بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

MONA MAGHRABY

Holmium Laser Enucleation Prostatectomy versus Bipolar Transurethral Resection of the Prostate in Management of Benign Prostatic Hyperplasia

Thesis

Submitted For Partial Fulfillment of Doctorate Degree in Urology

By

Ahmed Lotfy Ghazy El Gohary
MBBCh – MSc in Urology, Ain Shams University

Under supervision of

Prof. Dr. Mohamed Sherief Mourad
Professor of Urology
Faculty of Medicine - Ain Shams University

Assist. Prof. Dr. Mohamed Mohamed Yassin
Assistant Professor of Urology
Faculty of Medicine - Ain Shams University

Assist. Prof. Dr. Ahmed Farouk Salem
Assistant Professor of Urology
Faculty of Medicine - Ain Shams University

Faculty of Medicine
Ain Shams University
2021

سورة البقرة الآية: ٣٢

Acknowledgment

First and foremost, I feel always indebted to **ALLAH,**
the Most Kind and Most Merciful.

I'd like to express my respectful thanks and profound gratitude to **Prof. Dr. Mohamed Sherief Mourad,** *Professor of Urology, Faculty of Medicine - Ain Shams University for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to **Assist. Prof. Dr. Mohamed Mohamed Yassin,** *Assistant Professor of Urology, Faculty of Medicine - Ain Shams University, for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

I am deeply thankful to **Dr. Ahmed Farouk Salem,** *Assistant Professor of Urology, Faculty of Medicine - Ain Shams University, for his great help, active participation and guidance.*

I am very thankful to **Dr. Ahmed Ibrahim Radwan,** *Lecturer of Urology, Ain Shams University for his great support & effort throughout the whole work.*

Ahmed Lotfy

List of Contents

Title	Page No.
List of Tables	i
List of Figures	ii
List of Abbreviations	iv
Introduction	1
Aim of the Study	3
Review of Literature	
Anatomy of the Prostate	4
Physiology of BPH	7
Laser Prostate Surgery	14
Holmium: YAG Laser Prostatectomy	19
Holmium Laser Enucleation of the Prostate (HoLEP)	24
Bipolar Transurethral Resection of the Prostate	34
Patients and Methods	41
Results	48
Discussion	66
Conclusion	72
Summary	73
References	76
Arabic Summary	—

List of Tables

Table No.	Title	Page No.
Table (1):	Demographic data.	50
Table (2):	Comparison between both groups as regard age, complain and prostate size.	51
Table (3):	Comparison between both groups as regard IPSS, PSA and Qmax preoperatively.	53
Table (4):	Comparison between both groups as regard Hb drop, resected volume, postoperative catheter time and duration of hospital stay.	54
Table (5):	Comparison between both groups as regard Qmax, PSA and post voiding.	56
Table (6):	Comparison between both groups as regard IPSS, PSA, Qmax post, post voiding residual volume and postoperative prostate size.	56
Table (7):	Comparison between both groups as regard QOL pre and postoperative.	57
Table (8):	Comparison between both groups as regard complications.	58
Table (9):	Comparison between IPSS, Qmax, PSA and post voiding in laser group.	59
Table (10):	QOL pre and postoperative in laser group.	62
Table (11):	Comparison between IPSS, Qmax, PSA and postvoiding in bipolar group.	63
Table (12):	QOL pre and postoperative in bipolar group.	65

List of Figures

Fig. No.	Title	Page No.
Figure (1):	Zones of the prostate	5
Figure (2):	Prostate vasculature	6
Figure (3):	Symptoms of BPH	7
Figure (4):	International Prostate Symptom Score	9
Figure (5):	BPH progression.	10
Figure (6):	Site of prostatic adenoma.	10
Figure (7):	Prostate by TRUS.	12
Figure (8):	Prostate by PAUS.	12
Figure (9):	Uroflow.	13
Figure (10):	Evaluation of BPH.	13
Figure (11):	Electromagnetic spectrum	14
Figure (12):	Energy state of normal population of atoms	16
Figure (13):	Population inversion of atoms	16
Figure (14):	Spontaneous emission of energy	17
Figure (15):	Laser fiber	21
Figure (16):	Holmium laser machine.	21
Figure (17):	Endoscopy set.	22
Figure (18):	Enucleation lobe.	22
Figure (19):	Enucleation of the median lobe	26
Figure (20):	Enucleation of the lateral lobes	27
Figure (21):	Tissue morcellation after HoLEP	28
Figure (22):	New karl storz morcellator.	28
Figure (23):	Electrosurgical effects-desiccation.	37
Figure (24):	Electrosurgical effects- fulguration.	38
Figure (25):	Electrosurgical effects- vaporization.	39

List of Figures Cont...

