بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / مني مغربي أحمد

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

Role of Varicocele Sclerotherapy in the Management of Benign Prostatic Hyperplasia and its Associated Lower Urinary Tract Symptoms

Thesis

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By

Zeinab Aly Moussa Aly
M.B.B.Ch., M.Sc. Radiology

Under the Supervision of

Prof. Dr. Mohamed El Gharib Abou El Ma'aty
Professor of Radiodiagnosis and Interventional Radiology
Faculty of Medicine, Ain Shams University

Prof. Dr. Waleed Mohamed Abd El Hameed Hetta
Professor of Radiodiagnosis and Interventional Radiology
Faculty of Medicine, Ain Shams University

Dr. Khaled Sayed Ahmed Soliman
Lecturer of Radiodiagnosis
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University
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Zeinab Aly Moussa Aly

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List of Abbreviations

Abb.	Full term
ADC	***Apparent Diffusion Coefficient***
AVPs	***Amplatzer vascular plugs***
B-mode	***Brightness mode***
BOO	***Bladder outlet obstruction***
BPE	***Benign prostatic enlargement***
BPH	***Benign prostatic hyperplasia***
BWT	***Bladder wall thickness***
CBC	***Complete blood picture***
cc	***Cubic centimetre***
cm	***Centimetre***
(MD) CT	***(Multidetector) computed tomography***
DHT	***Dihydrotestosterone***
DMSO	***Dimethyl sulfoxide***
DNA	***Deoxyribonucleic acid***
DO	***Detrusor over activity***
DRE	***Digital rectal examination***
F	***French***
FT	***Free testosterone***
GV	***Gonadal vein***
(m) g/ml	***(Milli) gram/millilitre***
Mg/kg	***milligram/kilogram***
INR	***International normalized ratio***
IPSS	***International prostate symptom score***
IQR	***Interquartile range***
ISV	***Internal spermatic vein***
IVC	***Inferior vena cava***
LUTS	***Lower urinary tract symptoms***
L3 or L4	***3rd or 4th lumbar vertebral body***
MCi	***Millicurie***
Mg	***Milligram***
MHz	***Mega hertz***
Min	***Minutes***
Ml (/kg)	***Millilitre (per kilogram)***
Ml/sec	***Millilitre (per second)***

List of Abbreviations **cont.**

Abb.	Full term
$(Mm)^2$	Millimetre (squared)
MmHg	Millimeter mercury
MR (I)	Magnetic resonance (imaging)
(m) Sec	Millisecond
NBCA (-MS)	N-Butyl 2 Cyanoacrylate (-methacryloxysulfolane)
Ng (/ml)	Nanogram (/millilitre)
OBS	Overactive bladder syndrome
OWVs	One-way valves
P value	Probability value
PSA	Prostate-specific antigen
PVR	Post-void residual
RBCs	Red blood cells
Qmax	Maximum urinary flow rate
QoL	Quality of Life
SBPI	Scrotal blood pool index
SD	Standard deviation
SHBG	Sex hormone binding globulin
SPSS	Statistical Package for the Social Sciences
STDs	Sexually transmitted diseases
STS	Sodium tetradecyl sulfate
Tc	Technetium
TRUS	Transrectal ultrasound
TURP	Transurethral resection prostatectomy
T1WI	T1 weighted images
T2WI	T2 weighted images
UTIs	Urinary tract infections
3D	Three dimensional
^oC	Degree Celsius
Π	Pi (=3.14)

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INTRODUCTION

Benign prostatic hyperplasia (BPH) is one of the most prevalent ailments of aging men, affecting nearly 50% and 100% of this population by the time they reach 50 and 80 years of age, respectively, with a detrimental impact on their quality of life (QoL) ***(Landau & Welliver, 2020).***

The prostate grows at a rate of 2.5% per year in higher age groups and the age-related prostatic enlargement mainly affects the prostatic periurethral zone. Subsequent prostatic urethral compression occurs with resultant urinary outflow obstruction, urinary bladder hypertrophy and reduction of the bladder volume reservoir ***(Munsif et al., 2021).***

The lower urinary tract symptoms affect up to 74% of adults above 40 years, 42% of whom report a moderate degree of symptoms. Also, an age-dependent lower urinary symptomatic progression occurs in 5-year increments with a resultant poor sexual life due to erectile & ejaculatory dysfunctions and side effects of antiandrogenic medications ***(Lim, 2017).***

To further explore the underlying mechanisms of prostatic enlargement, Gat et al. proposed that the blood flow mechanics of the anatomically connected prostatic and testicular veins follow Pascal's and Bernoulli's laws, which postulate that the fluid hydrostatic pressure equalizes across communicating vessels ***(Gat et al., 2008).***

The age-related valvular destruction of the spermatic veins establishes continuous blood columns with elevated hydrostatic pressures that form a pressure gradient diverging the flow carrying free testosterone (dihydrotestosterone or DHT) from the testes to the prostate with subsequent prostatic congestion & androgen-dependent prostatic hyperplasia ***(Gat et al., 2008).***

Gat referred to the testicular-prostatic venous backflow as 'the backdoor phenomenon', which was used to explain the biologic paradox of testosterone-dependent BPH despite age-dependent serum testosterone decline. Subsequently, Gat considered varicoceles sclerotherapy to be a super-selective intraprostatic androgen deprivation therapy because the occlusion of the refluxing spermatic veins and their vertical bypasses eliminates the testicular-prostatic pressure gradient with back-flow cessation and reversal of the prostatic hyperplasia ***(Gat et al., 2008).***

Several studies agreed with the Gat theory while others rejected it. The supporting studies included the **Strunk et al. study** that detected an improvement of the urinary symptoms upon sclerotherapy application in patients with prostatomegaly, the **Ur Rehmen et al. study** that found the pressure in the incompetent left ISV to be as postulated by Gat et al. (31 mmHg with Valsalva) using direct measurement, and the **Pejčić et al. study** that detected a fourfold rise in the dihydrotestosterone (DHT) quantity of the BPH specimens using mass spectrometry.

On the other hand, studies that rejected the Gat theory disputed the proposed causal relationship between varicoceles & BPH, and claimed that prostatic enlargement is a multifactorial process caused by androstenedione-dependent DHT, aromatase-dependent estrogen stromal proliferation, androgen & estrogen receptors overexpression, chronic inflammation, and immune dysregulation ***(Chen et al., 2020).***

In addition, two prospective studies published different results from those of the Gat studies; **Gaona et al. study** uncovered no statistical significance in varicoceles percentage between patients with prostatic volumes ≥ 40 ml and < 40 ml and **De Caestecker et al. study** detected high periprostatic plexus testosterone in only 2 out of 7 patients undergoing Millin prostatectomy for BPH.