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17.0 OBJECTIVES

After going through this unit, you should be able to:

- relate the importance of puerperal infections to maternal morbidity and mortality;
- enumerate the various puerperal abnormalities;
- define puerperal fever and puerperal sepsis;
- enumerate the causes of puerperal fever;
- enlist the aseptic and antiseptic measures to be adopted for the prevention of puerperal sepsis; and
- manage the various abnormalities.

17.1 INTRODUCTION

You will appreciate that after delivery the placental site is denuded; it is like a wound elsewhere in the body and is prone to get infected. Sepsis, along with haemorrhage, anaemia and pre eclampsia / eclampsia is a prime contributor to maternal morbidity and mortality, particularly in the developing countries. It is the commonest complication during the puerperium, but largely preventable. Efforts are on to ensure that all deliveries are conducted by trained personnel. Taking appropriate measures right from the antenatal period to the puerperium can prevent most of the abnormalities and avert maternal morbidity and mortality due to sepsis.

17.2 PUERPERAL FEVER/PYREXIA

You must remember that puerperal pyrexia is defined as oral temperature of 38°C or more recorded twice in the first 10 days after delivery. It points to an underlying infection. While mild fever within 24 hours of delivery may be outside the definition of puerperal fever, virulent bacterial infections may cause high fever ($\geq 39^\circ\text{C}$) on the first day after delivery.

17.2.1 Causes of Puerperal Fever

- 1) Mild reactive elevation of temperature ($<38^\circ\text{C}$) in the first 24 hrs is very common. Causes of such fevers are dehydration, tissue trauma, reaction to fetal protein and breast engorgement. A temp of $>38^\circ\text{C}$ or more should alert the health care provider to the possibility of puerperal sepsis.
- 2) Puerperal uterine infection
- 3) Breast infections
- 4) Urinary infections
- 5) Thrombophlebitis
- 6) Other incidental infections
 - Tuberculosis
 - Typhoid
 - Malaria
 - Chest infection (pneumonia, bronchitis)
 - Meningitis
 - AIDS related infections

It must be remembered that infection may occur with low-grade fever or no fever at all. Though puerperal fever and sepsis are not synonymous, fever most often points to underlying infection.

17.3 PUERPERAL SEPSIS

You will read about puerperal sepsis in the following section. It is dealt in detail as it causes maternal mortality and morbidity and these are avoidable if proper care is taken.

17.3.1 Definition

Infection of the genital tract at any time between delivery of foetus till 42 days after delivery is puerperal sepsis. Two or more of the following features need to be present to label it as puerperal sepsis:

- pelvic pain
- fever of 38.5 degree centigrade or 101.3 degree fahrenheit (on anyone occasion)
- abnormal vaginal discharge e.g. presence of pus
- foul odour/abnormal smell of discharge
- delay in involution of uterus (sub-involution) — less than 2 cms/day during the first 8 days.

Abnormal Labour and Puerperium **17.3.2 Micro-organisms causing Sepsis**

Infection is most often a mixed one with several kinds of bacteria. It may be either endogenous or exogenous. E-coli, streptococci, klebsiella, Proteus, and staphylococci are common aerobes; Peptococci, Peptostreptococci, Bacteroids, clostridium are the anaerobes. Chlamydia, Mycoplasma and Gardnerella have also been implicated.

- Endogenous bacteria become harmful after delivery when
 - organisms that are usually present in the vagina become pathogen in the presence of tissue injury
 - they are introduced into the uterus by examining fingers or during manipulations like internal podalic version and manual removal of placenta.
 - tissues are bruised, lacerated or dead (after a traumatic delivery or following obstructed labour).
 - there is prolonged rupture of membranes.
- Exogenous bacteria can be introduced into the vagina by
 - unclean hands
 - unsterile instruments
 - by foreign substances introduced into the vagina (oils, herbs, cloth, etc.)
 - by sexual activity.

(Postpartum tetanus infection is an exogenous infection). STD infections, if not treated may cause uterine infections after delivery.

17.3.3 Risk Factors for Puerperal Sepsis

The risk can be avoided or minimized if proper care is taken.

