دکتر زینت السادات بوذری

استاد گروه زنان و زایمان دانشگاه علوم پزشکی بابل

تازه های غربالگری عفونت ها در بارداری

Pregnancy –Induced Immunological Change

- Horizontal transmission is the spread of an infectious agent from one individual to another.

- Vertical transmission refers to passage from the mother to her fetus of an infectious agent through the placenta, during labor or delivery, or by breastfeeding.

- Thus, preterm rupture of membranes, prolonged labor, and obstetrical manipulations may enhance the risk of neonatal infection .

Cytomegalovirus

TABLE 64-1. Specific Causes of Some Fetal and Neonatal Infections

Intrauterine
- Transplacental
  - Viruses: varicella-zoster, coxsackie, human parvovirus B19, rubella, CMV, HIV, Zika
  - Bacteria: *Listeria*, syphilis, *Borrelia*
  - Protozoa: toxoplasmosis, malaria
- Ascending infection
  - Bacteria: group B *streptococcus*, coliforms
  - Viruses: HIV

Intrapartum
- Maternal exposure
  - Bacteria: gonorrhea, chlamydia, group B *streptococcus*, tuberculosis, mycoplasmas
  - Viruses: HSV, HPV, HIV, hepatitis B, hepatitis C, Zika
- External contamination
  - Bacteria: staphylococcus, coliforms
  - Viruses: HSV, varicella zoster

Neonatal
- Human transmission: staphylococcus, HSV
- Respirators and catheters: staphylococcus, coliforms

CMV = cytomegalovirus; HIV = human immunodeficiency virus; HPV = human papillomavirus; HSV = herpes simplex virus.

Pregnancy –Induced Immunological Change

- The active immunological capacity of the fetus and neonate is compromised compared with that of older children and adults.
- Fetal cell-mediated and humoral immunity begin to develop by 9 to 1 5 weeks' gestation .
- The primary fetal response to infection is immunoglobulin M (Ig.M) .

Pregnancy –nduced Immunological Change

- Passive immunity is provided by IgG transferred across the placenta.
- By 16 weeks, this transfer begins to rise rapidly, and by 26 weeks, fetal concentrations are equivalent to those of the mother.
- After birth, breastfeeding is protective against some infections, although this protection begins to decline at 2 months of age.

Pregnancy –Induced Immunological Change

- Current World Health Organization (2013) recommendations are to exclusively breastfeed for the first 6 months of life with partial breastfeeding until 2 years of age.

Pregnancy –Induced Immunological Change

- Neonatal infection, especially in its early stages, may be difficult to diagnose because these newborns often fail to express classic clinical signs.
- If the fetus was infected in utero, there may be depression and acidosis at birth for no apparent reason.
- The neonate may suck poorly, vomit, or show abdominal distention. Respiratory insufficiency can develop, which may present similarly to idiopathic respiratory distress syndrome.
- The neonate may be lethargic or jitteriness.
- The response to sepsis may be hypothermia rather than hyperthermia, and the total leukocyte and neutrophil counts may be depressed.

Cytomegalovirus

- Several viruses cause severe maternal infections, and some can also cause devastating fetal infections.
- CMV is also the most common perinatal infection in the developed world.

Cytomegalovirus

- Fetal infection is found in 0.2 to 2.2 percent of all neonates .

- The virus is secreted into all body fluids, and person-to-person contact with viral-laden saliva, semen, urine, blood, and nasopharyngeal and cervical secretions can transmit infection.

Cytomegalovirus

- The fetus may become infected by transplacental viremia, or the neonate is infected at delivery or during breastfeeding.
- Moreover, acquisition continues to accrue.
- Day-care centers, for example, are a frequent source.
- **Amniocentesis in women whose blood is positive for CMV DNA does not result in iatrogenic fetal transmission.**

Cytomegalovirus

- Up to 85 percent of women from lower socioeconomic backgrounds are seropositive by the time of pregnancy, whereas only half of women in higher income groups are immune.

-

- Anti-CMV IgG do not prevent maternal recurrence, reactivation, or reinfection, nor do they totally mitigate fetal or neonatal infection.

Cytomegalovirus

- Women who are seronegative before pregnancy, but who develop primary CMV infection during pregnancy, are at greatest risk to have an infected fetus.

- It is estimated that 25 percent of congenital CMV infections in the United States are from primary maternal infection .

Cytomegalovirus

- Pregnancy does not increase the risk or severity o f maternal CMV infection.
- **Most infections are asymptomatic**, but 10 to 15 percent of infected adults have a mononucleosis-like syndrome characterized by fever, pharyngitis, lymphadenopathy, and polyarthritis.
- Immunocompromised women may develop myocarditis, pneumonitis, hepatitis, retinitis, gastroenteritis, or meningoencephalitis.

Cytomegalovirus

- Women with primary infection had elevated serum aminotransferases or lymphocytosis.

- Reactivation disease usually is asymptomatic, although viral shedding is common.

Cytomegalovirus

- Transmission rates for primary infection are 30 to 36 percent in the first trimester, 34 to 40 percent in the second, and40 to 72 percent in the third trimester.

- In contrast, recurrent maternal infection infects the fetus in only 0.15 to 1 percent of cases.

- Naturally acquired immunity during pregnancy results in a 70-percent risk reduction of congenital CMV infection in future pregnancies.

- Maternal immunity does not prevent recurrences, and maternal antibodies do not prevent fetal infection .

Cytomegalovirus

- Newborns with apparent sequelae of in-utero-acquired CMV infection are described as having **symptomatic CMV infection**.
- Congenital infection is a syndrome that may include:

Growth restriction, microcephaly, intracranial calcifications, chorioretinitis, mental and motor retardation, sensorineural deficits, hepatosplenomegaly, jaundice, hemolytic anemia, and thrombocytopenic purpura .

Cytomegalovirus

- Most infected infants are asymptomatic at birth, but some develop late-onset sequelae.
- Complications may include hearing loss, neurological deficits, chorioretinitis, psychomotor retardation, and learning disabilities.

Cytomegalovirus

- Routine prenatal CMV serological screening is currently not recommended by the Society for Maternal-Fetal Medicine .

- women should be tested for CMV if they present with a mononucleosis-like illness or if congenital infection is suspected based on abnormal sonographic findings.

Cytomegalovirus

- Specific CMV IgG avidity testing is valuable in conirming primary CMV infection.
- High anti-CMV IgG avidity indicates primary maternal infection >6 months before testing.
- viral culture may be usefule.

Cytomegalovirus

- Several fetal abnormalities associated with CMV infection may be seen with sonography, CT, or MRI.
- In some cases, they are found at the time of routine prenatal sonographic screening, but in others they are part of a specific evaluation in women with CMV infection.
- Findings include microcephaly, ventriculomegaly, and cerebral calciications; ascites, hepatomegaly, splenomegaly, and hyperechoic bowel; hydrops; and oligohydramnios .
- Abnormal sonographic findings seen in combination with positive findings in fetal blood or amnionic fluid are predictive of an approximate 75-percent risk of symptomatic congenital infection .

