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Normal Puerperium

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Abstract

Puerperium is the time following delivery during which pregnancy-induced maternal anatomical and physiological changes return to the nonpregnant state. Puerperium period of 6 weeks can be divided into: (a) immediate – within 24 hours (b) early – up to 7 days (c) remote – up to 6 weeks. The puerperal effects are seen in all organs and particularly in reproductive organs. Infection and haemorrhage are the common postpartum complications. Post partum care is very important. Advice on exclusive breast feeding and contraception is also mandatory after every childbirth.

Keywords: puerperium, postpartum, breastfeeding, lactation, parity

1. Introduction

Puerperium is the time following delivery during which pregnancy-induced maternal anatomical and physiological changes return to the nonpregnant state. Its duration is understandably inexact, but is considered to range between 4 and 6 weeks. By popular use, however, the meaning usually includes the six subsequent weeks of delivery.

The word puerperium is derived from Latin—puer- child and parus bringing forth.

The postpartum period is associated with much tradition and superstition because the health of a new infant is very important to the survival of any family. Puerperium begins as soon as the placenta is expelled and lasts for approximately 6 weeks when the uterus regress almost to the non pregnant size.

Puerperium can be divided into:

- a. immediate – within 24 hours.
- b. early – up to 7 days.
- c. remote – up to 6 weeks.

2. Physiology of the puerperium

2.1 Uterus

The uterus weighs approximately 1000 gm and has a volume of 5 L immediately after delivery, compared with its non pregnant weight of approximately 70 g m and 5–10 ml.

Just after delivery, the height of the uterine fundus is halfway between the pubic symphysis and the umbilicus. It happens because of the delivery of the fetus, placenta and amniotic fluid. Also there is loss of hormonal stimulation.

The height of the fundus just after delivery is 13.5 cm above the symphysis pubis. The level remains constant for first 24 hours. After that, there is a steady decrease in height by 1.25 cm in 24 hours, resulting in uterus so that by the end of 2nd week the uterus becomes a pelvic organ. The rate of involution thereafter slows down getting back the uterus to normal size in 6 weeks. Just after delivery, due to the rapidly decreasing endometrial surface that is attached to the placenta, placenta gets sheared from the decidual layer. The average diameter of the placenta attached to the decidua is 18 cm; which goes down to 9 cm in the immediate postpartum period.

For the first 3 days after delivery, the placental site is infiltrated with granulocytes and mononuclear cells. It is a reactionary change that extends into the endometrium and superficial myometrium as well.

By the 7th day, the regeneration of endometrial glands is evident, and they often appear atypical with irregular chromatin patterns, enlarged nuclei, pleomorphism and increased cytoplasm.

By the end of the first week, regeneration of the endometrial stroma is also evident, and mitotic figures are noted in gland epithelium. By postpartum day 16, the endometrium gets fully restored.

Just after birth, hemostasis is achieved by arterial smooth muscle contraction and compression of vessels by the involuting uterine muscle. In the first 8 days, vessels in the placental site are characterized by thrombosis, hyalinization. Endophlebitis in the veins and hyalinization and obliterative fibrinoid endarteritis in the arteries are notable findings.

The postpartum uterine discharge, or lochia, begins as a flow of blood that lasts several hours, then rapidly diminishes to a reddish brown discharge through the third or fourth day postpartum.

The post partum discharge is termed lochia and it contains erythrocytes, shredded decidua, epithelial cells and bacteria. For the first few days after delivery, it is known as lochia rubra. After 3 or 4 days, lochia becomes progressively pale in color and is known as lochia serosa. Then at around 10th day, because of an admixture of leukocytes and reduced fluid content, lochia assumes a white or yellow-white color known as lochia alba. The average duration of puerperial lochial discharge is from 24 to 36 days [1].

Breastfeeding or the use of oral contraceptive agents does not affect the duration of lochia. The cervical os contracts slowly, and for a few days just after labor, it readily admits two fingers. Gradually, this opening narrows and the cervix thickens with reformation of endocervical canal in a week. The external os never resumes its pre gravid appearance. It remains somewhat wider with the ectocervical depressions getting permanent at the site of lacerations.

2.2 Birth canal

The vagina and the introitus gradually reduce in size but hardly regain the nulliparous size and shape. Rugae start appearing by the third week but are less prominent. The hymen is represented by several small tissue tags of tissue that form the myrtiliform caruncles.

