



شبكة المعلومات الجامعية  
التوثيق الإلكتروني والميكرو فيلم

# بسم الله الرحمن الرحيم



**MONA MAGHRABY**



شبكة المعلومات الجامعية  
التوثيق الإلكتروني والميكروفيلم



# شبكة المعلومات الجامعية التوثيق الإلكتروني 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**



# **Antegrade Ureteric Stenting in Management of Ureteric Obstruction in Case of Difficult Retrograde Access; Indications, Success Rates & Predictors of Failure**

Thesis

*Submitted for Partial Fulfillment for M.D in Urology*

By

***Amr Mohamed Sayed Zriek***

*M.B.B.Ch., M.SC. (Urology)*

Supervised by

**Prof. Dr. Khaled Abd El Fattah Hassan Taema**

*Professor and Head of Urology Department  
Faculty of Medicine - Ain Shams University*

**Assist. Prof. Dr. Hany Hamd Gad**

*Assistant Professor of Urology  
Faculty of Medicine - Ain Shams University*

**Dr. Mohamed Ebrahim Ahmed**

*Lecturer of Urology  
Faculty of Medicine - Ain Shams University*

Faculty of Medicine  
Ain Shams University

2021

# Acknowledgments

*First and foremost, I feel always indebted to **Allah** the Most Beneficent and Merciful.*

*I wish to express my deepest thanks, gratitude and appreciation to **Prof. Dr. Khaled Abd El Fattah Hassan Taema**, Professor and Head of Urology Department, Faculty of Medicine, Ain Shams University, for his generous support, kind guidance, valuable instructions and help.*

*Special thanks to **Assist. Prof. Dr. Hany Hamd Gad**, Assistant Professor of Urology, Faculty of Medicine, Ain Shams University, for his sincere efforts & for his wise academic and clinical supervision .*

*I am deeply thankful to **Dr. Mohamed Ebrahim Ahmed**, Lecturer of Urology, Faculty of Medicine, Ain Shams University, for his great help, outstanding support.*

*Special thanks to our patients who accepted to be part of this study, without them those papers wouldn't be written.*

*Words are not enough to thank my family; my mother, father, my wife & my kids EYAD & DORRH, all of them shared my dream & still.*

**Amr Mohamed Sayed Zriek**

# List of Contents

Title	Page No.
List of Abbreviations.....	i
List of Tables.....	iii
List of Figures .....	iv
Introduction .....	1
Aim of the Work .....	5
Review of Literature	
Anatomy.....	6
Pathophysiology of Urinary Tract Obstruction.....	24
Drainage of Obstructed Urinary Tract.....	32
Patients and Methods.....	69
Results.....	79
Discussion .....	94
Summary and Conclusion .....	107
References .....	109
Arabic Summary	

# List of Abbreviations

Abb.	Full term
ASA.....	<i>American Society of Anesthesiologists</i>
AGDJ.....	<i>Antegrade double J</i>
BMI .....	<i>Body Mass Index</i>
BUN .....	<i>Blood Urea Nitrogen</i>
BUO .....	<i>Bilateral Ureteric Obstruction</i>
CBC .....	<i>Complete Blood Count</i>
CT scan .....	<i>Computed Tomography scan</i>
CX.....	<i>Cancer</i>
DJ .....	<i>Double J stent</i>
DTPA .....	<i>Diethylene Triamine Pentaacetic Acid</i>
FENa .....	<i>Fractional urinary sodium Excretion</i>
Gd-DTPA.....	<i>Gadolinium diethylene triaminepentaacetate</i>
GMV .....	<i>Galadako Modified Valdivia</i>
GW.....	<i>Guide Wire</i>
IVU .....	<i>Intravenous Urogram</i>
MAG3 .....	<i>Mercaptoacetyltriglycine</i>
MHz .....	<i>Megahertz</i>
MPA.....	<i>Multipurpose Angiographic catheter</i>
MRI.....	<i>Magnetic resonance imaging</i>
MRU .....	<i>Magnetic resonance urography</i>
PCN .....	<i>Percutaneous Nephrostomy</i>
PTFE .....	<i>Polytetrafluoroethylene</i>
PUJ.....	<i>Pelviureteric junction</i>