Cytomegalovirus

- CMV nucleic acid amplification testing (NAAT) o f amnionic luid is considered the **gold standard** for the diagnosis of fetal infection. Sensitivities range from 70 to 99 percent and depend on amniocentesis timing.

- Sensitivity is highest when amniocentesis is performed at least 6 weeks after maternal infection and after 21 weeks' gestation .

- A negative result from amnionic fluid polymerase chain reaction (PCR) testing does not exclude fetal infection and may need to be repeated if suspicion for fetal infection is high.

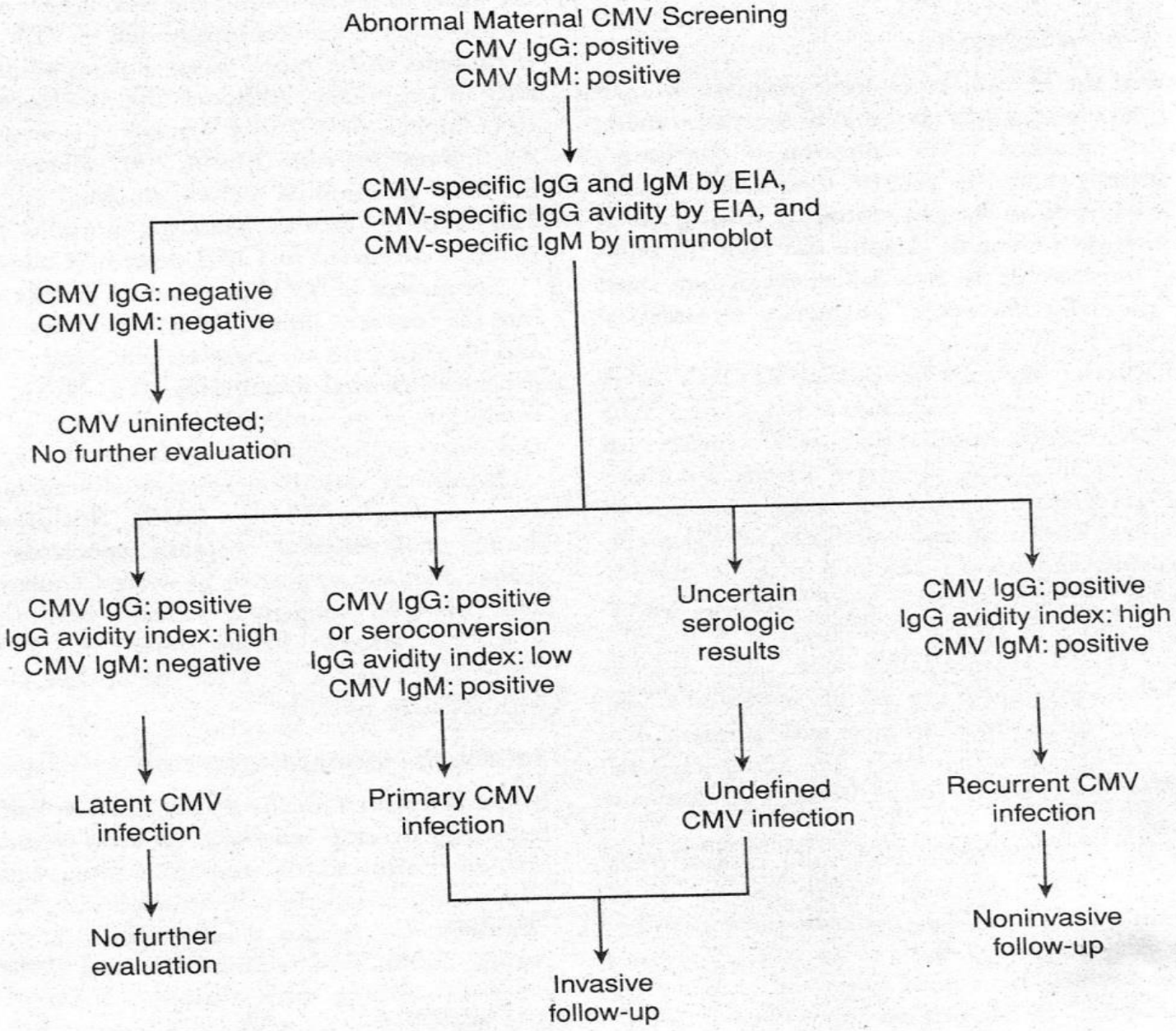


FIGURE 64-2 Algorithm for evaluation of suspected maternal primary cytomegalovirus (CMV) infection in pregnancy. EIA = enzyme

Cytomegalovirus

- The management of the immunocompetent pregnant woman with primary or recurrent CMV is limited to symptomatic treatment.
- **If recent primary CMV infection is confirmed, amnionic fluid analysis should be offered**.
- Counseling regarding fetal outcome depends on the gestational age during which primary infection is documented.
- Despite the high infection rate with primary infection in the first half of pregnancy, most fetuses develop normally.
- However, pregnancy termination may be an option for some.

Cytomegalovirus

- Currently, no proven treatments are available for CMV infection.

- Oral treatment with valacyclovir, 8g daily, apparently mitigated adverse outcomes in 8 of 11 affected fetuses treated beginning at median of 25.9 weeks' gestation.

- Intravenous valganciclovir administered for 6 weeks to neonates with symptomatic central nevous system (CNS) disease prevented hearing deterioration at 6 months and possibly later.

Cytomegalovirus

- Passive immunization with CMV-specific hyperimmune globulin may lower the risk of congenital CMV infection when given to pregnant women with primary disease.

Cytomegalovirus

- There is no CMV vaccine, although several clinical trials are underway.

- Prevention of congenital infection relies on avoiding maternal primary infection, especially in early pregnancy.

- Basic measures such as good hygiene and hand washing have been promoted, particularly for women with toddlers in day-care settings.

Varicella-Zoster Virus

- Varicella-zoster virus (VZV) is a doublestranded DNA herpes virus acquired predominately during childhood.
- And 95 percent of adults have serological evidence of immunity.

Varicella-Zoster Virus

- The incidence of adult varicella infections declined by 82 percent after the introduction of varicella vaccination.
- This has resulted in a decrease in maternal and fetal varicella infections.

Varicella-Zoster Virus

- Primary infection—varicella or chicken pox—is transmitted by direct contact with an infected individual, although respiratory transmission has been reported.
- The incubation period is 10 to 21 days, and a nonimmune woman has a 60- to 95-percent risk of becoming infected after exposure .
- Maternal Infection Primary varicella infection presents with a 1- to 2-day flu-like prodrome, which is followed by pruritic vesicular lesions that crust over in 3 to 7 days.
- She is then contagious from 1 day before the onset of the rash until the lesions are crusted over.
- Infection tends to be more severe in adults.

Varicella-Zoster Virus

- Mortality is predominately due to varicella pneumonia, which is thought to be more severe during adulthood and particularly in pregnancy.
- Between 2 and 5 percent of infected pregnant women developed pneumonitis.
- Risk factors for VZV pneumonia include smoking and having more than 100 cutaneous lesions.
- Maternal mortality rates with pneumonia have decreased to 1 to 2 percent .