Some women are more vulnerable to infection after delivery. They are given below:

- i) Maternal Factors:
 - anaemia
 - malnutrition
 - diabetes mellitus
 - prolonged labour
 - obstructed labour
 - prolonged rupture of membranes
 - frequent vaginal examinations
 - operative deliveries—caesarean section, forceps delivery etc.
 - unrepaired cervical and vaginal lacerations
 - postpartum haemorrhage
 - non-immunization against tetanus
 - poor hygiene
 - poor aseptic techniques for delivery
 - manipulations high in the birth canal (upper vagina and uterus)
 - intrauterine death of foetus, retained bits of placenta or membranes, ischaemic necrosis following obstructed labour.

- introducing unsterile hand, instrument or packing
 - pre-existing STDs.
 - colonisation of vagina with group B streptococci, chlamydia, mycoplasma, ureaplasma and gardnerella.
- ii) Community risk factors
- low socio-economic status
 - cultural factors which delay health care seeking behaviour, low status of woman
 - lack of knowledge about signs and symptoms of puerperal sepsis
 - lack of transportation
 - lack of resources
 - long distance from home to health facility.
- iii) Health Service risk factors
- inadequate monitoring of temperature during labour and after delivery
 - lack of adequate asepsis during delivery
 - shortage of blood transfusions
 - inappropriate antibiotics
 - operative intervention
 - inadequate bacteriological investigations

17.3.4 Diagnosis

You are already aware that all women in the immediate postnatal period should be monitored for infections during the scheduled postnatal visits. Refer to Unit 12, Block 3.

The clinical presentation will depend on the extent of infection. Infection may be confined to uterus or spread to parametrium, adnexa, pelvic peritoneum and outside pelvis.

a) Clinical Features

1) *Endometritis (Uterine Infection)*

Placental site is the seat of infection. With chorioamnionitis, the infection continues from intranatal to postnatal period. Symptoms of infection continue after delivery also. In other cases, the symptoms appear 3-6 days after delivery. It is common after caesarean delivery.

In mild cases, there is fever with proportional tachycardia. Uterus is soft and tender. Subinvolution of uterus is often present. Lochia is offensive and copious. In infection with beta haemolytic streptococci there is fever with chills and rigors, severe tachycardia out of proportion to temperature and there may be no local signs (no foul smelling lochia or subinvolution).

Wound infection may also be present such as in perineum, vagina, cervix or abdominal wound. At wound site, she has pain, swelling and discharge.

Subinvolution

This means a delay or arrest in the process of involution of uterus. If the fundal height does not decrease by 1-2 cms. every day, or if the uterus is palpable abdominally 2 weeks after delivery, it is said to be subinvolved. Early and complete breastfeeding help in involution. Overdistension of uterus, grand multiparity, caesarean section and fibroid

Abnormal Labour and Puerperium predispose to the condition. Infection and retained products aggravate the condition. The patient may have prolonged and excessive lochial discharge, irregular bleeding or abdominal pain. Fever occurs if there is infection. Careful observation, ensuring breastfeeding, antibiotics in case of infection, removal of placental bits are the usual therapeutic measures. Ergometrine may be helpful.

2) *Pelvic Cellulitis*

Spread of infection to parametrium may occur. There is fever and pelvic pain. On abdominal examination, tenderness is felt in lower abdomen. Vaginal examination reveals unilateral or bilateral tender swellings in lateral fornices. In unilateral parametritis, the uterus may be pushed to the opposite side. The swelling feels board like and hard. If suppuration occurs, there is spiky temperature rise with chills and rigors, intense pain and softening of the mass. Rectal examination confirms the findings. General condition of the woman may deteriorate.

3) *Salpingitis and Peritonitis*

These two conditions cannot be differentiated easily. The woman has fever with pain in lower abdomen. On examination tachycardia and rise in temperature is found. Tenderness and guarding is felt in lower abdomen. Vaginal examination reveals tenderness in uterus and all fornices. Cervical movements are painful. When pelvic abscess is formed, the woman has tenesmus and mucous diarrhoea. On vaginal examination, a bulge is felt in posterior fornix. The findings are confirmed on rectal examination.

General peritonitis is characterised by high temperature, vomiting toxic look, signs of dehydration and tachycardia. Whole abdomen is tender, distended and rebound tenderness may be elicited. Later, guarding and rigidity appears. Bowel sounds are poor and sluggish.

4) *Pelvic Thrombophlebitis*

Pyrexia continues for more than one week in the absence of any obvious infection. Extra pelvic extensions can occur into (a) inferior vena cava through right ovarian vein (b) left renal vein through left ovarian vein (c) iliofemoral vein through retrograde spread. Extension to iliofemoral vein produces the clinical picture of white leg (Phlegmasia alba dolens) when associated with arterial spasm.

