

{ "وَقُلْ رَبِّ زِدْنِي عِلْمًا" }

سورة طه الايه (114)

(الَّذِي خَلَقَنِي - فَهُوَ يَهْدِينِ * وَالَّذِي هُوَ يُطْعِمُنِي - وَيَسْقِينِ * وَإِذَا مَرِضْتُ فَهُوَ يَشْفِينِ * وَالَّذِي يُمِيتُنِي ثُمَّ يُحْيِينِ - * وَالَّذِي أَطْمَعُ أَنْ يَغْفِرَ لِي خَطِيئَتِي - يَوْمَ الدِّينِ * رَبِّ هَبْ لِي حُكْمًا وَأَلْحِقْنِي بِالصَّالِحِينَ * وَاجْعَلْ لِّي لِسَانَ صِدْقٍ فِي الْآخِرِينَ * وَاجْعَلْنِي مِنْ وَرَثَةِ جَنَّةِ النَّعِيمِ * وَاعْفُ عَنِّي لِأَبِي إِنَّهُ كَانَ مِنَ الصَّالِحِينَ * وَلَا تُخْزِنِي يَوْمَ يُبْعَثُونَ * يَوْمَ لَا يَنْفَعُ مَالٌ وَلَا بَنُونَ * إِلَّا مَنْ أَتَى اللَّهَ بِقَلْبٍ سَلِيمٍ * وَأُزْلِفَتِ الْجَنَّةُ لِلْمُتَّقِينَ *)

(سورة الشعراء من الآية (78-90)

Dedication

At this time it's hard to find way to pick the perfect words to say.

To my parents whom I beloved and blessed and who taught me how to be patient, grateful and responsible for our family.

To my lovely sons, daughters, wife, colleagues, technologists and sonologists.

Thanks are extended to my family and to Dr. Elsawi Yousif (Radiologist in Elobeid) Dr.Bushra Hussien and to Dr. Caroline Edward Ayad for help and guidance.

Acknowledgements

Page | III

First of all great thank to my God for giving me strength patience to carry out this research.

I would like to thank my supervisor Dr. **ELSAFI AHMED ABDALLH** for valuable advice, encouragement and close **Co. Supervisor Dr. MOHAMED ELFADIL** for his help and assistance for making me laugh and relax when I was stressed out and everything seemed to be wrong.

My deep thanks to my teachers and staff member of medical ultrasound in Sudan University, and teacher Osman Abd Elgadeer in medical laboratory of Kordofan University.

Thanks to my colleagues, Friends and population of skikan in North Kordofan for their cooperation.

Abstract

Schistosomiasis (Bilharziasis) is one of the most prevalent tropical diseases. Sonography is among the most valuable diagnostic tools for Schistosomiasis-related organ lesions, for revealing, evaluation and showed signs of Bilharziasis on the urinary tracts(mainly urinary bladder) and related organs. The main objective of this research was to study the ultrasound outcome in diagnosis of patient infected by bilharziasis mainly positive urinary bilharziasis and to evaluate the extent of the lesions in the urinary tract(mainly urinary bladder), and lesions in the other internal organs .This is descriptive cross sectional study .This study determines the typical findings in patients who were infected by Schistosomiasis, and the study was, conducted in Shikan area in North Kordofan State – Sudan in Elobied teaching Hospital and one private Clinic during the period from March 2014 to October 2015 which far away from capital Khartoum. Ultrasound scans were done using portable Fukuda 4100 machine with convex probe 3.5 MHz. Proper preparation of patient was consider. The scan included. urinary tracts, liver and spleen. The data were analysed by standard Statistical Package for the Social Sciences (SPSS). A total of 108 patients' with positive *Schistosoma haematobium* were included 97(89.8%) were males and 11(10.2%) were females, their ages ranged between <10 > 40 years old with mean age of 14.80 ± 8.438 years old. The results of the study showed that there was a significant correlation between the variables including age, gender occupation and gastrointestinal manifestations of Schistosomiasis at $p < 0.000$. The prevalence of urinary bladder manifestation was found to be: (17.6%) have localized urinary bladder wall thickness and (82 %) have general thickness and the result of study showed that most of the affected patients were school student 74.1% all patients showed bladder wall thickening, due to urinary Schistosomiasis infection. Other bladder lesions including polyps and calcification were seen in (20%) while (80%) showed no lesion. The renal pelvicalyceal system and lower ureteric end were found to be normal in the majority of patients constituting (94%) and (96%) respectively. This study concluded that the bilharziasis affects the bladder wall more than other parts of the urinary system and mostly urinary system does not associated with lesion. The study indicated that ultrasound is useful, cheap, non-invasive, and less time - consuming as it demonstrate structures morbidity and complication caused by *Schistosoma haematobium* if lab investigation are added.