After delivery, the vaginal epithelium reflects the hypoestrogenic state, and it stops proliferating until 4 to 6 weeks. Some damage to the pelvic floor may be inevitable, and parturition predisposes to urinary incontinence and pelvic organ prolapse.

2.3 Ovarian function

Ovulation starts as early as 27 days after childbirth. It can start after about 70 to 75 days in non lactating women. But for breastfeeding women, the mean time to ovulation can be about 6 months.

Menstruation usually resumes by 12 weeks postpartum in 70% of non lactating women. The mean time to the first menses after childbirth is 7 to 9 weeks.

In a woman exclusively breastfeeding, the likelihood of ovulation within the first 6 months postpartum is 1% to 5%.

The persistent elevation of serum prolactin in lactating women is the basis for ovulation suppression in lactating women. Prolactin levels get back to the normal range by 3 weeks after delivery in nonlactating women but remains elevated till the 6th week in lactating women.

2.4 Peritoneum and abdominal wall

The broad and round ligaments require considerable time to recover from stretching and loosening during pregnancy.

After cesarean delivery, a 6-week interval to allow fascia to heal and abdominal soreness to diminish is reasonable.

Silvery abdominal striae commonly develop as striae gravidarum.

Marked separation of the rectus abdominis muscles—diastasis recti—may result.

2.5 Blood and blood volume

Marked leukocytosis and thrombocytosis may occur during and after labor. The greatest level of coagulability is observed immediately after delivery and remains for the following 48 hours. Fibrinogen concentrations gradually diminish over the first 2 weeks postpartum. Increased fibrinolytic activity is seen in the initial 4 days following delivery. The fibrinolytic activity is back to normal in a week and is shown by plasminogen activation inhibitor 1 levels. D-dimer levels are more than pregnancy levels, but are a poor marker of thrombus formation. Protein-S levels and activated protein-C resistance are less for around 6 weeks in puerperium. The changes in the coagulation system, together with vessel trauma and immobility, account for the increased risk for thromboembolism noted in the puerperium, especially when an operative delivery has occurred.

2.6 Cardiovascular system

Plasma volume is diminished by about 1000 mL just after delivery and that is due to blood loss during delivery.

Due to the shift of extracellular fluid into the vascular space. The plasma volume is replenished by the 3rd day of puerperium. Also, the total blood volume declines by 16% of the pre delivery value, and that manifests as transient anemia.

By 8 weeks of puerperium, the red cell mass rebounds and the hematocrit becomes normal in most women. Since, the blood volume becomes normal, venous tone also gets to baseline. Pulse rate increases throughout gestation, like stroke volume and cardiac output. Just after delivery, these remain elevated or may rise even higher for initial 30 to 60 minutes. Following delivery, a transient rise of about 5% occurs in both diastolic and systolic blood pressures and that continues for the first 4 days postpartum.

2.7 Thyroid function

Thyroid volume increases to about 30% during pregnancy and then gets back to normal in a 12-week period in puerperium. Both thyroxine and triiodothyronine increase throughout pregnancy and becomes normal within 4 weeks post delivery. For women on thyroid medications, it is advisable to check thyroid profile at 6 weeks postpartum to titrate the dosage. Sometimes, during the postpartum period, there is an increased risk for the development of a transient autoimmune thyroiditis that may later evolve into permanent hypothyroidism.

2.8 Immune system

The immune system gets compromised during pregnancy—particularly cellular-mediated immunity. The rebound of cellular mediated immunity after delivery leads to “flare-ups” of autoimmune diseases and subclinical infections with inflammatory reactions. Autoimmune thyroiditis, multiple sclerosis, and lupus erythematosus are examples of auto immune diseases that show flare ups in the first few months of puerperium.

2.9 Urinary tract

Normal pregnancy-induced glomerular hyperfiltration persists during the puerperium but returns to prepregnancy baseline by 2 weeks [2].

Dilated ureters and renal pelvis return to their prepregnant state by 2 to 8 weeks postpartum.

Postpartum, the bladder has an increased capacity and a relative insensitivity to intravesical pressure. Thus, over distention, incomplete emptying, and excessive residual urine are frequent in puerperium [3, 4].