Varicella-Zoster Virus

- Symptoms of pneumonia usually appear 3 to 5 days into the course of illness. It is characterized by fever, tachypnea, dry cough, dyspnea, and pleuritic pain.

- Nodular infiltrates are similar to other viral pneumonias .

- Although resolution of pneumonitis parallels that of skin lesions, fever and compromised pulmonary function may persist for weeks.

Varicella-Zoster Virus

- If primary varicella infection is reactivated years later, it causes herpes zoster or shingles .
- This presents as a unilateral dermatomal vesicular eruption associated with severe pain.
- Zoster does not appear to be more frequent or severe in pregnant women.
- Congenital varicella syndrome rarely develops in cases of maternal herpes zoster.
- Zoster is contagious if blisters are broken, although less so than primary varicella infection.

Varicella-Zoster Virus

- In women with chicken pox during the first half of pregnancy, the fetus may develop congenital varicella syndrome.
- **Some features include :**

chorioretinitis

microphthalmia

cerebral cortical atrophy

growth restriction

hydronephrosis

limb hypoplasia

cicatricial skin lesions

Varicella-Zoster Virus

- 1994:1373 -When maternal infection developed before 13 weeks, only two of 472 pregnancies—0.4 percent—had neonates with congenital varicella.
- 2017-The highest risk was between 13 and 20 weeks, during which time 7 of 351 exposed fetuses—2 percent—had evidence of congenital varicella.
- 2017- After 20 weeks' gestation, the researchers found no clinical evidence of congenital infection. **Thus, congenital infections, particularly after 20 weeks, are uncommon.**
- 2007-2011- Subsequent sporadic reports have described central nervous system abnormalities and skin lesions in fetuses who developed congenital varicella in weeks 21 to 28 of gestation .

Varicella-Zoster Virus

- If the fetus or neonate is exposed to active infection just before or during delivery, and therefore before maternal antibody has been formed, then there is a serious threat to newborns.
- Attack rates range from 25 to 50 percent, and mortality rates approach 30 percent.
- In some instances, neonates develop disseminated visceral and central nervous system disease, which is commonly fatal.
- For this reason, varicella-zoster immune globulin should be administered to neonates born to mothers who have clinical evidence of varicella 5 days before and up to 2 days after delivery.

Varicella-Zoster Virus

- **Diagnosis :**
- Maternal varicella infection is usually diagnosed clinically.
- The virus may also be isolated by scraping the vesicle base during primary infection and performing a Tzanck smear, tissue culture, or direct fluorescent antibody testing.
- Also, available nucleic acid amplification tests (NAATs) are very sensitive.
- Congenital varicella may be diagnosed using NAAT analysis of amnionic fluid, although a positive result does not correlate well with the development of congenital infection .
- A detailed anatomical sonographic evaluation performed at least 5 weeks after maternal infection may disclose abnormalities, but the sensitivity is low.

Varicella-Zoster Virus

- Most adults are VZV seropositive,
- Exposed pregnant women with a negative history for chicken pox should undergo VZV serologic testing.
- At least 70 percent of these women will be seropositive, and thus immune.
- Exposed pregnant women who are susceptible should be given VariZIG, a recently approved varicella zoster immune globulin.
- best given within 96 hours of exposure, its use is approved for up to 10 days.

Varicella-Zoster Virus

- Any patient diagnosed with primary varicella infection should be isolated from pregnant women.
- Because pneumonia often presents with few symptoms, a chest radiograph is recommended by many.
- Most women require only supportive care, but those who require intravenous (IV) fluids and especially those with pneumonia are hospitalized.
- Intravenous acyclovir therapy is given to women requiring hospitalization—500 mg/m2 or 10 to 15 mg/kg every 8 hours.

