginal examination
- Retained parts of placenta or membranes.
- Intrauterine manipulations (e.g. manual separation of placenta)
- Instrumental delivery with possible genital tract lacerations.

Exogenous:

- from attendants by droplet infection or from unsterilized instruments.

Endogenous:

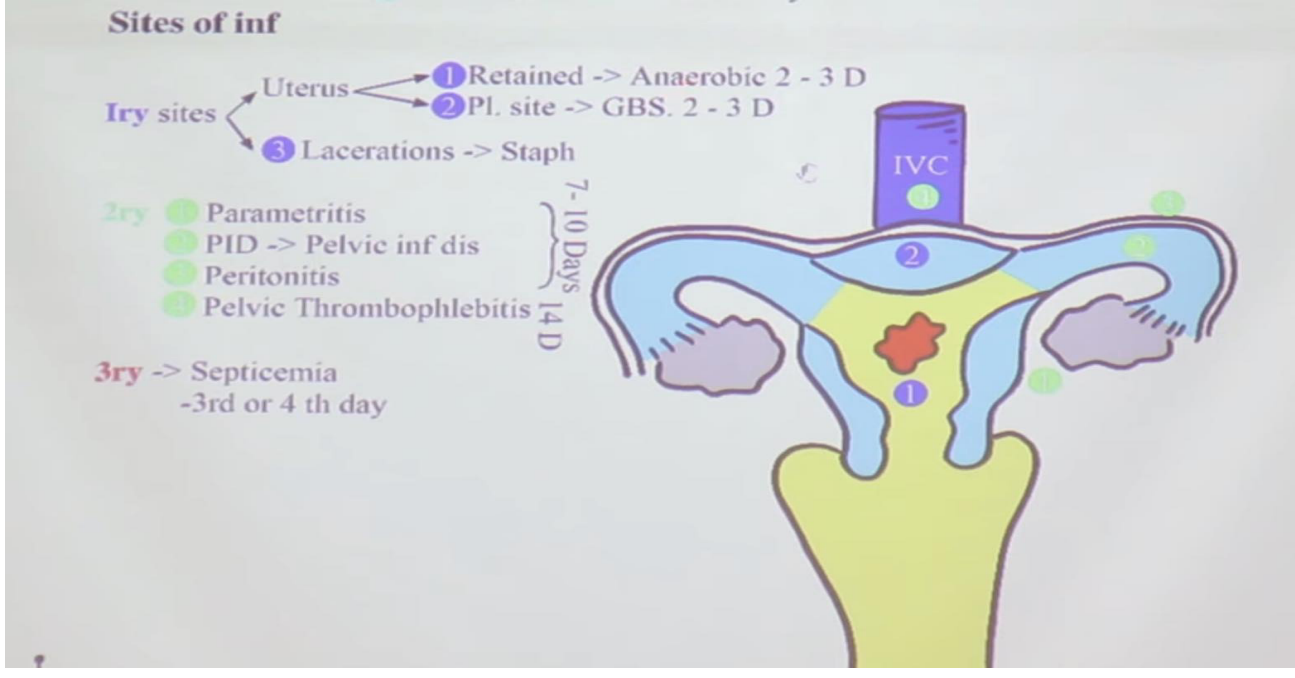
- organisms are already present in the genital tract before delivery, e.g. vaginitis or cervicitis. Retained products of conception

Autogenous:

- organisms reach the genital tract from remote site via blood stream e.g. tonsilitis respiratory tract infection, careous teeth.