5) *Septicaemia*

Along with high temperature, the woman is very sick. There are chills and rigors with fever, headache, insomnia and mental confusion. Spleen is enlarged. Blood culture is positive. Symptoms of metastatic infections in lungs, brain, meninges or joints may appear. Subsequently, BP may fall with signs of septic shock.

A detailed history and presence of risk factors should be elicited. General and systemic examination, abdominal, vaginal and rectal examination will help to make the diagnosis.

If the infection has spread beyond the uterus, it is better to refer such patients to District Hospital.

b) **Investigations**

- Haemoglobin, total and differential leucocyte count
- Routine urine examination (midstream urine)
- Wherever possible the additional tests are done as follows. Culture and sensitivity tests on samples of
 - blood
 - high vaginal/cervical swab
 - mid stream urine

- Plain X-ray chest
- Thick blood film for malarial parasite
- Blood urea, serum creatinine
- Serum electrolytes

Hence for the above investigations and monitoring, infections spreading beyond uterus are sent to referral hospitals.

c) **Differential Diagnosis**

Any fever during puerperium is assumed to be due to puerperal sepsis unless otherwise proved. Infection may occur in other parts of body connected to reproductive process or it can be incidental. They are:

- a) breast infections
- b) urinary tract infections
- c) incidental
 - tuberculosis
 - typhoid
 - malaria
 - chest infection (pneumonia, bronchitis, tuberculosis)
 - meningitis
 - AIDs related infections.

17.3.5 Management

After the diagnosis, you will be reading about management. Management is described under two headings (1) Preventive (2) Curative.

1) **Preventive**

Preventive measures are taken during antenatal, intranatal and postnatal period against puerperal sepsis.

- *Antenatal*

Regular antenatal care by

- a) preventing tetanus by immunization against tetanus
- b) diagnosis and treatment of conditions such as
 - malnutrition
 - anaemia
 - urinary tract infection
 - diabetes mellitus
 - syphilis
 - STDs
- c) preventing prolonged and obstructed labour by diagnosis of CPD and abnormal presentations.
- d) health education for institutional delivery or by trained personnel.
- e) Training of Dais in aseptic delivery (observing 5 cleans) and supplying them delivery kits.

Abnormal Labour and Puerperium ● *Intranatal*

- i) All deliveries to be conducted using aseptic techniques.
- ii) Personnel with septic focus are not allowed in the delivery room or postnatal ward.
- iii) Unnecessary vaginal examinations are to be avoided.
- iv) Unnecessary catheterisation is to be avoided.
- v) Avoid trauma to perineum by using correct technique to deliver the head.
- vi) Avoid unnecessary induction of labour by ARM
- vii) Suture perineal, vaginal and cervical tears and episiotomy as early as possible taking all aseptic precautions.
- viii) Prophylactic antibiotics is to be given in woman with premature rupture of membranes, prolonged labour, instrumental deliveries and intrauterine manipulations.

● *Postnatal*

- a) Proper perineal care in woman with perineal wounds
- b) Maintain good personal hygiene
- c) Less visitors
- d) Look out for early signs of infection

2) **Curative**

Except mild cases of puerperal sepsis, all other cases are managed in referral hospitals.

● *General Care*

- Isolation and barrier nursing in hospital set up
- Bed rest. Foot end to be raised to facilitate drainage
- In mild cases, plenty of fluids orally and light diet is advised
- In severe cases, IV fluids ringer lactate and dextrose saline are given
- Blood transfusion may be required to correct anaemia
- Analgesics and sedatives are prescribed as required
- Monitoring of the condition every 6 hourly.

● *Specific*

- Antibiotics are started empirically.
- Mild cases – single broad spectrum antibiotics is started such as ampicillin 500 mg 6 hourly orally and add metronidazole 400 mg 8 hourly. After 48 hours, if the response is good and the condition improves complete the antibiotic course. If condition deteriorates or there is no response after 48 hours, refer her to referral hospital.
- Severe Cases – Initial therapy is started with crystalline penicillin 2-4 million units intravenously 4 hourly, gentamycin 80 mg IM 8 hourly and metranidazole 500 mg IV 12 hourly. Start IV drip with normal saline and refer to FRU/District Hospital for further management. There the therapy is continued if response is good. Once culture and sensitivity report is available, change to appropriate antibiotics if there is no adequate improvement in the condition.