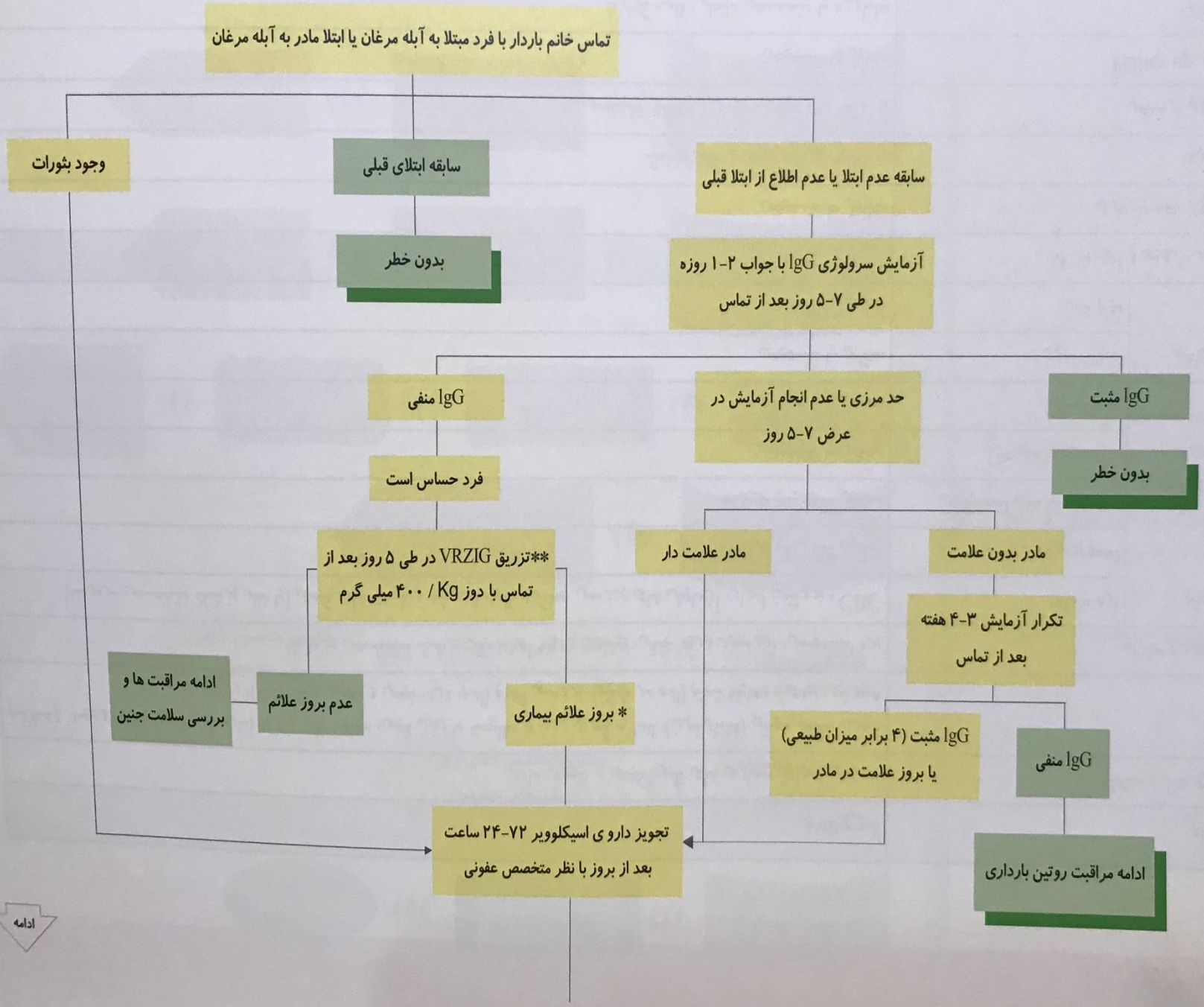
Varicella-Zoster Virus

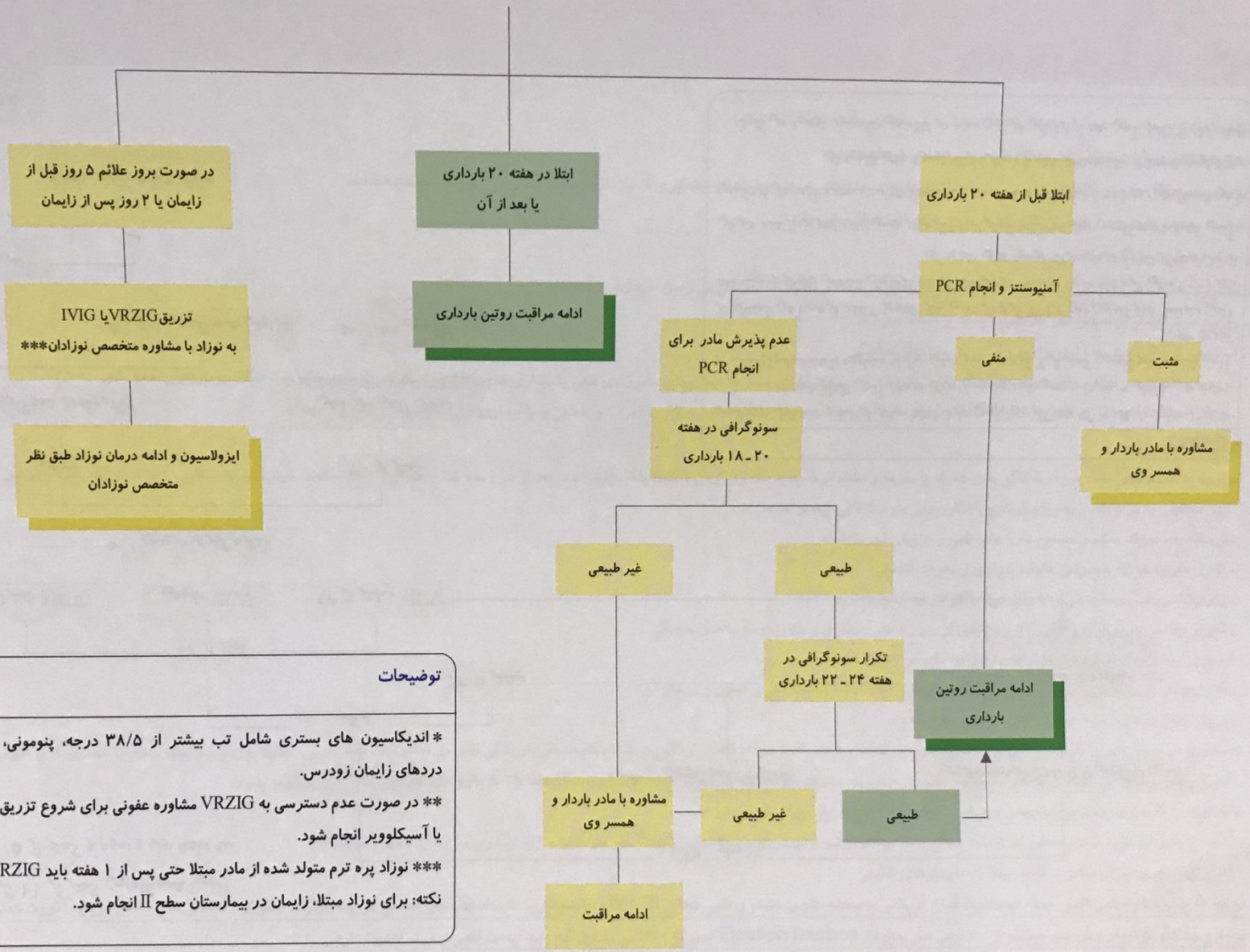
- An attenuated live-virus vaccine—Varivax— was approved in 1995.
- Two doses, given 4 to 8 weeks apart,are recommended for adolescents and adults with no history of varicella.
- results in 98-percent seroconversion .

- Importantly, vaccineinduced immunity diminishes over time, and the breakthrough infection rate approximates 5 percent at 10 years.

- The vaccine is not recommended for pregnant women or for those who may become pregnant within a month following each vaccine dose.

- The attenuated vaccine virus is not secreted in breast milk. Thus, postpartum vaccination should not be delayed because of breast feeding .


تماس خانم باردار با فرد مبتلا به آبله مرغان یا ابتلا مادر به آبله مرغان
وجود بثورات
سابقه ابتلای قبلی
بدون خطر
سابقه عدم ابتلا یا عدم اطلاع از ابتلا قبلی
آزمایش سرولوژی IgG با جواب ۲-۱ روزه
در طی ۷-۵ روز بعد از تماس
IgG منفی
فرد حساس است
**تزریق VRZIG در طی ۵ روز بعد از
تماس با دوز ۴۰۰ / Kg میلی گرم
ادامه مراقبت ها و
بررسی سلامت جنین
عدم بروز علائم
* بروز علائم بیماری
حد مرزی یا عدم انجام آزمایش در
عرض ۷-۵ روز
مادر علامت دار
IgG مثبت
بدون خطر
مادر بدون علامت
تکرار آزمایش ۳-۴ هفته
بعد از تماس
IgG مثبت (۴ برابر میزان طبیعی)
یا بروز علامت در مادر
IgG منفی
ادامه مراقبت روتین بارداری
تجویز دارو ی اسیکلوویر ۷۲-۲۴ ساعت
بعد از بروز با نظر متخصص عفونی
ادامه



توضیحات

* اندیکاسیون های بستری شامل تب بیشتر از ۳۸/۵ درجه، پنومونی، آنسفالیت، دردهای زایمان زودرس.

** در صورت عدم دسترسی به VRZIG مشاوره عفونی برای شروع تزریق IVIG یا آسیکلوویر انجام شود.

*** نوزاد پره ترم متولد شده از مادر مبتلا حتی پس از ۱ هفته باید VRZIG بگیرد.

نکته: برای نوزاد مبتلا، زایمان در بیمارستان سطح II انجام شود.

Influenza Virus

- These respiratory infections are caused by members of the family Orthomyxoviridae.
- Influenza A and B form one genus of these RNA viruses, and both cause epidemic human disease.
- Influenza A viruses are subclassified further by hemagglutinin (H) and neuraminidase (N) surface antigens.
- Influenza outbreaks occur annually,
- epidemic was in 2013–2014 caused by an influenza A/H1N1 strain.
- and the most recent epidemic was in 2016–2017 caused by an influenza A/H3N2 strain.
-

Influenza Virus

- Maternal influenza is characterized by fever, dry cough, and systemic symptoms.
- Infection usually is not life-threatening in otherwise healthy adults, but pregnant women appear to be more.
- Sever infection has a maternal mortality rate of 1 precent.
- From 2009 to 2010, widespread influenza A infection affected pregnant women and caused 12% of pregnancy – related deaths.