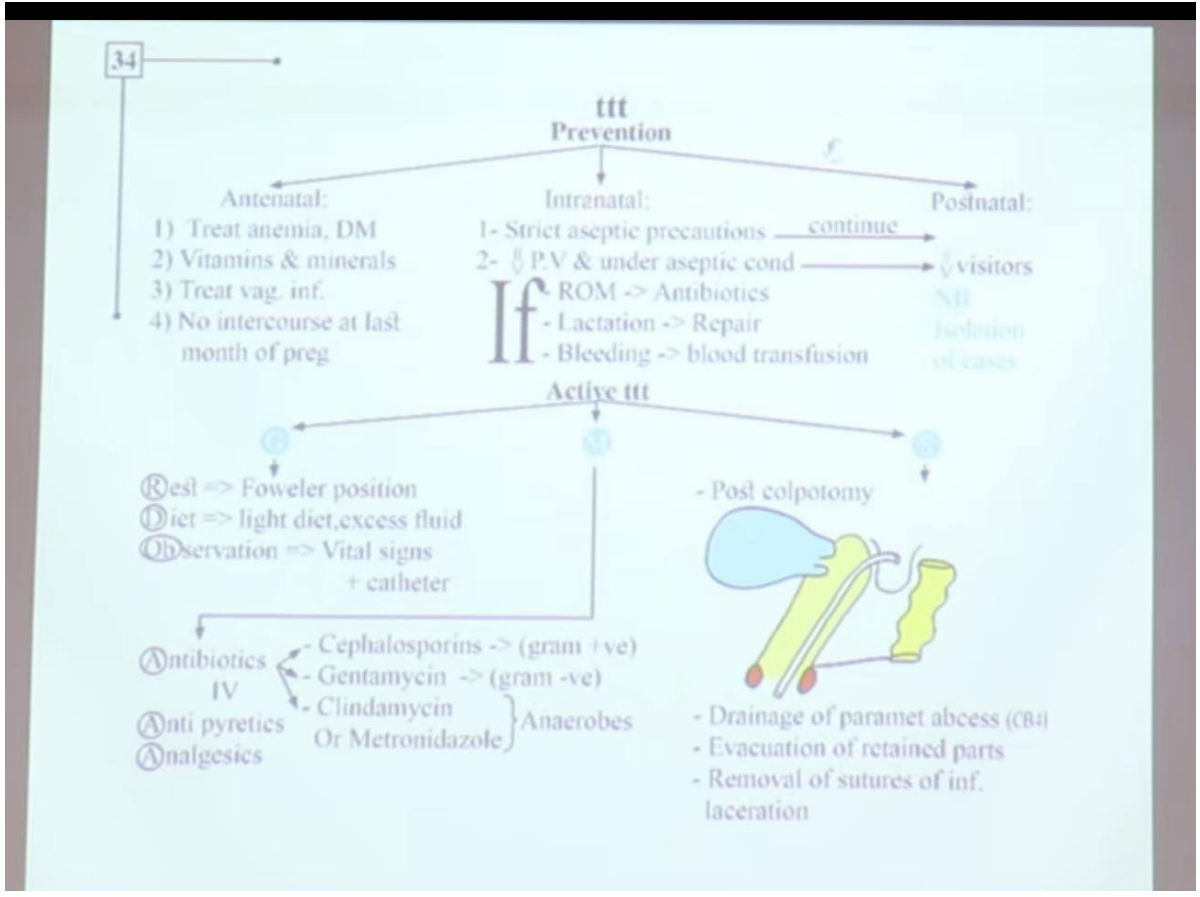
- PATHOLOGY:
- The pathological picture depends on the site of infection and its spread, so we may find:
- Primary sites of infection: The uterus "the commonest site"
- Infected lacerations: In the perineum, vagina or cervix. Appears usually as ulcers with dirty base, greenish discharge with surrounding edema.
- Secondary sites:
- Para-metritis
- Salpingo-oophoritis
- Pelvic thrombophlebitis
- Peritonitis

- Generalized infection



Puerperal sepsis

Prevention and management



INITIALLY BROAD SPECTRUM ANTIBIOTICS:

- Ampicillin 500 mg QDS
- Gentamycin 60-80 mg TDS
- Metronidazole 400 mg TDS

SEVERE cases:

- IV Clindamycin 600 mg IV 8 hourly
- IV Gentamycin 60-80 mg TDS
- IV cephalosporins

Wound infection

- Inflammation in the site of cesarian incision, episiotomy, laceration associated with delivery,
- On exam, painful erythematous and edematous wound and discharge or vulvar edema with fever persistent despite antibiotic treatment develop around postoperative day 4

Treatment

- remove suture under tension
- Clean and dress with antiseptic solution
- Analgesia + antibiotics
- Sitz bath
- Healing by primary intension or secondary suturing

Breast engorgement

2-3 postpartum day if breastfeeding has not been effectively established

Breast engorgement may give rise to puerperal fever of up to 39ºC in 13% of mothers, however other infective causes must be excluded

Primary engorgement ? interstitial edema and onset of copious milk production

Secondary engorgement ? mother's milk supply exceeds the amount of milk removed by her infant

Treatment :

- manual expression, firm support, applying an ice bag and an electric breast pump, warm compresses before feeding to enhance let-down and facilitate milk removal
- mild analgesics such as acetaminophen, ibuprofen
- In women who are not breastfeeding, the use of a tight bra and avoidance of breast stimulation

Mastitis

- Mastitis means inflammation of the breast, and may be non-infectious or infectious in origin. In lactating women, it is essentially caused by an accumulation of milk.
- Epidemiology
- Worldwide up to 20% of breastfeeding women develop lactation mastitis.

Aetiology:

- Puerperal mastitis may or may not be associated with infection.
- Non-infectious mastitis is due to an accumulation of milk causing an inflammatory response in the breast.
- Infectious mastitis occurs when accumulated milk allows bacteria to grow. The usual infecting organism is Staphylococcus aureus, although it may also be Staphylococcus albus and streptococci..
- Infectious mastitis may lead to a breast abscess.

Mastitis

- Presentation
- Mastitis is diagnosed based on clinical symptoms
- Symptoms:
- This normally presents ≥1 week postpartum, usually in only one breast. The area affected is painful, tender, red and hot.
- Systemic symptoms include fever, rigors, muscle pain, lethargy, depression, nausea and headache.
- It should be distinguished from (breast engorgement) which usually presents on the second or third day of breastfeeding. The complaint in this case is of swollen and tender breasts bilaterally.
- Signs
- Breast examination reveals unilateral oedema, erythema, and tenderness. The affected area feels firm and hot.
- There may be fever.
- If a breast abscess has developed, there will be a fluctuant tender lump, with overlying erythema.

