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Physiology and management of normal puerperium

Introduction

- The puerperium is a period of approximately 6 weeks which commences following completion of third stage of labour.

  During this time the women recovers from stresses of pregnancy & delivery & the physiological adaptations which occur during pregnancy subside, facilitating the restoration of the non pregnant state.

Definitions

- The puerperium is defined as the 6 weeks period commencing after the completion of third stage of labour.

  -E.M SYMONDS

- The puerperium is refers to the 6 weeks period following child birth, when considerable adjustments occur before return to the pre pregnant state.

  -PHILIP N. BAKER

- Puerperium is defined as the time from delivery of the placenta through the first few weeks after the delivery.

(cont….)

Stages of puerperium

- **The post partum period has been divided into:**

- **The immediate puerperium**, the first 24 hours after parturition; when acute post anesthetic or post delivery complications may occur.

- **The early puerperium**, which extends until the first week post partum.

- **The remote puerperium**, which includes the period of time required for involution of the genital organs through the sixth weeks postpartum.

Reproductive system

Uterus

Involution:-is the return of the uterus to a nonpregnant state after childbirth

Involution process begins immediately after expulsion of the placenta with contraction of uterine smooth muscles

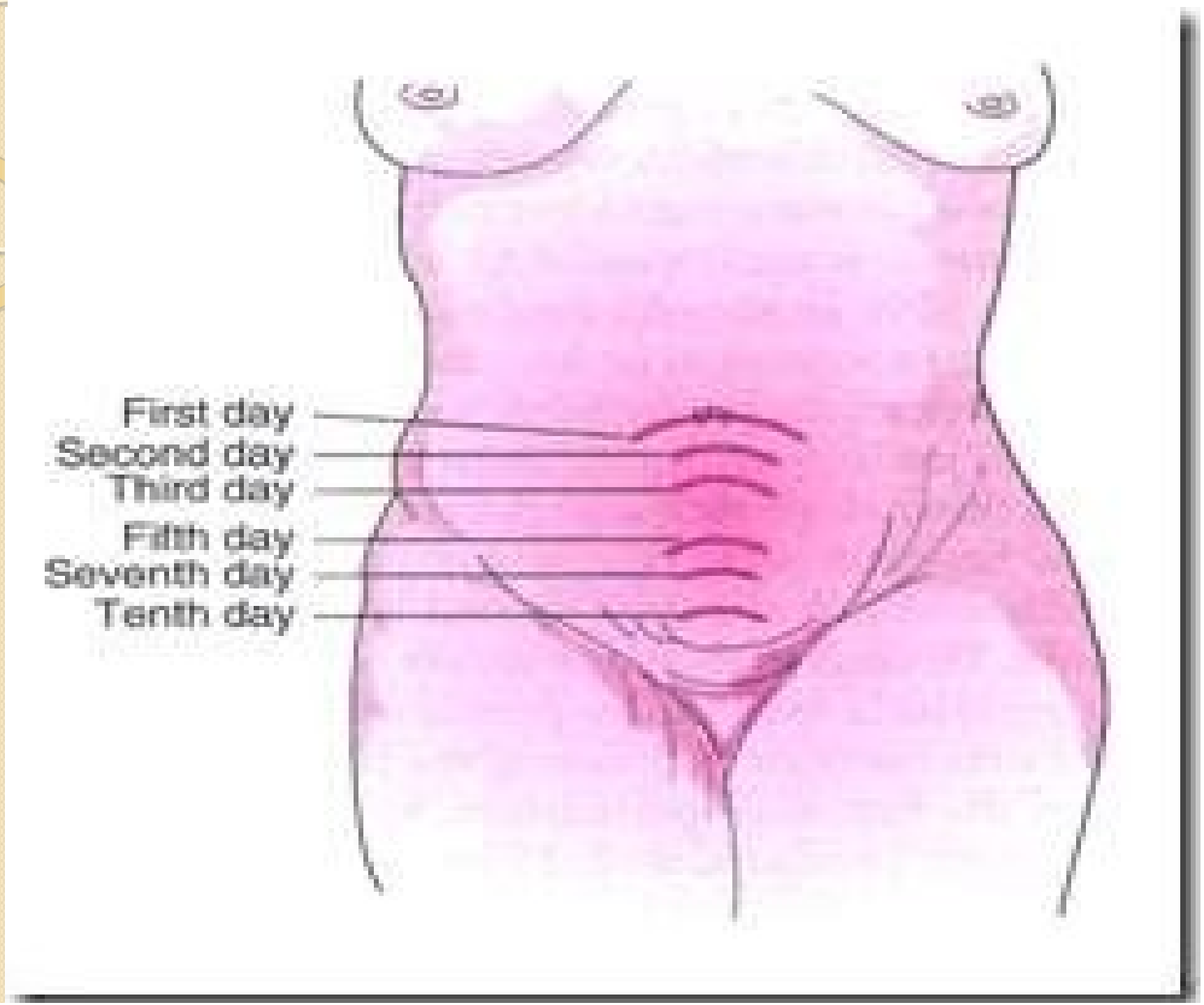
At the end of third stage of labor, the uterus is in the midline, about 2cm below the level of the umbilicus and weighs 1000g

By 24 hours postpartum the uterus is about the same size it was at 20 gestational weeks

The fundus descends about 1 to 2cm every 24 hours, and by the sixth postpartum day it is located halfway between the symphysis pubis and the umbilicus.