Influenza Virus

- There is no firm evidence that influenza A virus causes congenital malformations .
- Increased neural-tube defects in neonates born to women with influenza early in pregnancy, but this was possibly associated with hyperthermia .
- Viremia is infrequent, and transplacental passage is rare .
- Stillbirth, preterm delivery, and first-trimester abortion have all been reported, usually correlated to severity of maternal infection .

Influenza Virus

- Influenza may be detected in nasopharyngeal swabs using viral antigen rapid detection assays .
- Reverse transcriptase–polymerase chain reaction (RT-PCR) is the more sensitive and specific test, although not commercially available in many hospitals .
- In contrast, rapid influenza diagnostic tests (RIDTs) are least indicative, with sensitivities of 40 to 70 percent.
- Importantly, decisions to administer antiviral medications for influenza treatment or chemoprophylaxis should be based on clinical symptoms and epidemiological factors.
- Moreover, the start of therapy should not be delayed pending testing results .

Influenza Virus

TABLE 64-2. Outpatient Influenza A and B Virus Testing Methods

Method[a]	Test Time
Viral cell culture	3–10 d
Rapid cell culture	1–3 d
Direct (DFA) or indirect (IFA) fluorescent antibody assay	1–4 hr
RT-PCR and other molecular assays	1–6 hr
Rapid influenza diagnostic tests (RIDT)	<30 min

[a]Nasopharyngeal or throat swab.
RT-PCR = reverse transcription-polymerase chain reaction.
Data from Centers for Disease Control and Prevention, 2017e.

Influenza Virus

- Management Two classes of antiviral medications are currently available.
- Neuraminidase inhibitors are highly effective for the treatment of early influenza A and B.
- These include **oseltamivir (Tamiflu),** which is taken orally for treatment and for chemoprophylaxis, and **zanamivir (Relenza),** which is inhaled for treatment.
- **Peramivir** is an investigational drug administered intravenously.

Influenza Virus

- The adamantanes include amantadine and rimantadine, which were used for years for treatment and chemoprophylaxis of influenza A.
- In 2005, influenza A resistance to adamantine was reported to be > 90 percent in the United States, and thus, adamantane use is not currently recommended. It is possible that these drugs may again be effective for subsequently mutated strains.
- There is limited experience with all five of these antiviral agents in pregnant women.
- They are FDA category C drugs, used when the potential benefits outweigh the risks.
- At Parkland Hospital, we recommend starting **Tamiflu** treatment within 48 hours of symptom onset—75 mg orally twice daily for 5 days.
- Prophylaxis with **Tamiflu**, 75 mg orally once daily for 10 days, is also recommended for significant exposures. Antibacterial medications should be added when a secondary bacterial pneumonia is suspected .

Influenza Virus

- Vaccination Effective vaccines are formulated annually.
- Vaccination against influenza throughout the influenza season, but optimally in October or November, is recommended by the Centers for Disease CDC and the ACOG for all women who will be pregnant during the influenza season.
- This is especially important for those affected by chronic medical disorders such as diabetes, heart disease, asthma, or human immunodeficiency virus (HIV) infection .

Influenza Virus

- Inactivated vaccine prevents clinical illness in 70 to 90 percent of healthy adults.
- Importantly, there is no evidence of teratogenicity or other adverse maternal or fetal events .
- Moreover, several studies have found decreased rates of influenza in infants up to 6 months of age whose mothers were vaccinated during pregnancy .
- Immunogenicity of the trivalent inactivated seasonal influenza vaccine in pregnant women is similar to that in the nonpregnant individual .
- A live attenuated influenza virus vaccine is available for intranasal use but is not recommended for pregnant women.

Mumps Virus

- Mumps This uncommon adult infection is caused by an RNA paramyxovirus. Because of childhood immunization, up to 90 percent of adults are seropositive .
- The virus primarily infects the salivary glands.
- Infection also may involve the gonads, meninges, pancreas, and other organs.
- It is transmitted by direct contact with respiratory secretions, saliva, or through fomites.

Mumps Virus

- Treatment is symptomatic, and mumps during pregnancy is no more severe than in nonpregnant adults.
- Women who develop mumps in the first trimester may have an increased risk of spontaneous abortion.
- Infection in pregnancy is not associated with congenital malformations, and fetal infection is rare .

Mumps Virus

- The live attenuated Jeryl-Lynn vaccine strain is part of the MMR vaccine—measles, mumps, and rubella—and is contraindicated in pregnancy according to the CDC .
- No malformations attributable to MMR vaccination in pregnancy have been reported, but pregnancy should be avoided for 30 days after mumps vaccination.
- The vaccine may be given to susceptible women postpartum, and breast feeding is not a contraindication.

Rubeola (Measles)

- Measles is caused by a highly contagious RNA virus of the family Paramyxoviridae that only infects humans.

- Annual outbreaks occur in late winter and early spring, transmission is primarily by respiratory droplets.

Rubeola (Measles)

- Infection is characterized by fever, coryza, conjunctivitis, and cough.
- The characteristic erythematous maculopapular rash develops on the face and neck and then spreads to the back, trunk, and extremities.
- Koplik spots are small white lesions with surrounding erythema found within the oral cavity.
- Diagnosis is most commonly performed by serology, although RT-PCR tests are available.

Rubeola (Measles)

- Treatment is supportive.
- Pregnant women without evidence of measles immunity should be administered intravenous immune globulin (IVIG), 400 mg/kg within 6 days of a measles exposure .
- Active vaccination is not performed during pregnancy.
- However, susceptible women can be vaccinated routinely postpartum, and breast feeding is not contraindicated .

Rubeola (Measles)

- The virus does not appear to be teratogenic .
- However, an increased frequency of abortion, preterm delivery, and low-birthweight neonates is noted with maternal measles .
- If a woman develops measles shortly before birth, there is considerable risk of serious infection developing in the neonate, especially in a preterm neonate.

Rubella—German Measles

- This RNA togavirus typically causes infections of minor importance in the absence of pregnancy.

- Rubella infection in **the first trimester**, risk for abortion and severe congenital malformations.

Rubella—German Measles

- Transmission occurs via nasopharyngeal secretions, and the transmission rate is 80 percent to susceptible individuals.
- The peak incidence is late winter and spring.

Rubella—German Measles

- Maternal rubella infection is usually a mild, febrile illness with a generalized maculopapular rash beginning on the face and spreading to the trunk and extremities.
- **Other symptoms may include:**
- arthralgias or arthritis
- head and neck lymphadenopathy
- conjunctivitis.

Rubella—German Measles

- The incubation period is 12 to 23 days. Viremia usually precedes clinical signs by about a week, and adults are infectious during viremia and through 5 to 7 days of the rash.
- Up to half of maternal infections are subclinical despite viremia that may cause devastating fetal infection

Rubella—German Measles

- Diagnosis: Rubella may be isolated from the urine, blood, nasopharynx, and cerebrospinal fluid for up to 2 weeks after rash onset.