المستخلص

تعتبر البلهارسيا أحد أبرز الأمراض المدارية إنتشاراً . ويستخدم التصوير بالموجات فوق الصوتية لأنه من أفضل وسائل التشخيص لهذا المرض . إذ إنه يساعد على إكتشاف المرض وتقويم الحالة وإبراز العلامات المرضية التي يخلفها على القنوات البولية (خاصة المثانة البولية) بالإضافة الى الأعضاء المجاورة . وكان الهدف الأساسي لهذا البحث هو دراسة نتائج التصوير بالموجات فوق الصوتية لتشخيص مرض البلهارسيا خاصة في الحالات التي تظهر إيجابية لهذا المرض ، بالإضافة الى تقويم مدى إمتداد المرض على طول القناة البولية وعلى الأعضاء الداخلية الأخرى . وهذا البحث الوصفي المقطعي يحدد النتائج النموذجية في المرضى المصابين بالبلهارسيا .

أجريت هذه الدراسة في منطقة شيكان بولاية شمال كردفان - السودان في مستشفى الأبيض التعليمي وكذلك في عيادة خاصة خلال الفترة من مارس 2014م الى أكتوبر 2015م . وقد أجري التصوير بالموجات فوق الصوتية بإستخدام الجهاز المحمول من نوع فوكودا 4100 مع $H_z3.5$ probe .

وقد تم مراعات التحضير الجيد للمريض قبل التصوير . تم تصوير القنوات البولية والكبد والطوحال.

وقد تم تحليل البيانات بإستخدام مقياس الحزمة الإحصائية للعلوم الإجتماعية .

كان عدد المرضى المصابين بالمرض 108 مريض منهم 97 (89.8%) ذكور و 11 (%) 10.2) إناث وكانت أعمارهم تتراوح بين (10 الى 40 سنة) بمتوسط عمر $14.8 \pm$ 8.4 سنة .

وقد أظهرت نتائج الدراسة أن هنالك علاقة ذات دلالة إحصائية بين متغيرات العمر والنوع والوظيفة وأعراض البلهارسيا التي تظهر على المعدة والأمعاء ($p < .000$)

كما أظهرت الدراسة أن حدوث أعراض المرض بصورة جزئية على المثانة البولية كانت بنسبة (17.6%) سمك الجدار (82%) بصورة عامة على سمك الجدار .
أظهرت الدراسة أيضاً أن معظم المصابين بمرض البلهارسيا كانوا من طلاب المدارس بنسبة (74.1%) . وقد أظهرت زيادة في سمك جدار المثانة بجميع المرضى بسبب التهاب المجاري البولية بالبلهارسيا.

وقد أظهرت إصابات أخرى على المثانة تمثلت في ورم حميد (polyp) وتكلس في 20% من الحالات بينما كانت نسبة الذين لم تظهر عليهم هذه الحالات 80% .
وكانت حالات الجهاز الكلوي الحوضي للكلى وكذلك أسفل الحالب طبيعية في معظم المرضى 94% - 96% على التوالي.

خلصت الدراسة أن مرض البلهارسيا يصيب جدار المثانة البولية أكثر من أي جزء آخر من الجهاز الكلوي ، وكانت معظم الحالات غير مصحوبة بتورم ، وكذلك إشارة الدراسة الى أن التصوير بالموجات فوق الصوتية مفيد ورخيص ولا يسبب جروحاً ويستغرق زمناً أقل لإظهار الأعراض المرضية مهما كانت معقدة إذا أضيف الى الفحوصات المعملية .

