***Prenatal infection***

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**Objectives:**

**1.To know the different infectious agents that cause a range of morbidity and mortality.**

**2.Understand the maternal and fetal diagnostic tests to confirm the in –utero infection.**

**3.Appreciate the perinatal complications of fetal infection, and understands the prevention through vaccination.**

**STORCH5**

* **S-- syphilis**
* **T-- toxoplasmosis**
* **O--other diseases, as Trich. vaginalis, E. coli and H. influenza.**
* **R --rubella**
* **C --cytomegalovirus**
* **H ---5 Herpes, HIV, Hepatitis B, humans’ parvo virus and Human papilloma virus.**
* **Infections causing congenital abnormalities:**

**1. Rubella:**

-Is toga virus spread by the droplets transmission, Ip 2-3 weeks.

**Clinical features:**

-Is charactrised by a febrile rash but may be asymptomatic in the mother in 20-50% of cases.

**-Features of congenital rubella syndrome** can include cataract, microphthalmia, sensorinural deafness, encephalitis,and endocrine problems.

-the risk of congenital rubella infection reduces with gestation,

-It is over 80% in the first 12 weeks of pregnancy among mothers with symptoms and reduces to 25 % at the end of the2nd trimester.

- during 1st 11 weeks of pregnancy----100% of fetuses infected.

-Between 16 -20 weeks -----minimal risk of deafness.

-After 20 weeks gestation -----carries no risk.

**Diagnosis:**

1.serology is the mainstay of diagnosis.

2.Acute infection may be diagnosed by isolation of the virus from throat swab, but it is more common for an acute rubella-specific( IgM) response to be detected in non immune person.

-Rubella specific IgG indicates previous infection or immunization.

-Immunity is usually life long.

**Management:**

-Vaccination of children remains the cornerstone of the preventive strategy for this fetal disease, is live attenuated vaccine and should be avoided in pregnancy.

-**If infection is confirmed in the first trimester,** termination of pregnancy should be offered as the sequelae of congenital infection are devastating.

-**Later in pregnancy** , fetal blood sampling to measure levels of Rubella –specific IgM may be performed and Rubella –specific RNA identified using RT-PCR.

**2.Syphlis:**-is a sexually acquired infection caused by spirochaete Treponema pallidum.

**Clinical features :**

**1**.**primary syphilis**-may present as a painful genital ulcer 3-6 weeks after the infection is acquired (condylomata lata), this may be on the cervix and go unnoticed..

**2.** **Secondary syphilis**-manifistations occur 6 weeks to 6 months after infection and presents as a maculopapular rash or lesions affecting the mucous membranes.

- 20% of untreated patients will develop symptomatic cardiovascular **tertiary syphilis** and 5-10 % will develop symptomatic neurosyphilis.

-**Pregnancy has no known effect** on the clinical course of syphilis.

-**The mother can transmit** the infection to the fetus either transplacentally or by contact of the newborn with a genital lesions .

-Treponema pallidum can infect the fetus from as early as 9 -10 weeks.

-**Untreated syphilis during pregnancy can affect pregnancy outcome,** resulting in:

1- spontaneous abortion .

2- stillbirth.

3- non-immune hydropes .

4- growth restriction ,preterm delivery , neonatal death .

 5- An infant disorders like deafness , neurologiacal impairment and bone deformities .

-**congenital syphilis** has been divided into two clinical syndroms :early and late congenital syphilis , early refers to the clinical manifistations that appear within the first two years of life. Late syphilis occurs after two years , usually around puberty.

-The risk of congenital syphilis is declines with increasing duration of maternal syphilis prior to pregnancy.

**Diagnosis:**

-any women presenting during pregnancy with small genital ulcers should be sreened for syphilis &herpes.

1. - Dark ground examination from the lesion looking for spirochete .
2. - Serology usually becomes positive in secondary or early latent syphilis: Fluorescent treponemal antibody absorption test (FTA) is the first test to become positive in early syphilis, and TPHA.

