

## ORIGINAL ARTICLE

# Comparative study between nested semi- quantitative PCR technique and serological tests in diagnosis of toxoplasmosis during pregnancy- The role of IL-12 in toxoplasmosis

A study in AL-Madinah, Saudi Arabia

Fawzia A Habib<sup>1</sup>, Lobna M Saber<sup>2</sup>, Amany A Abd El-Aal<sup>3</sup>, Hala F Gawad<sup>4</sup>, Asmaa A Abd El-Aal<sup>5</sup>  
and Lamia A El-Hosseiny<sup>6</sup>

1. Department of Obstetrics and Gynecology, 3. Department of Parasitology & 4. Department of Physiology, Faculty of Medicine, Taibah University, Saudi Arabia, 2. Department of Biochemistry, Faculty of Medicine, Al-Azhar University, Cairo, Egypt, 5. Department of Clinical pathology, Faculty of Medicine, Cairo University, Egypt, 6. Department of Biomedical Technology, National Research Center, Cairo, Egypt

## ABSTRACT

**Background:** Difficulties in interpretation of serological tests carried out to detect primary maternal infection with toxoplasmosis during pregnancy implies more and more frequent use of the Polymerase Chain Reaction (PCR).

**Aim - Methods:** To evaluate the results of serological tests, the nested semi- quantitative PCR method was applied in 168 pregnant women, for the presence of B1 gene of *Toxoplasma gondii*. The presence of IgG and IgM *Toxoplasma gondii* antibodies was detected by the indirect haemagglutination (IHA) method. In addition, a trial was done to evaluate the role of IL-12 (Th-1 cytokine) in toxoplasmosis in 40 pregnant out of our 168 cases in which *Toxoplasma* gene was demonstrated in 20 blood samples of them. The serum level of IL-12 was estimated using ELISA technique.

**Results:** The study revealed significant differences between the results of IHA and PCR. *Toxoplasma gondii* genetic material in blood was found in 68 (40.5%) samples. IgG was detected in 28 (16.7%) of these PCR-positive cases, positive IgM was found in 8 out of these 28 samples. On the other hand, 100 (59.5%) cases were PCR- negative; 44 (26.1%) of them were serologically positive and the remaining 56 (33.3%) cases were serologically negative. No correlation was estimated between the sero-reactivity and the serum level of IL-12, On the other hand, a positive correlation was estimated between the results of IL-12 and the presence of *Toxoplasma* gene in patient's blood. The 20 gene positive samples obtained higher level of IL-12 irrespective to their serum *Toxoplasma* immunoglobulin level. Moreover, the concentration of the gene positive samples were significantly higher than the gene negative group  $P < 0.01$ .

**Conclusions:** The present study highlights the need for a confirmatory test in addition to serology to detect primary acute toxoplasmosis in pregnant women. Nested (semi-quantitative) PCR amplification of the B1 gene of *T. gondii* using whole blood is a rapid, sensitive and specific diagnostic procedure for the diagnosis of *T. gondii* infection in adult females before or during pregnancy. The significant rise in the IL-12 that was shown in the present study with recently infected cases suggested the possible use of this cytokine as an indicator or marker to diagnose recent infection of *Toxoplasma gondii* in the absence of specific *Toxoplasma* antibodies.

**Keywords:** *toxoplasmosis, pregnancy, Polymerase Chain Reaction, serologic tests, diagnosis.*

## INTRODUCTION

**T**oxoplasmosis is caused by infection with *Toxoplasma gondii*, a single-cell protozoan that belongs to the family Coccidia. *T. gondii* infection is found in 30%-50% of the human population worldwide. Although adult-acquired toxoplasmosis is usually mild to asymptomatic, the disease can be severe in the immunocompromised subjects.<sup>1</sup>

When acute *T. gondii* infection is suspected in a pregnant woman, the diagnosis should be pursued. Early diagnosis of toxoplasmosis in pregnant women allows early intervention and prevention of congenital disorders. Toxoplasmosis is usually diagnosed on the basis of antibody detection. Indirect haemagglutination test (IHA)<sup>2</sup>, enzyme-linked immunosorbent assay (ELISA)<sup>3</sup> and indirect fluorescent antibody test among the serological tests used to diagnose such infection.<sup>1</sup> In acute infection with toxoplasmosis, IgG and IgM antibody levels generally raise within one to two weeks of infection.<sup>4,5</sup>

The most frequent challenge encountered by physicians all over the world is determination of acute infection in pregnant women. Women who acquired the infection prior to pregnancy are essentially not at risk of delivering an infected infant, unless the woman is immunosuppressed.<sup>6</sup> It

**Corresponding Author:** Dr Lobna M. Saber,  
PO Box 20322, AL-Madinah, Saudi Arabia.  
Tel:00966507540292 Fax:0096648157060,  
E-mail:lobnahasan@yahoo.com