Mastitis

- **Investigations**
- Diagnosis is usually clinical.
- **Management**

First-line management

- Encourage the woman to continue breastfeeding.
- Improve milk removal. This may involve:
  - Assessment of breastfeeding technique.
  - an appropriately Manual expression of milk to empty the breast after feeding.
  - Self-massage of the breast before feeding or expression, or application of heat by warm compresses, shower or heat packs.
  - Increasing feeding frequency.
  - Feeding on the affected side.
- Analgesia. Paracetamol or ibuprofen.

Antibiotics

Antibiotics, usually flucloxacillin or clarithromycin, should be prescribed. Treatment should be in accordance with local prescribing guidelines.

Surgical management

Surgical management is indicated for breast abscesses. Incision and drainage of abscess

Chest complications

first 24 hours after delivery particularly after general anesthesia

Atelectasis

Ass. With general anesthesia
associated with fever
can be prevented by physiotherapy

Aspiration pneumonia

Mendelson's syndrome
spiking temperature, wheezing,
dyspnea, and hypoxia

SUMMARY OF MOST COMMON CAUSES OF POST-OP FEVER WHEN STARTING ON

- 1st Day : Reactive to drugs or surgical tissue trauma
- 2nd Day : Atelectasis
- 3rd Day : IV line infection (STP)
- 4th Day : Pneumonia, DVT, UTI
- 5th Day : Wound infection (still pneumonia, DVT, UTI)
- 7th Day : Abscess somewhere
- After first week : allergy to drugs, transfusion-related-fever, septic pelvic vein thrombosis and intraabdominal abscesses

venous thromboembolism and pulmonary embolism

Risk factors

- Pre-existing:
- Previous VTE.
- Thrombophilia:
  - Heritable: antithrombin deficiency, protein C deficiency, protein S deficiency, factor V Leiden, prothrombin gene mutation.
  - Acquired: antiphospholipid antibodies, persistent lupus anticoagulant and/or persistent moderate/high titre anticardiolipin antibodies and/or β2-glycoprotein 1 antibodies.
- Medical comorbidities
- Age >35 years.
- Obesity (BMI ≥ 30 kg/m^2) either pre-pregnancy or in early pregnancy.
- Gross varicose veins (symptomatic or above knee or with associated phlebitis, oedema/skin changes).
- Paraplegia.

New onset/transient:

- Any surgical procedure in pregnancy or puerperium
- Bone fracture.
- Admission or immobility (≥3 days' bed rest) - eg, pelvic girdle pain restricting mobility.
- Long-distance travel.

Venous thromboembolism and pulmonary embolism

RISK FACTORS

- age >=35 years
- hypertension
- and postpartum bleeding.
  - Previous VTE
  - High body mass index / immobilization
  - Caesarean delivery or operative delivery

Clinical Picture:

- Pulmonary embolism: Acute-onset dyspnea, sharp pain, and hemoptysis

- DVT : Edema, Leg pain, Tenderness, Warmth or erythema of the skin over particular area

Venous thromboembolism and pulmonary embolism

- **INVESTIGATION:**
- lower limb compression ultrasound done within 24-48 hr
- Venography and MRI can be useful

PE

(ECG) and a chest X-ray (CXR) ventilation/perfusion (V/Q)

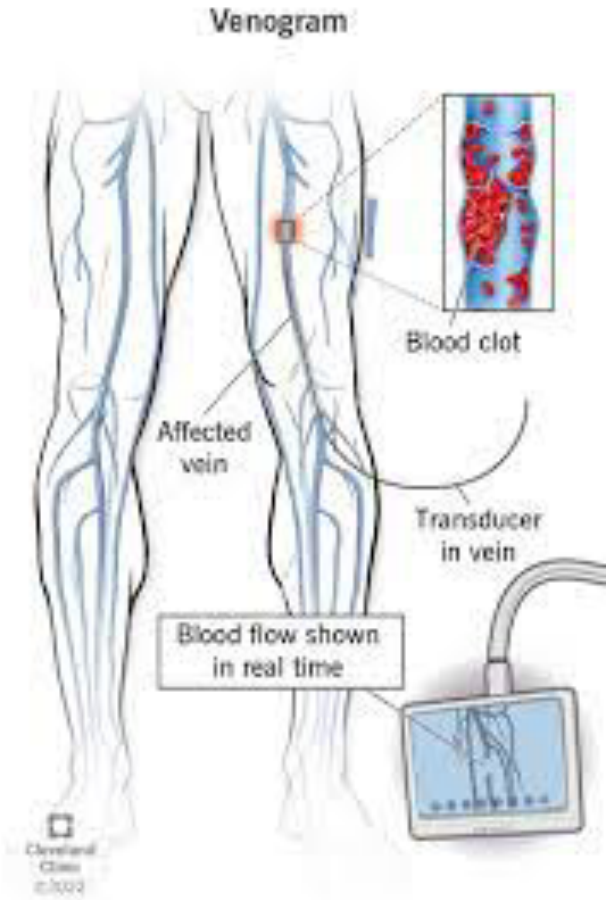
(CTPA).