# List of Abbreviations cont...

Abb.	Full term
<i>RGDJ</i> .....	<i>Retrograde double j</i>
<i>RI</i> .....	<i>Resistive index</i>
<i>TURBT</i> .....	<i>Transurethral Resection of Bladder Tumor</i>
<i>TURP</i> .....	<i>Transurethral Resection of the Prostate</i>
<i>UEAS</i> .....	<i>Uretero-enteric anastomotic stricture</i>
<i>UO</i> .....	<i>Ureteric Obstruction</i>
<i>URS</i> .....	<i>Ureterorenoscopy</i>
<i>UTI</i> .....	<i>Urinary tract infection</i>
<i>UUO</i> .....	<i>Unilateral Ureteric Obstruction</i>



# List of Tables

Table No.	Title	Page No.
<b>Table 1:</b>	Demographic data .....	79
<b>Table 2:</b>	Causes of ureteric obstruction .....	81
<b>Table 3:</b>	Trials of retrograde ureteric stenting in group II .....	83
<b>Table 4:</b>	Intraoperative technical causes of failure of retrograde stenting in both groups .....	84
<b>Table 5:</b>	Antegrade dj success /failure in both groups .....	85
<b>Table 6:</b>	Antegrade dj success/failure in group II .....	86
<b>Table 7:</b>	Dye study and its value as predictor of success /failure for antegrade ureteric stenting in group I ....	87
<b>Table 8:</b>	Dye study and its value as predictor of success /failure for antegrade ureteric stenting in group II .....	88
<b>Table 9:</b>	Complications of both groups .....	89
<b>Table 10:</b>	Auxiliary procedures needed in both groups .....	90
<b>Table 11:</b>	Types of anesthesia needed in both groups .....	91
<b>Table 12:</b>	Operative time and hospital stay .....	92
<b>Table 13:</b>	Comparison between preoperative and postoperative serum creatinine level in both groups .....	93

# List of Figures

Fig. No.	Title	Page No.
<b>Figure 1:</b>	Renal orientation in vertical axis.....	7
<b>Figure 2:</b>	Schematic of a lateral view of a longitudinal section through the retroperitoneum showing the posterior (P) and anterior (A) layers of the renal fascia. ....	8
<b>Figure 3:</b>	Schematic of a superior view of a transverse section of the kidneys at the level of the second lumbar vertebra showing the three compartments of the retroperitoneal space.....	9
<b>Figure 4:</b>	Schematic of an anterior view of the renal fascia (Gerotas' fascia) and kidneys.....	10
<b>Figure 5:</b>	Schematic of an inferior view of the diaphragmatic dome .....	11
<b>Figure 6:</b>	Schematic of a lateral view of the kidney and its relationships with the diaphragm, ribs, pleura, and lung.....	12
<b>Figure 7:</b>	(A) Inferior view of a transverse section at the level of the suprahilar region of the kidney. (B) Similar section to A at the level of the infrahilar region.....	13
<b>Figure 8:</b>	Superior view of a transverse section at the level of the inferior poles of the kidney.....	14
<b>Figure 9:</b>	Schematic of a longitudinal section of the kidney.....	15
<b>Figure 10:</b>	Schematic representation of the possible minor calyx (mc) arrangements .....	16
<b>Figure 11:</b>	Calyceal orientations in the Brödel and Hodson configurations.....	17
<b>Figure 12:</b>	Pelvicalyceal system Group A .....	18
<b>Figure 13:</b>	Pelvicalyceal system Group A Type A-II .....	19
<b>Figure 14:</b>	Pelvicalyceal systems Group B. Type B-I .....	20

# List of Figures cont...

Fig. No.	Title	Page No.
<b>Figure 15:</b>	Group B Type B-II: shows the kidney midzone drained by minorcalyces (M) entering directly into the renal pelvis, independently of both the superior (S) and inferior (I) calyceal groups.....	20
<b>Figure 16:</b>	Intrarenal arterial anatomy.....	22
<b>Figure 17:</b>	Schematic drawing of OR organization .....	49
<b>Figure 18:</b>	Galdakao-modified supine Valdivia position. (lateral view) & (front view).....	51
<b>Figure 19:</b>	Calyx selection for percutaneous entry.....	58
<b>Figure 20:</b>	Technique of bypassing angulated ureter .....	59
<b>Figure 21:</b>	Change in respiration to alter ureteral course....	60
<b>Figure 22:</b>	Technique of bypassing tight stricture .....	61
<b>Figure 23:</b>	Use of safety thread to position proximal pigtail .....	65
<b>Figure 24:</b>	BMI in group I & II.....	80
<b>Figure 25:</b>	Sex distribution in both groups.....	80
<b>Figure 26:</b>	Age distribution in both groups. ....	80
<b>Figure 27:</b>	Causes of ureteric obstruction in both groups.....	82
<b>Figure 28:</b>	Trials of retrograde ureteric stenting in group II.....	83
<b>Figure 29:</b>	Intraoperative technical causes of failure of retrograde stenting in both groups .....	84
<b>Figure 30:</b>	Antegrade dj success /failure in both groups.....	85
<b>Figure 31:</b>	Antegrade dj success/failure in group II.....	86