2.10 Lactation

Breasts begin to secrete colostrum after delivery. It is a dark yellow liquid and usually can be expressed from the nipples by the second postpartum day. In comparison to mature milk, colostrum is rich in both immunological components and minerals and amino acids [5]. It also has more protein, mostly globulin, but contains less sugar and fat.

Colostrum secretion continues for 5 days to 2 weeks post partum, with later conversion from “transitional” to mature milk in next 4 to 6 weeks.

3. Management of puerperium

3.1 Hospital stay

For most parturients, the immediate puerperium is spent in the hospital or birthing center.

In the 1950s, the lying-in period after delivery used to be around 8 to 14 days. Now, most women stay in the hospital only for 24 to 48 hours after a vaginal birth. For patients with an uncomplicated postoperative course after caesarean delivery, the post partum stay is only 2 to 4 days. During the hospital stay, the focus should be on preparation of the mother for newborn care, infant feeding including the special issues involved with breastfeeding, and also the required newborn laboratory testing.

There are no dietary restrictions for women who have been delivered vaginally. Two hours after uncomplicated vaginal delivery, a woman is allowed to eat.

3.2 Postpartum complications

Infection commonly occurs in approximately 5% of post partum patients and significant immediate postpartum hemorrhage in approximately 1% of patients. Just after the delivery of the placenta, the uterus is palpated bimanually to ascertain its tonicity. Uterine palpation is very important and is repeated frequently during the immediate postpartum period to prevent and identify uterine atony promptly. In only 1% of cases, bleeding persists or is excessive and is called delayed postpartum hemorrhage. If the bleeding is heavy or the uterus is believed to contain blood clots, uterus should be massaged until it contracts and the clots expressed. The physician may be notified, and on order an oxytocin preparation such as syntocinon 1 ml given intramuscularly or IV infusion with 5% glucose is administered. When the general condition of the mother is satisfactory, the mother and baby should be transferred to the ward. As soon as the post natal ward is notified that the newly delivered mother and her baby is to be transferred to the ward, the mid wife should arrange for a bed to be prepared in a single room or in a quiet area of a ward so that the mother will be able to sleep following her efforts during delivery.

On arrival, we should note the following:

- Consistency of the uterus
- Blood loss
- Pulse
- BP
- Temperature
- General condition of the mother-tired –feeling weak
- Parity and age
- Blood group and Rh factor
- Events of labour and delivery including the amount of blood loss
- The baby's condition at birth and his birth weight
- Mother's chosen method of infant feeding
- What examinations and tests have already been carried out and plan for those which must be done during the next few days.

3.3 Daily examination

Every morning the mother should be seen and asked as to how she is feeling. The midwife should particularly note if the mother complains of feeling unduly tired. Any woman who is anaemic or who is developing an infection will not feel well. Temperature, pulse and Blood pressure should be measured. The temperature

and pulse rate may be recorded at least twice a day for the few days and then once daily until the 10th days of the puerperium. If the temperature exceeds 37.3 degree Celsius or 99 degree Fahrenheit, the physician is to be notified. The pulse rate is normally 80 or below per minute. Any rise in the pulse rate above 90 beats per minute should be reported to the physician irrespective of whether it is accompanied by rise in temperature or not. Any rise in temperature may be indicative of excessive bleeding or of a developing puerperal infection. Tachycardia which is due to excessive bleeding will be accompanied by hypotension. When a nurse notices a rising pulse rate and fall in blood pressure she must check the state of the uterus and lochia in order to identify post partumhaemorrhage. The blood pressure is checked during the first 24 hours following a normal delivery and for a longer period of time, if there has been any history of bleeding, hypertension during pregnancy, or if the mother has had a Caesarean section or has required any other surgical intervention.

The breasts should be examined daily and noted whether the breasts are soft and are free from lumps, redness and soreness.

3.4 Breasts problems: sore and damaged nipples

Abnormal nipples: Inverted and flat nipples.

The complications of breast feeding are engorgement of breasts. In breasts feeding mothers breast engorgement occurs around the third and fourth post partum day. The breasts are hard, painful and sometimes flushed. The mother may develop pyrexia along with that. Engorgement results from an increased amount of blood and edema in the breasts and indicates that the baby is not ready to take the full quantity. Warm compresses to the breasts and removal of excess milk at the end of each feeding will relieve the condition. Even tight brassieres help.