Both remain positive even after treatment.

* Non specific VDRL, become unreactive after the treatment.
* Ultrasound to detect some of the manifestation of syphilis , hydrops, hepatosplenomegaly, placentomegaly, small bowel dilatation.
* **Management:**
* once the diagnosis is confirmed the pencillin regimen is the treatment of choice, with monthly follow up of serological titers for the evaluation of the adequacy of the treatment.
* Parental pencillin has a 98% success rate for the preventing of congenital syphilis.
* early syphilis(primary,secondary or early latent),1.2 million unit for 12 days and in late syphilis for 21 days. Tetracycline as a second line is contraindicated in pregnancy. Erythromycin has less reliable response.

**3.Toxoplasmosis:**

**-** Toxoplasma gondii is a unicellular protozoon found in cat faces , soil, or uncooked meat.

-**Infection** occur from ingestion of the parasite from uncooked meat or unwashed hand, and transplacentally to the fetus.

**Clinical features:**

* The initial infection may be relatively asymptomatic or may be a glandular fever like illness, (mild malais , lethargy, lyphadenopathy).
* Infection during the first trimester of pregnancy is more likely to cause sever fetal damage (85%), and 10% risk of fetal infection transmission.
* In third trimester 85% of infection are transmitted but the risk of fetal damage is 10 %.
* **Congenital toxoplasmosis** is marked by the classic triad of chorioretinitis, intracranial calcification and hydrocephalus.
1. **If infection occurs in the first trimester ---**spontaneous miscarriage is common.
2. The risk of fetal infection rises throughout gestation, with 65% of fetuses affected in the third trimester, transplacental passage is more common when maternal infection occurs in the later half of pregnancy but fetal injury is less sever.
3. Majority of infants are born without any obvious problem.., but may develop sequelae several years later.

**Diagnosis:**

* Serology by the sabin-feldman dye test , Enzyme-linked immunosorbant assay (ELISA) are available for measurement of IgG, IgM antibodies, serial testing for rising titers is necessary.
* Ultrasound detection of fetal abnormalities.
* Amniocentesis and PCR analysis for the identification of T.gondii.

**Treatment:**

1. Spiramycin can be used in pregnancy 2-3 g per day for 3 weeks , reduces the incidence of transplacental infection.
2. If fetal abnormalities detected by ultrasound due to toxoplasmosis, the termination of pregnancy can be offered.

**4. Cytomegalovirus (CMV):**

* Is a DNA herpes virus, it is transmitted by the respiratory droplets by close contact, sexual intercourse or blood transfusuion.
* **Primary infection** **in the mother** often produces no symptoms or mild non specific flu like symptoms.
* **Fetal abnormalities seen by US** are FGR, microcephaly, ventriculomegaly, ascities, or hydrops. Most fetus may not show any features on ultrasound.
* **most infected newborns** lacks signs of infection**, but 10 %** have low birth weight , jaundice , hepatosplenomegaly, skin rash, microcephaly and chorioretinities.

**Diagnosis:**

* CMV IgM, IgG,and CMV IgG avidity serological tests have led to more accurate diagnosis of CMV infection.
* Diagnosis of fetal infection is sometimes be made by using fetal blood or amniotic fluid , at 20-21 weeks.

**Treatment:**

* **Termination of pregnancy** can be offered if there is evidence of intrauterine infection +US finding of CNS damage.
* Antiviral drugs such as ganciclovir and foscarnet. Not used in pregnancy.

**5.Varicella:**

-Varicella zoster virus (chicken pox), is highly contagious DNA virus of the herpes family. Causes chicken pox, reactivation causes shingles.

-**Transmitted** by respiratory droplets, direct contact with the vesicle fluid, IP is 10-21 weeks , the disease is infectious 48 hours before rash appears and untile the vesicle crust over.

-**The primary infection** is characterized by fever , malaise , pruritic rash, becomes maculopapular , vesicular finally crust.

