

# TOXOPLASMOSIS IN A PREGNANT WOMAN – CASE STUDY

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## ABSTRACT

Infection with the protozoan parasite *Toxoplasma gondii* is a rare health problem among pregnant women, which can pose a serious risk to the foetus. Infections with *Toxoplasma gondii* in adults are typically asymptomatic. The diagnosis and treatment are important and should be tailored to the clinical status of a pregnant woman and the foetus. The patient management crucially depends on whether the infection was transmitted across the placenta to the foetus. Spiramycin is prescribed when primary maternal toxoplasmosis is diagnosed during gestation until the foetal invasion is confirmed or until delivery. A neonate born to a mother with toxoplasmosis should be diagnosed for congenital toxoplasmosis.

Aim of the study was to present the diagnosis, management, and possible complications of toxoplasmosis based on the care of a female patient infected with *Toxoplasma gondii*.

This is a case study. The patient provided informed consent to the observation and access to her medical records. The patient's privacy is protected.

This is a case of a 32-year-old pregnant woman hospitalized in the second trimester of pregnancy due to impending preterm delivery. The patient was diagnosed with *Toxoplasma gondii* infection during hospitalization.

Toxoplasmosis may pose a serious threat to the foetus and subsequently to the health of a newborn. If a maternal infection is detected, treatment should be implemented forthwith. A midwife's task is to educate every pregnant woman on the prevention, methods of detection, and treatment of infections with *Toxoplasma gondii*.

**Key words:** pregnancy, *Toxoplasma gondii*, congenital toxoplasmosis.

## INTRODUCTION

Toxoplasmosis is one of the most common parasitic infections in humans. It is caused by the parasite *Toxoplasma gondii*, a cosmopolitan intracellular protozoan [1]. It is estimated that about one-third of the world's population is infected with latent toxoplasmosis [2]. There are three basic infectious stages of *Toxoplasma gondii*: bradyzoites (housed in tissue cysts), oocysts, and tachyzoites, which are all invasive for humans (intermediate hosts) [1]. Humans can become infected by several routes, including by consuming contaminated foods (foodborne infection), transplacentally from mother to foetus (congenital), through direct transmission from an infected animal (zoonotic), and through blood transfusion or organ transplantation [3].

According to the standards of care valid in Poland, every pregnant woman has the right to undergo a test to detect immunoglobulin M (IgM) and immunoglobulin G (IgG) anti-*Toxoplasma gondii* antibodies

up to the 10<sup>th</sup> week of gestation and to be retested for immunoglobulin M (IgM) anti-*Toxoplasma gondii* antibodies between 21 and 26 weeks of gestation if the test result in the first trimester of pregnancy was negative [4].

## CASE STUDY

A 32-year-old female patient (2<sup>nd</sup> pregnancy, 2<sup>nd</sup> delivery) was admitted to a tertiary referral centre at 20+0 weeks of gestation, presenting with symptoms of threatened preterm labour. The patient was diagnosed with an incompetent cervix, status post treatment of genital candidiasis caused by *Candida albicans*. The pregnancy was complicated by RhD incompatibility (the patient was on immunoprophylaxis). The patient did not report any comorbidities except for hypothyroidism diagnosed during pregnancy and managed with Letrox 75 µg/100 µg. The patient regularly attended Ob-Gyn check-ups. The patient reported an allergy to amoxicillin. The first preg-

nancy was uncomplicated, with vaginal delivery at 41+3 weeks of gestation. The patient had no history of miscarriages. She underwent laparoscopic excision of a left ovarian tumour (dermoid cyst of the ovary – teratoma) in 2013.

On admittance to a high-risk pregnancy department, no abnormalities were detected in laboratory blood tests: 0 Rh (–) negative, PTA: (–) negative, WR: (–) negative, HBsAg: (–) negative, a-HCV: (–) negative, HIV: (–) negative, Toxo IgG: (–) negative, Toxo IgM: (–) negative, Rubella IgG: (+) positive, Rubella IgM: (–) negative, CMV IgG: (–) negative, CMV IgM: (–) negative. Due to gestational age, the patient did not have any vaginal and rectal GBS smears.