Management:

full anticoagulant therapy (ex: Heparins, warfarin, factor Xa inhibitors)

Endovascular and surgical interventions

Percutaneous transcatheter treatment of DVT (Thrombus removal, Mechanical thrombectomy, Angioplasty, Stenting)



Psychological problems

Maryam zyad al abadi

Baby blues

- 50 to 85% of women experience postpartum blues during the first few weeks after delivery.
- **Symptoms**: feelings of sadness, mood lability, tearfulness, anxiety or irritability , Feeling overwhelmed and that you cant take care of the baby
- **Onset**: 4-5 day after delivery and may last for a few hours or a few days.
- Remitting spontaneously within two weeks of delivery

Post Partum Depression (PPD)

- **Related solely to pregnancy and childbirth**
- PPD generally **lasts for 3-6 months**, with 25% of patients still affected at 1 year.
- PPD greatly affects the **patient's ability to complete activities** associated with daily living.
- First line of treatment : antidepressant and supportive care , reassurance from family and health care professionals.

Who is at Risk for Postpartum Depression?

Postpartum psychosis

- The most severe form of postpartum psychiatric illness.
- It is a rare event (1 to 2 per 1000 women) after childbirth.
- Patient with postpartum psychosis usually present with schizophrenia or manic depressive disorder.
- Onset of symptoms: as early as the first 48 to 72 hours after delivery. The majority of women with puerperal psychosis develop symptoms within the first two postpartum weeks.
- All patient need hospitalization , medical therapy and long term psychiatric care.

Symptoms :

1. Hallucinations
2. delusions
3. a manic mood
4. a low mood
5. sometimes a mixture of both a manic mood and a low mood - or rapidly changing moods
6. loss of inhibitions
7. feeling suspicious or fearful
8. restlessness
9. feeling very confused
10. behaving in a way that's out of character

	Postpartum Blues or "Baby Blues"	Postpartum Depression	Postpartum Psychosis
Baby	**Any**	**Usually 2nd**	**Usually 1st**
Onset	Begins after birth and lasts up to 2 weeks	Begins within 1 month of birth and symptoms may continue	Begins within 1 month of birth and symptoms may continue
Mother cares about baby	Yes	May have thoughts about hurting the baby	May have thoughts about hurting the baby
Symptoms	Mild depressive	Severe depressive	Severe depressive and psychotic symptoms
Treatment	Self-limited; no treatment necessary	Antidepressants	Antidepressants and mood stabilizers or antipsychotics

GI, Urinary complications & Postpartum HTN

Khaled Mohammad majali

Urine retention

Urinary complications

- **Postpartum urinary retention (PUR) is a common postpartum complication characterised by dysuria or a complete inability to urinate after delivery(VOIDING DIFFICULTY).**

- **Management**

- Leave an indwelling catheter on continuous drainage for 48 hours.

- After the bladder has been continuously emptied, the catheter can be removed and then the volumes of urine passed can be monitored.

Incontinence of urine

Urinary incontinence will occur in approximately 15% of women who will have it to persist for 3 months after birth.

It is **more** frequently seen following instrumental delivery and **least** frequently after elective caesarean section.

Complications to the ureter are most commonly seen after a complicated caesarean section, when ureteric injury may either result in a ureteric fistula or ureteric occlusion.

Urinary tract infection

- **urinary tract infections that take place in the days or weeks after giving birth**.
- **Clinical picture :**
- Lower urinary symptoms : frequency, urgency, dysuria , haematuria
- For pyelonephritis : fever, vomiting and flank pain and tenderness
- **Management :**
- Fluid if there is signs of dehydration
- Proper antibiotic : Trimethoprim-sulfamethoxazole , nitrofurantoin, ciprofloxacin

- **Compared with intended vaginal delivery, intended caesarean delivery was significantly associated with a higher risk of postpartum urinary tract infection.**

Postpartum urinary tract infection by mode of delivery: a Danish nationwide cohort study

Tina Djernis Gundersen et al. BMJ Open. 2018.
Free PMC article

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Abstract

Objectives: To examine the association between postpartum urinary tract infection and intended mode of delivery as well as actual mode of delivery.

Design: Retrospective cohort study.

Setting and participants: All live births in Denmark between 2004 and 2010 (n=450 856). Births were classified by intended caesarean delivery (n=45 053) or intended vaginal delivery (n=405 803), and by actual mode of delivery: spontaneous vaginal delivery, operative vaginal delivery, emergency or planned caesarean delivery in labour or prelabour.

Primary and secondary outcome measures: The primary outcome measure was postpartum urinary tract infection (n=16 295) within 30 days post partum, defined as either a diagnosis of urinary tract infection in the National Patient Registry or redemption of urinary tract infection-specific antibiotics recorded in the Register of Medicinal Product Statistics.

Results: We found that 4.6% of women with intended caesarean delivery and 3.5% of women with intended vaginal delivery were treated for postpartum urinary tract infection.Women with intended caesarean delivery had a significantly increased risk of postpartum urinary tract infection compared with women with intended vaginal delivery (OR 1.33, 95% CI 1.27 to 1.40), after adjustment for age at delivery, smoking, body mass index, educational level, gestational diabetes mellitus, infection during pregnancy, birth weight, preterm delivery, preterm prelabour rupture of membranes, pre-eclampsia, parity and previous caesarean delivery (adjusted OR 1.24, 95% CI 1.17 to 1.46).Using actual mode of delivery as exposure, all types of operative delivery had an equally increased risk of postpartum urinary tract infection compared with spontaneous vaginal

NEXT

GI complications - Incontinence of feces

35% of women undergoing their first vaginal delivery develop **anal sphincter injury**. Approximately 10% will still have anal symptoms of urgency or incontinence at 3 months after birth.

