Laser Ablation of Non-Muscle Invasive Bladder Tumors; Any Advantage Over Standard Resection Prospective Comparative Study

Thesis

Submitted for partial fulfillment of M.D. degree in Urology

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2020

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. Hassan Sayed Shaker,*** *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. Ahmed Farouk Mahmoud,*** *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 ***Assist. Prof. Dr. Ahmed Tawfick Hassan,*** *Assistant Professor of Urology Faculty of Medicine – Ain Shams University, for his great help, active participation and guidance.*

Saif El-Islam

List of Contents

List of Tables

List of Tables Cont...

List of Figures

List of Figures Cont...

List of Figures Cont...

List of Abbreviations

Abb.	Full term
µm	Micrometer
ALA	Aminolaevulinic acid
AUA	American Urological Association
BCG	Bacille Calmette-Guerin
BPE	Benign prostatic enlargement
BPH	Benign prostatic hyperplasia
CIS	Carcinoma in situ
CT	Computed tomography
CTURBT	Conventional transurethral resection of bladder tumor
DNA	Deoxyribonucleic acid
DRE	Digital rectal examination.
EAU	European Association of Urology
EORTC	European Organization for Research and Treatment of Cancer
Er:YAG	Erbium yttrium–aluminum–garnet
ESWL	Extracorporeal shock wave lithotripsy
F	French
FDA	Food and Drug Administration
FISH	Fluorescence in situ hybridization.
FLA	Focal laser ablation
HAL	Hexaminolaevulinic acid
HG	High grade
HIV	Human immunodeficiency virus
Ho: YAG	Holmium yttrium aluminum garnet
HoLEP	Holmium laser enucleation of the prostate
KTP	Potassium titanyl phosphate
LASER	Light amplification by stimulated emission of radiation
LBO	Lithium Triborate

List of Abbreviations Cont...

Abb.	Full term
LG	Low grade
MIBC	Muscle invasive blabber cancer
MMC	Mitomycin C
MRI	Magnetic resonance imaging
NBI	Narrowband imaging
Nd:YaG	Neodymium-doped yttrium aluminum garnet
Nm	Nanometer
NMIBC	Non-muscle invasive blabber cancer
NOS	Not Otherwise Specified
NOTES	Natural Orifice Transluminal Endoscopic Surgery
PCa	Prostate cancer
PET	Positron emission tomography
PFS	Progression-free survival
pH	Power of hydrogen
PSA	Prostatic specific antigen.
PUNLMP	Papillary urothelial neoplasm of low grade potential
PVP	Photoselective vaporization of the prostate
QH	Quartz head contact fiber
RFS	Recurrence-free survival
SD	Standard deviation
TCC	Transitional cell cancer
Thu:YAG	Tm: YAG: Thulium yttrium aluminum garnet
ThuLEP	Tm: YAG transurethral anatomical laser enucleation of the prostate
ThuVARP	Tm: YAG vaporesection of the prostate
ThuVEP	Tm: YAG vapoenucleation of the prostate
Tis	Tumor in situ
TNM	Tumor, lymph node, metastases.

List of Abbreviations Cont...

Abb.	Full term
TUR	Transurethral resection
TURBT	Transurethral resection of bladder tumor
TURP	Transurethral resection of the prostate
UPJO	Ureteropelvic junction obstruction
VLAP	Visual laser ablation of the prostate
W	Watts
WHO	World Health Organization
YAG	Yttrium aluminum garnet

INTRODUCTION

Urinary bladder tumors is one of the commonest diseases in genitourinary system. About 549393 new bladder cancer cases have been diagnosed all over the world in 2018, with 199922 cases estimated cancer related death. In other words, bladder cancer accounts around 7% of new cancer diagnoses and 4% of new estimated deaths in men ***(Bray et al., 2018).***

About 75% of all newly diagnosed cases per year, tumors are confined to the mucosa (Ta, CIS) or submucosa (T1), called non-muscle-invasive bladder cancer (NMIBC) ***(Babjuk et al., 2013).***

The prevalence of Non-muscle invasive blabber cancer (NMIBC) is higher because of long term survival of most cases, and lower risk of cancer linked mortality compared to muscle invasive bladder cancer (MIBC) ***(Ferlay et al., 2012; Burger et al., 2013).***

For non-muscle invasive bladder cancer (NMIBC), conventional transurethral resection of bladder tumor (TURBT) combined with Bacille Calmette-Guerin (BCG) and or intravesical chemotherapy is the standard treatment ***(Böhle et al., 2017).***

The recurrence rate of NMIBC is still as high as 50–70%, and 5–25% of cases progress to muscle-invasive bladder tumor after repeated recurrence ***(Muto et al., 2014).***

Therefore, we need to comprehensively reduce the recurrence rate in NMIBC patients and prolong the time to tumor recurrence ***(Comploj et al., 2014).***

First attempts to use laser in bladder cancer therapy were published by Staehler and Hofstetter in 1979. However, first large report on laser use in bladder cancer therapy was published by Beer in 1989 ***(Beer et al., 1989).***

Despite promising outcomes, this method was abandoned for years. The reason for that might be possible bowel injury while using deep penetrating Nd:YaG laser. Nowadays with introduction of new devices, laser resection techniques for bladder tumor are coming back ***(Yang et al., 2020).***

AIM OF THE WORK

We aim to evaluate the safety and efficacy of laser ablation of the tumor bed after resection of non-muscle invasive urothelial carcinoma of the urinary bladder. The 1ry end point is detection the recurrence or progression of the tumor in comparison to resection without laser ablation. The 2nd end point is the postoperative complication.