Most patients respond to the above therapy.

(Note: Start with available broad spectrum antibiotics with metronidazole)

● *Local*

- a) In infected episiotomy, perineal lacerations, caesarean section wound, stitches are removed to facilitate drainage of pus and relief of pain.
 - Local cleaning of wound with antiseptic solution and dressing it after applying antibiotic powder or ointment.

- Secondary suturing of wound is done after the infection has cleared up and wound is clean.

- b) Removal of infected placental bits and membranes digitally or with sponge holding forceps/gentle blunt curette may be used.
- c) Draining of pus in pelvic abscess by colpotomy
- d) Draining of pus from other sites.

WHO publication has suggested flow chart for management of puerperal sepsis.

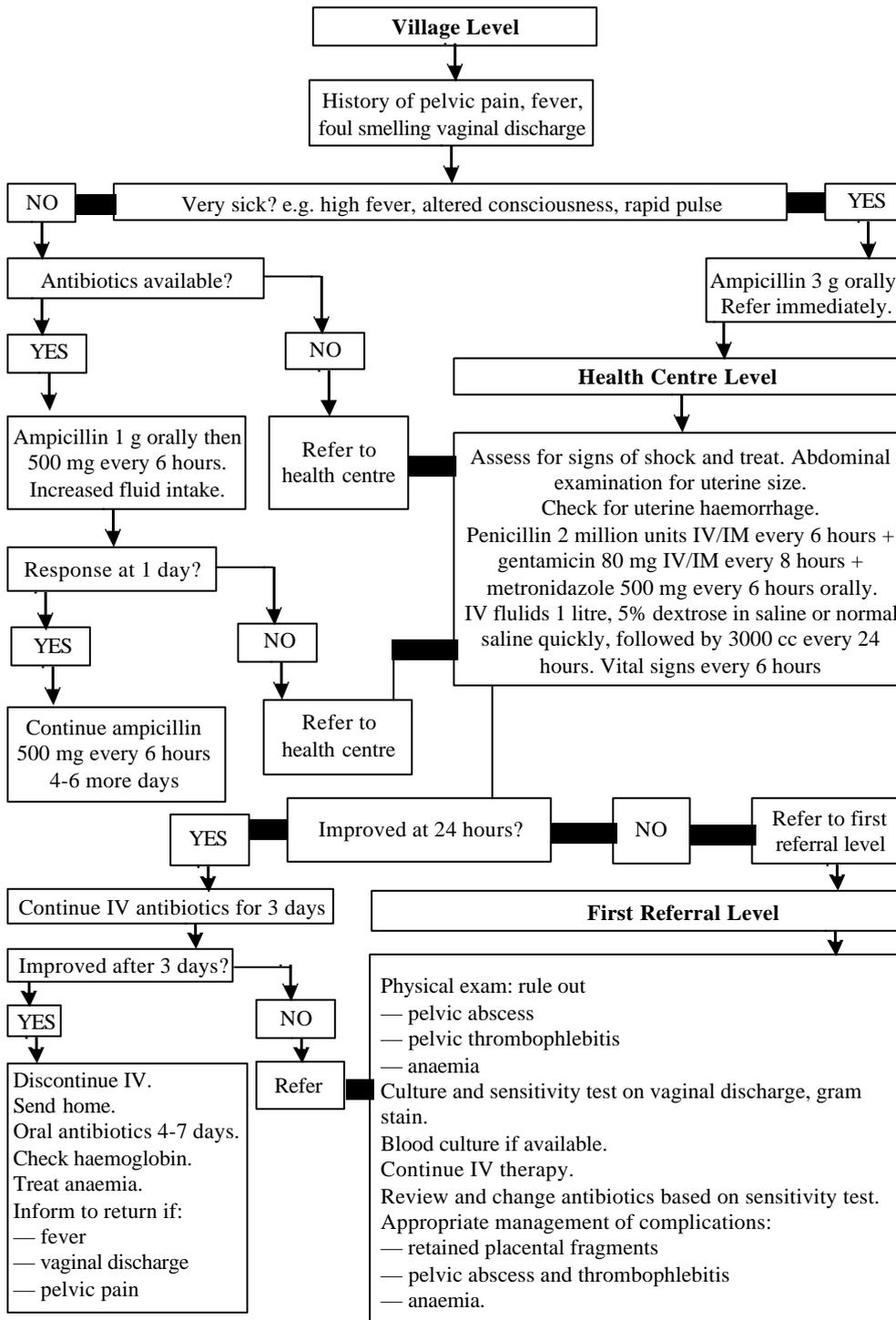


Fig. 17.1: Prevention and Management of Puerperal sepsis (Ref. WHO/FHE/MSM/95.4: Page 19)