3.5 The Bowels

The bowels tends to be sluggish during the puerperium for the following reasons.

1. The woman is losing fluid from her body in quantities of urine, in perspiration and breastmilk.
2. The anus maybe insensitive to stimulation having been forcibly dilated by the pressure of baby's head.

It is good to give some mild laxative for the first 36 hrs after delivery such as liquid paraffin or milk of magnesia. When diet contains sufficient roughage and fluid, the bowel needs less artificial stimulation. If the bowels do not move 48 hrs after delivery, glycerine or dulcolex suppository is usually given.

3.6 Diet

The nursing mother needs a liberal nourishing diet to build up her strength and enable her to produce sufficient breast milk. Good whole food is essential containing sufficient proteins, minerals and vitamins. As so many women are anaemic at this time the nurse must ensure that food rich in iron are included in the diet. The haemoglobin is estimated on 8th or 9th day. Iron supplements are usually prescribed for one month. As the woman is losing calcium when she breastfeeds, she should take adequate dietary calcium. Fruit and vegetables should be served at every meal.

3.7 Rest and sleep

The woman needs adequate rest, quietness and sleep because of the hypersensitive state of her nervous system. If kept awake by some discomfort such as after pains, haemorrhoids, or engorged breasts, the nurse should treat the cause before giving analgesics. The ward should be closed morning and afternoon for 1 hour. The patient is requested to relax and keep silent if they cannot sleep. The persistent insomnia in absence of pain should be viewed as a warning sign of ensuing puerperal psychosis at times.

3.8 Asepsis and antisepsis

Asepsis must be maintained, especially during the first week of puerperium. The woman is particularly vulnerable to infection at this time for the following reasons:

1. The uterus provides an ideal environment for the growth and multiplication of the micro organisms.
2. The lacerated and bruised tissues of the vulva and vagina being devitalised are unable to resist the invasion of organism.
3. The vaginal orifice is gaping and micro organisms can readily enter.
4. The woman's immunity is lowered because of depletion of energy, lack of sleep and food.
5. Blood loss may have been excessive.

The nurse must wear a mask when the vulva is exposed during the first week of puerperium.

The room and bed linen, the women skin and clothing should be clean. Adequate use of soap and water is the first requirement.

What to report to the physician.

- Temperature and pulse.
- Appetite and sleep
- Bowel and bladder movements
- Character of lochia
- Condition of sutured perineum
- Pain eg. In the breasts, abdomen, leg, head
- Any peculiarity in behaviour.

3.9 Perineal care

In puerperium, the woman is advised to maintain hygiene and clean the vulva from anterior to posterior toward the anus. A cool pack may be applied to the

perineum to bring down edema and pain during the first 24 hours, especially in perineal laceration or an episiotomy.

3.10 After pains

Uterine involution manifests as several clinical findings. In primiparas, the uterus usually remains tonically contracted after delivery. Whereas in multiparas, the uterus contracts vigorously at intervals and manifests as afterpains, which are almost like labor pains. These pains are more pronounced as parity increases and worsen when the newborn lactates, because of oxytocin release. By the 3rd day post partum, afterpains decrease in intensity and become mild. In women with postpartum uterine infections, there may be severe and persistent after pains. Aspirin can be given with food in those cases.

Severe perineal, vaginal or rectal pain always warrants careful inspection and palpation. Hemorrhoidal veins are often congested at term. Thrombosis is common and may be promoted by second-stage pushing. Treatment for the condition includes topically applied anesthetics, warm soaks, and stool-softening agents.

3.11 Bowel and bladder function

Stool softeners may be prescribed, especially if the patient has had a fourth degree perineal tear or a laceration involving the rectal mucosa during delivery.

Hemorrhoids are varicosities of the hemorrhoidal veins and are commonly found in puerperium. Surgical treatment may be considered only after 6 months postpartum to allow for natural involution. Sitz baths, stool softeners, and local medicinal preparations are useful along with reassurance.

She goes to the toilet after 6 hours to pass urine. Periurethral edema after vaginal delivery may cause transitory urinary retention.

3.12 Retention of urine

3.12.1 Causes

1. Recumbent- posture and lack of privacy.
2. Stitches in perineum.
3. Bruises of bladder neck- bladder neck spasms.
4. Bladder atony.

