Perinatal infections

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• The majority acquired during pregnancy are of little or no consequence to the fetus

• Appropriate treatment can prevent morbidity and mortality

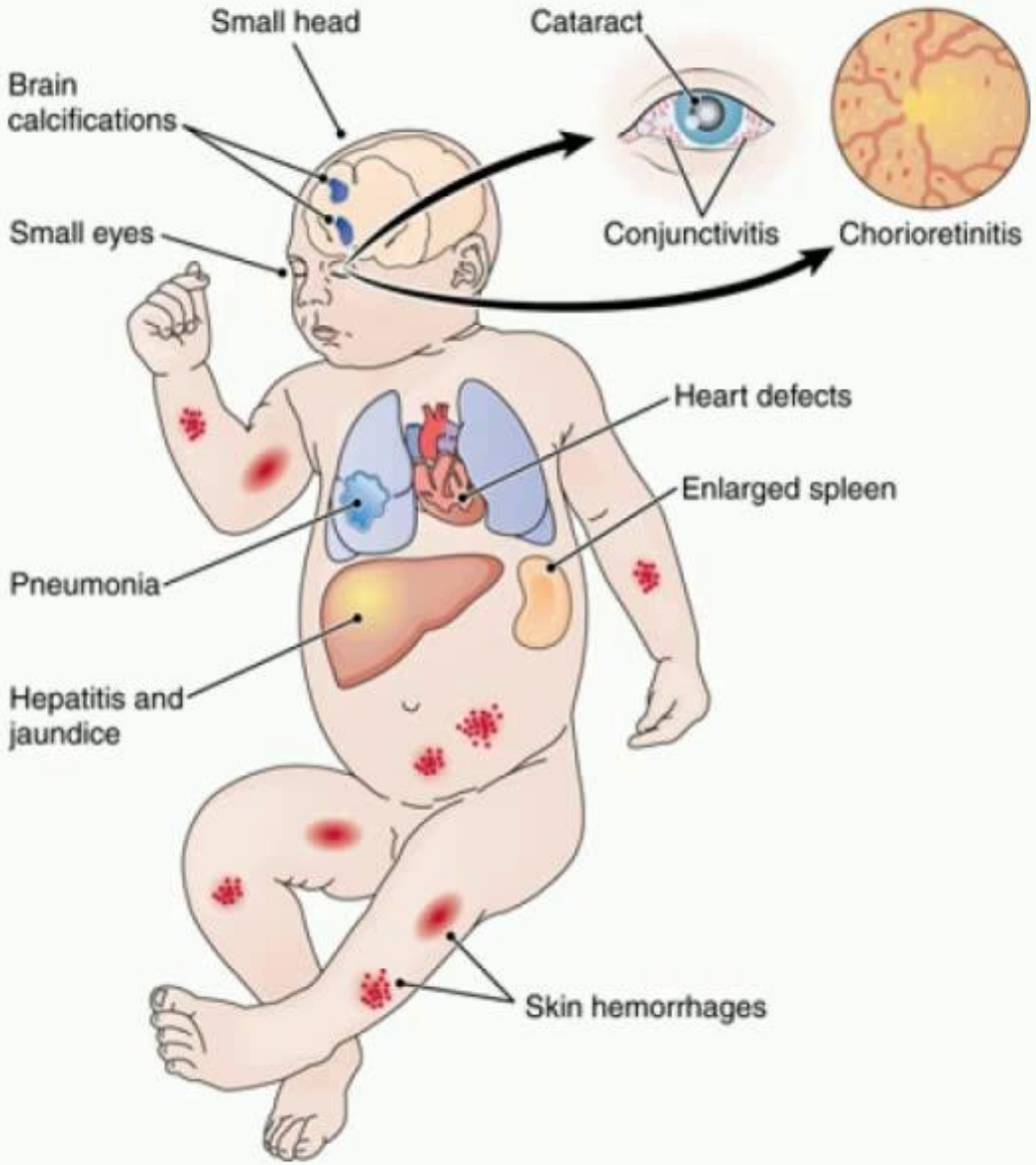
• May result in anything from fetal demise to structural abnormalities and neuro-developmental delay.

• The effect on the fetus depends on

A. The type of infection

B. The gestation acquired

TORCH syndrome



Infection of a developing fetus or newborn by any of a group of infectious agents.

"TORCH" is an acronym meaning:

T: Toxoplasmosis

O: Other Agents

R: Rubella (German measles)

C: Cytomegalovirus

H: Herpes Simplex

Toxoplasmosis

- A unicellular protozoan called TOXOPLASMA GONDI

- Cats are the definitive host and produce oocysts and sporozoites

- Human acquisition of the infection occurs by:

1. Oocyst contaminated soil, salads, vegetables.
2. Ingestion of raw or undercooked meat containing tissue cysts (Sheep, pigs and rabbits are the most common meat sources).
3. Ingestion of oocysts and sporozoites in cat faeces and contaminated surface water.

Maternal infection

- Usually asymptomatic, although they may develop a mild malaise, lethargy and lymphadenopathy.

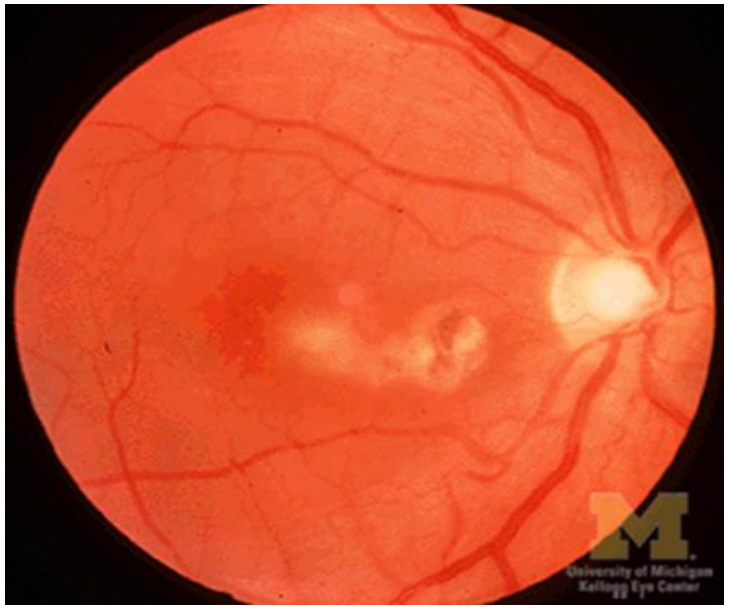
- Is often associated with unsafe eating habits.