- The diagnosis is usually made, however, with serological analysis.

Rubella—German Measles

- Specific IgM antibody can be detected using enzyme-linked immunoassay from 4 to 5 days after onset of clinical disease, but it can persist for up to 6 weeks after appearance of the rash .

- Importantly, rubella reinfection can give rise to transient low levels of IgM.
- Serum IgG antibody titers peak 1 to 2 weeks after rash onset.

- This rapid antibody response may complicate serodiagnosis unless samples are initially collected within a few days after the onset of the rash.

Rubella—German Measles

- Rubella is one of the most complete teratogens, and sequelae of fetal infection are worst during organogenesis .
- Pregnant women with rubella infection and a rash during the first 12 weeks of gestation have a fetus with congenital infection in up to 90 percent of cases .
- At 13 to 14 weeks' gestation, this incidence was 54 percent, and by the end of the second trimester, it was 25 percent. **Defects are rare after 20 weeks .**

Rubella—German Measles

- congenital rubella syndrome includes one or more of the following:
- Eye defects—cataracts and congenital glaucoma
- Congenital heart defects—patent ductus arteriosus and pulmonary artery stenosis
- Sensorineural deafness—the most common single defect
- Central nervous system defects—microcephaly, developmental delay, mental retardation, and meningoencephalitis
- Pigmentary retinopathy
- Neonatal purpura
- Hepatosplenomedisease
- galy and jaundice
- Radiolucent bone

Rubella—German Measles

- Neonates born with congenital rubella may shed the virus for many months and thus be a threat to other infants and to susceptible adults who contact them.

- The extended rubella syndrome, with progressive panencephalitis and type 1 diabetes, may not develop clinically until the second or third decade of life.

Rubella—German Measles

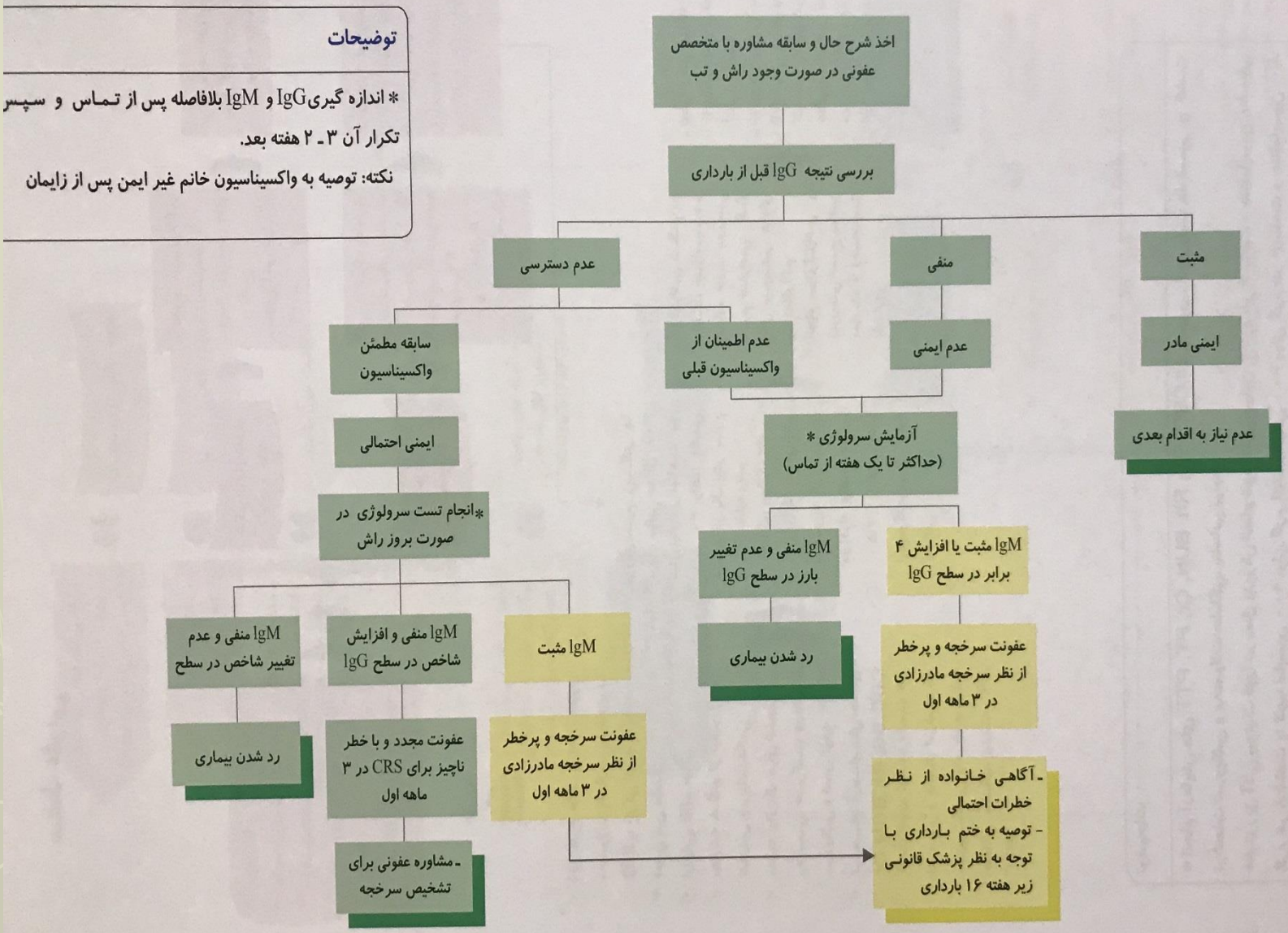
- There is no specific treatment for rubella.
- Droplet precautions for 7 days after the onset of the rash are recommended.
- Primary prevention -------vaccination programs.

Rubella—German Measles

- MMR vaccine should be offered to nonpregnant women of childbearing age who do not have evidence of immunity.
- Vaccination of all susceptible hospital personnel who might be exposed to patients with rubella or who might have contact with pregnant women is important.
- Rubella vaccination should be avoided 1 month before or during pregnancy because the vaccine contains attenuated live virus.
- Although there is a small overall theoretical risk of up to 2.6 percent, there is no observed evidence that the vaccine induces malformations .

Rubella—German Measles

- MMR vaccination is not an indication for pregnancy termination.
- Prenatal serological screening for rubella is indicated for all pregnant women. Women found to be nonimmune should be offered the MMR vaccine postpartum.



توضیحات

* اندازه گیری IgG و IgM بلافاصله پس از تماس و سپس تکرار آن ۳ ـ ۲ هفته بعد.

نکته: توصیه به واکسیناسیون خانم غیر ایمن پس از زایمان

Parvovirus

- Human parvovirus B19 causes erythema infectiosum, or fifth disease.
- The B19 virus is a small, single-stranded DNA virus that replicates in rapidly proliferating cells such as erythroblast precursors.
- This can lead to anemia, which is its primary fetal effect.
- Only individuals with the erythrocyte globoside membrane P antigen are susceptible.
- In women with severe hemolytic anemia—for example, sickle-cell disease— parvovirus infection may cause an aplastic crisis.