-The uterus lies in the true pelvis within 2 weeks after childbirth.

- **Involution of the uterus**
  - *return to the pelvis by about 2 weeks*
  - *be at normal size by 6 weeks*
  - *the weight changes of uterus*
    - ✓ **1000g immediately after birth (excluding the fetus, placenta, membrane and amniotic fluid.**
    - ✓ **500g 1 weeks after birth**
    - ✓ **300g 2 weeks after birth**
    - ✓ **50g 6 weeks after birth**
- **The endometrial lining rapidly regenerates (16 days)**
- **The placental site undergoes a series of changes in the postpartum period**


First day
Second day
Third day
Fifth day
Seventh day
Tenth day

Its fundus level approximates *that of a 20 week* pregnancy at the level of umbilicus, *at the end first post partum week* it is palpable at the symphysis pubis

-Autolysis:-it is a self destruction of excess hypertrophied tissue.

-Subinvolution:-is the failure of the uterus to return to a nonpregnant state.

-The most common causes of subinvolution are retained placenta fragments and infection

Contraction

The hormone oxytocin strengths and coordinates uterine contraction, which compress blood vessels and promotes homeostasis

During the first 1 to 2 postpartum hours, uterine contractions may decrease in intensity and become uncoordinated

Exogenous oxytocin is usually administered immediately after expulsion of the placenta to maintain the uterus firm and contracted.

Mothers are encouraged to put the baby to breast immediately after birth to stimulate the release of oxytocin.

Placental site

-Immediately after the expulsion of the placenta and membranes, vascular constriction and thrombosis cause the placental site to be reduced to an irregular nodular and elevated area.

Upward growth of endometrium causes the sloughing of necrotic tissues and prevents scar formation.

Endometrial regeneration is completed by postpartum day 16, except the placental site is not complete until 6 weeks after birth.

Endocrine system

Placental hormones

Expulsion of the placenta results in dramatic decreases of hormones produced by placenta.

The placental enzyme insulinaze causes the diabetogenic effects of pregnancy to be reversed, resulting in significantly lower blood sugar levels in the immediate postpartum period

- Estrogen and progesterone levels decrease markedly after expulsion of the placenta, reaching their lowest levels 1 week into the postpartum period.
- 2- Decreased estrogen level associated with; breast engorgement, and diuresis of excess extracellular fluid that has accumulated during pregnancy.

The estrogen levels in nonlactating women begin to increase by 2 weeks after birth, and higher by postpartum day 17.

Pituitary hormones and ovarian function:-

-Lactating and nonlactating women differ in the time of the first ovulation.

-The persistence of elevated serum prolactin levels in breast feeding women appears to the responsible for suppressing ovulation

In women who breast feed, prolactin levels remain elevated into the sixth week after birth.

Serum prolactin levels are influenced by the frequency of breastfeeding, the duration of each feeding, and the degree to which supplementary feedings are used.

Prolactin levels decline in nonlactating women, reaching the prepregnant range by third week

About 70% of nonlactating women resume menstruation by 3 months after birth.

-The mean time to ovulation in women breast feed is about 6 months.

-The resumption of ovulation and the return of menses in lactating women are determined by breastfeeding patterns.

-The first menstrual flow after childbirth is usually heavier than normal, within 3-4 cycles, the amount of menstrual flow returned to woman's prepregnant volume

Abdomen

-Abdominal muscles protrude during the first days after birth.

-During the first 2 weeks after birth the abdominal wall is relaxed and it takes approximately 6 weeks to return almost to its nonpregnant state

-The skin regains most of its previous elasticity, but some striae may present

-The return of muscle tone depends on previous tone, proper exercise, and the amount of adipose tissue.

Urinary system

The diminishing steroids levels after birth may explain the reduced renal function that occurs during the pueriperium.

Urine components

BUN level increases during puerperium as autolysis of the involuting uterus occurs. This breakdown of excess protein in the uterine muscle cells results in a mild (+1)proteinurea for 1-2 days after childbirth

Postpartal diuresis

-Within 12 hours of birth, women begin to lose the excess tissue fluid that has accumulated during pregnancy.

-One mechanism responsible for reducing these retained fluids is the profuse diaphoresis that often occurs for the first 2-3 days after childbirth

-The fluid loss through increased urinary output accounts for weight loss of approximately 2.25kg during the puerperium

Urethra and bladder

If trauma to the urethra and bladder occur during the birth process, the bladder wall becomes hyperemic and edematous, often with small areas of hemorrhage.

