Summary / lec. 2 for Dr. Ashraf / Congenital viral infections / if you want to skip, read the highlighted

-Infections at the first trimester are mostly associated with conginital abnormalities. the 3rd trimester (natal period) is also dangerous as the birth canal is contaminated with many species as group B streptococci. the least dangerous trimester is the 2nd.

- definitions :
-congenital:in utero
-perinatal : beginning at 22 completed weeks (154 days) plus deaths of live births within the first seven days after birth.
- postnatal:period beginning immediately after the birth of a child and extending for about six weeks
-Neonatal : the first 28 days of life

Common Infecting Agents

- Viruses
- Bacteria
- Protozoa
- Rickettsiae/Chlamydiae
- (Fungi are very very rare)

Intrauterine & Perinatal Infection

Diagnosed in utero(Parvovirus B19) ****

Manifest at Birth	Acquired around the time of birth (at 3rd trimester) and **symptomatic later**
Toxoplasma gondii **Rubella** **CMV** Varicella/Zoster Treponema pallidum **hepatitis B** **hepatitis C** **HIV**	Herpes simplex **hepatitis B** **hepatitis C** **HIV** **Group B beta haemolytic streptococci** E. coli (+) Listeria monocytogenes **Chlamydia trachomatis** **Neisseria gonorrhoea**

---

infections from mother to fetus acronym is TORCH or more generally CHEAP-TORCHES ;

*Toxoplasma/Others (Varicella/Zoster & Tr. Pallidum)/Rubella/CMV /Herpes simplex

*for cheaptorches : H > hepatitis B,C,D,E but not A

Prevention : screening /vaccines **before** pregnancy /caesarean section as end stage option to avoid organisms in the birth canal

---

HIV, CMV , Herpes simplex and HBV can be transmitted during all the three stages (congenital , natal and postnatal) , with Principal time of transmission at the **natal** period. مهم

Rubella is transmitted only during the congenital period (see the figure)

Risks of rubella infection during pregnancy

Preconception	minimal risk
0-12 weeks	>80% risk of fetus being congenitally infected resulting in major congenital abnormalities in all infants (heart defects and deafness). Spontaneous abortion occurs in 20% of cases.
13-16 weeks	infection 54%. 35% congenital abnormalities (deafness and retinopathy)
after 16 weeks	normal development. No congenital abnormalities

---

Education :to prevent the infection is not routinely used except if the mother is diagnosed with infection. ما بتخوفها اذا ما في داعي

An example of antenatal care : most women are immunized against rubella , and if you find low titre for a woman give a booster and advise her to not get pregnant at least for 3 weeks after the booster.

Antenatal screening :

Instituted Problems:

it gives a"snapshot" in time,
also Women remain at risk of acquiring infection during the pregnancy ,so **test at early first and late third trimesters**
A woman may be in the"window period" ; asymptomatic infection (i.e. in HBV infection > when surface antigens equals anti-surface antigens > neutralization).

screening tests can't cover all possible organisms

Very important :

Examples of types of Congenital Infection – Included in routine antenatal screening programmes?

YES	NO
Rubella	CMV
HBV	herpes simplex
HIV	parvovirus B_{19}
Syphilis	

+ GBS: group b strep

routinely hearing test for : rubella and CMV

for neonates (i.e. not antenatal, as antenatal care is during pregnancy)

Rubella (German measles):

Togavirus/+ve ss-RNA genome/ Two glycoproteins E1 and E2/One serotype, only in humans(so easily eradicated , and as the person is vaccinated or infected ,he develps life long immunity)

• Virus enter the cell by viropexis: receptor mediated endocytosis

---

Epidemiology and pathogenesis

• Winter and spring
• Contagious 7 days before to 7 days after onset of rash

• Pathogenesis of congenital defects:
1) vasculitis with impaired fetal oxygenation.
2) chronic viral infection leads to impaired mitosis, cellular necrosis and chromosomal breakage.

• Shedding of the virus in infected infants is prolonged (up to 30 months); Infected babies spread the virus 6 monthes after birth.

Clinical Features (acute cell limiting illness with fever and rash , but in pregnant it's serious infection)
Rubella in a pregnant woman may be asymptomatic or characterized by:

• Fever • URT symptoms • conjunctivitis • Lymph Node enlargment • Macular rash 1-3 days (head, neck and trunk), faint rash • arthralgia, arthritis

---

Congenital Rubella Syndrome

Classical triad consists of cataracts, heart defects, and sensorineural deafness. other abnormalities had been described and these are divided into transient,permanent and developmental.

Transient	Permanent	developmental
low birth weight, hepatosplenomegaly , hepatitis	Congenital abnormalities : deafness, Heart Defects ,Eye Defects . Other Defects (microcephaly, diabetes Melliti, thyroid disorder..)	deafness,Mental retardation, Diabetes Mellitus, thyroid disorder
means after the 16 weeks , other symptoms rather than conginital abnormalities	happening within the first 16 weeks	as the virus might shed , after activation it will cause damage

---

Outcome

• 1/3 rd normal independent • 1/3 rd will live with parents • 1/3rd institutionalised

"The only effective way to prevent CRS is to terminate the pregnancy > abortion"

Vaccines : live attenuated MMR , MMRV

• Contraindications: IC and pregnant women (قبل الحمل)

CMV : (no congenital abnormalities with the virus)

The most common congenital infection worldwide

- Belong to the beta-herpesvirus
- ds DNA
- Primary infection usually asymptomatic. Virus then becomes latent and is reactivated
- Transmission may occur in utero(congenital), perinatally(natallly) or postnatally.

Clinical Manifestations

- Congenital infection - may result in cytomegalic inclusion disease;

–isolation of CMV from the saliva or urine within 3 weeks of birth. (congenital only)
(After 3 wk, viral detection may indicate perinatal (natal) or congenital infection)

– Commonest congenital viral infection, affects 0.3 - 1% of all live birth. The second most common cause of mental handicap after Down's syndrome .

– Transmission to the fetus may occur following primary or recurrent CMV infection.

– Clinically apparent disease in the neonate is much more likely to occur after a primary maternal exposure particularly in the first half of pregnancy

– No evidence of teratogenecity

- Perinatal infection - Maternal antibody is thought to be protective, and most exposed term infants are asymptomatic or not infected

- Postnatal infection - usually asymptomatic. However, in a minority of cases, the syndrome of infectious mononucleosis may develop .

Many women who become infected with CMV during pregnancy are asymptomatic, but some develop a mononucleosis-like illness.

- **About 5-10% of infants with congenital CMV infection are symptomatic at birth**

---

tests: • CBC • ophthalmologic evaluation • Hearing tests

Prognosis :

Symptomatic neonates have a mortality rate of up to 30% , and 40 to 90% of survivors have some neurologic impairment, including:• Hearing loss• Intellectual disability• Visual disturbances

Among asymptomatic neonates, 5 to 15% eventually develop neurologic sequelae; hearing loss is the most common.

Management

- **Perinatal and postnatal infection - it is usually not necessary to treat such patients.**
- **Primary Infection - consider termination of pregnancy.**
- **Recurrent Infection - termination not recommended**
- **Treatment - ganciclovir is reserved for neonates with symptomatic CNS disease.**
- **Antenatal Screening – impractical.**
- **Vaccination - may become available in the near future.**