



D

**PARVOVIRUS B19 INFECTION IN PATIENTS WITH  
ERYTHEMA INFECTIONOSUM, ARTHROPATHY AND  
CHRONIC HAEMOLYTIC ANAEMIA**

**Thesis**

Submitted in partial fulfillment of The  
M.D. Degree in Clinical and Chemical Pathology

**By**

**Hoda Mahmoud Osman**  
(M.B., B.Ch., M. Sc.)

11/0156  
11 1

53344

**Supervisors**

*ISLAH EL FALAKY*

**Prof. Dr. ISLAH HASSAN EL-FALAKY**  
Professor of Clinical and Chemical Pathology.

*MONA EL SAMAHY*

**Dr. MONA HUSSEIN EL SAMAHY**  
Professor of Pediatrics

*Magda Salah El-Din Gabr*

**Dr. HADIA HUSSEIN BASSIM**  
Ass. Prof. of Clinical and Chemical Pathology

*Magda Salah El-Din Gabr*

**Dr. MAGDA SALAH EL-DIN GABR**  
Ass. Prof. of Clinical and Chemical Pathology

*NEVINE NABIL KASSEM*

**Dr. NEVINE NABIL KASSEM**  
Ass. Prof. of Clinical and Chemical Pathology



*M/*

**Faculty of Medicine  
Ain Shams University  
1996**









**To My Family**



## ACKNOWLEDGEMENT

I would like to express my deepest thanks, gratitude and appreciation to Prof. Dr. **ISLAH HASSAN EL-FALAKY**, Professor of Clinical and Chemical Pathology, Ain Shams University, for her sincere supervision, helpful suggestions and constructive criticism. I am readily indebted to all the kind help she had offered me which made the completion of this work possible.

My deepest thanks and appreciation to Dr. **MONA HUSSEIN EL-SAMAHY**, Professor of Pediatrics, Ain Shams University, for facilitating the collection of samples required in this study and for her valuable suggestions and guidance.

I wish also to express my sincere thanks to Dr. **HADIA HUSSEIN BASSIM**, Assistant Professor of Clinical and Chemical Pathology, Ain Shams University, for her valuable guidance, supervision, overwhelming kindness and encouragement.

I wish also to express my deep gratitude to Dr. **MAGDA SALAH EL-DIN GABR**, Assistant Professor of Clinical and Chemical Pathology, Ain Shams University, for her unlimited effort and assistance.

I am very grateful to Dr. **NEVINE NABIL KASSEM**, Assistant Professor of Clinical and Chemical Pathology, Ain Shams University for her generous help and continuous encouragement.





---

## ABSTRACT

Human parvovirus B19 is a small, single-stranded DNA virus belonging to the taxonomic genus *autonomous parvovirus* of the family *parvoviridae*.

In the present study, our aim was to assess the importance of parvovirus B19 infection in cases of erythema infectiosum (group I, n=22), chronic haemolytic anaemia (group II, n=21) and arthralgia (group III, n=22) by detection of parvovirus B19 antigen using counter immunoelectrophoresis and IgM and IgG viral antibodies using ELISA technique.

Our results showed that in group I (EI) parvovirus B19 IgM antibodies were detected in 41%. In group II (CHA) evidence of recent parvovirus B19 infection (antigen and/or IgM) were detected in 7 out 21 cases, 5 of them suffered from aplastic crisis. In group III (arthropathy) parvovirus B19 IgM and IgG antibodies were detected in 54.4%.

We conclude that parvovirus B19 infection could be considered as a causal association with arthropathy and gave a strong support to the proposition that parvovirus B19 is the specific cause of erythema infectiosum and aplastic crisis in chronic haemolytic patients.

---

Abstract



---

## LIST OF ABBREVIATIONS

AAV:	Adeno-associated virus.
AIDS:	Acquired Immuno deficiency syndrome.
CDC:	Centers for Disease control.
cDNA:	Complementary DNA.
CFU-E:	Colony-forming unit-Erythyroid.
CHA:	Chronic haemolytic anaemia.
CIE:	Counter current Immuno Electrophoresis.
CPV:	Canine Parvo Virus.
DBA:	Diamond Blackfan anaemia.
DNA:	Deoxyribonucleic acid.
EI:	Erythema Infectiosum.
ELISA:	Enzyme linked Immunosorbent Assay.
EM:	Electron Microscopy.
FCS:	Fetal calf serum.
FPV:	Feline parvovirus.
HBsAg:	Hepatitis B surface antigen.
HLA:	Human leucocyte antigen.
HPV-B19:	Human parvovirus B19.
IEM:	Immuno-Electron-Microscopy.
IFA:	Indirect Immuno fluorescence Assay.
IgG:	Immunoglobulin G.
IgM:	Immunoglobulin M.
ISPCR:	In situ polymerase chain reaction.
ITP:	Idiopathic thrombocytopenic purpura.
nM:	Nanometer.
O.D:	Optical density
PCR:	Polymerase chain reaction.
RA:	Rheumatoid Arthritis.
RF:	Rheumatoid Factor
RPHA:	Reverse passive hemagglutinin.
RIA:	Radio Immuno Assay.
TAC:	Transient Aplastic Crisis.
TEC:	Transient Erythroblastopenia of Childhood.



---

## LIST OF FIGURES

- Fig. (1):**  
Ouchterlony gel diffusion test .....(6)
- Fig. (2):**  
The icosahedral parvovirus B19  
particle .....(13)
- Fig. (3):**  
Human parvovirus B19 genome, characteristic  
hairpin structure .....(14)
- Fig. (4):**  
Map of parvovirus genome .....(15)
- Fig. (5):**  
Model for B19 parvovirus DNA  
replication .....(17)
- Fig. (6):**  
Postulated replication of parvovirus  
B19 .....(19)
- Fig. (7):**  
Events that follow intranasal inoculation  
of virus .....(26)

---

<b>Fig. (8):</b>	
Immunoelectron micrograph of human parvovirus B19 .....	(60)
<b>Fig. (9):</b>	
Counter-immunoelectrophoresis .....	(61)
<b>Fig. (10):</b>	
Schematic diagram of steps in the antigen-capture assay .....	(63)
<b>Fig. (11):</b>	
Schematic diagram of steps of the antibody-capture assay .....	(69)
<b>Fig. (12):</b>	
Model of IgM ELISA microwell strip .....	(91)
<b>Fig. (13):</b>	
Model of IgG ELISA microwell strip .....	(97)
<b>Fig. (14):</b>	
Template for counter immuno-electrophoresis .....	(101)
<b>Fig. (15):</b>	
ELISA O.D. values of parvovirus B19-IgM in the sera of the group of children with erythema infectiosum in relation to age .....	(114)

---

**List of Figures**