Etiology include

1. instrumental delivery (use of vacuum 16% extraction is associated with less perineal trauma than forceps 32% delivery)
2. Prolonged second stage of labour,
3. birthweight over 4.0 kg,
4. occipito-posterior position
5. Episiotomy.

In women who have a recognized anal sphincter rupture, 37% continue to have anal incontinence despite primary sphincter repair.

Postpartum pelvic floor mucle training (kegel exercise) decreased the rate of urinary incontinence and related bother 6 months postpartum and increased muscle strength and endurance.

Can postpartum pelvic floor muscle training reduce urinary and anal incontinence?: An assessor-blinded randomized controlled trial

Thorgerdur Sigurdardottir et al. Am J Obstet Gynecol. 2020 Mar.

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Abstract

Background: Pelvic floor dysfunction, including urinary and anal incontinence, is a common postpartum complaint and likely to reduce quality of life.

Objective: To study the effects of individualized physical therapist-guided pelvic floor muscle training in the early postpartum period on urinary and anal incontinence and related bother, as well as pelvic floor muscle strength and endurance.

Materials and methods: This was an assessor-blinded, parallel-group, randomized controlled trial evaluating effects of pelvic floor muscle training by a physical therapist on the rate of urinary and/or anal leakage (primary outcomes); related bother and muscle strength and endurance in the pelvic floor were secondary outcomes. Between 2016 and 2017, primiparous women giving birth at Landspitali University Hospital in Reykjavik, Iceland, were screened for eligibilty 6-10 weeks after childbirth. Of those identified as urinary incontinent, 95 were invited to participate, of whom 84 agreed. The intervention, starting at ~9 weeks postpartum consisted of 12 weekly sessions with a physical

Kegels in 4 Steps

Inhale Through Your Nose

Exhale & Simultaneously Contract the Pelvic Floor Muscles

Hold for 3-5 Seconds

Exhale Through Your Mouth

Others GI complication

- **constipation**
  - Postpartum constipation, with symptoms such as pain or discomfort, straining, and hard stool, is a common condition affecting mothers .

- **hemorrhoids**
  - haemorrhoids can be triggered by an increase in pressure on rectal veins. This can result from growing uterus and pressure from growing baby, Straining on the toilet because of constipation can also trigger or worsen haemorrhoids.

Postpartum Hypertension:

The new-onset of hypertension postpartum has been reported in 0.3 to 7.5 percent of individuals after giving birth.

Causes include:

1. intrapartum/postpartum volume overload.
2. Transient new-onset postpartum hypertension can be related to a combination of factors, including administration of a large volume of intravenous fluids to patients who have had a cesarean birth or neuraxial anesthesia for labor, loss of pregnancy-associated vasodilation after delivery, mobilization of extravascular fluid after delivery, administration of ergot derivatives for prevention or treatment of postpartum hemorrhage, and/or prolonged administration of high doses of nonsteroidal anti-inflammatory drugs (NSAIDs) for postdelivery analgesia)
3. pregnancy-associated hypertension (eg, preeclampsia)
4. underlying medical disorders.

patients with antepartum/intrapartum preeclampsia

- patients with severe pre-eclampsia should be managed for the first 24 hours on a high-dependency unit until their blood pressure is controlled and they achieve a good diuresis.
- Their blood pressure should be kept under **150/100mmhg**
- **Labetolol or slow-release nifedipine** are good choices for this, and are commonly needed for **1–2 weeks** postnatally
- in most cases of preeclampsia, the BP returns to baseline by 12 weeks postpartum.
- Blood pressure should be tested in every postnatal visit.
  - Note: One guideline suggests avoiding methyldopa postpartum because of the risk of postnatal depression. High-quality evidence to guide optimum management of postpartum Non severe hypertension is limited.

patients with antepartum/intrapartum preeclampsia (monitoring)

- blood pressure typically decreases within 48 hours of birth, but can increase again three to six days postpartum. (Pain, drugs (e.g., nonsteroidal anti-inflammatory drugs [NSAIDs]), excess fluid administration or restoration of vascular tone to pre-pregnancy level may increase blood pressure.)

after hospital discharge hypertension may present and may be asymptomatic we should do :

- blood pressure check soon after discharge in high-risk patients, especially those with preeclampsia that appeared to be resolving.
- ACOG suggests daily blood pressure evaluation for 72 hours postpartum and again around 7 to 10 days postpartum, or earlier in patients with symptoms.
- Another approach is to ensure measurement at least once during postpartum days three to five. Adjunctive home blood pressure monitoring, if possible, is useful for early recognition of hypertension
- Patients who were normotensive during pregnancy and while in the hospital after giving birth still need to be aware of the possibility of delayed postpartum preeclampsia and call their provider if they develop symptoms (eg, headache, epigastric pain, visual changes).