On admittance, after a detailed history taking and documentation review, the patient was found to be negative for *Toxoplasma gondii* IgG and IgM antibodies in tests performed in the 1<sup>st</sup> trimester of pregnancy. According to the Regulation of the Minister of Health of 16 August 2018 on the perinatal standards of care, a woman who tested negative for toxoplasmosis in the first trimester of pregnancy can be retested for *Toxoplasma gondii* IgM antibodies in later pregnancy. *Toxoplasma gondii* IgM test was performed again at 28+5 weeks of gestation revealing IgG: (–) negative, IgM: (+) positive status. The patient was consulted with an infectious disease specialist, who prescribed Rovamycine (spiramycin) (3 × 3 million IU) and follow-up tests in 3 weeks. The patient was also informed she was eligible for amniocentesis to determine the status of infection transmission to the foetus, but she refused it and asked for some time to consider her options. After a conversation clarifying doubts about initiating Rovamycine, the patient consented to the therapy. At 31+3 weeks of gestation, the patient reported a lump in her right groin. Palpation showed that it was a palpable, painless, mobile lymph node. It was reported to an internist who, through a telephone consultation, recommended reporting this event to the infectious diseases specialist. Another test for *Toxoplasma gondii* IgG and IgM antibodies was performed at 31+4 weeks of gestation. The infectious diseases specialist was consulted again at 31+5 weeks of gestation; the diagnosis of toxoplasmosis was definitively confirmed based on the persistence of IgM antibodies and seroconversion to IgG antibodies (IgG: (+) positive); continuation of the current treatment was recommended. Amniocentesis was also considered, and postpartum diagnostics of the newborn for congenital toxoplasmosis was recommended. The nodule present in the right groin proved to be nonspecific for lymph node toxoplasmosis. It was concluded that the nodule could correspond to a reactive lymph node or a boil secondary to a deep folliculitis. Foetal ultrasound was performed during hospitalization. No pathologies were found at that time. At 31+6 weeks of gestation, the patient

was discharged against informed consent, and was instructed to attend regular check-ups.

## DISCUSSION

Over 211 million pregnancies occur each year, worldwide [5]. Toxoplasmosis is found in 0.5-8 out of 1000 pregnant women susceptible to the infection [1]. Individuals with an uncompromised immune system infected with *Toxoplasma gondii* do not show any specific signs or symptoms of the infection. A small share of infected individuals develop enlarged lymph nodes (lymphadenopathy), fever, and muscle weakness. Most often, however, the disease is asymptomatic [6].

## Diagnosis

Diagnosis mainly relies on serological tests [7]. Tests are performed to detect specific IgM and IgG antibodies against *Toxoplasma gondii*. A recent infection can be suspected if a negative test result is obtained in early pregnancy followed by a positive test result for IgM/IgG antibodies (seroconversion) in later pregnancy. However, the test results can be difficult to interpret, and a more detailed diagnosis should be performed [5]. Specific IgM are the first antibodies produced during an initial infection. The IgM antibodies are generated within the first week of primary infection and the IgM titres tend to increase for the subsequent 4 weeks. After this period, the IgM titres decrease and remain low for different lengths of time, even for up to several years. As a result, the mere presence of IgM antibodies is not sufficient to confirm primary toxoplasmosis. Specific IgG antibodies are detectable about 2 weeks after the infection. The serum titres increase fast to reach peak values within 2 months. The high titres persist for at least 8 months and then decrease. If the levels of IgG remain constant, a previously acquired infection can be suspected [8]. *T. gondii* IgA assay is helpful for the diagnosis of primary toxoplasmosis. The IgA titres increase during the first month after the infection and reach their peak after about 2-3 months. One year after the infection, IgA are undetectable in most patients [1, 9].

