Normal Puerperium

Physiological changes of the puerperium

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Normal Puerperium

Definition

It is the period following the birth of the baby, placenta and membranes to 6 weeks postpartum.

It is the period during it ,the reproductive organs & maternal physiology returns towards the pre-pregnancy state .

There is also an element of emotion/psychological adjustment for mother, baby and other family members

Phases in the puerperium

35
17 **The immediate puerperium;** the first 24hours after birth.

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17 **The early puerperium;** after 24 hours to first week postpartum

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17 **The remote/late puerperium**; which includes the period of time required for involution of the reproductive organs through the sixth weeks postpartum (end of week 1 to week 6).

General Physiological changes in the puerperal period

- Puerperium starts immediately after delivery and continues for a period of six (6) weeks.
- Changes that occurred in the body systems during pregnancy are reversed as the body returns to the non-pregnant state.
- Puerperium marks the establishment of lactation, and the new infant is accepted into the family.
- During puerperium, the mother and baby are closely monitored at the clinic and home to prevent any complications like secondary PPH.

General Physiological Changes (Vital signs)

There is generalized physical fatigue immediately after birth .

- The pulse rate may be elevated a few hours after childbirth due to excitement or pain and usually normalizes on the second day.

- The blood pressure could be elevated due to pain or excitement but is generally in the normal range.

- A significant decrease (> 20% below baseline) in blood pressure could be a sign of postpartum hemorrhage or septic shock.

- Conversely, high blood pressure could be a sign of pain or pre-eclampsia.

General Physiological changes (Vital signs)

- The temperature is slightly elevated up to 37.2°C along with increased shivering, sweating, or diaphoresis in the first 24 hours and normalizes within 12 hours.
- The temperature rise may be linked to the systemic absorption of metabolites.
- There could be a transient temperature rise (by 0.5°C) on the third or fourth day due to breast engorgement.
- The respiratory rate also begins to fall back to the pre-pregnancy level within 2 to 3 days.
- A rise of temperature beyond the third day or over the upper limit is usually a sign of infection.

General Physiological changes (Weight loss)

- There is a weight loss of 5 to 6 kg due to the expulsion of products of gestation and accompanying blood loss.

- Further weight loss of 2 to 3 kg can be attributed to the brisk diuresis. The weight loss due to diuresis may continue up to 6 months after delivery.

Weight loss may be expedited by postnatal exercises

Reproductive Tract changes in Puerperal period

- **Uterus**
- Involution, is the term given to the process of reproductive organs returning to their prepregnant state.
- Immediately following the birth, the uterus, and the placental site contracts rapidly to prevent further blood loss.
- This rapid uterine contraction can lead to abdominal pain or cramps after childbirth.
- At this point, the uterus has an increased tone, feels firm, and weighs 1000g, and at the end of the first week.
- The uterus weighs 500g, and by six weeks, it weighs approximately 50g.

Reproductive Tract Changes in Puerperal period

- The female may complain of afterpains (a minor discomfort in the puerperal period).

- Initially, the contraction of the uterus is due to a substantial reduction in myometrial cell size; it constricts the blood vessels and limits the bleeding.
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- The subsequent decrease in size is due to autolysis and infarction of uterine blood vessels.

- The withdrawal of estrogen and progesterone leads to an increase in the process of autolysis

Reproductive Tract changes in Puerperal period

- The intima and elastic tissues in the uterine blood vessels also undergo fibrosis and degeneration, leading to shedding of uterine cells, which are removed by macrophages (White blood cells).

- The superficial and basal layers of the endometrium become necrotic and sloughed.

- The endometrium of the uterus is usually fully restored within 2 to 3 weeks.

Reproductive Tract changes in the Puerperal period

Involution is the rapid decrease in the size of the uterus as it returns to the non-pregnant state and the breastfeeding mothers may experience a more rapid involution.

Assessment:

a. Weight of the uterus decreases

b. Endometrium regenerate

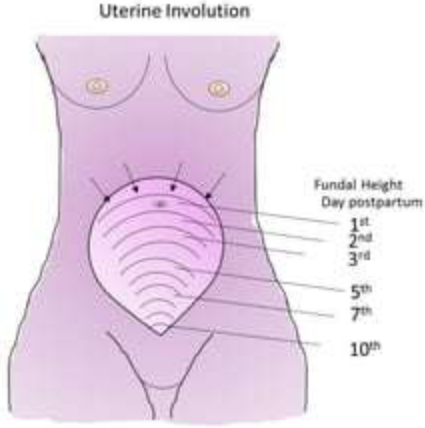
c. Fundus descends into the pelvis

d. Fundal height decreases about 1 finger (1 cm)/day.

e. By 10 days postpartum the uterus cannot be palpated abdominally

f. Note that a flaccid fundus indicate uterine atony and should be massaged until firm a tender fundus indicate an infection.