Postpartum haemorrhage (PPH)

Ragad Kuran

Subinvolution of the uterus :

The involution is impaired and retracted

Causes: grandmultiparity, multiple gestation ,polyhydrominous, cesarian section, prolapsed uterus , uterine fibroids

Clinical features: mainly asymptomatic
Abnormal lochial discharge either excessive or prolonged Excessive uterine bleeding
Irregular cramp like pain due to presence of retained products or rise in temperature in case of sepsis

Definition

- Defined as Bleeding of more than 500cc in the first 24hs after vaginal delivery
  More than 1000cc after Cesarean section
  OR according to ACOG : 10% drop in Hematocrit value between the admission and puerperium
- Types
  PPH occurring in the first 24 hours after delivery: primary or early PPH
  PPH occurring from 24 hours to 6weeks after delivery: secondary, late, or delayed PPH.

BOX 10-3

CAUSES OF POSTPARTUM HEMORRHAGE

Uterine atony*
Retained placental tissue*
Genital tract trauma
Low placental implantation
Uterine inversion
Coagulation disorders
Amniotic fluid embolism
Retained dead fetus
Inherited coagulopathy
Abruptio placentae (usually ante- or intrapartum)

*Both of these conditions result in retained blood clots and placental fragments, causing uterine stretching and prevention of uterine contractions.

UTERINE ATONY

Failure of the uterus to contract after placental separation leads to excessive placental site bleeding.

(75-80%) of pph cases.

Most of the blood loss due to uterine atony occurs from the myometrial spiral arterioles and decidual veins.

BOX 10-4

FACTORS PREDISPOSING TO POSTPARTUM UTERINE ATONY

- History of postpartum hemorrhage*
- Prolonged labor*
- Grand multiparity (a parity of 5 or more)*
- Overdistention of the uterus†
  - Multiple gestations
  - Polyhydramnios
  - Fetal macrosomia
- Oxytocic augmentation of labor†
- Precipitous labor (one lasting <3 hr)
- Magnesium sulfate treatment of preeclampsia†
- Chorioamnionitis†
- Halogenated anesthetics
- Uterine leiomyomata†
- Vitamin D deficiency
- Genetic and epigenetic factors (maternal, environmental, and fetal)

*High-risk patients (one or more factors).
†Medium-risk patients (one or more factors).

- **GENITAL TRACT TRAUMA**

Trauma during delivery is the second most common cause of PPH.

- **RETAINED PLACENTAL TISSUE**

The uterus is unable to maintain a contraction and involute normally around a retained placental tissue mass

- **LOW PLACENTAL IMPLANTATION**

The relative content of musculature decreases in the lower uterine segment, which may result in insufficient muscular control of placental site bleeding

- **COAGULATION DISORDERS**

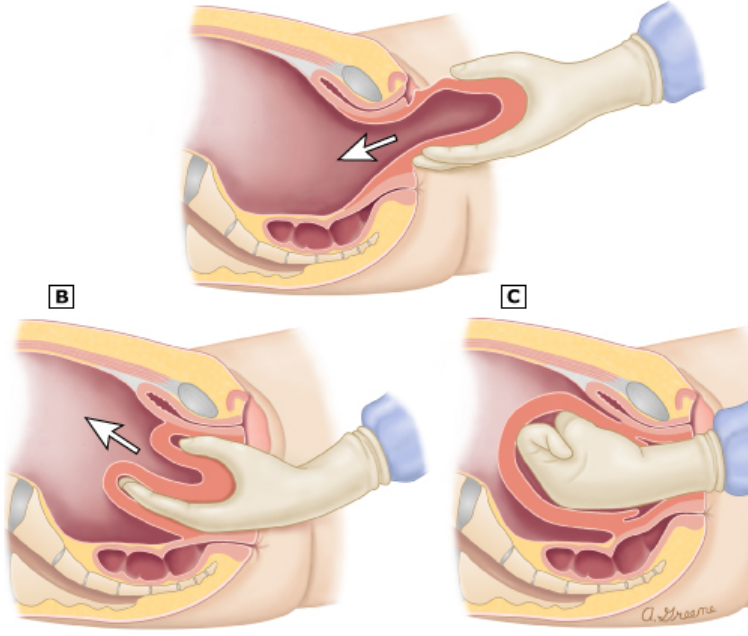
Uterine inversion

- Inversion- a large, red, rounded mass , the endometrium is exposed (perhaps with placenta attached) protrude 20 to 30 cm outside the introitus

- **Contributing factors** are:

Myometrial weakness , traction of cord in an unprofessional way, fibroids, polyps

- **Management** : correct inversion (push fundus inside then give uterotonic agents)



If the cause of bleeding has not been identified, the management of PPH requires a systematic approach.
The fundus of the uterus should be palpated through the abdominal wall to determine the presence or absence of uterine atony. Next, a quick but thorough inspection of the vagina and cervix should be performed to ascertain whether any lacerations may be compounding the bleeding problem. Any uterine inversion or pelvic hematoma should be excluded during the pelvic examination.