-**Maternal infection <20 weeks** ma y result in fetal varicella syndrome skin scarring , eye defects, (microphthalmia, chorioretinites, cataract), microcephaly.

-**Maternal infection >20 weeks** and up to 36 weeks---dosent appear to be associated with adverse fetal effect effects.

-**Diagnosis:** 1- clinical 2- electron microscopy and culture of vesicle fluid**.**

**-** **Treatment:** During pregnancy it carries low risk of fetal infection, if the mother is not immunized, give VZ IG ,acyclovir may be given if pregnant women develop chickenpox.

* **Congenital infection associated with pregnancy loss and preterm pregnancy:**
1. **Parvovirus:**
* Parvovirus B19 (erythema infectiousum, fifth disease).
* Single stranded DNA virus , spreed by droplet infection.
* Common in women who works with young children like teachers.
* No evidence that it is teratogenic.
* Cause unexpected stillbirth, late misscarge, main concern of fetal infection is development of fetal hydrops secondary to fetal anemia or cardiac dysfunction due to myocardities.
* Diagnosed by detection of parvovirus specific IgM from maternal and fetal blood.

**2..Listeria:**

* **Listeria monocytogenes** is an aerobic and facultatively anaerobic motile G+ve bacilli.
* **Pregnant women with listeriosis** commonly suffer from a flue like illness with fever and general malaise , may be asymptomatic.
* **Transmission** : ascending rout through cervix or transplacentally.
* results in miscarriage , preterm delivery, neonate may have RDS, fever, sepsis, neurological symptoms.
* **Treatment during pregnancy** by Ampcillin 2 gm l 6 hours.

**3.Malaria:**

* Caused by parasite plasmodium , falciparum, vivax , ovale, and malaria.
* May cause miscarriage, preterm labour, FGR and congenital malaria
* **Diagnosis by** blood film
* **Treatment** : quinine sulphate, fansidar and combination of chloroquine .
* **Infections acquired around the time of delivery with serious neonatal consequences:**

**1.Herpes:**

* Is a double stranded DNA virus.
* Two viral types HSV-1 cause orolabial infection and HSV-2 cause genital herpes.
* **Genital herpes** presents as ulcerative lesions on vulva , vagina, cervix.may give a history of recurrence
* **Neonatal herpes** mostely by HSV 1 or 2 ,manifests itself in three forms: skin, eyes, and mouth herpes (SEM) .
* **Diagnosis :** is confirmed by the direct detection of HSV ,a swab for viral culture .
* **Factors increase transmission are:** type of infection, duration of rupture membrane , primary infection during 3rd trimester especially 6 weeks before delivery.
* **Management :**
1. **Primary infection** ---caesarean delivery to all pregnant women with primary episode genital herpes at the time of delivery, or within 6 weeks of expected date of delivery..
* **To reduce exposure of the fetus to HSV in genital secretions**.
* **If patient opts for vaginal delivery** –avoid rupture membrane +invasive procedures, give IV acyclovir intrapartum to mother and then to the neonate.
1. **Recurrent infection during antenatal period or at the time of delivery-**C/Sis not indicated. mode of delivery individualized according to the clinical circumstances, and patient preferences because the risk of neonatal herpes is very small 1-3%.
* **If HSV lesion were detected at the onset of labour + patients opts for C/S daily acyclovir from the 36 weeks until delivery , likely reduce active herpes lesion at term.**
* **If recurrent genital herpes + confirmed membrane rupture at term advise to have delivery expedited by appropriate means, and avoid invasive procedures during delivery.**

 **2.Group B streptococcus:**

* common bacteria which are often found in the vagina, rectum or urinary bladder of women**.**
* If a woman has these bacteria without having any symptoms, she is said to be **colonized (positive).**
* -40 – 70% of colonized mothers pass the bacteria onto their babies during the birthing process.
* **Risks for neonatal infection:** Preterm labour, prelabour rupture of membranes, maternal pyrexia, and growth restricted fetuses or birth asphyxia.
* **Treatmen:** Expectant mothers who tested positive for GBS bacteria will be treated with antibiotics when they go into labour or if their membranes rupture (water breaks) early.