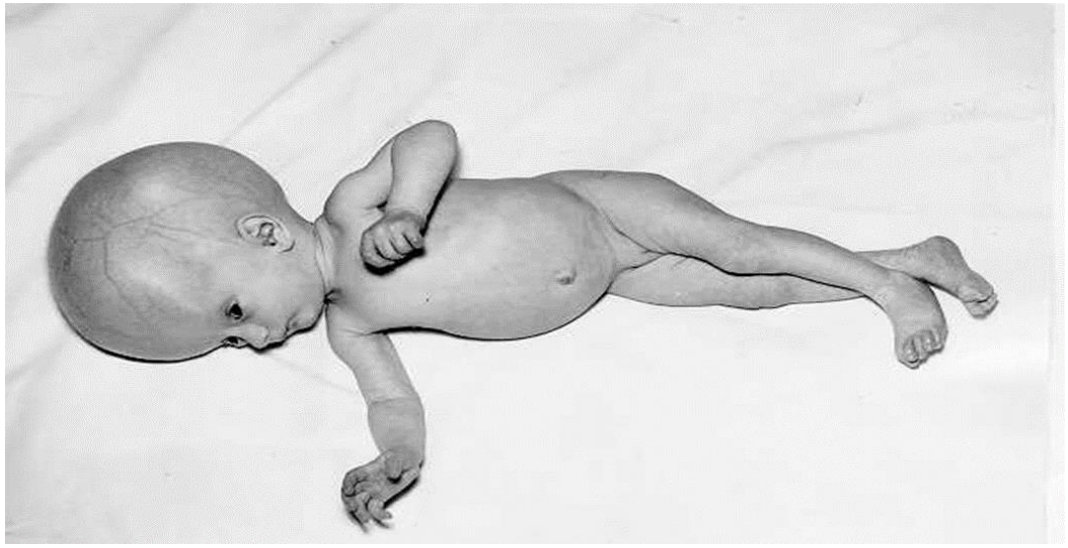
Maternal diagnosis

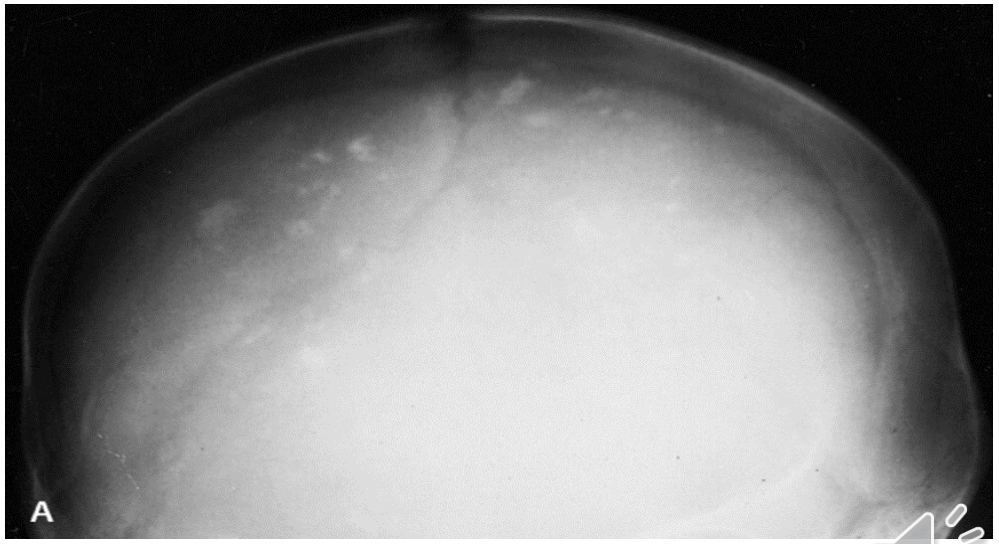
- Serological
- When IgM and IgG are identified, conversion from a seronegative sample taken at booking is helpful in accurately confirming the diagnosis.
- Serial IgG measurement.

Fetal infection

- Chorioretinitis
- Intracranial calcifications
- Hydrocephalus.







- The likelihood of fetal infection and the severity are gestation dependent.

- In the first trimester fetal infection will often result in miscarriage

- As pregnancy progresses the likelihood of transplacental passage increases but fetal injury is less likely.

Fetal and neonatal diagnosis

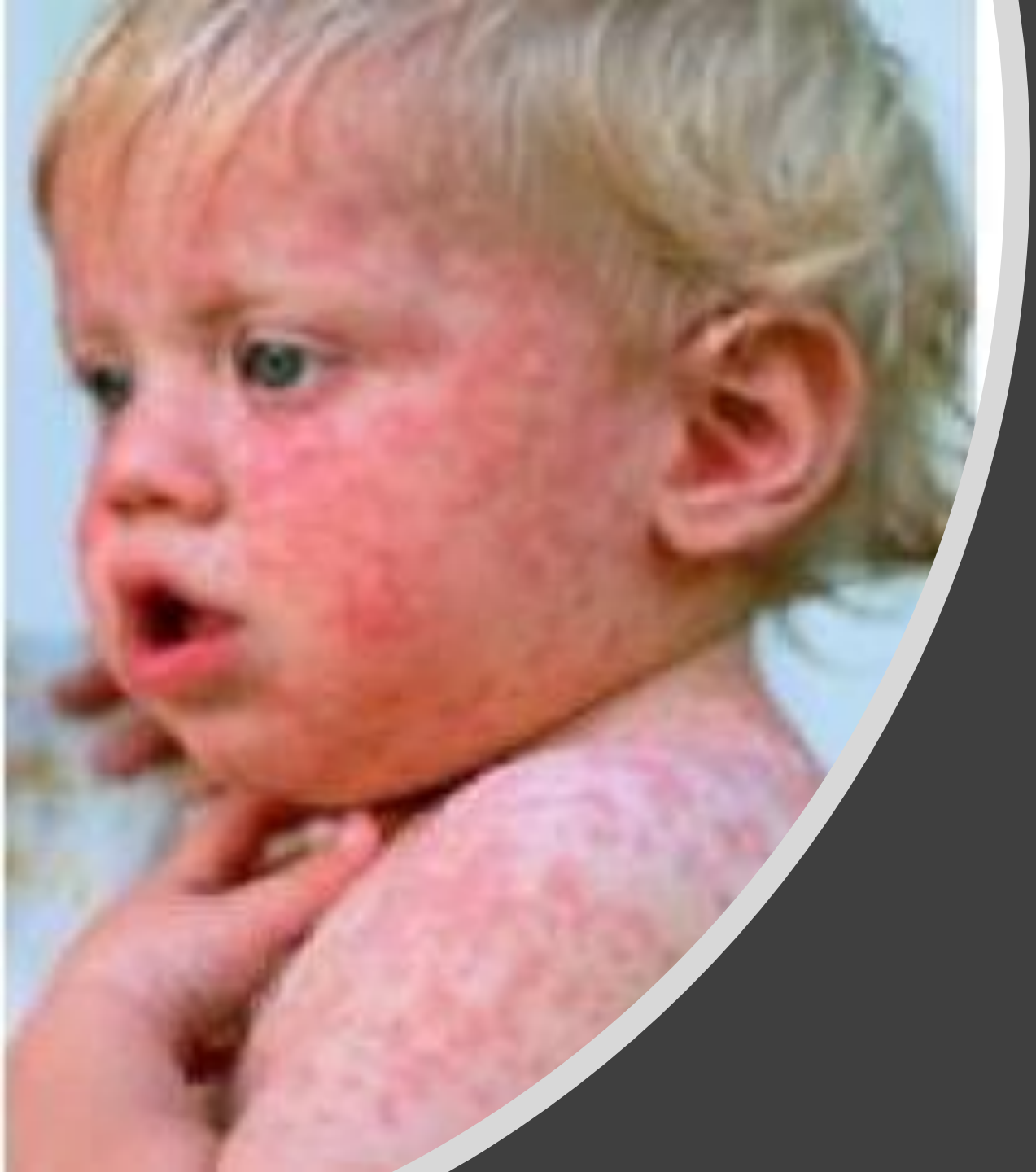
- PCR of amniotic fluid
- Parasitic load of the amniotic fluid, with infections acquired before 20 weeks' gestation and a high parasitic load , and women with fetal anomalies shown on ultrasound, having a poor prognosis.
- In neonates; Serologic testing, brain imaging, CSF analysis and ophthalmologic evaluation