Parvovirus

- The main mode of parvovirus transmission is respiratory or hand-to-mouth contact, and the infection is common in spring months.
- The maternal infection rate is highest in women with school-aged children and in day-care workers but not usually in school teachers.

Parvovirus

- Viremia develops 4 to 14 days after exposure.
- By adulthood, only 40 percent of women are susceptible.
- In 20 to 30 percent of adults, infection is asymptomatic.

Parvovirus

- Fever, headache, and flu-like symptoms may begin in the last few days of the viremic phase.
- Several days later, a bright red rash with erythroderma affects the face and gives a slapped cheek appearance.
- The rash becomes lacelike and spreads to the trunk and extremities.
- Adults often have milder rashes and develop symmetrical polyarthralgia that may persist several weeks.

Parvovirus

- There is no evidence that parvovirus infection is altered by pregnancy.
- With recovery, there is production of IgM antibody 7 to 10 days postinfection, and this persists for 3 to 4 months.
- Several days after IgM is produced, IgG antibody is detectable and persists for life with natural immunity.

Parvovirus

- **Fetal infection** has been associated with abortion, nonimmune hydrops, and stillbirth.
- The rate of fetal loss with serologically provent parvovirus infection is 8 to 17 percent **before 20 weeks gestation**, and 2 to 6 percent **after mid pregnancy**.

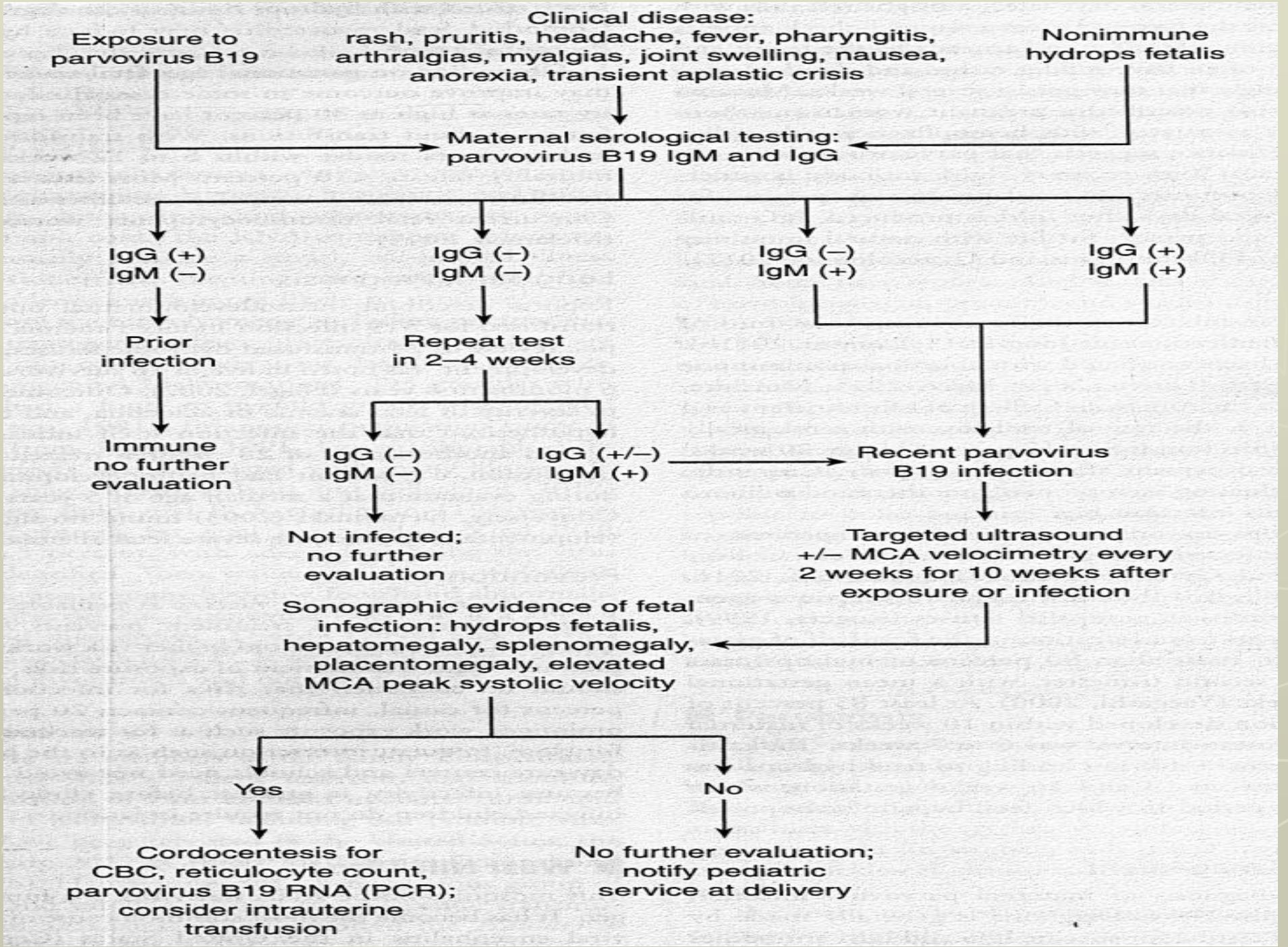
- Currently, there are no data to support evaluating asymptomatic mothers and stillborn fetuses for parvovirus infection.

Parvovirus

- Parvovirus is the most frequent infectious cause of nonimmune hydrops in autopsied fetuses .
- This complication develops only in approximately 1 percent of infected women and usually is caused by infection in the first half of gestation .
- At least 85 percent of cases of fetal infection developed within 10 weeks of maternal infection, and the mean interval was 6 to 7 weeks.
- More than 80 percent of hydrops cases were found in the second trimester, with a mean gestational age of 22 to 23 weeks.
- The critical period for maternal infection leading to fetal hydrops was estimated to be between 13 and 16 weeks—coincidental with the period in which fetal hepatic hemopoiesis is greatest.

Parvovirus

- An algorithm for diagnosis of maternal parvoviral infection


Exposure to parvovirus B19
Clinical disease: rash, pruritis, headache, fever, pharyngitis, arthralgias, myalgias, joint swelling, nausea, anorexia, transient aplastic crisis
Nonimmune hydrops fetalis
Maternal serological testing: parvovirus B19 IgM and IgG
IgG (+) IgM (–)
IgG (–) IgM (–)
IgG (–) IgM (+)
IgG (+) IgM (+)
Prior infection
Repeat test in 2–4 weeks
Immune no further evaluation
IgG (–) IgM (–)
IgG (+/–) IgM (+)
Recent parvovirus B19 infection
Not infected; no further evaluation
Targeted ultrasound +/– MCA velocimetry every 2 weeks for 10 weeks after exposure or infection
Sonographic evidence of fetal infection: hydrops fetalis, hepatomegaly, splenomegaly, placentomegaly, elevated MCA peak systolic velocity
Yes
No
Cordocentesis for CBC, reticulocyte count, parvovirus B19 RNA (PCR); consider intrauterine transfusion
No further evaluation; notify pediatric service at delivery

Parvovirus

- Long-Term Prognosis Reports describing neurodevelopmental outcomes in fetuses transfused for B19 infection-induced anemia are conflicting.
- Nagel and colleagues (2007) reviewed 25 transfusions in 24 hydropic fetuses. There was abnormal neurodevelopment in five of 16 survivors—32 percent—at 6 months to 8 years.
- Outcomes were not related to severity of fetal anemia or acidemia, and these investigators hypothesized that the infection itself induced cerebral damage.
- De Jong (2012) described longterm neurodevelopmental outcomes in 28 children treated with intrauterine transfusion. At a median age of 5 years, 11 percent had neurodevelopmental impairment.
- Conversely, Dembinski (2003) followed 20 children for a mean of 52 months after transfusion. They found no significant neurodevelopmental delay despite severe fetal anemia.