3.12.2 Treatment

Women go to toilet or sit on bedpan with screen. Hot and cold water bottles are applied on hypogastrium. Plenty of oral fluid to be given. Catheterization if she cannot pass urine. Patients' urinary output should be monitored for the first 24 hours after delivery. If catheterization is required more than twice in the first 24 hours, placement of an indwelling catheter for 1 to 2 days is advisable. Prolonged catheterization needs to be avoided.

3.12.3 Pain, mood, and cognition

Mild analgesics containing codeine, aspirin, or acetaminophen, preferably in various combinations are given as frequently as every 4 hours during the first few

days. It is fairly common for mother to exhibit some degree of depressed mood a few days after delivery termed postpartum blues. Post partum blues can be multifactorial. Mostly, anticipation, recognition, and reassurance works. This disorder is usually mild and self-limited to 2 to 3 days, but sometimes may last up to 10 days. Persistence or worsening of moods calls for evaluation for symptoms of major depression.

3.12.4 Ambulation

Postpartum patients should be encouraged to begin ambulation as soon as possible after delivery. Early ambulation helps avoid urinary retention and prevents puerperal venous thromboses and pulmonary embolism. Early ambulation is the key to faster recovery post delivery.

3.12.5 Breast care

Nipples are cleansed with sterile water and cotton swab before and after feeding. They are covered with sterile bra. In non lactating women, breast engorgement occurs in the initial days of puerperium and gradually reduces over this period. Painful breasts should be supported with a well-fitting brassiere. Ice packs and analgesics may also help relieve breast discomfort and pain. Women who do not wish to breastfeed should be encouraged to avoid nipple stimulation and advised to avoid continued manual expression of milk. Mastitis, or infection of the breast tissue, most often occurs in lactating women and manifests as sudden-onset fever, localized pain and swelling in the breast. Mastitis is associated with infection by micro organisms like *Staphylococcus aureus*, Group A or B streptococci, β Haemophilus species, and *Escherichia coli*.

Treatment includes continuation of breastfeeding or emptying the breast with a breast pump to avoid engorgement and also use of appropriate antibiotics.

3.12.6 Immunizations

Women who do not have antirubella antibody should be immunized during the immediate postpartum period [6]. Breastfeeding is not a contraindication for that.

If a patient has not received the tetanus-diphtheria acellular pertussis vaccine, or it has been at least 2 years since her last tetanus-diphtheria booster, she should be administered a dose before discharge from hospital.

If the woman is Rh-negative blood group, not isoimmunized and has given birth to a Rh-positive or weak-Rh-positive baby, 300 micrograms of anti-D immune globulin should be administered postpartum, ideally within 72 hours of delivery.

3.12.7 Post partum posture and exercise

In sitting posture she feeds her baby for sometime daily, she lies in her face for three weeks.

Deep breathing and simple movement of limbs are encouraged. Some simple exercises are practised when she feels it for after a few days to tone up abdominal and pelvic floor muscles as:-.

1. Deep breathing.
2. Abdominal wall is tightened on deep inspiration and breathholding followed by its relaxation. This is done 10 times on floor with knees pulled up.

3. Pelvic floor muscles- Bent knees press on a pillow followed by relaxation for a number of times. Encourage erect walks.
4. Sexual intercourse is permitted with use of contraceptive following first post natal check up at sixth week.

3.13 Contraception

Postpartum care in the hospital should include discussion of contraception. Approximately 15% of non-nursing women are fertile at 6 weeks postpartum. Progestin preparations (oral norethindrone or depo-medroxyprogesterone acetate) have no effect or may slightly facilitate lactation. Women may consider initiating progesterone-only contraceptives at 6 weeks if breastfeeding exclusively or at 3 weeks if not exclusively.

Postpartum sterilization is performed at the time of cesarean delivery or after a vaginal delivery and should not extend the patient's hospital stay.

3.14 Sexual activity

Coitus may be resumed when the woman is pain free and comfortable. However, the risks of hemorrhage and infection are minimal at approximately 2 weeks postpartum. Women should be counseled, especially if breastfeeding, that coitus may initially be uncomfortable because of a dry vagina as a result of low estrogen levels. In such conditions, use of exogenous, water soluble lubrication is helpful.