Uterine involution



Lochia drainage

- The lochia is the vaginal discharge that originates from the uterus, cervix, and vagina after the birth of a neonate and expulsion of the placenta.
- The lochia is firstly red and comprised of blood and fragments of decidual tissues, endometrial tissues, and mucus, and lasts 1 to 4 days.
- The lochia then changes colour to yellowish or pale brown, lasting 5 to 9 days, and is comprised mainly of blood, mucus, and leucocytes.
- Finally, the lochia is white and contains mostly mucus, lasting up to 10 to 14 days. The lochia can persist up to 5 weeks postpartum.
- The persistence of red lochia beyond one week, offensive odour and blood clots might be an indicator of uterine subinvolution.

Reproductive Tract changes in the puerperal period

The vagina and Cervix

- The cervix and vagina may be edematous and bruised in the early postpartum period and gradually heal back to normal.

- Once the ovarian function resumes, ruggae start to appear in the vagina, usually by the third week in females that are not breastfeeding.

- Similarly, the postpartum vaginal epithelium, is restored in 6 to 10 weeks, but the recovery delays in breastfeeding females due to low estrogen levels.
- The bruised flattened out ruggae [folds] is especially spontaneous vaginal births heal and return to its pregravid although not entirely.

Reproductive tract changes in the puerperal period

Fallopian tubes

The epithelium in the fallopian tubes atrophy within 2 weeks after birth

Pelvic floor muscles

All pelvic floor muscle regain their tone during the puerperal period

Over stretched muscles, and muscular tear during labour can predispose women to genital prolapse and genital hernias e.g. rectocele, cystocele etc.

Lactation

- The initial secretion from the breasts called colostrum increases after childbirth.
- Colostrum is rich in protein, vitamins and immunoglobulins, and other humoral factors (lactoferrin) and provides an immunological defense to the newborn
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- The preparation of breasts for lactation starts during pregnancy.
- The high levels of estrogen and progesterone make the breast tissue unresponsive to prolactin. After birth, Prolactin begins its milk secretory activity in mammary glans.
- The milk secretion starts on the third or fourth day postpartum.

Lactation

- The stimulation of nipples helps in the secretion of oxytocin from the posterior pituitary to initiate lactation.

- "Milk ejection," or milk let down reflex" - Oxytocin affects the contraction of myoepithelial cells, leading to milk expression from the mammary ducts.
- The milk ejection reflex can be inhibited by pain, anxiety, depression, breast engorgement, or depression.
- Prolactin maintains effective and continuous lactation.
- A healthy mother secretes 500-800 ml of milk per day, which requires 700kcal/ day.
- The fat stores of up to 5 kg gained during pregnancy can provide enough calories to make up for any nutritional deficit during lactation.

Changes to the endocrine system during puerperium

- The onset of the first menstrual period following delivery depends on if the mother is lactating or not.
- If the mother is not breastfeeding, then the menstrual function returns by the sixth to eighth week postpartum in most of the cases.
- The period of ovulation depends on the frequency and intensity of breastfeeding and high serum prolactin levels associated with suckling.
- Elevated serum prolactin levels inhibit the ovarian response to the follicular stimulating hormone, suppress the release of luteinizing hormone, suppressing ovulation.

Changes to the endocrine system in the puerperal period

- This approach offers a natural method of contraception to the lactating female. In lactating females, menstruation usually reappears in 4 to 5 months, and in some cases, can be as late as 24 months.

- However, ovulation can commence in the absence of menstruation, and pregnancy can occur.

- Women who are not breastfeeding should use contraceptive measures after three weeks, and lactating mothers after three months of delivery.

Changes to the renal system in the puerperal period

- The bladder wall may become edematous, hyperemic, and the bladder might be overdistended without the urge to pass urine.

- The retention of urine in the first few days after labour may be due to the laxity of the abdominal musculature, tone of pelvic floor muscles, atony of bladder, compression of urethra by edema or hematoma, reflex inhibition of micturition due to genitourinary trauma.

- Urge incontinence, affects 30% of postpartum females and is attributed most to psychological stress associated with childbirth.