Treatment

- Needs to be commenced within 4 weeks of infection
- Spiramycin should be commenced before PCR results.
- If PCR result is positive and patient is more than 18 weeks GA , pyrimethamine + sulfadiazine + folinic acid is used

Prevention

- Prenatal education
- Handling and cooking meat correctly
- Wearing gloves to handle cat litter
- Avoiding contact with objects that are potentially contaminated with cat faeces.



Rubella
(German measles)

- It is caused by rubella virus; Rubivirus family
- A single stranded RNA virus
- The national immunization programs in many countries have made this disease increasingly rare
- Transmitted by aerosol via the respiratory tract
- Incubation period on average of 14 days (12–23 days)
- Classic non-confluent maculopapular rash seen first on the face then spreading to the trunk. There is often a lymphadenopathy.

Maternal diagnosis

- An acute infection may be diagnosed by isolation of the virus from throat swabs, but it is more common for an acute rubella specific immunoglobulin (IgM) response to be isolated using fluorescent immunoassay techniques.

Fetal infection

Feto-maternal transmission rate

1st trimester = 80%

2nd trimester = 25%

Risk is decreased after 16 weeks

Defects occur in

1st trimester = 85%

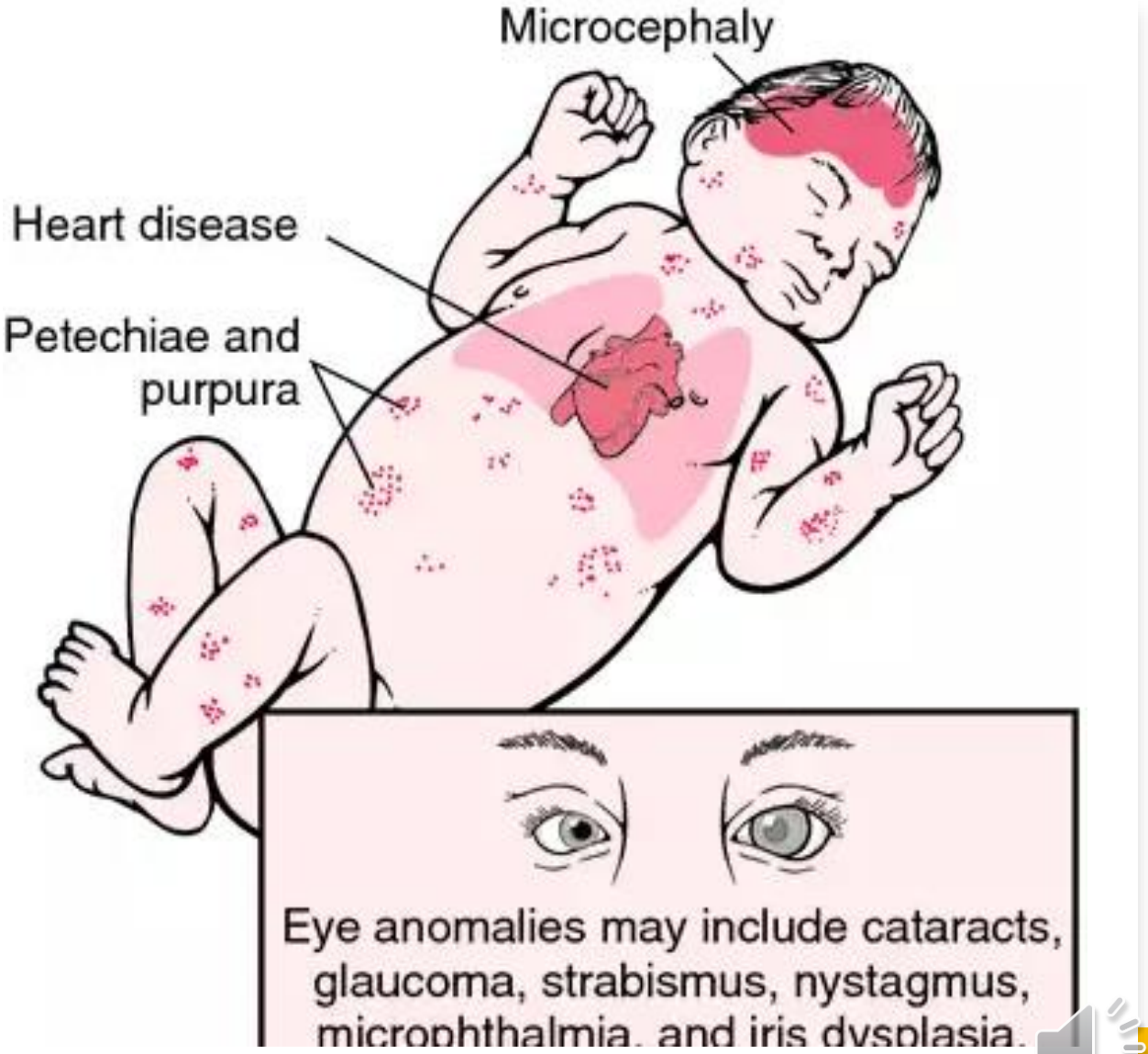
2nd trimester = 20%

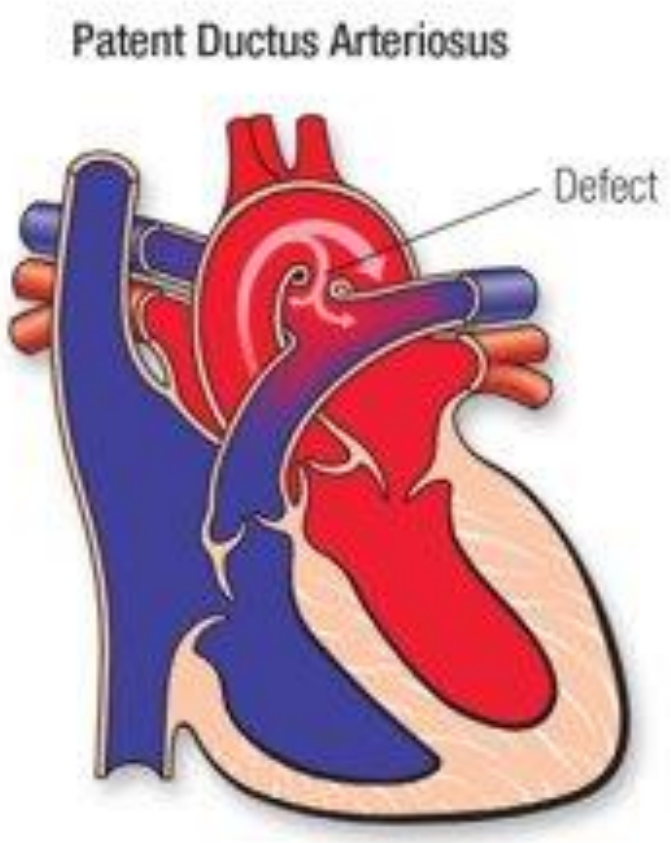
>16 weeks = minimal risk of deafness only