3.15 Follow-up care

By discharge, women who had an uncomplicated vaginal delivery can resume most activities, including bathing, driving, and household functions. The American Academy of Pediatrics and the American College of Obstetricians and Gynecologists (2017) recommend a postpartum visit between 4 and 6 weeks. This has proven quite satisfactory to identify abnormalities beyond the immediate puerperium and to initiate contraceptive practices.

Advice on discharge for home:

- Exclusive breast feeding for 6 months
- Care of the newborn
- Total infant immunization for protection of infant from six killer diseases.
- Oral rehydration for mild diarrhoea

The discharge carries the following:

- Discharge slip- carrying details of the delivery and childbirth date.
- Instruction to mother on food, iron folic acid laxative.
- betadime cream is applied once daily on perineal wound at home for 7 days.
- She is instructed to put on sterile pad for lochial discharge and to return on sixth week for post natal check up.

She is also referred to infant immunization center for full immunization of infants upto 10 months.

Post natal care:

3.16 Post natal examinations

First check up on discharge and second on sixth post partum week.

Mother: general health, pulse, BP, temperature breasts, uterine fundus is palpated per lower abdomen for normal involution.

Perineum is inspected and that of lochia.

Bladder and bowel functions are enquired.

Infant: weight, skin condition (jaundiced), eyes, condition of umbilical cord, feeding, stool, urination, any other problem are checked by referring to pediatric opd or paediatrician.

Second post natal check up on sixth week.

Mother and infant: duration of lochia, duration of first menses, sleep, bladder, bowel, perineal wound, breasts or bottle feeding.

Any problem of mother or baby is enquired.

Examination on mother: weight, BP, Pulse, anemia, breast, abdomen, perineum, pelvic organs.

Infants: weight, heart, lungs, umbilicus, Inj BCG are checked.

Advice on discharge: Food advices to mother, giving her a food chart and use of boiled water.

Rest, sleep, exercise and posture by mother.

Advice on contraceptives.

Breast feeding.

After delivery, the breasts start to secrete colostrum, which is a deep lemon yellow liquid usually by the second postpartum day. Compared with mature milk, colostrum is rich in immunological components and contains more minerals and amino acids, protein, much of which is globulin, but less sugar and fat. The colostrum content of immunoglobulin A (IgA) offers the newborn protection against enteric pathogens. Mature milk is a complex and dynamic biological fluid that consists of fat, proteins, carbohydrates, bioactive factors, minerals, vitamins, hormones and many other cellular products. The concentrations and contents of human milk change even during a single feed, but are affected by maternal diet and newborn age, health and needs.

A nursing mother usually produces 600 mL of milk daily. However, maternal gestational weight gain has little impact on the quantity or quality of milk. Milk is isotonic with plasma, and lactose alone accounts for half of the osmotic pressure. Essential amino acids in milk are derived from blood, and nonessential amino acids come from blood or synthesized in the mammary gland. Alpha-lactalbumin, beta-lactoglobulin and casein are some of the milk proteins. Fatty acids are synthesized in the breast alveoli from glucose and are secreted by an apocrine-like process. Though vitamins are found in human milk, but these are present in variable amounts. Vitamin K is virtually absent, and thus, an intramuscular dose is required to be given to the newborn [7].

Even the milk serum whey contains large amounts of interleukin-6. Human milk has a whey-to-casein ratio of 60:40 and that is considered ideal for absorption. Prolactin is also actively secreted into breast milk. Epidermal growth factor (EGF) found in milk is not destroyed by gastric proteolytic enzymes and hence may be absorbed to promote growth and maturation of newborn intestinal mucosa [8]. Lactoferrin, melatonin, oligosaccharides, and essential fatty acids are the other constituents of milk. The precise humoral and neural mechanisms involved in lactation are complex.