## INTRODUCTION

**D**ilatation of the renal pelvis and calices as a result of urinary tract obstruction can be intrinsic or extrinsic and can result from both benign and malignant aetiologies. Extrinsic obstruction is most often caused by compression or mural infiltration of the ureter wall by a surrounding pelvic mass, for instance a urologic, gynaecologic or colorectal tumour. Furthermore, extrinsic obstruction can be caused by benign aetiologies such as retroperitoneal fibrosis, scar tissue, endometriosis, inflammation or, in rare circumstances, by anatomic variants (*Hausegger et al., 2006*).

The management of ureteric obstruction depends upon the underlying pathology, type/cause of obstruction/ stricture and also the patient's preference and whether or not the patient is fit to undergo anesthesia (*Venyo & Bakir, 2011*).

Patients who require temporary or long term urinary drainage for obstruction of the upper urinary tract may be managed by a number of procedures some of which include percutaneous nephrostomy insertion, antegrade ureteric stent insertion, retrograde ureteric stent insertion, ileal conduit construction, ureterostomy procedure as well as uretero-ureteric anastomosis (*Venyo & Bakir, 2011*).

In general, the treatment of choice in acute hydronephrosis is insertion of a percutaneous nephrostomy

catheter (PCN). However, this external drainage catheter shows a high incidence of complications in long-term management, such as infection and dislocation (*Venyo & Bakir, 2011*).

The first two procedures can be performed with the use of local anesthesia, sedation and analgesia, but the remaining procedures do require the use of general anesthesia in the operating theatre and require the patients to be fit to undergo general anesthesia (*Hausegger et al., 2006*).

Patients with benign/malignant ureteric strictures are often treated with ureteric stenting via an antegrade, retrograde or combined approach (*Chitale et al., 2002*).

In most institutions retrograde stent insertion is attempted first. Retrograde stent insertion is typically performed under cystoscopic guidance with patients occasionally under general anaesthesia. In patients with malignant obstruction the retrograde approach may be difficult, or even impossible (*Yossepowitch et al., 2001*).

Sometimes retrograde ureteric stenting may be abandoned in theatre due to the inability of the surgeon to advance the guidewire by the retrograde approach beyond the point of obstruction; in such cases the only options left are insertion of a percutaneous nephrostomy plus or minus an attempt at insertion of the ureteric stent by means of the antegrade approach (*Hausegger et al., 2006*).

It is also possible for a ureteric stent to be inserted in a patient who is temporarily not fit to undergo general anesthesia (*Venyo & Bakir, 2011*).

The major complication of the antegrade technique is retroperitoneal bleeding. Transfusion-demanding bleeding ranges between 1% and 4% in case of standard PCN (*Wah et al., 2004*).

The retrograde approach avoids the potential complications of PCN, which is the prerequisite for antegrade stent placement. Potential complications of a double J catheter, and thus for both techniques, are perforation, infection, haematuria, malposition, migration, inadequate relief of obstruction and ureteral erosion or fistulisation (*Makramalla & Zuckerman, 2011*).

Several studies report on the results of retrograde internal stent placement, sometimes in comparison with PCN. These studies show that retrograde stent insertion is technically successful in more or less 75% of cases. Only two studies compare retrograde and antegrade double-J catheter placement, however not in randomized fashion (*Monsky et al., 2013*).

In a series of 65 patients Chitale et al. retrospectively compare technical success rates of retrograde stent insertion with PCN followed by antegrade stent placement in patients with malignant obstruction. The retrograde approach had a

success rate of only 21%. On the other hand, antegrade stent insertion was successful in 98% cases. They conclude that obstruction of the pelvic ureter is best managed by two-stage antegrade ureteric stenting. In a series of 50 obstructed ureters (in 30 patients) Uthappa et al. report success rates of 50% and 96%, of respectively retrograde and antegrade stent insertion (*Uthappa & Cowan, 2005*).