Management algorithm of PPH 'HAEMOSTASIS'

H	Ask for **H**elp and hands on uterus (uterine massage)
A	**A**ssess and resuscitate
E	**E**stablish aetiology, **e**nsure availability of blood and **e**cbolics
M	**M**assage uterus
O	**O**xytocin infusion/prostaglandins — IV/IM/per rectal
S	**S**hift to theatre-aortic pressure or anti — shock garment/ bimanual compression as appropriate
T	**T**amponade balloon/uterine packing — after exclusion of tissue and trauma
A	**A**pply compression sutures — B —Lynch/modified
S	**S**ystematic pelvic devascularisation-uterine/ovarian/quadruple/ internal iliac
I	**I**nterventional radiology and, if appropriate uterine artery embolization
S	**S**ubtotal/total abdominal hysterectomy

Table 2

Management of Patients at Risk for Postpartum Hemorrhage

1. All women in early labor who have risk factors for PPH should be identified and their hemoglobin checked. For medium-risk women, their blood should be typed and screened for irregular antibodies such as Rh and Kell. For high-risk women, 2 units of blood should be typed and crossmatched.

2. As soon as the fetus has been delivered, an infusion of oxytocin (Pitocin) 10 to 40 U/L IV should be started and maintained during the first 6 hours postpartum.

3. The vagina and perineum should be inspected to rule out any lacerations that could cause excessive bleeding.

4. The placenta should be carefully assessed at delivery to make certain there are no missing cotyledons (lobules of placenta).

5. The uterus should be evaluated by abdominal palpation during the first 1 to 2 hours before transfer to the postpartum unit. The nurses on the postpartum unit should frequently assess the status of uterine contractility, instructing the patient on how to assess uterine firmness and reporting any excessive bleeding. For high-risk patients, continuation of the oxytocin IV infusion during the early postpartum hours should be considered.

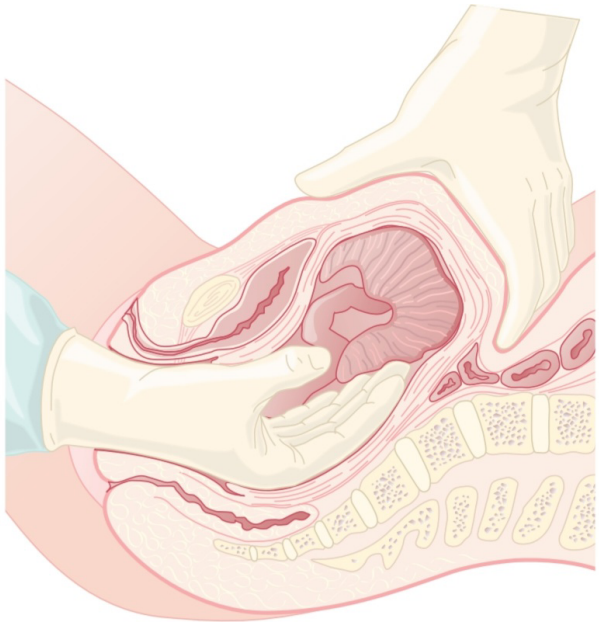


FIGURE 10-3 Manual removal of the placenta. The abdominal hand provides counterpressure on the uterine fundus against the shearing force of the fingers in the uterus.

TABLE 10-2

BLOOD PRODUCTS USED TO CORRECT COAGULATION DEFECTS

Blood Product	Volume (mL) in 1 U*	Effect of Transfusion
Platelet concentrate	30-40	Increases platelet count by about 5000-10,000
Cryoprecipitate	15-25	Supplies fibrinogen, factor VIII, von Willebrand factor, and fibronectin
Fresh frozen plasma	200	Supplies all factors except platelets (1 g of fibrinogen)
Packed red blood cells	200	Raises hematocrit 3-4%

*Quantity obtained from 1 U (500 mL) of fresh whole blood.

Case

- **History** A 39-year-old woman in her first pregnancy delivered twin sons 2h ago. There were no significant antenatal complications. She had been prescribed ferrous sulphate and folicacid during the pregnancy as anemia prophylaxis, and her last hemoglobin was 10.9 g/dL at 38 weeks. The fetuses were within normal range for growth and liquor volume on serial scan estimations. A vaginal delivery was planned and she went into spontaneous labour at38 weeks and 4 days. Due to decelerations in the cardiotocograph (CTG) for the first twin,both babies were delivered by ventouse after 30 min active pushing in the second stage.The midwife recorded both placentae as appearing complete.As this was a twin pregnancy, an intravenous cannula had been inserted when labour was established and an epidural had been sited. The lochia has been heavy since delivery but the woman is now bleeding very heavily and passing large clots of blood. On arrival in the room you find that the sheets are soaked with blood and there is also approximately 500 mL of blood clot in a kidney dish on the bed.
- **Examination** The woman is conscious but drowsy and pale. The temperature is 35.9°C, blood pressure120/70 mmHg and heart rate 112/min. The peripheries feel cool. The uterus is palpable to the umbilicus and feels soft. The abdomen is otherwise soft and non-tender. On vaginal inspection there is a second-degree tear which has been sutured but you are unable to assess further due to the presence of profuse bleeding. The midwife sent blood tests 30 min ago because she was concerned about the blood loss at the time.