Parvovirus

- There is currently no approved vaccine for human parvovirus B19, and there is no evidence that antiviral treatment prevents maternal or fetal infection .

- Pregnant women should be counseled :
- risks for infection approximate 5 percent for casual,infrequent contact
- 20 percent for intense, prolonged work exposure such as for teachers
- 50 percent for close, frequent interaction such as in the home

- Workers at day-care centers and schools need not avoid infected children because infectivity is greatest before clinical illness.

- Finally, infected children do not require isolation.


Thank
You!

Group B Streptococcus

- **Intrapartum Antimicrobial Prophylaxis**
- Prophylaxis administered 4 or more hours before delivery is highly effective
- Regardless of screening method, penicillin remains the first-line agent for prophylaxis, and ampicillin is an acceptable alternative

TABLE 64-3. Regimens for Intrapartum Antimicrobial Prophylaxis for Perinatal GBS Disease

Regimen	Treatment
Recommended	Penicillin G, 5 million units IV initial dose, then 2.5 to 3.0 million units IV every 4 hours until delivery
Alternative	Ampicillin, 2 g IV initial dose, then 1 g IV every 4 hours or 2 g every 6 hours until delivery
Penicillin allergic	
Patients not at high risk for anaphylaxis	Cefazolin, 2 g IV initial dose, then 1 g IV every 8 hours until delivery
Patients at high risk for anaphylaxis and with GBS susceptible to clindamycin	Clindamycin, 900 mg IV every 8 hours until delivery
Patients at high risk for anaphylaxis and with GBS resistant to clindamycin or susceptibility unknown	Vancomycin, 1 g IV every 12 hours until delivery

GBS = group B *Streptococcus*; IV = intravenous.

Data from the Verani, 2010

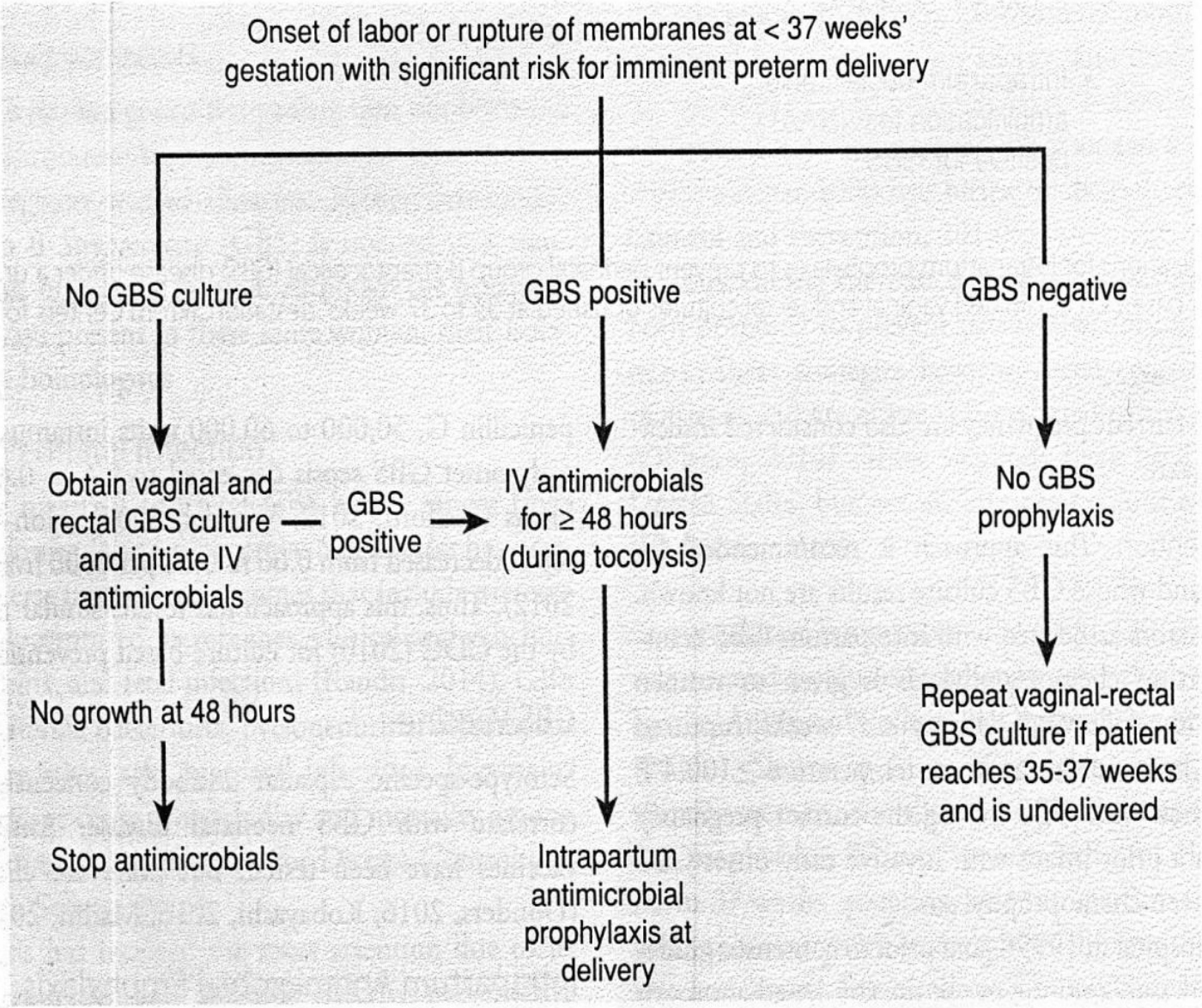


FIGURE 64-7 Sample algorithm for prophylaxis for women with group B streptococcal (GBS) disease and threatened preterm delivery. This algorithm is not an exclusive course of management, and variations that incorporate individual circumstances or institutional preferences may be appropriate. IV = intravenous. (Adapted from Centers for Disease Control and Prevention, 2016a.)

Group B Streptococcus

- **Erythromycin is no longer used for penicillinallergic patients.**

- Women undergoing cesarean delivery before labor onset with intact membranes do not need intrapartum GBS chemoprophylaxis, regardless of GBS colonization status or gestational age.