To sum up, toxoplasmosis can be diagnosed using serological tests based on the following criteria: seroconversion for IgG (if negative before pregnancy), a significant increase in IgG and the presence of IgM and/or IgA, high IgG titre and the presence of *Toxoplasma gondii* IgM and/or IgA antibodies accompanied by lymphadenopathy during pregnancy, high IgG titres and the presence of *Toxoplasma gondii* IgM and/or IgA antibodies in the second half of pregnancy without lymphadenopathy [3].

In addition, toxoplasmosis can be more reliably classified as either recently or previously acquired in-

fection based on avidity of IgG antibodies. IgG avidity test determines the affinity of specific IgG antibodies to the *Toxoplasma gondii* antigen as an expression of the host's immune response. IgG antibodies demonstrate low avidity in primary and active toxoplasmosis, which is manifested by the rapid decline of antigen-antibody complexes. In chronic *Toxoplasma gondii* infection acquired at least 3-5 months earlier, a high IgG avidity in serum means that the antigens are strongly bound by the antibodies to form an antigen-antibody complex. Avidity tests provide more diagnostic value in early pregnancy (1<sup>st</sup> trimester) because they can differentiate between infections acquired before and during pregnancy [10].

If no anti-toxoplasma antibodies are detected in a pregnant woman, she should be considered a high-risk patient. Therefore, the patient should be educated about proper prophylaxis, and the tests should be repeated every 3 months [6]. Repeated testing during pregnancy is recommended due to the risk of vertical transmission of *Toxoplasma gondii* to the foetus in recent maternal infection [11].

### Management and possible complications

Diagnosing and managing toxoplasmosis during pregnancy is very important to prevent serious complications in the foetus [12]. The patient management crucially depends on whether the infection was transmitted across the placenta to the foetus [13]. Spiramycin is prescribed when primary maternal toxoplasmosis is diagnosed during gestation until the foetal invasion is confirmed or until delivery [14]. Spiramycin is not teratogenic and does not readily cross the placenta; therefore, it is not considered an effective drug for an infected foetus [8]. However, prenatal treatment may reduce the risk of severe congenital toxoplasmosis in children of mothers who received appropriate antenatal treatment [15]. If foetal infection is confirmed, antifolates – Fansidar (pyrimethamine plus sulfadiazine) – can be used in combination with folic acid [16]. The clinical changes in the foetus are related inversely to the gestational age at the time of foetal infection [3]. The risk of transplacental transmission of *Toxoplasma gondii* increases with gestational age due to the physiological increase in placental permeability [17]. The risk of severe damage to the central nervous system of the foetus decreases with increasing gestational age [1]. Transplacental foetus infection with *Toxoplasma gondii* during the first trimester may cause severe damage to the foetus, miscarriage, or premature delivery [18]. If the infection is transmitted at later gestational age, it may result in foetal hydrocephalus, microcephaly, cerebral calcifications, retinal choroiditis, and changes in the central nervous system. These changes may become symptomatic later in life [19].

When discussing a case study of toxoplasmosis in a pregnant woman, it is important to highlight the role of the prevention of *Toxoplasma gondii* infections. Midwives should be actively involved in educating pregnant women about preventive measures. Expectant mothers should pay greater attention to maintaining personal hygiene standards that can effectively prevent primary infection [20]. Eating raw and undercooked meat should be avoided; fruit and vegetables should be washed and peeled. When working in the garden, protective gloves should be worn to avoid contact with cat faces [21, 22]. Secondary prophylaxis involves testing for IgG and IgM antibodies against *Toxoplasma gondii* at least twice during pregnancy. These tests can detect possible seroconversion, after which appropriate treatment can be initiated [7].

### SUMMARY

Toxoplasmosis, although not classified as a common problem among patients hospitalized at high-risk pregnancy departments, may pose a serious threat to the foetus and, subsequently, to the health of a newborn. Expectant mothers should be educated on this topic by healthcare professionals – midwives and attending physicians.

### Disclosure

The authors declare no conflict of interest.

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