Serological detection of *Toxoplasma gondii* in chronic renal failure patients and in renal transplant recipients

Thesis

Submitted for the Partial Fulfillment of
the M.Sc. degree in Parasitology

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2009

ACKNOWLEDGEMENT

*First, I would like to express my sincerest gratitude and gratefulness to **Allah** who bless and fill me with hope, faith and patience that enable me to carry out all my daily work.*

*My deep gratitude and appreciation, great thanks to Prof. Dr. **Hoda Helmy**, Professor and Head of Parasitology Department, Faculty of Medicine, Cairo University, for her generous help and continuous support throughout this work.*

*I am greatly honored to express my thanks and gratitude to Prof. Dr. **Sayeda M. Aufy**, Professor of Parasitology, Faculty of Medicine, Cairo University, for guidance, great help encouragement and her creative support throughout the whole work up of this thesis.*

*I would like to express thanks and gratitude to Professor Dr. **Mohamed Gamal El-din Saadi**, Professor of Internal medicine, Faculty of Medicine, Cairo University, for his valuable help and advice for me to accomplish this work.*

*I am very much indebted to Dr. **Abeer Mohamed Mahgoub**, Lecturer of Parasitology, Faculty of Medicine, Cairo University, for her kind supervision, valuable advices, constructive criticism and indispensable help throughout this work.*

*Last but not least, I would like to thank **my family** for their great help and support and every person who helped me during this work especially **my dear colleagues** in Parasitology Department, Faculty of Medicine, Cairo University, for their great help in this work.*

ABSTRACT

Toxoplasma gondii antibodies were detected serologically in 78 patients with renal disease using ELISA technique. Patients were classified according to renal status; chronic renal failure not undergo haemodialysis group (19 cases), chronic renal failure undergo haemodialysis (30 cases), renal transplant recipient (29 cases), compared to 13 cases in control group. Seropositivity for anti-*Toxoplasma* IgG & IgM antibodies were 36.8% & 10.5% in renal failure patients not undergo haemodialysis, 56.7% &16.7% in patients undergo haemodialysis and 69% &24.1% in renal transplant recipients versus 23.1% & 0% in control group with statistical significant difference for anti-*Toxoplasma* IgG antibodies only.

KEY WORDS: *Toxoplasma gondii*, renal, haemodialysis, transplant, ELISA, IgG & IgM antibodies.

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LIST OF ABBREVIATIONS

AIDS	Acquired immune deficiency syndrome
APCs	Antigen presenting cells
AU	Arbitrary Units
CA	Circulating antigens
CAT	Computerized axial tomography
CFT	Complement fixation test
CGMC	Comparative IgG profiles between mother and child test
CIEP	Counter-current Immune Electrophoresis
CMI	Cell mediated immune response
CNS	Central nervous system
CRF	Chronic renal failure
CT	computed tomography
DCs	Dendritic cells
DT	Sabin-Feldman dye test
ELIFA	Enzyme-linked immunofiltration assay
ELISA	Enzyme linked immunosorbent assay
ES	excretory/ secretory
ESRD	End-stage renal failure
GRA	Granular proteins
HIV	Human immune deficiency virus
HRP	Horseradish peroxidase
HS	Highly Significant
HSP	heat shock protein
IDO	Indolamine-2,3dioxygenase
IEL	Intraepithelial lymphocytes
IFA	indirect fluorescent antibody assay

IFAT	Indirect fluorescent antibody test
Ig	Immunoglobulin
IHAT	Indirect haemagglutination test
IL	Interleukin
ISAGA	IgM Immunosorbent agglutination assay
IU	International Units per milliliter
LA	Latex agglutination test
M	Macrophages
MAT	Modified direct agglutination test
MIC	Microneme
mRNA	Messenger ribonucleic acid
NK	Natural killer
NO	Nitric oxide
NS	Non-Significant
PAS	Periodic acid-Schiff positive
PCR	Polymerase Chain Reaction
PMNs	Polymorphonuclear leukocytes
PV	Parasitophorous vacuole
PVM	PV membrane
RNI	Reactive nitrogen intermediates
ROI	Reactive oxygen intermediates
S	Significant
SAG	Surface antigen
SMX	Sulfamethoxazole
T. gondii	*Toxoplasma gondii*
TE	Toxoplasmic encephalitis
Th	T-helper
Thp	T-helper precursor cells
TMB	Tetramethylbenzidine

TMP	Trimethoprim
TNF	Tumor necrotic factor
TSPs	*Toxoplasma* serologic profiles
W	Week
Y	Year

INTRODUCTION AND AIM OF THE WORK

Introduction and Aim of the work

Toxoplasma gondii is a ubiquitous protozoan parasite that is estimated to infect one-third of the world's human population ***(Weiss and Dubey, 2009)***.