>20 weeks = no increased risk

Congenital rubella syndrome

- Heart defects (patent ductus arteriosis, pulmonary stenosis, pulmonary arterial hypoplasia)
- Eye defects (cataracts, microphthalmos, retinopathy)
- CNS problems (mental and psychomotor delay, speech and language delay)
- Microcephaly and sensorineural deafness
- Hepatosplenomegaly; Thrombocytopenic purpura (blueberry muffin rash) and haemolytic anaemia.

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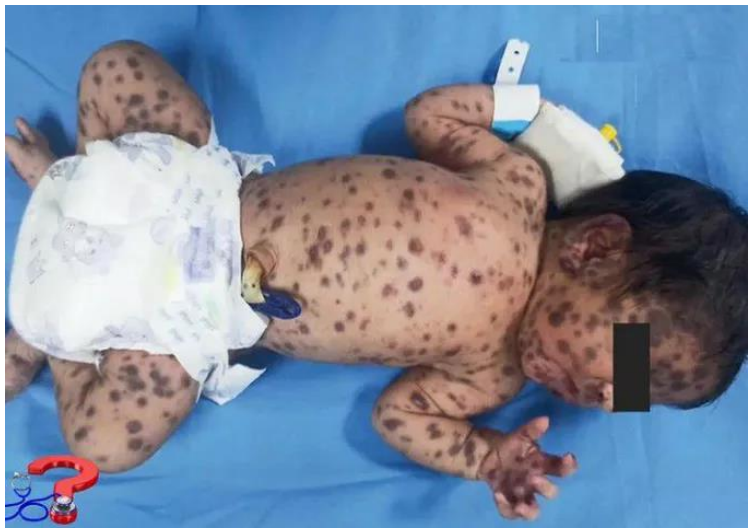
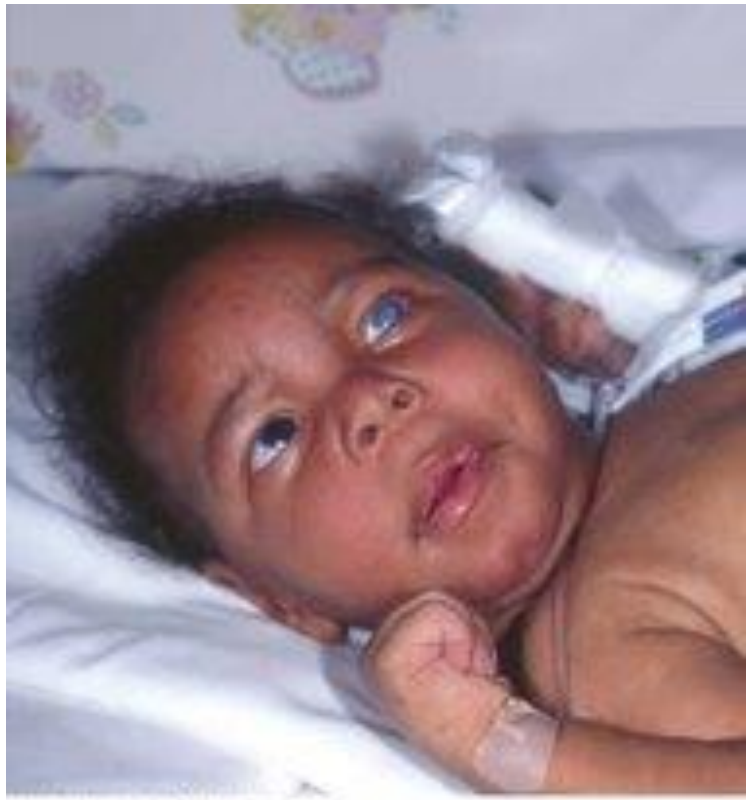
Defect