Birth-induced trauma increased bladder capacity and the effects of conduction anesthesia combine to cause a decrease in the urge to void. In addition to pelvic soreness from the forces of labor, vaginal laceration, or an episiotomy which they reduce the voiding reflex.

Decreased voiding, along with postpartal diuresis may result in bladder distention.

-Distended bladder pushes the uterus up and to the side and this prevents the uterus from firmly contracting which may cause excessive bleeding.

-Bladder tone is usually restored 5-7days after childbirth .

Gastrointestinal system

Appetite

The mother is usually hungry shortly after giving birth.

Bowel evacuation

A spontaneous bowel evacuation may be delayed until 2-3 days after childbirth. This can be explained by decreased muscle tone of the intestines during labor and the immediate puerperium, prelabor diarrhea, lack of food, or dehydration

GI/hepatic function

GI tone and motility decreases in the early postpartum period, commonly causing constipation.

-Normal bowel function returns approximately 2 to 3 days postpartum.

-Liver function returns to normal approximately 10 to 14 days postpartum.

-Gall bladder contractility increases to normal, allowing for expulsion of small gallstones

Cardiovascular function

Most dramatic changes occur in this system.

Cardiac output decreases rapidly and returns to normal by 2 to 3 weeks postpartum.

Hematocrit increases and increased red blood cell (RBC) production stops.

Leukocytosis with increased white blood cells (WBCs) common during the first postpartum week.

Blood volume

The blood volume which increase during pregnancy is eliminated within the first 2 weeks after birth, with return to nonpregnant values by 6 weeks postpartum.

Cardiac output

Immediately after the birth, the pulse rate, stroke volume and cardiac output remain elevated or increase for 30 to 60 minutes as the blood that shunted through uteroplacental circuit suddenly returns to the maternal systemic venous circulation

Vital Signs

- **Temperature:**
- **The temperature is slightly elevated: 0.5 degrees for the first 24 hours and up to 38 degrees is known. This rise in temperature is due to the absorption of waste products of muscular contractions of labor.**
- **Transient rise in temperature later on is due to:**
  - **Milk engorgement (by the 4th day postpartum).**
  - **Constipation.**
  - **Nervous excitation.**
  - **Infection.**

The pulse:

- **The pulse is full and slow (about 60-70 B/mm) and is known as physiological bradycardia (for 24-48 hrs after labor). It is due to:**
  - **The rest period after labor .**
  - **The increase in the circulating blood volume on account of the elimination of the placental pool.**
  - **The pulse should remain below 100 B/mm if all is going well. A rapid pulse may be brought on by pain, visitors, excitement, exhaustion, the nursing infant, hemorrhage or infection.**

- **Respiration:**
  - **This is in the usual relation with pulse and temperature. Because of a reduction in the size of the uterus and relaxation of the abdominal wall respiration is more abdominal in character. Deviation from the normal may suggest pneumonia or embolism.**

- **Blood Pressure:**
  - **No change is counted, but if hypotension is present, postpartum hemorrhage may be suspected. If hypertension is present (over 140/90 mm Hg) postpartum toxemia may be suspected.**

Blood and Fluid Changes

Marked leukocytosis and thrombocytosis occur during and after labor

The leukocyte count sometimes reaches 30,000L, with the increase

.There is also a relative lymphopenia and an absolute eosinopenia.

Normally, during the first few postpartum days, hemoglobin concentration and hematocrit fluctuate moderately.

If they fall much below the levels present just prior to labor, a considerable amount of blood has been lost

By 1 week after delivery, the blood volume has returned nearly to its nonpregnant level.

Respiratory function

-Returns to normal by approximately 6 to 8 weeks postpartum.

-Basal metabolic rate increases for 7 to 14 days postpartum, secondary to mild anemia, lactation, and psychological changes-

Neurological system

Discomfort and fatigue are common.

Afterpains and discomfort from the delivery, lacerations, episiotomy, and muscle aches are common.

Frontal and bilateral headaches are common and are caused by fluid shifts in the first week postpartum.

The elimination of physiologic edema through the diuresis that occurs after childbirth relieves carpal tunnel syndrome by easing the compression of the median nerve.

Musculoskeletal function

-Generalized fatigue and weakness is common.

-Decreased abdominal tone is common.

-Diastasis recti heals and resolves by the 4th to 6th week postpartum.

-Until healing is complete, abdominal exercises are contraindicated

Integumentary system

- Chloasma of pregnancy usually disappears at the end of pregnancy.
- Hyperpigmentation of the areolae and linea nigra may not regress completely after childbirth, and it may be permanent in some women.
- Stretch marks on breasts, abdomen, hips, and thighs may fade but usually do not disappear
- Hair growth slows during postpartum period, and some women may actually experience hair loss.

Immune system

No significant changes occur during postpartum period

Any Questions…???


THANK
YOU