Abnormal Labour and Puerperium 17.3.6 Complications

- Septicaemia
- Septic Shock
- Disseminated intravascular coagulation (DIC)
- Pulmonary embolism
- Distant metastasis of infection to lungs, brain, meninges and joints.
- Kidney failure
- Death

Late Complications

- Menstrual problems
- Chronic pelvic pain, backache, dysmenorrhoea, dyspareum
- Secondary infertility
- Chronic PID

Neonatal Problems

Where antepartum infection is present.

- Stillbirth
- Birth asphyxia
- Septicaemia
- Pneumonia
- Neonatal death

Check Your Progress 1

1) Name 3 sites of infection in puerperal sepsis.

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2) Name 3 causes of fever due to conditions associated with birth process.

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3) Name 3 risk factors to mastitis.

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17.4 INFECTION ASSOCIATED WITH CHILD BIRTH PROCESS OTHER THAN PUERPERAL SEPSIS

This section deals with breast infection and urinary tract infection.

17.4.1 Breast Problems

Common problems encountered are retracted or cracked nipples, breast engorgement, mastitis and breast abscess and failure of lactation. Most of these can be prevented during antenatal period by examination of breasts in early pregnancy, adequate preparation of the mother for breast feeding and counseling about breast feeding.

Retracted nipples require drawing them out with fingers for a long period of time. Suction may be used to draw out the retracted nipple (Refer Unit 17 of Block 4, Course 3).

Breast engorgement usually occurs if all the secreted milk is not ejected through the ducts. It may occur due to blockage of duct by colostrum or crusted sebum. The breasts become heavy and painful which becomes worse if there is lymphatic or venous obstruction.

Engorgement can be prevented by proper care of the nipples and expression of excessive milk after breast-feeding. Treatment of breast engorgement includes cold/warm compresses, analgesics and expression of milk manually or with breast pump. Occasionally injection of 5 units of oxytocin intramuscularly 30 minutes before expression maybe helpful. Adequate breast support with a brassiere is necessary.

Mastitis and breast abscess; infection can occur in the cellular tissue through a cracked nipple. Engorged breasts predispose to glandular infection through the lactiferous ducts. Difficulty in fixing the baby to the breast, bruising of breast tissue due to rough handling and baby having eye or skin infections are other predisposing factors. Usually there is fever, severe pain in the breast and malaise. The breast is hard and tender. There will be local signs of inflammation and tender axillary lymphadenopathy. If mastitis is not treated early, breast abscess forms. The infection is usually caused by staphylococcus aureus. Cloxacillin is usually effective in doses of 500mg every 6 hours. Milk expression should be attempted manually or with pump. Adequate breast support and analgesics are helpful.

If breast abscess has formed, it should be drained under general anaesthesia. Incision should be deep and radial to avoid injury to the lactiferous ducts. All loculi should be broken and dependent drains inserted. Adequate antibiotics and analgesics should be administered. Breastfeeding can be continued in the other breast.

17.4.2 Urinary Problems

Retention of urine, incontinence and urinary infections are not uncommon after delivery. Undetected antenatal urinary infection, trauma during labour, catheterisation, obstetric manipulations and instrumentation are predisposing factors. Clinically there is fever with chills, dysuria, lower abdominal pain in cystitis. Loin pain with toxic features may indicate pyelonephritis. Microscopic examination of urine may reveal pus cells and bacteria. Culture of urine will help to identify the organism and choose the appropriate antibiotics. Antenatal screening for infection, minimum catheterization and obstetric intervention, early ambulation and encouraging frequent voiding in the postnatal period will go a long way to prevent urinary infections.

17.4.3 Venous Thrombosis

Pregnancy is a hypercoagulable state because of increase in coagulation factors. Puerperium predisposes to deep vein thrombosis as well as infective thrombophlebitis. Though this condition is uncommon in our country, it can have dangerous complications like pulmonary embolism.