- The mother may complain of painful micturition or dysuria that could be due to tears, laceration of the cervix or vagina, or episiotomy.

Changes to the renal system in the puerperal period

- During pregnancy, the compressive forces of the gravid uterus and the progesterone-induced decrease in ureteral tone, peristalsis, increasing the volume of fluid in kidneys by 30%.
- The dilated ureters and renal pelvis usually return to the pre-pregnant state within four-eight weeks after birth.
- There is an increased risk of developing urinary tract infections.
- It is important to counsel the mother to void every 3 to 4 hours

Renal changes in the puerperal period

- There is a shift of fluid from extravascular to intravascular space, corresponding to 6 to 8 litres of total body water.
- There is brisk diuresis in the first two weeks after childbirth, and it is not uncommon to have a urinary output of 3L/day.
- The amount of loss is usually in line with the amount of fluid retained during pregnancy.
- The glomerular filtration rate of the kidneys returns to baseline at eight weeks postpartum.
- Lactosuria is not uncommon on the third or fourth day of the start of lactation.

Haematological changes during puerperium

- The hematocrit values return to normal in 3-5 days postpartum as plasma volume starts to increase.

- The discrepancy in hemoglobin values in the postpartum phase is due to the variability in the plasma volume due to fluid shifts.

- The patient may develop leukocytosis [elevated white blood cell count] due to the stress associated with labour. The white blood cell count returns to pre-pregnant values within four weeks.

- The gestational thrombocytopenia resolves in 4 to 10 days after birth as platelet count increases in response to platelet consumption during birth.

Haematological changes during puerperium

- In the early postpartum period, the fibrinogen levels are still high, and platelets begin to rise to normal values.
- The tissue plasminogen, an enzyme responsible for clot lysis, does not rise or normalize in the early postpartum period.
- During pregnancy, the hypercoagulable state resolves gradually after birth, as clotting factor levels normalize in 8 to 12 weeks postpartum.
- There is an increased risk for thromboembolic phenomena that are approximately twenty-fold during the early postpartum period.

Cardiovascular system changes in the puerperal period

- Cardiac output increases throughout pregnancy.
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- Following birth, there is an increase in circulating blood volume from the contraction of the uterus.
- Rapidly declines to pre-labour values in 1 to 2 hours following birth and to pre-pregnancy values in two weeks postpartum.
- An increase in serum levels of progesterone and relaxin, promotes systemic vasodilation leading to a progressive decrease in systemic vascular resistance (SVR) in pregnancy.

Cardiovascular system changes in the puerperal period

- There is also a decrease in systemic blood pressure by 5 to 10 mm Hg during pregnancy.

- The systemic blood pressures start to rise during the third trimester and return to prepregnant values at 16 weeks postpartum.
- Heart rate returns to pre-pregnant levels 6 weeks postpartum.
- The physiological hypertrophy of the ventricular system reverts to the pre-pregnant state in 4 weeks postpartum.
- Cardiac contractility and ventricular ejection fraction don't undergo any significant change during the entire peripartum period.

Gastrointestinal changes in the puerperal perioc

- The mother may develop flatulence or constipation due to intestinal ileus (induced by pain or presence of placental hormone relaxin in the circulation), loss of body fluids, laxity of abdominal wall, and hemorrhoids in pregnancy.

- The postpartum constipation is due to the progesterone and relaxin induced decrease in gastrointestinal transit time.

- After childbirth, the levels of progesterone and gastrin drop within 24 hours, and the acid reflux and associated symptoms resolve in the next three to four days.

Integumentary changes in the puerperal perioc

- Hyperpigmentation is the most common skin condition.
- The pigment changes accompanying pregnancy (melasma and linea nigra) usually disappear by 6 to 8 weeks.
- Venous dilation, nonpitting edema and varicosities in lower extremities, return to baseline in the postpartum period.
- The nails that undergo symmetrical, uniform hyperpigmentation during pregnancy , fades away in the postpartum period.
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Muscular changes in the puerperal period

- The abdominal muscles are overstretched during pregnancy and strained during labor and are slow to regain their normal tone and elasticity, returning to pre-pregnancy levels by 6 to 8 weeks.

- The patient may have divarication of recti, and the striae or stretch marks over the abdomen and legs might not disappear

Clinical Significance

- Human physiology is significantly altered during pregnancy and in the postpartum period.

- The midwife should be aware of the physiological changes associated with the postpartum period.

- All system have should be examined during the postnatal period to ensure that they have returned to the pre-gravid state by the 6th week. For prompt management of complications arising during the period.

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