**3.Chlamydia infection:**

* Is intracellular organism, commonest bacterial, STD.
* May cause neonatal eye infection (ophthalmia neonatorum) and pneumonia.
* **Diagnosis: 1.**Endocervical, rectal and first pass urine, organism can be detected  **2.**ELISA **3.**DNA detection or direct immunoflouresence.
* **Treatment:**  Doxycycline 100 mg twice daily for 2 weeks avoided in second and third trimester.

**4.Gonorrhea:**

* **Is sexually transmitted** bacterial infection causing pelvic inflammatory disease.
* may cause **neonatal eye infection**, it may lead to blindness-local & systemic antibiotic should be given.
* **Diagnosis:** microscopy and culture, DNA detection tests.
* **Treatment:** ceftriaxone 250 mg single dose, azithromycin 1 gm, Ophthalmia neonatarum is treated with topical and systemic antibiotics acc. to sensitivity.
* **Perineatal infection causing long term disease:**
1. **HIV:**
* is a virus that causes AIDS (Acquired Immunodeficiency Syndrome)**.**
* **A baby can become infected with HIV in the womb**, during delivery or while [breastfeeding](http://americanpregnancy.org/first-year-of-life/breastfeeding-overview/), if the mother does not receive treatment.
* **Zidovudine (also known as ZDV, AZT and Retrovir®) was the first drug licensed to treat HIV**.
* **Now it is used in combination with other anti-HIV drugs** and is often used to prevent perinatal transmission of HIV. ZDV should be given to HIV-infected women beginning in the second trimester and continuing throughout pregnancy, labor and delivery. Side effects include nausea, [vomiting](http://americanpregnancy.org/pregnancy-concerns/vomiting-during-pregnancy/) and low red or white blood cell counts.
* **If no preventative steps are taken,** the risk of HIV transmission during childbirth is estimated to be 10-20%, even greater if the baby is exposed to HIV-infected blood or fluids. should avoid performing  [episiotomies](http://americanpregnancy.org/labor-and-birth/episiotomy/).
* [**Cesarean sections**](http://americanpregnancy.org/labor-and-birth/cesarean-procedure/)**performed before labor and/or the rupture of membranes** may significantly reduce the risk of perinatal transmission of HIV.
* About 15% of newborns born to HIV-positive women will become infected if they breastfeed for 24 months or longer.

**2.Hepatites B.**

* **double-stranded DNA** virus in the Hepadnaviridae family**.**
* **The incubation period** is 90 days from time of exposure to onset of symptoms, but may vary from 6 weeks to 6 months **.**
* **Acutely infected individuals** develop clinically apparent hepatitis with loss of appetite, nausea, vomiting, fever, abdominal pain and jaundice . Some may have dark urine and gray stool.
* **Is** usually not severe and is not associated with increased mortality or teratogenicity**.**
* **There is an increased incidence** of low birth weight and prematurity in infants born to mothers with acute HBV infection . Furthermore, acute HBV occurring early in the pregnancy has been associated with a 10 percent perinatal transmission rate . Transmission rates significantly increase if acute infection occurs at or near the time of delivery, with rates reported as high as 60 percent **.**

**Treatment of acute infection during pregnancy: -**

* **is mainly supportive**.
* Liver biochemical tests and prothrombin time should be monitored.
* Antiviral therapy is usually unnecessary, except in women who have acute liver failure or protracted severe hepatitis**.**
* Patients should be hospitalized if they have coagulopathy, encephalopathy , or severe debilitation
* With appropriate hepatitis B immunoprophylaxis, breast-feeding poses no additional risk for transmission from infected hepatitis B virus carriers.

**THE END**