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Review Article

Chorioamnionitis - A Serious Perinatological Challenge

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Abstract

PTBs are a significant global health issue worldwide and a leading cause of perinatal morbidity and mortality. Perinatal infections are the leading cause of PTBs. Genital tract infections account for about 25 - 40% of preterm deliveries. Chorioamnionitis (CA) is considered an important reason for prematurely childbirth, as microbiological data testify. Thus there are several diagnoses in the literature. Histopathological diagnosis CA defines as the presence of inflammatory cells in the fetal membranes. Clinically, CA is defined as Typically maternal fever and at least two of next signs: uterine tenderness, fetal and/or maternal tachycardia, maternal leukocytosis, foul smelling fluid. A number of bacterial, viral, fungal, and parasitic pathogens may be etiological factors of CA. In term births, CA is present in 4% of births. However, that frequency is higher in preterm births and PPROM. In pregnant women with clear clinical signs of CA, there is a strong correlation between histologically confirmed CA and the cardinal symptoms of CA. Often, the diagnosis of CA is delayed, leading to delayed preterm delivery, endangering the health of the pregnant woman, and damage to the fetus. Therefore, early recognition and diagnosis of CA is especially important.The diagnosis is made on the basis of clinical maternal symptoms. The primary management of CA is administration of antibiotics. Immediate treatment with antibiotics and proper care will ensure a better outcome of the CA-threatened pregnancy.

Keywords: *Preterm Birth; Chorioamnionitis; Diagnosis; Management*

Introduction

Preterm births (PTBs) are all births before 37 completed weeks or 259 days of gestation. It is a major determinant of neonatal mortality and morbidity and has long-term adverse consequences for health [1,2]. PTBs are a significant global health issue worldwide and a leading cause of perinatal morbidity and mortality. The incidence of PTB has not changed during the last 50 years. Every year about 15 million babies are born preterm. PTB usually affects 5 - 7% of births, but most of them are in developing countries [3]. The incidence of PTB has increased worldwide. In 2010, 11% of all live births were born preterm [4]. It is very important to identify women and pregnant at risk for PB early in pregnancy.

Genital tract infections account for about 25 - 40% of preterm deliveries. Women with Chlamydia trachomatis, Gardnerella Vaginalis, Trichomonas Vaginalis, Neisseria Gonorrhoeae, Treponema Pallidum, have a higher rate of preterm births. Still, the infection is difficult to detect due to the limitations of conventional microbial techniques and the difficulties in obtaining appropriate diagnostic samples during

pregnancy [6,7]. Experimental models also suggest the possible induction of labor by viral infection [5]. Chorioamnionitis is considered an important reason for prematurely childbirth, as microbiological data testify [5-7].

Definition

Chorioamnionitis (CA) is technically a histopathological diagnosis, but clinically the term "intraamniotic infection" may be more appropriate. Thus there are several diagnoses in the literature. Histopathological diagnosis CA defines as the presence of inflammatory cells in the fetal membranes. Clinically, CA is defined as Typically maternal fever and at least two of next signs: uterine tenderness, fetal and/or maternal tachycardia, maternal leukocytosis, foul smelling fluid.Taking into account the maternal inflammatory response, CA is defined as: Inflammatory changes limited to the subchorion, chorion and amnion. Finally, if the fetal immune response is considered, CA will be defined as umbilical vasculitis, funistis, elevated inflammatory markers in the cord blood. However, CA can be defined as infection and inflammation of the chorionic membrane (chorionic and amniotic) and/, or the amnion/amniotic fluid. CA is most commonly caused by a maternal ascending polymicrobial pathway, and can be infected by the fetus following exposure to an infection, directly by contact with amniotic fluid, or indirectly by placental-fetal circulation [8,9].

Etiology

A number of bacterial, viral, fungal, and parasitic pathogens may be etiological factors of CA. The most common causes are: Ureaplasma urealyticum (15 - 62%), Mycoplasma hominis (7 - 35%), Group B Streptococcus (8 - 11%), Escherichia coli (7 - 12%), Gardnerella vaginalis (8 - 25%), Bacteroides sppeties (8 - 30%), Fusobacterium sppeties (10 - 67%), Prevotella sppeties (17%), Peptostreptococcussppeties (16%) etc [9].

CA is most often due to ascending bacteria causing acute inflammation of the membranes and the chorion of the placenta. Risk factors for CA include longer duration of membrane rupture (more than 12 h), nulliparity, internal monitoring of labor, multiple vaginal exams (more than or equal to 3), smoking, alcohol or drug abuse, immune compromised states and colonization with group B streptococcus. PPROM is the main factor of risk for clinical manifestation of CA. However, it should not be forgotten that preterm delivery and PPROM are most often a consequence of subclinical CA [10].