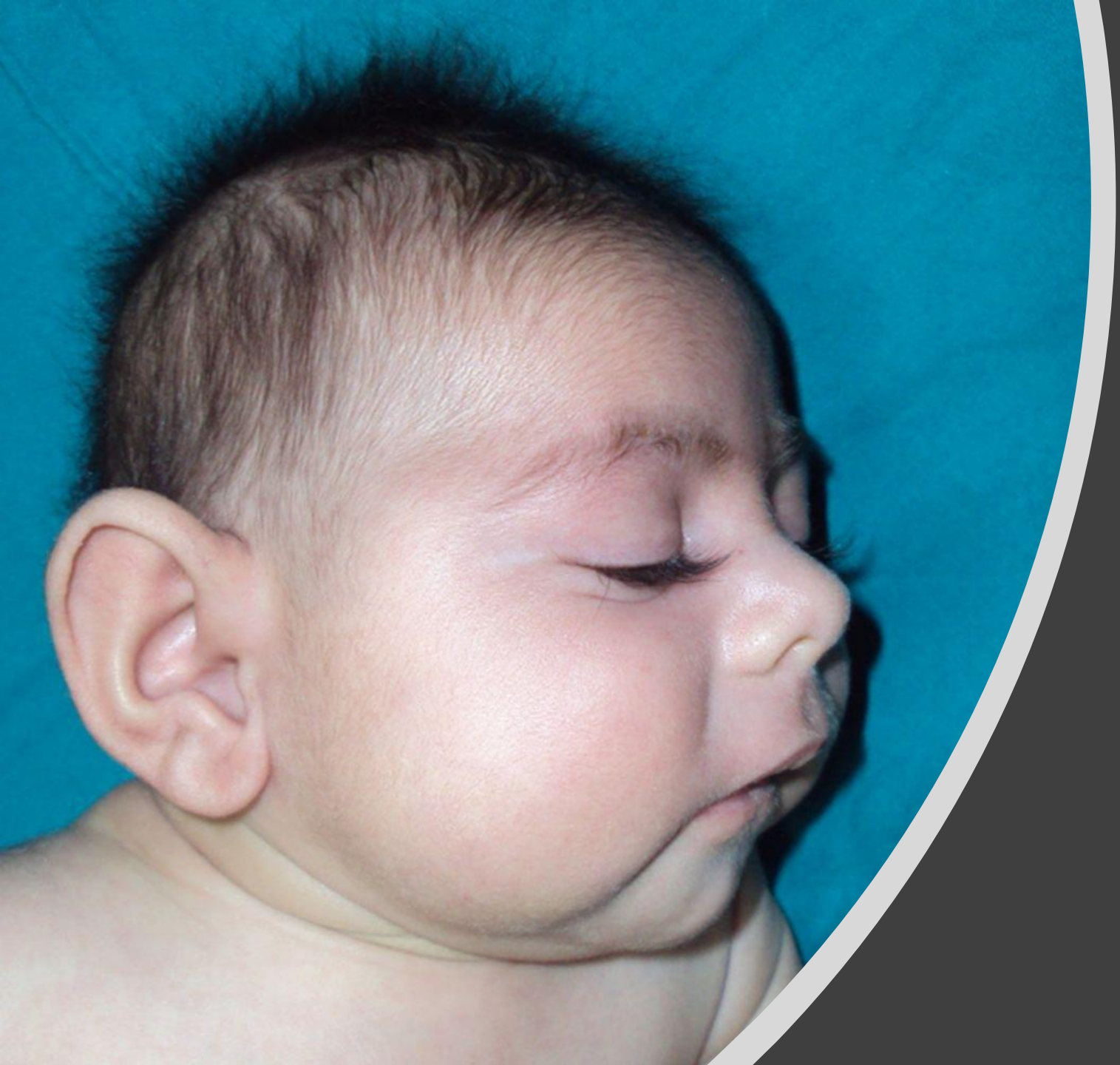


Diagnosis in the fetus

- Fetal blood sampling to measure levels of rubella specific IgM
- Rubella-specific RNA using reverse-transcriptase polymerase chain reaction (RT-PCR)

Treatment and prevention

- No treatment, only supportive.
- Prevention is by vaccination (childhood or post-natal).
- Rubella vaccine is live attenuated as part of the MMR vaccine, so 3 months contraception is advised after vaccination.
- Testing of pregnant women for rubella immunity is mandatory.
- Proper counseling regarding avoiding exposure.



Cytomegalovirus (CMV)

- Double-stranded DNA virus that belongs to the herpes virus family.
- The most common congenital infection
- 50–70 per cent of pregnant women show serological evidence of previous infection
- Transmission of the virus requires close contact between individuals though contaminated urine, saliva, semen, cervical secretions and breast milk
- Incidence of primary maternal infection in pregnancy is 1- 4%, with transmission to the fetus occurring in approximately one-third of cases.

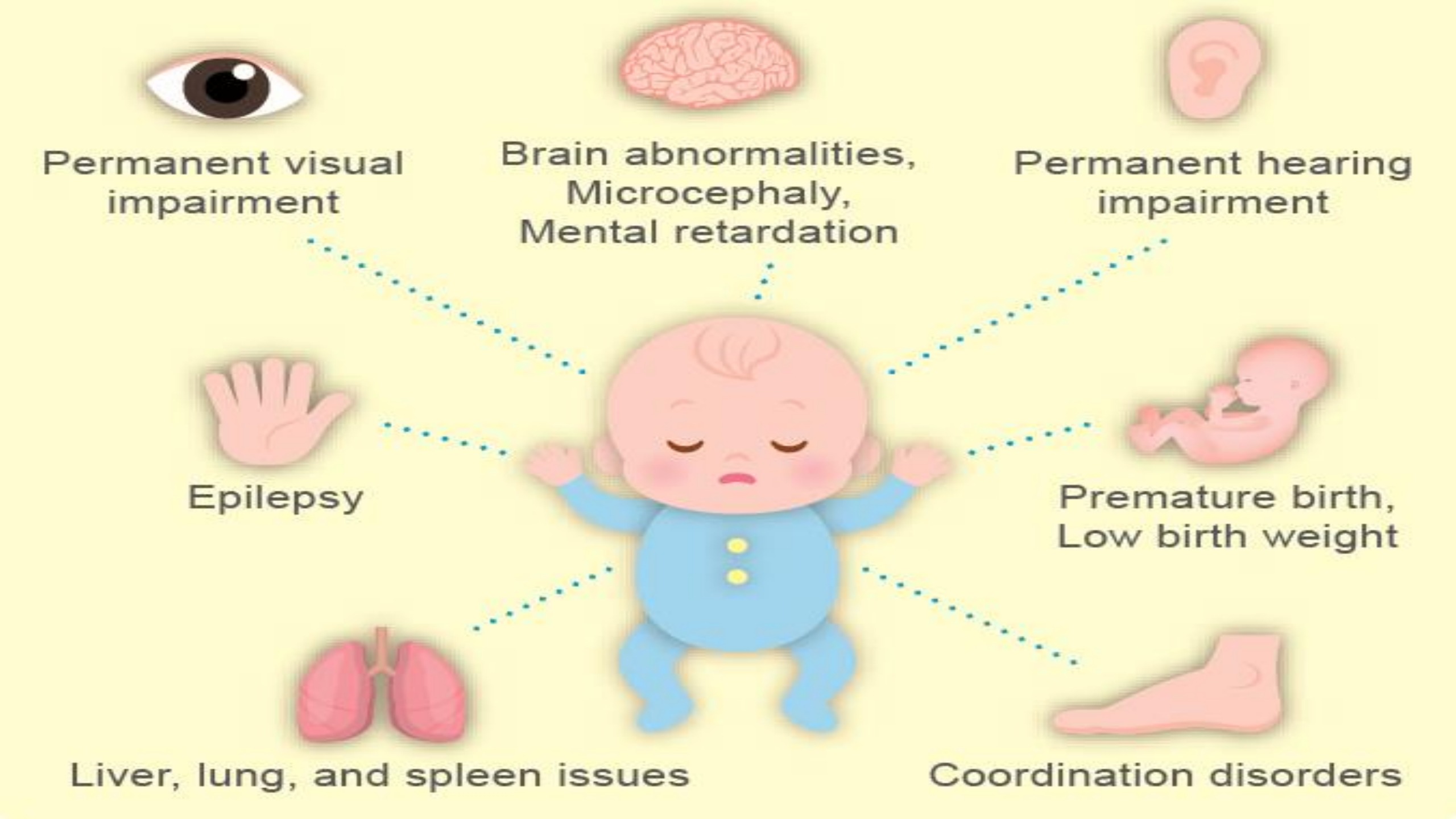
Maternal diagnosis

- CMV IgG has a high sensitivity and specificity as a sign of a past or recent infection.

- CMV IgM is suggestive of a recent or ongoing infection with a high sensitivity.

Fetal infection

- IUGR
- Microcephaly
- Sensorineural hearing loss
- Cerebral atrophy
- Ventriculomegaly
- Intracranial calcification
- Fetal hydrops


Permanent visual impairment
Brain abnormalities, Microcephaly, Mental retardation
Permanent hearing impairment
Epilepsy
Premature birth, Low birth weight
Liver, lung, and spleen issues
Coordination disorders

- The likelihood of CMV having an effect on the fetus is not gestation dependent, but the sequelae differ.

- In early infection fetal brain anomalies are more frequently seen and the neonate is more likely to be symptomatic in comparison to later infection where hepatitis and thrombocytopenia are more common.

- Congenital CMV infection is the most common cause of deafness and learning disabilities in the developed countries.