There are mainly two types:

- 1) Phlebothrombosis —The primary event is a thrombosis
- 2) Thrombophlebitis —The primary event is inflammation

Abnormal Labour and Puerperium Predisposing factors:

- 1) Increasing maternal age
- 2) Obesity
- 3) Anaemia
- 4) Dehydration
- 5) Trauma
- 6) Infection
- 7) Smoking
- 8) Reduced mobility

These conditions can affect either the superficial or the deep vessels. The lower limbs are usually affected. There is fever, pain and swelling of legs. There may be tachycardia. The limb shows tenderness particularly of the calf muscle. Homan's sign—pain over calf on dorsiflexion of foot may be positive. Doppler studies will help to diagnose and localise the condition. Occasionally, the thrombosis may extend to pelvic vessels and rarely to great vessels.

Preventive measures include a) adequate antenatal physical activity, b) attention to presence of varicose veins, c) avoidance of pressure on the popliteal vessels during labour, d) early ambulation in puerperium, e) prophylactic heparin in high risk patients.

Treatment consists of rest, elevation of limb, analgesics and anticoagulation. Heparin is the drug of choice and should be given in doses of 5000 units, 4 hourly, intravenously. Prothrombin time should be monitored and kept around 2.5 times that of control. Oral anticoagulants should be started after 4-5 days. Warfarin in doses of 5 mg twice a day is given for 3-4 weeks. Warfarin contraindicates breast feeding. Thrombolytic therapy with 500000 units of streptokinase has been successfully used.

Antibiotics may be added where there is evidence of inflammation / suppuration.

Check Your Progress 2

- 1) Fill in the blanks:
 - i) Breast infection is usually caused by
 - ii) Uninary tract infection is usually caused by
- 2) List 3 conditions that predispose to urinary tract infection.
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- 3) Name the 2 types of venous thrombosis.
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4) What is Homan's sign?

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17.5 PUERPERAL MORBIDITY OTHER THAN INFECTION

Secondary haemorrhage, puerperal psychosis and obstetric palsy are included in this section.

17.5.1 Secondary Haemorrhage

It is usually due to infection, retained bits of placenta and membranes and subinvolution. Sometimes the bleeding can be severe. Treatment is directed towards improving general condition, if needed blood transfusion, adequate and aggressive antibiotic therapy. Retained bits should be removed. Curettage of uterine cavity can be dangerous as it can precipitate torrential bleeding. Ergometrine is often used.

17.5.2 Puerperal Psychosis

Transient depression may occur a few days after delivery. It is caused by the emotional changes of pregnancy and delivery, discomforts of puerperium, physical and mental fatigue, lack of sleep, anxiety about caring for the baby and fear of becoming less attractive. It is usually transient and self-limiting. In some women it may be the unmasking of an underlying disorder or may persist to become more severe. Pharmacological intervention with antidepressants and psychological counseling are important.

17.5.3 Obstetric Palsy

Pressure on the lumbosacral nerve plexus during labour may present with severe neuralgia, some sensory loss and paralysis. Foot drop is a common manifestation. Rarely femoral, obturator or sciatic nerves may be involved. Spontaneous recovery usually occurs over a period of time. Meanwhile physiotherapy is helpful.

17.6 LET US SUM UP

In this unit you have learnt about abnormal puerperium. Various problems that can occur in puerperium have been listed. Puerperal infection is discussed in detail. Other complications are mentioned namely: breast problems, delayed haemorrhage, venous thrombosis, puerperal psychosis and obstetric palsy. This will help you to diagnose and treat or refer appropriately. Due importance is given to the understanding of preventive aspects.

17.7 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

- 1) i) Placental site, ii) Laceration of cervix, iii) Laceration of vagina, iv) Episiotomy or tears of perineum.
- 2) i) Puerperal sepsis, ii) Urinary tract infection, iii) Mastitis/Breast abscess.
- 3) i) Breast engorgement, ii) Cracks in the nipple, iii) Difficulty in fixing baby to breast, iv) Bruising of breast tissues.

Abnormal Labour and Puerperium Check Your Progress 2

- 1) i) Staphylococcus aureus, ii) E-coli
- 2) i) undetected antenatal urinary infection, ii) Trauma during labour, iii) Catheterisation
- 3) i) Phlebothrombosis, ii) Thrombophlebitis
- 4) Pain over calf on dorsiflexion of foot is called Homan's sign.

17.8 FURTHER READINGS

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