Fig. No.	Title	Page No.
Figure (26):	Set used in Bipolar TURP.	43
Figure (27):	Steps of TURP	44
Figure (28):	Consort flowchart.	49
Figure (29):	Complaint.	50
Figure (30):	Age.	52
Figure (31):	Complaint.	52
Figure (32):	Post operative catheter time.	55
Figure (33):	Duration of hospital stay.	55
Figure (34):	International Prostate Symptom Score (IPSS).	60
Figure (35):	Qmax.	60
Figure (36):	PSA.	61
Figure (37):	QOL pre and postoperative in laser group	62
Figure (38):	Comparison between IPSS in bipolar group	63
Figure (39):	Qmax.	64
Figure (40):	PSA.	64
Figure (41):	QOL pre and postoperative in bipolar group	65

List of Abbreviations

Abb.	Full term
BOO	Bladder outlet obstruction
BPH	Benign prostatic hyperplasia
B-TURP	Bipolar system Transurethral resection in saline
BTURP	Bipolar transurethral resection of the prostate
CO2	Carbon dioxide
CZ	Central zone
Ho:YAG laser	Holmium: Yttrium-Aluminum-Garnet laser
HoBNI	Holmium Laser Bladder Neck Incision
HoLAP	Holmium Laser Ablation of the Prostate
HoLEP	Holmium Laser Enucleation of the Prostate
HoLRP	Holmium Laser Resection of the Prostate
IPSS	International Prostate Symptom Score
KTP laser	Potassium Titanyl phosphate laser
LUTS	Lower urinary tract symptoms
Nd:YAG laser	Neodymium: Yttrium-Aluminum-Garnet laser
OP	Open prostatectomy
PZ	Peripheral zone
QoL	Quality of life
Tu:YAG laser	Thulium: Yttrium-Aluminum-Garnet laser
TUR	Transurethral resection
TURP HoLEP	Holmium laser enucleation of the prostate
TURP	Transurethral resection of the prostate
TVP	Transurethral vaporization of the prostate
TZ	Transition zone
UTIs	Urinary tract infections
YAG	Yttrium-aluminum-garnet

INTRODUCTION

TURP remains the most frequently performed operation for BPH in small to moderate size prostate, however the long resection time required for large prostate is associated with an increased risk of TUR syndrome and blood loss ***(Zhu et al., 2013).***

Until the year 2012 open prostatectomy was represented as a first line treatment alternative for large size prostate more than 80 gm, despite the substantial perioperative morbidity and extended catheterization and convalescence period ***(Geavlete et al., 2013).***

The Introduction of the bipolar system transurethral resection in saline (B-TURP) has reduced the relative risks of transurethral resection syndrome (TUR Syndrome), blood transfusion and has reduced the need for readmission after surgery. However perioperative bleeding that may require blood transfusion, incontinence and sometimes bladder neck contracture, are the main complications that may be encountered during this procedure ***(Cleves et al., 2016).***

Therefor A novel treatment modalities have been vigorously pursued with efficacy comparable to that of open prostatectomy but with fewer complications, HoLEP is one of such modalities that is highly effective for large BPH, however the long learning curve and high cost limits its widespread

extensive application especially in developing countries ***(Zhu et al., 2013).***

Holmium laser enucleation of the prostate (HoLEP) is the most recent step in the evolution of holmium laser prostatectomy. HoLEP is a safe and effective surgical procedure, which has comparable results to transurethral resection of the prostate (TURP) and open prostatectomy, with low morbidity and short hospital stay ***(Elzayat et al., 2006).***

HoLEP is equally suitable for small, medium, and large prostate glands, with clinical outcomes that are independent of prostate size, and recently it has been proposed as a new gold standard for treatment of symptomatic benign prostatic hyperplasia (BPH) ***(Kuntz et al., 2004).***

Aim of the Study

To compare Holmium laser enucleation and bipolar transurethral resection of the prostate in terms of safety, and efficacy, in the management of prostatic hyperplasia.

Chapter 1

ANATOMY OF THE PROSTATE

The prostate is a pyramidal fibromuscular gland that encircles the male urethra. The average volume of the normal prostate gland is approximately 20 grams. The gland is in continuity with bladder neck superiorly, while inferiorly the apex of the gland lies on the external sphincter of the bladder ***(Nehikhare et al., 2017).***

Microscopic Anatomy of the prostate has divided it into 3 zones as shown in figure (1): transition zone (TZ), central zone (CZ), and peripheral zone (PZ). The prostate consists of approximately 70% glandular tissue and 30% fibro-muscular stroma. (TZ) accounts for 10% of the glandular tissue while the (PZ) accounts for 70% for the glandular tissue ***(Nehikhare et al., 2017).***

(TZ) encircle the urethra from the bladder neck till the membranous urethra and it is where BPH occurs and leads to bladder outlet obstruction (BOO), it is usually described as 2 lateral lobes and a median lobe that leads to LUTS. (CZ) is the area surrounding the ejaculatory ducts and consists of 25% of the glandular element represented in the verumontanum. (PZ) forms the posterior and lateral aspects of the prostate, it is examined during the digital rectal examination and this area