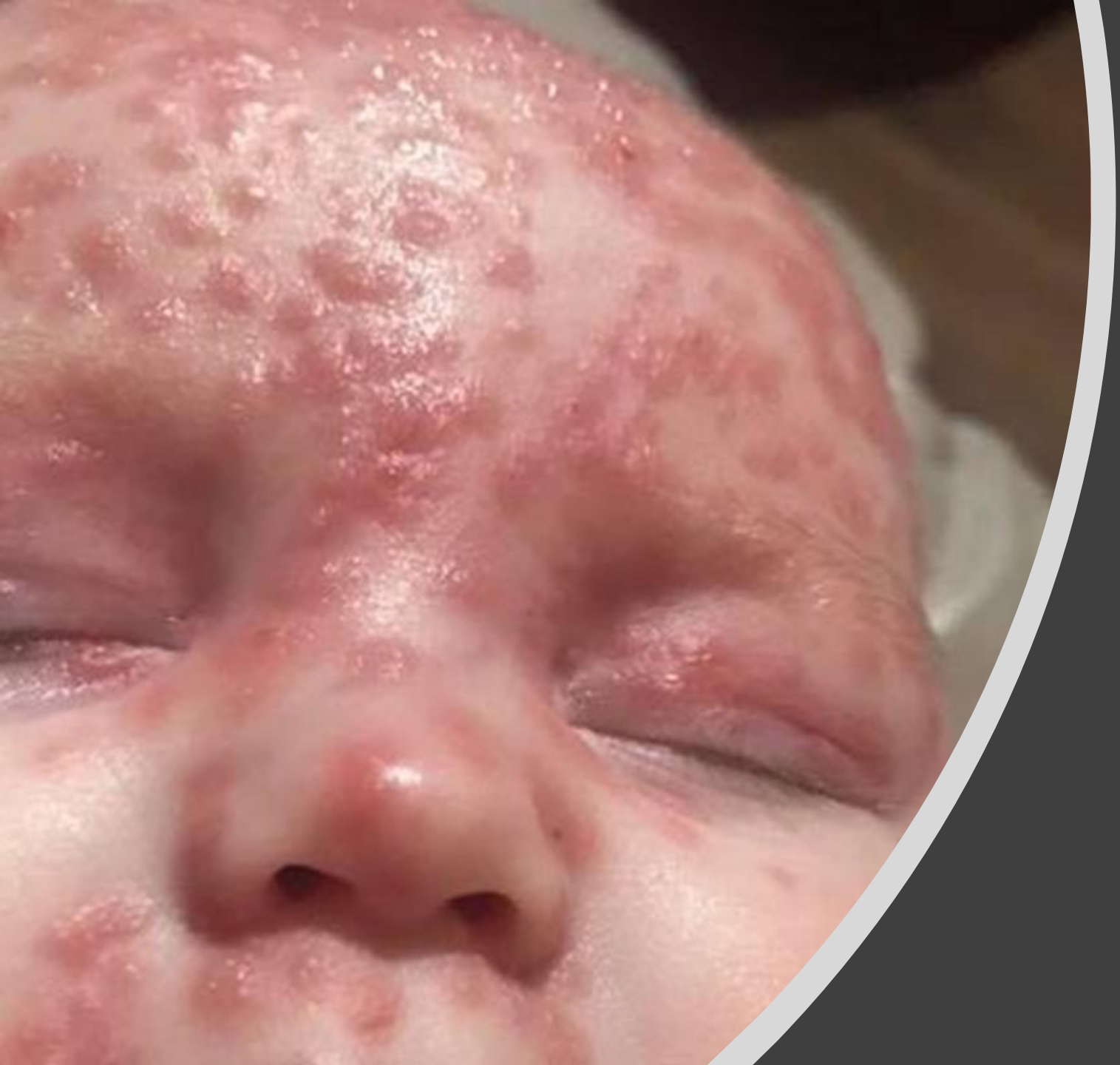
Diagnosis in the fetus

- Quantitative PCR on the amniotic fluid.

- The diagnostic sensitivity is high if the sample is taken after week 21 of pregnancy (once fetal diuresis is established) and 6 weeks after maternal serum is positive.

Treatment and prevention

- There is no effective fetal therapy.
- There is no vaccination.
- Ganciclovir can transiently reduce viral shedding and may reduce the audiological consequences of CMV in some infected infants.



Herpes Simplex Virus

- HSV is transmitted through close physical contact with mucosal surfaces or abraded skin and during sexual intercourse.

- HSV remains latent in sensory neurons; the trigeminal nerve in type 1 and the sacral ganglia in type 2.

- Reactivation then occurs as a result of triggers such as trauma, fever, stress, menstruation and ultraviolet light.

- primary genital herpes is usually severe with lesions that start with erythema, progressing to vesicles and then ulcers and finishing with crusting involving the vulva and cervix, and lasting 2 weeks.

Maternal diagnosis

- primary genital herpes is usually severe with lesions that start with erythema, progressing to vesicles and then ulcers and finishing with crusting involving the vulva and cervix, and lasting 2 weeks.

- For women presenting with first episode genital herpes in the third trimester, particularly within 6 weeks of expected delivery, type specific HSV antibody testing (immunoglobulin G [IgG] antibodies to HSV-1 and HSV-2) is advisable.

Fetal infection

- Intrauterine infection is associated with:
    1. Hydrops Fetalis
    2. In-utero fetal demise

Neonatal herpes

- Clinical manifestation can arise any time during the first six weeks of life, but usually occurs within the first month of life.

- It is classified into three subgroups in the infant depending on the site of infection:
  1. Disease localised to skin, eye and/or mouth
  2. Local central nervous system (CNS) disease (encephalitis alone)
  3. Disseminated infection with multiple organ involvement, 30% mortality rate