Progesterone, estrogen, and placental lactogen, as well as prolactin, cortisol, and insulin act in concert to stimulate the growth and development of the milk-secreting apparatus in lactating breasts [9]. With delivery, the maternal serum levels of progesterone and estrogen decline abruptly and significantly. The falling progesterone and estrogen levels remove the inhibitory influence on alpha-lactalbumin production and thus stimulates lactose synthase in milk. Progesterone withdrawal also allows prolactin to act unopposed and stimulates production of alpha-lactalbumin in milk. The intensity and duration of subsequent lactation are controlled, in large part, by the repetitive stimulus of nursing and emptying of milk from the breast. Prolactin is essential for lactation and women with extensive pituitary necrosis— Sheehan syndrome—does not lactate. Although after delivery, plasma prolactin levels drop to levels lower than during pregnancy, each act of suckling causes a rise in levels [10]. Suckling curtails the release of dopamine, also known as prolactin-inhibiting factor, from the hypothalamus. That in turn, also transiently induces prolactin secretion. Oxytocin is known to be secreted by the pituitary in pulsatile fashion. This oxytocin stimulates contraction of myoepithelial cells in the alveoli and small milk ducts and hence helps in milk expression. Milk ejection or letting down, is a reflex initiated especially by suckling, which stimulates the posterior pituitary to liberate oxytocin. The reflex may even be provoked by an infant cry and can be inhibited by maternal fright or stress.

3.17 Nursing

Human milk is known ideal food for newborns for it provides age-specific nutrients, immunological factors, and antibacterial substances to the newborn. Milk also helps in promoting cellular growth and differentiation. For both mother and infant, the benefits of breastfeeding are long-term and unique. World Health Organization (2011) recommends exclusive breastfeeding for up to 6 months.

3.18 Advantages of breastfeeding

Nutritional

Immunological

Developmental

Psychological

Social

Economical

Environmental

Optimal growth and development

Decrease risks for acute and chronic diseases

The Baby Friendly Hospital Initiative is an international program to promote exclusive breastfeeding. It is based on the World Health Organization (1989) Ten Steps to Successful Breastfeeding. World wide, almost 20,000 hospitals are designated as “baby-friendly hospitals.

Ten Steps to Successful Breastfeeding (Baby Friendly Hospital Initiative):

- a. Have a written breastfeeding policy that is regularly communicated to all Health-care staff.
- b. Train all staff in skills necessary to implement this policy.
- c. Inform all pregnant women about the benefits and management of breastfeeding.
- d. Help mothers initiate breastfeeding within an hour of birth.
- e. Show mothers how to breastfeed and how to sustain lactation, even if they should be separated from their infants.
- f. Feed newborns nothing but breast milk, unless medically indicated, and under no circumstances provide breast milk substitutes, feeding bottles, or pacifiers free of charge or at low cost.
- g. Practice rooming-in, which allows mothers and newborns to remain together 24 hours a day.
- h. Encourage breastfeeding on demand.
- i. Give no artificial pacifiers to breastfeeding newborns.
- j. Help start breastfeeding support groups and refer mothers to them.

3.19 Contraindications to breastfeeding

Nursing is contraindicated in some women who have intake of street drugs or alcohol abuse; have an infant with galactosemia; human immunodeficiency virus (HIV) infection; active, untreated tuberculosis; undergoing breast cancer treatment [11]. Breastfeeding has been recognized for some time as a mode of HIV transmission and is proscribed in developed countries in which adequate nutrition is otherwise available. Other viral infections do not contraindicate breastfeeding. Women with active herpes simplex virus may suckle their infants if there are no breast lesions and if particular care is directed to hand washing before nursing.

3.20 Other issues with lactation

With inverted and depressed nipples, nursing is very difficult. Here, lactiferous ducts open directly into a depression at the center of the areola. If the depression is not deep, milk can sometimes be expressed with the help of a breast pump. During the last few months of pregnancy, daily attempts can be made to draw or “tease” the nipple out with the fingers.

Extra breasts—polymastia, or extra nipples—polythelia, may develop along the milk line or the former embryonic mammary ridge. In some women, rests of accessory breast tissue may also be found in the mons pubis or vulva. In the general population, the incidence of accessory breast tissue ranges from 0.22 to 6 percent [12]. These accessory breasts are very small and are mistaken to be pigmented moles, lymphadenopathy or lipoma. However, polymastia has no obstetrical

significance. But, occasional enlargement of these accessory breasts during pregnancy or postpartum cause patient discomfort and anxiety.

Galactocele is another complication wherein a milk duct gets obstructed by inspissated milk secretions. The amount is ordinarily limited, but an excess may form a fluctuant mass—a galactocele. Galactocoele may cause pressure symptoms and also form an abscess. It might get resolved spontaneously or might require aspiration.

Among individuals, the volume of milk secreted varies markedly. This depends on breast glandular development rather than maternal health. Rarely, there is a condition with complete lack of mammary secretion—agalactia. Again, mammary secretion might be excessive—polygalactia.

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