Toxoplasmosis can cause fetal infection if it is acquired during pregnancy, with unpredictable manifestations in the fetus and neonate ***(Foulon et al., 2000)***. Within immunocompetent humans, toxoplasmosis is benign and self limiting **(Barbosa et al., 2008)**. Whereas, toxoplasmosis is a major opportunistic infection that may lead to morbidity and mortality in immunocompromised individuals ***(Lin et al., 2000 and Meeka et al., 2001).***

Chronic renal failure patients suffer from impairment of cell mediated immunity either due to uremia or due to interventions used in their therapy, including dialysis and transplantation with subsequent immunosuppressive therapy and multiple blood transfusions ***(Pesanti, 2001)***.

Immuncompromised hosts with T cell defects include AIDS patients, patients with hematological malignancies (especially Hodgkin's disease and other lymphomas), organ transplant recipients, and patients receiving immunosuppressive therapy with corticosteroids and cytotoxic drugs ***(Weiss and Dubey, 2009)***.

Toxoplasmosis in these patients usually occurs as a consequence of the recrudescence of a latent infection acquired before the onset of immune suppression. However, it may occur also due to recently acquired acute infection with the parasite ***(Montoya et al., 2001).***

Human beings can be infected with *Toxoplasma gondii (T. gondii)* by ingestion or handling of undercooked or raw meat (mainly pork and lamb) containing tissue cysts or water or food containing oocysts excreted in the faeces of infected cats or exposure to infected cats ***(Cook et al., 2000, Dubey et al., 2002 and Bahia-Oliveira et al., 2003).*** Direct human-to-human transmission include transplacental transmission from mother to her fetus ***(Reis et al., 2006)***.It also include transmission of *T. gondii* by organ

transplantation from a seropositive donor to a seronegative recipient in heart, heart-lung, kidney, liver, and liver pancreas transplantations. Although rare, *T. gondii* can also be transmitted via blood or leucocytes from immunocompetent and immunocompromised donors ***(Montoya and Liesenfeld, 2004).***

Toxoplasmosis demonstrates various clinical manifestations. In immunocompetent individuals, toxoplasmosis is generally asymptomatic, however, it sometimes manifests with fever, malaise, headache, myalgia, asymptomatic lymph node enlargement, and chorioretinitis when it locates in the eye ***(Montaya et al., 2002)***. In immunocompromised patients, *T. gondii* may cause encephalitis, pneumonitis and myocarditis as manifestations of toxoplasmosis. These infections are usually fatal if not recognized and treated ***(Weiss and Dubey, 2009)***.

Clinical signs are non-specific and insufficiently for a definite diagnosis because toxoplasmosis mimics several other infectious disease ***(Remington et al., 2001).***

Diagnosis of toxoplasmosis in humans is usually made by serological, histological, and molecular methods, or by some combination of the above ***(Montoya et al., 2002)***. The direct recovery of *Toxoplasma gondii* from biological samples is often impracticable. Consequently, serological diagnosis represents the most widely used approach for defining the stage of infection ***(Sensini, 2006).***

In clinical practice, serological tests are routinely employed to detect immunoglobulin M (IgM) and immunoglobulin G (IgG) specific antibodies, including indirect immunofluorescence and immunoenzymatic tests (enzyme – linked immunosorbent assay (ELISA), with the latter showing higher sensitivity and specificity ***(Remington et al., 2004)***.

<u>Aim of work:</u>

- Study prevalence of seropositivity for anti-*Toxoplasma* antibodies (IgG and IgM) in patients with chronic renal failure and renal allograft recipient using enzyme – linked immunosorbent assay (ELISA) technique.