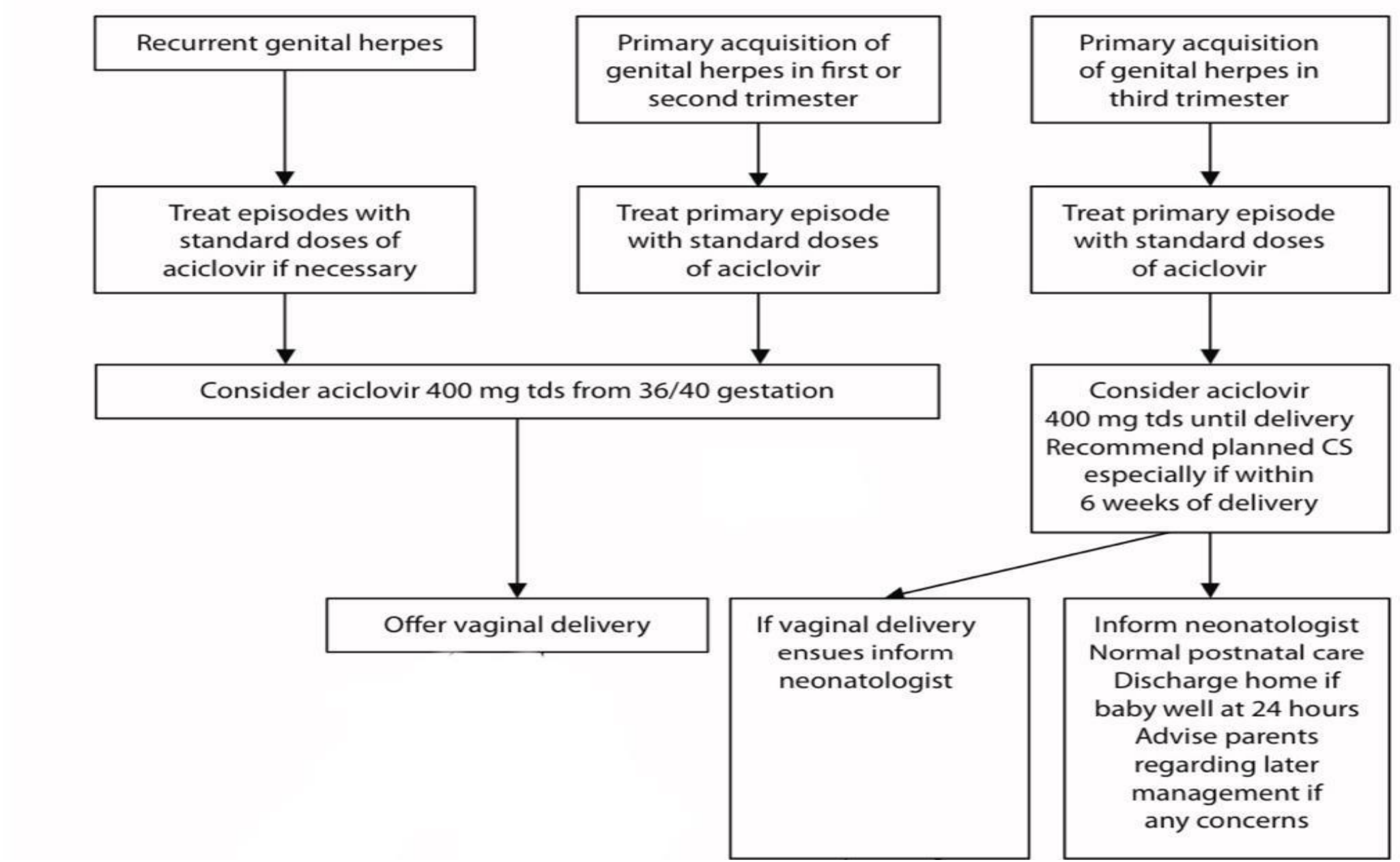
- Neonatal infection occurs as the result of an infection at the time of birth; in contrast, congenital herpes is extremely rare and occurs by transfer of infection in utero.

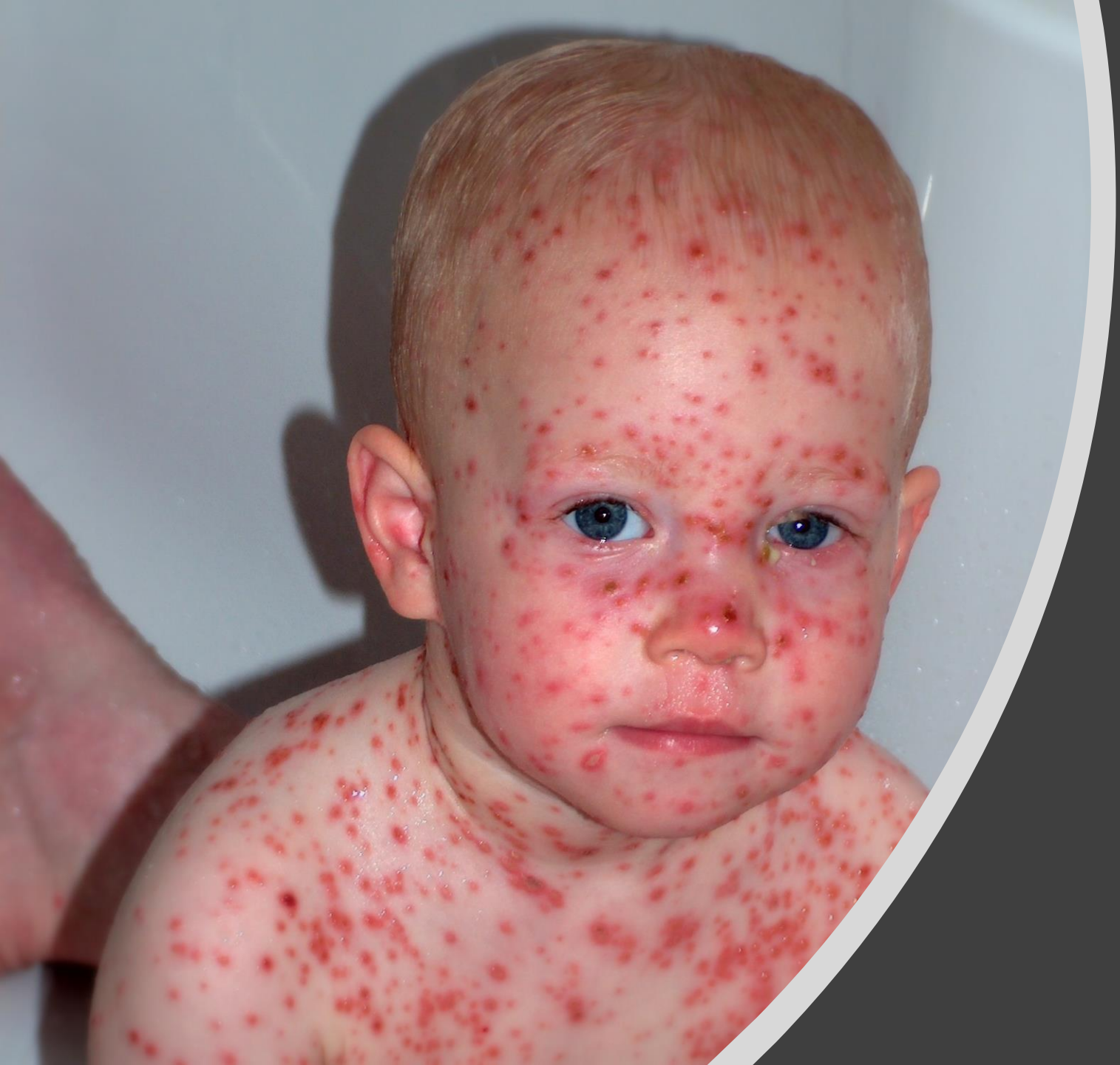
Management

- Management is dependent both on gestation and on whether the episode is a primary or secondary occurrence.

- Infected infants should be treated with I.V. acyclovir.

Algorithm for the management of herpes in pregnancy and care of neonate





VARICELLA
(chicken pox)

- Varicella-zoster virus (VZV) is a highly contagious DNA virus of the herpes family

- It's transmitted by respiratory droplet and by direct personal contact with vesicle fluid.

- The incubation period is 7–21 days and a person is infectious 48 hours before the rash appears and continues to be infectious until the vesicles crust over, typically 5 days.