INVESTIGATIONS (blood tests taken at 28 weeks)

		Normal range for pregnancy
Haemoglobin	7.8 g/dL	11–14 g/dL
Mean cell volume	68 fL	74.4–95.6 fL
White cell count	11.2×10^9/L	$6–16 \times 10^9$/L
Platelets	237×10^9/L	$150–400 \times 10^9$/L

Urinalysis: negative

Blood group: A negative

No atypical antibodies detected.

Questions.

What is the diagnosis and what are the likely causes?

What is the sequence of management options you would employ in this situation?

Contraception

Ansam Kamal

contraception

Sterilization can be offered to mothers who are certain that they have completed their family

breast feeding: fully breastfeeding her baby has a less than 2% chance of conceiving in the first 6 months

Barriers

IUCD (it is best to wait for 4–8 weeks to allow for involution)

Progesterone only pills

Injectable contraception,

Breastfeeding

Physiology of lactation

- At puberty, the milk ducts that lead from the nipple to the secretory alveoli are stimulated by oestrogen to sprout, branch and form glandular tissue buds from which milk-secreting glands will develop.
- During pregnancy, breast tissue is further stimulated so that pre-existing alveolar–lobular structures hypertrophy and new ones are formed.
- At the same time milk-collecting ducts also undergo branching and proliferation. Both oestrogen and progesterone are necessary for mammary development in pregnancy but prolactin, growth hormone and adrenal steroids may also be involved.
- During pregnancy only minimal amounts of milk are formed in the breast despite high levels of the lactogenic hormones prolactin and placental lactogen. This is because the actions of these lactogenic hormones are inhibited by the secretion of high levels of oestrogen and progesterone from the placenta and it is not until after delivery that copious milk production is induced.

Colostrum

- Colostrum is a yellowish fluid secreted by the breast that can be expressed as early as the 16th week of pregnancy, but is replaced by milk during the second postpartum day.
- Colostrum has a high concentration of proteins (immunoglobulin (Ig) A, which plays an important role in protection against infection).
- It also contains large fat globules (but contains less sugar and fat than breast milk).
- Colostrum is believed to have a laxative effect, which may help empty the baby's bowel of meconium.

Breast milk

- The major constituents of breast milk are lactose, protein, fat and water. However, the composition of breast milk is not constant.
- Lactalbumin is the major protein in breast milk.
- In addition to IgA, breast milk contains small amounts of IgM and IgG and other factors such as lactoferrin, macrophages, complement and lysozymes.

Milk ejection reflex

Successful breastfeeding depends as much on effective milk transfer from the breast to the baby as on adequate milk secretion.

The milk ejection reflex is the release of **oxytocin** from the posterior pituitary gland .

Oxytocin causes contraction of the sensitive myoepithelial cells that are situated around the milk-secreting glands and also dilates the ducts by acting on the muscle cells that lie longitudinally in the duct walls.

Contraction of these cells therefore has the dual effect of expelling milk from the glands and of encouraging free flow of milk along dilated ducts. This is recognized by the mother as milk ‘ let-down’ and she may be aware of milk being ejected from the opposite breast from which the baby is suckling.

- The milk ejection reflex is readily inhibited by emotional stress and this may explain why maternal anxiety frequently leads to failure of lactation.

- Successful breastfeeding depends on engendering confidence in the mother and ensuring correct fixing and suckling on the nipple.

- Another factor that is of potential physiological importance as an inhibitor of breast milk is: when the milk is not effectively stripped from the breast at each feed, this will inhibit lactopoiesis and lead to a fall in milk production.

Mechanisms of lactational amenorrhoea

- The key event is a **suckling-induced change in the hypothalamic sensitivity** to the feedback effects of ovarian steroids.
- During lactation, the hypothalamus becomes **more sensitive** to the **negative feedback** effects and **less sensitive** to the **positive feedback** effects of estrogen.
- This means that if the pituitary secretes enough follicle-stimulating hormone to initiate the development of an ovarian follicle, the consequent oestrogen and inhibin secretion will inhibit gonadotrophin production and the follicle will fail to mature.

- From a clinical standpoint, the major factor is **the frequency and duration of the suckling** stimulus, although other factors such as maternal weight and diet may be important confounding factors.

- If supplementary food is introduced at an early stage, the suckling stimulus will fall and early ovulation and a return to fertility.

Advantages of breastfeeding

- Readily available at the right temperature and ideal nutritional value.
- Cheaper than formula feed.
- Has a contraceptive effect with associated amenorrhoea.
- In the longer term it is associated with:
  - reduced necrotizing enterocolitis in preterm babies;
  - reduced childhood infective illnesses, especially gastroenteritis;
  - reduced atopic illnesses (e.g. eczema and asthma);
  - reduced juvenile diabetes;
  - reduced childhood cancer, especially lymphoma;
  - reduced premenopausal breast cancer.

Non-breastfeeding mothers

- Non-breastfeeding mothers may suffer considerable engorgement and breast pain.
- Dopamine receptor stimulants, such as **bromocriptine** and **cabergoline**, inhibit prolactin and thus suppress lactation. However, both commonly cause drowsiness, hypotension, headache and gastrointestinal side-effects.
- Furthermore, **fluid restriction and a tight brassiere** have been shown to be as effective as bromocriptine usage by the second week and therefore this is the method of choice for the suppression of lactation.

Thank You (: