

# **COMPLICATIONS OF ENDOSCOPIC URETERIC MANIPULATIONS**

*Essay*

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## **SUMMARY AND CONCLUSION**

Ureteroscopy developed as an extension of cystoscopy and cystoscopic techniques and has gradually become a major technique for the diagnosis and treatment of lesions of the upper urinary tract, both within the ureter and intrarenal collecting systems. This progression has been based on the development of appropriate instrument with rigid and flexible ureteroscopes and effective working instruments. The development of these instruments was the key in the development of ureteroscopy, yet not the sole advancement in techniques.

When the field of endoscopy expanded, urologists had a desire to view the ureter and upper collecting system. The first ureteroscopic procedure was performed by Young in 1912.

Durable rigid and semirigid ureteroscopes have been developed that weigh less and have new features. Some small caliber, semirigid ureteroscopes have been developed with a continuous irrigation feature that optimizes the view and prevents proximal migration of stone fragments. Digital video semirigid ureteroscopes have been introduced.

Ureteroscopy has become a standard urologic technique and is used in a wide variety of situations. The current generation of flexible, actively deflectable fiberoptic endoscopes makes virtually every part of the kidney, including the lower pole, accessible for the treatment of calculi. Retrograde access to the proximal



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## List of Contents

<i>Title</i>	<i>Page No.</i>
▪ <i>Introduction .....</i>	<i>1</i>
▪ <i>Aim of the Work.....</i>	<i>4</i>
▪ <i>Ureteral Anatomy.....</i>	<i>5</i>
▪ <i>Advances in Ureteroscopy.....</i>	<i>16</i>
▪ <i>Technique of Ureteroscopy .....</i>	<i>32</i>
▪ <i>Indications for Ureteroscopy.....</i>	<i>47</i>
▪ <i>Complications of Ureteroscopy.....</i>	<i>69</i>
▪ <i>Prevention and Management of Ureteroscopic Complications .....</i>	<i>116</i>
▪ <i>Summary and Conclusion.....</i>	<i>130</i>
▪ <i>References .....</i>	<i>132</i>
▪ <i>Arabic Summary</i>	

## List of Tables

<i>Table No.</i>	<i>Title</i>	<i>Page No.</i>
<b>Table (1):</b>	Complications of ureteroscopy.....	71
<b>Table (2):</b>	Possible causes of ureteral strictures.....	110

## List of Figures

<i>Fig. No.</i>	<i>Title</i>	<i>Page No.</i>
<b>Fig. (1):</b>	Semirigid ureteroscope.....	16
<b>Fig. (2):</b>	(A, B) Olympus Endo EYE semirigid video ureteroscope .....	17
<b>Fig. (3):</b>	Deflection of flexible ureteroscope for lower pole access .....	19
<b>Fig. (4):</b>	Storz Flex-X2 flexible ureteroscope (A), with laser resistant tip (B).....	19
<b>Fig. (5):</b>	Gyrus ACMIDUR-D flexible video ureteroscope .....	20
<b>Fig. (6):</b>	Olympus URF-P5 flexible ureteroscope (A) with 5.4F “Evolution tip” (B) .....	20
<b>Fig. (7):</b>	Gyrus ACMI Invisio Digital Controller .....	22
<b>Fig. (8):</b>	New stone baskets: (A) Bard Dimension; (B) Microvasive Urology/Boston Scientific Escape .....	26
<b>Fig. (9):</b>	Cook NTrap ureteral occlusion device.....	27
<b>Fig. (10):</b>	Ureteral access sheaths: (A) Cook Flexor DL; (B) Gyrus ACMI UroPass .....	28
<b>Fig. (11):</b>	Bard X-Force ureteral balloon dilator .....	29
<b>Fig. (12):</b>	Microvasive Urology, Boston Scientific Polaris Loop ureteral stent .....	30
<b>Fig. (13):</b>	Various models of flexible ureteroscopes .....	34
<b>Fig. (14):</b>	Endourology tools .....	35
<b>Fig. (15):</b>	A systematic examination of the renal collecting system with an actively deflectable flexible ureteroscope .....	49
<b>Fig. (16):</b>	Multiple filling defects in the left renal collecting systems are seen on retrograde pyelograms .....	52

## List of Figures (cont...)

<i>Fig. No.</i>	<i>Title</i>	<i>Page No.</i>
<b>Fig. (17):</b>	A, Radiograph of 16-year-old male patient.....	55
<b>Fig. (18):</b>	The stone was not bypassed by a wire, even under visual guidance .....	73
<b>Fig. (19):</b>	Plain film of the abdomen (A) and, B, retrograde ureteropyelogram showing the proximal end of a DJ stent out of the ureter.....	74
<b>Fig. (20):</b>	The ureteral wall is perforated (on the right side), while a guidewire is inserted into the ureteral lumen (on the left side) .....	75
<b>Fig. (21):</b>	Antegrade passage of helical stone basket. Stone engaged and retrograde extraction attempted. ....	77
<b>Fig. (22):</b>	Ureteral avulsion: an impacted stone is entrapped into a basket .....	80
<b>Fig. (23):</b>	The submucosal stone fragments can be identified endoscopically as a bulge in the ureteral wall .....	83
<b>Fig. (24):</b>	Mucosal tear noted after balloon dilation in the mid-ureter to facilitate insertion of a ureteroscope.....	89
<b>Fig. (25):</b>	Broken shaft of flexible ureteroscope due to rough handling.....	95
<b>Fig. (26):</b>	One of the basket wires is disrupted after using holmium laser for fragmentation of an entrapped stone.....	97
<b>Fig. (27):</b>	Schematic representation: at the tip of the Holmium laser fiber, plasma bubble is formed; that destroys both the stone and, eventually, the basket wires .....	98
<b>Fig. (28):</b>	Ureteroscope appears curved along its axis .....	99



## List of Figures (cont...)

<i>Fig. No.</i>	<i>Title</i>	<i>Page No.</i>
<b>Fig. (29):</b>	Impacted stone in the ureteral lumen.....	101
<b>Fig. (30):</b>	A, Plain film of the abdomen shows a ureteral stone located in the upper third of the ureter.....	102
<b>Fig. (31):</b>	A, Intravenous pyelogram and, B, abdominal computed tomography scan show urine extravasation associated with retroperitoneal hematoma, following left ureteroscopy.....	104
<b>Fig. (32):</b>	Upward stent migration .....	105
<b>Fig. (33):</b>	A long stricture developed after a ureteroscopic stone extraction in which there was a perforation leading to extensive extravasation.....	110

## List of Abbreviations

<b>CCD</b>	<i>Charged coupled device</i>
<b>CT</b>	<i>Computed tomography</i>
<b>DL</b>	<i>Dual lumen</i>
<b>EHL</b>	<i>Electrohydraulic lithotripsy</i>
<b>ESWL</b>	<i>Extracorporeal shock wave lithotripsy</i>
<b>FREDDY YAG</b>	<i>Frequency doubled, double pulse neodymium YAG</i>
<b>HDTV</b>	<i>High definition television</i>
<b>Ho:YAG</b>	<i>Laser Holimum Yag Lasser</i>
<b>Nd:YAG</b>	<i>Neodymium Yag Lasser</i>
<b>PTFE</b>	<i>Polytetrafluorethylene</i>
<b>TCC</b>	<i>Transitional cell carcinoma</i>
<b>UPJ</b>	<i>Ureteropelvic junction</i>

## INTRODUCTION

Ureteroscopy was initially developed in the late 1970s to diagnose and treat conditions in the distal ureter. The technique has improved dramatically over the past 2 decades, and has evolved into a minimally invasive procedure for the diagnosis and treatment of pathology within the upper urinary tract (*Monga et al., 2007*).

Certain features are important to the success of a flexible endoscope. Key features to a successful endoscope include a small external caliber that maintains an adequate working channel and an active deflecting mechanism. In the 1980s, design improvements in ureteroscope deflection, fiberoptics, caliber, and working channel increased the usefulness of the flexible ureteroscope (*Pietrow et al., 2002*).

There are currently four major manufacturers of flexible ureteroscopes: ACMI (Southborough, Massachusetts), Olympus (Lake Success, New York), Karl Storz (Tuttlingen, Germany) and Henke-Sass Wolf (Tuttlingen, Germany) all produce flexible ureteroscopes. The Storz, ACMI, and Wolf flexible ureteroscopes have intuitive active deflection, which means the tip of the ureteroscope moves in the same direction as the deflector lever. The Olympus ureteroscope is counterintuitive and deflects in the opposite direction as the lever (*Delvecchio et al., 2001*).

Recently, prototype flexible ureteroscopes with active secondary deflection have been described and may revolutionize complex access to the lower pole of the collecting system. Flexible endoscopic technology has extended (*Johnson et al., 2004*).

Rigid and flexible instruments are important for complete visualization of the upper urinary tract. Ureteroscopy allows visual recognition of pathology within the lumen of the ureter or kidney. Upper tract filling defects represent the most common diagnostic application of ureteroscopy. ureteroscope has revolutionized the diagnosis and treatment of the entire upper urinary tract (*Pietrow et al., 2002*).

Endoscopic tools have evolved, providing the surgeon with the armamentarium necessary to treat many different pathologic processes. Almost all renal calculi can be treated with retrograde ureteroscopy. The fragility of these new endoscopes is a concern, and great care must be taken when using them. With good technique and proper use of instruments, their working life can be extended (*Johnson et al., 2004*).

Most complications of ureteroscopy are minor, necessitating only close observation or minimal intervention. Major complications of ureteroscopy, however, may have severe and lasting consequences. Although no formal classification system for ureteroscopic

injuries has been established, most investigators segregate complications either by chronologic order or by severity. Although most complications occur intraoperatively, the sequelae of these complications often occur in the early or late postoperative period (*Kristensen et al., 2005*).

A few complications arise primarily postoperatively, such as infection or urinary retention, which are not foreseen by any intraoperative actions. Complications are considered major if operative intervention is required for resolution or if the complication is life-threatening. Minor complications are those that are adequately managed with nonoperative measures (*Weizer et al., 2002*).

## **AIM OF THE WORK**

Aim of this essay is to review the complications of endoscopic ureteric manipulations, its' management and how to avoid these complications.

# URETERAL ANATOMY

## Microscopic Anatomy

As seen by light microscopy, the ureter consists of three distinct layers: the mucosa, muscularis, and adventitia. The mucosal lining consists of transitional epithelium, which has four to six layers of cells when the ureter is contracted. There are a large number of junctional complexes between these cells. This, together with the low but consistent level of keratin precursors within them, is probably responsible for the waterproof property of this layer. This mucosal layer also contains many longitudinal folds, or rugae, that give the nondistended ureter a characteristic stellar outline. The epithelium rests on a lamina propria of connective tissue that contains many blood vessels and unmyelinated nerve fibers. However, these nerve fibers seem to be absent from the inner third of the lamina propria (*Daniel and Shackman, 2006*).

The muscular wall of the ureter is traditionally described as two longitudinal layers separated by a middle circular layer. However, a number of more recent studies seem to indicate that the muscle layers are actually arranged spirally. In the pelvic portion of the ureter, the inner spirals are steep and the outer spirals are horizontal, thus appearing in cross section as inner longitudinal and outer circular layers (*Daniel and Shackman, 2006*).