Abbreviation

SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization
PH	Hydrostatic Pressure
ADH	Antidiuretic Hormone
GFR	Glomerular Filtration rate
CT	Computerized Tomography
MRI	Magnetic Resonance Imaging
CNS	Central Nervous system
PCS	Pelvicalyceal system
LUE	Lower Ureteric End
S. Haematobium	Schistosoma Haematobium
GIT	Gastrointestinal tract
IVP	Intravenous Pyelography
CIA	Common Iliac Artery
ECIA	External common Iliac Artery
ECIA	Internal common Iliac Artery
PPF	Periportal Fibrosis
PVD	Portal Vein Diameter

SPVD

Splenic Vein Diameter

IVC

Inferior Vena Cava

List of contents

Title	Page No
الأيات	.I
Dedication	.II
Acknowledgements	.III
Abstract	.IV
المستخلص	.V
Abbreviation	VII.
List of Contents	VIII.
List of tables	XII.
List of figures	XIII.
Chapter One	
1-1 Introduction	1
1-2 problem of the study	5
1-3 objectives of the study	5
1-4 Significance of the study	6
1-5 Overview of the study	6
Chapter Two	

(Background and Literature Review)	
2-1 Anatomy Of Urinary System	7
2-2 Urinary System Physiology	15
2-2-1 Introducation of the kidney function	15
2-2-2 Function of the kidney	16
2-2-3 Function of the urinary bladder	21
2-3 Pathology	22
2-3-1 Epidemiology	22
2-3-2 Life cycle of schistosomiasis	24
2-3-3 Pathophysiology of schistosoma infection	25
2-3-4 Katayama fever	26
2-3-5 Mortality and morbidity	26
2-3-6 Schistosomaiasis Pathology of Urinary tract (Mainly Urinary Bladder)	27
2-3-7 After severe, chronic infection the following serious problem can occur	28
2-3-8 Schistosomiasis of Intestinal lesions	29
2-3-9 Ectopic schistosomiasis localizations	29
2-4 Methods of Diagnosis of schistosoma haematobium	30
2-5 Ultrasound appearance of urinary tracts	31
2-5-1 the ultrasound of urinary bladder	31
2-5-2 Ureter	33
2-5-3 Kidney	35
2-6 previous study	37

Chapter Three	
3-1 Materials (Materials and methods)	
3-1-1 Machine Used	47
3-1-2 Population of the study	47
3-1-3 Sample size and type	47
3-2 Methods	48
3-2-1 Scanning protocols	48
3-2-1-1 Renal Scanning Technique	48
3-2-1-2 Liver Scanning Technique	52
3-2-1-3 Spleen Scanning Technique	54
3-2-2 Method of data collection	55
3-3 Method of data analyses	60
3-4 Ethical approval	60
Chapter Four	61
(Results)	
Chapter Five	72
(Discussion, Conclusion & Recommendation)	
5-1 Discussion	72
5-2 Conclusion	75
5-3 Recommendation	76

References	77
Appendix (1)	82
Appendix (2)	101

List of tables

Tables	Page No
Table (4-1) A frequency distribution of patient occupation	62
Table(4-2) A frequency distribution of patient gender	63
Table (4-3) A frequency distribution of the pelvicalyceal system status	64
Table (4-4) A frequency distribution table of kidney lower ureteric end	65

Table (4-5) A frequency distribution of bladder wall thickening	66	
Table (4-6) A frequency of bladder lesion	67	
Table (4-7) A cross-tabulation table of occupation versus bladder wall thickness status	71	Page XII
Table (4-8) A cross-tabulation table of bladder lesion versus bladder wall thickness status	71	
Table (4-9) A cross-tabulation table of lower ureteric end and kidney pelvicalyceal system	71	

List of Figures

Figures	Page No
Figure (4-1) A par graph shows the percentage of frequency distribution of patient	62
Figure (4-2) A par graph shows the percentage of gender frequency distribution	63
Figure (4-3) A par graph shows the percentage of kidney PCS status distribution	64
Figure (4-4) A par graph shows the percentage of kidney lower ureteric end condition	65
Figure (4-5) A par graph shows the percentage of the bladder wall	66

thickening distribution	
Figure (4-6) A bar graph shows the percentage of bladder lesion	67
Figure (4-7) Scatter plot shows a direct linear relationship between the liver size and portal vein diameter	68
Figure (4-8) Scatter plot shows a direct linear relationship between the spleen size and splenic vein diameter	68
Figure (4-9) Scatter plot shows a direct linear relationship between the patient age and liver size	69
Figure (4-10) Scatter plot shows a direct linear relationship between the patient age and spleen size	69
Figure (4-11) Scatter plot shows a direct linear relationship between the bladder wall thickness and pre micturition volume	70
Figure (4-12) Scatter plot shows a direct linear relationship between bladder wall thickness and post micturition volume	70