- Over 90% of the antenatal population in the UK are seropositive for VZV-specific IgG antibody

- Infection is uncommon, affecting 1 in 1000 pregnancies.

Maternal diagnosis

- Maternal history
- For a woman with no previous history of chickenpox and a significant history of exposure, diagnosis is serological by looking for VZV IgG.
- The diagnosis itself is made from examination of the classic rash.

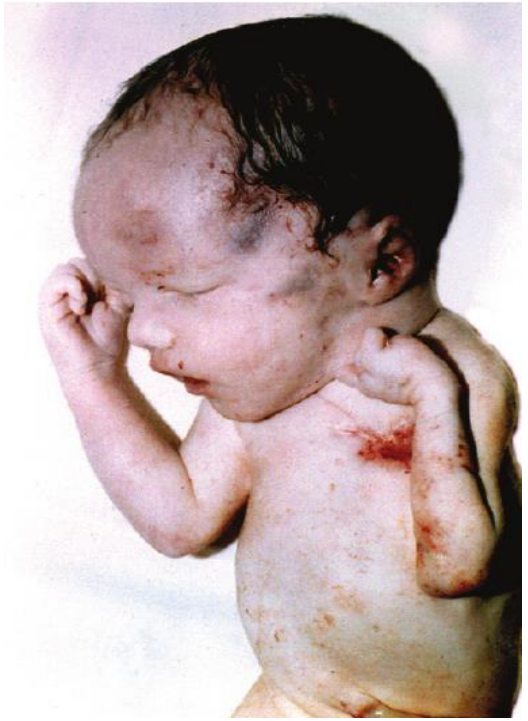
Fetal infection

- The effect of VZV on the fetus is gestation dependent.

- From as early as 3 weeks until 28 weeks' gestation it is possible for the fetus to develop fetal varicella syndrome (FVS), the risk 1-3% only.

- (FVS) :

1. limb deformity
2. microcephaly
3. hydrocephaly
4. soft tissue calcification
5. IUGR



Fetal diagnosis

- Ultrasound findings.
- Amniocentesis may be performed to confirm the diagnosis with PCR identification of VZV DNA.
- There is usually a time lag of at least 5 weeks after the primary infection before fetal differences are seen.

Treatment and prevention

- There is no intrauterine treatment currently available.
- For women known to be seronegative varicella vaccine can be administered before pregnancy. This is a live attenuated vaccine and hence pregnancy should be avoided for 1–3 months after administration.
- If the pregnant woman is not immune to VZV and she has had a significant exposure, she should be offered varicella-zoster immunoglobulin (VZIG) as soon as possible.
- If maternal infection occurs in the last 4 weeks of a woman’s pregnancy, there is a significant risk of varicella infection of the newborn. A planned delivery should normally be avoided for at least 7 days after the onset of the maternal rash to allow for the passive transfer of antibodies from mother to child, provided that continuing the pregnancy does not pose any additional risks to the mother or baby.

TREATMENT

-7 -6 -5 -4 -3 -2 -1 +1 +2 +3 +4

- Newborn will have protective antibodies
- Likelihood of severe disease is low
- Do not separate baby from mother
- Continue breast feeding
- No VZIG
- Acyclovir if baby develops rash

- Newborn will not have protective antibodies
- Likelihood of severe disease is high
- Separate baby from mother
- If baby devps rash stay with mother
- VZIG within 72 hours
- Acyclovir

- Newborn will not have protective antibodies
- But, likelihood of severe disease is low
- Separate baby from mother
- f baby devps rash _ stay with mother
- No VZIG
- Acyclovir if baby develops

Hepatitis B virus

- Hepatitis B virus (HBV) is an extremely infectious double-stranded DNA virus that has three major structural antigens: surface antigen (HBsAg), core antigen (HBcAg) and e antigen (HBeAg).

- This blood-borne virus is transmitted sexually, vertically or by blood contamination.

- Carriage among pregnant women in the UK is estimated at 0.5-1%

Diagnosis

- Is made by the detection of HBsAg. The detection of HBeAg indicates active disease and the disappearance of HBsAg and the appearance of surface antibodies indicate disease resolution and these antibodies will provide immunity. Resolution usually occurs within 3 months.

- All pregnant women are routinely offered screening for HBV.

Vertical transmission

- The risk of vertical transmission depends on the antigen status of the women. There is a 95% transmission rate in the presence of both HBsAg and HBeAg, compared with 2–15% when HBeAg negative.

- 95% of cases of transmission occur at the time of delivery.

Management

- Prevention of HBV infections of the neonate is achieved by avoiding fetal invasive procedures during labour and the administration of passive immunoglobulin in the first 24 hours to neonates of highly infectious mothers.

- Hepatitis vaccination is given to those born of low-infectivity mothers.

- When a baby has been immunised there is no contraindication to breastfeeding.

Follow up

- Complete HBV immunization as per schedule 3 dose schedule

- Follow up testing done at 9 to 18 months of age for Anti-HBs and HbsAg

Termination of pregnancy for fetal anomalies

- The management of the pregnancy in which an abnormal fetus is identified involves a whole multidisciplinary team of specialists. This team comprises the sonographer, fetal medicine specialist, geneticist, neonatologist and paediatric surgeon.

- When the diagnosis is made, clear information should be made available to the parents regarding the condition, prognosis and level of disability, should the baby be born alive.

The detailed fetal anomaly scan

- Ultrasound scan done at 18-21 weeks' gestation.

1. Transverse section through the fetal head, assessing head shape and internal structures
2. face: lips
3. Fetal spine: sagittal, coronal and transverse views
4. Fetal abdomen: longitudinal and transverse; identifying intra-abdominal organs: stomach, kidneys, bladder and ventral wall integrity and cord insertion
5. Transverse section through fetal thorax to examine four-chamber view of the heart and outflow tracts
6. Limbs: identify three long bones in each limb, hands and feet

Lethal conditions

- Anencephaly
- Bilateral renal agenesis
- Lethal skeletal dysplasias
- Some severe complex cardiac defects
- Triploidy
- Trisomies 18, 13 and 15

Options for termination of pregnancy

Medical

- The introduction of prostaglandins (PGE1) and the antiprogesterone mifepristone.
- Medical termination is the preferred method in the second trimester.
- Medical termination has the additional advantage of allowing the opportunity for a postmortem examination.
- Disadvanteges: can be a lengthy process and may require further surgery to remove retained tissue

Surgical

- Dilatation of the cervix prior to surgery is achieved by passing graduated metal dilators or inserting vaginal prostaglandin preparations.

- The inherent risk associated with abortion relates to the use of general anaesthesia and the invasive nature of the procedure – with complications of haemorrhage, uterine perforation and infection.

- Cervical dilatation may be complicated by cervical tears, uterine perforation and the creation of false passages.

Care of women and follow up

- Time for grieving must be allowed
- Psychological stress is high after termination, with 40% of women showing symptoms of psychiatric morbidity
- Prevent lactation by Dopamine agonists as early as 16 weeks of gestation
- Postmortem results may provide additional information as to the precise diagnosis.
- Referral to a genetic specialist may be required in order to assess the risk of recurrence and possibly to investigate other family members.

THE END