CA is an infection that can occur before labor, during labor. It can be acute, subacute or chronic. The effects of CA on the health of the newborn are particularly important in clinical practice. In the case of premature birth, the newborn is already at risk of all the risks of early termination of pregnancy. Additionally, CA carries additional health risks for the newborn. Most commonly, CA is associated with chronic lung disease in the infant, premature retinopathy, very low birth weight, and impaired brain development [10].

Epidemiology

In term births, CA is present in 4% of births. However, that frequency is higher in preterm births and PPROM. Premature delivery and PPROM, histologically in addition to CA, are also dominated by vasculitis [1-13]. Histologically confirmed CA is present in 94% of births that occurred between 21-24 weeks of gestation [14,15].

Pathogenesis

CA is most often an ascending infection, originating from the lower urogenital tract (cervical or vaginal infection). Other ways of transmitting the infection to the chorion and amnion have already been mentioned above.

A pathological feature of CA is neutrophil infiltration into fetal membranes and the presence of neutrophils in amniotic fluid.

Whether the infection is ascending or descending, the first step in the pathogenesis of CA is the passage of infectious agents into the chorioamnion and/or umbilical cord and/or placenta. The presence of infectious agents in the chorioamnion causes an inflammatory response in the mother and fetus, characterized by the release of a combination of proinflammatory and inhibitory cytokines and chemokines in both the mother and the fetus. The inflammatory response may cause clinical chorioamnionitis and/or lead to prostaglandin release, cervical maturation, membrane rupture and delivery (term or preterm delivery). In conditions of CA, in addition to the risk of direct adverse effect of the infectious agent on the fetus, one must not forget the effect of the fetal inflammatory response which may cause cerebral white matter damage, which damage may cause cerebral palsy, short-term or long-term neurological sequels [10,11,13].

The consequences of maternal CA are manifested as: endomyometritis, wound infection, pelvic abscess, bacteriemia and postpartum-hemorrhage, while, septic shock, disseminated intravascular coagulation, adult respiratory distress syndrome and maternal death are only rarely encountered [10,16,17].

Clinical signs and symptoms

CAis clinically manifested asa maternal fever associated with an elevated white blood cell count (≥ 15,000/mm^3), uterine tenderness (4 - 25% cases), abdominal pain, purulent fluid coming from the cervical canal, and fetal and maternal tachycardia (in 50 - 80% cases) and fetal tachycardia (in 40 - 70% cases). Presence of maternal fever is a necessary criterion for the diagnosis of clinical CA (maternal temperature ≥ 38°C). Fever is present in 95 - 100% of cases of clinical CA and is typically required for the diagnosis. The majority of women presenting with CA are in labor or have ruptured membranes [10,11,13,15].

Diagnosis

Often, the diagnosis of CA is delayed, leading to delayed preterm delivery, endangering the health of the pregnant woman, and damage to the fetus. Therefore, early recognition and diagnosis of CA is especially important.

The diagnosis is made on the basis of clinical maternal symptoms. Laboratory signs in favor of CA are: elevated leukocyte count, elevated CRP, microbiological examination of vaginal and cervical material. Postpartum, histopathological diagnosis is made by analysis of the chorion and amnion, placenta, and umbilical cord [10,11,14].

Differential-diagnostic, in women with fever, pain, and tenderness during labor must be evaluated for other common infections such as appendicitis, urinary tract infection, pyelonephritis, and pneumonia. Additional ancillary testing and examination must be thoroughly reviewed before making a final diagnosis [10].

Management

The primary management of CA is administration of antibiotics. The most common antibiotics used are ampicillin and gentamicin. Alternative antibiotics include clindamycin, metronidazole, cephalosporins, and vancomycin in women allergic to penicillin. After delivery, the current recommendation is to administer one additional dose with a cesarean section but no additional antibiotics for vaginal deliveries. Additional broad-spectrum antibiotics may be required, depending on the clinical status [10,18].

Conclusion

CA is a common and serious perinatal problem. If not recognized in time and treated appropriately and in a timely manner, CA leads to significant maternal, fetal, and neonatal morbidity and mortality. The diagnosis is based on the clinical signs, and therefore it is important during the perinatal examinations, to educate the pregnant woman what are the symptoms that if they occur, she should immediately

contact a gynecologist. Immediate treatment with antibiotics and proper care will ensure a better outcome of the CA-threatened pregnancy. Research in this area and the discovery of new biomarkers will allow appropriate interventions and treatments to be applied in the future, thus contributing to the prevention and more effective treatment of CA.

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