Laparoscopic Ureterolithotomy versus Laser Lithotripsy in Management of Upper Ureteric Stones

A Prospective Randomized Comparative Clinical Study

Thesis

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Mostafa Ali Ahmed

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List of Abbreviations

Abb.	Full term
ASA	*American Society of Anaethesiologists*
AUA	*American Urological Association*
BMI	*Body mass index*
CT	*Computed Tomography*
EAU	*European Association of Urology*
ESWL	*Extracorporeal shok wave lithotripsy*
EXU	*Excretory urography*
IVP	*Intravenous pyelography*
IVU	*Intravenous urography*
KUB	*Kidney, ureter and bladder x-ray*
LRU	*Laparoscopic Retroperitoneal Ureterolithotomy*
LTU	*Laparoscopic Transperitoneal Ureterolithotomy*
MRU	*Magnetic resonance urography*
NANC	*Non adrenergic non cholinergic*
OSS	*Open stone surgery*
PDE	*Phosphodiesterase*
PNL	*Percutaneous nephrolithotomy*
PS	*Physical status*
SPR	*Stone passage rate*
UTI	*Urinary tract infection*

Abstract

We found Operation was successfully performed in all 80 cases, and no open surgery was converted in any case. In the ureteroscopy and laparoscopy groups, the mean operating time was 33.83 ± 6.39 min and 107.25 ± 20.13 min, respectively, their hospitalization time was 1.65 ± 0.48 days vs. 3.90 ± 0.63days, and stone clearance rate was 88.00% (32/40) vs. 95% (38/40), and residual stones were removed by extracorporeal shock-wave lithotripsy (ESWL). All patients were followed up for more than three months, and no major complications occurred.

We concluded that Laparoscopic ureterolithotomy and ureteroscopy are both effective and reliable for the treatment of proximal ureteral stones. However, considering the shorter operation and hospitalization times we suggest that ureteroscopy, as a minimally invasive method, may be the first choice in the treatment of proximal ureteral stones.

Keywords: Laparoscopic Retroperitoneal Ureterolithotomy - Magnetic resonance urography - Open stone surgery

INTRODUCTION

The optimal treatment for ureteral calculi must consider many factors, including stone composition, size and location, patient characteristics, technical skills of the surgeon, and instrument availability. Ureteroscopy has already become a major technique for the diagnosis and treatment of ureteric lesions. For upper urinary tract lithiasis, the use of ureteroscopes has been increasing continuously ***(Geavlete et al., 2006).***

The development of smaller-caliber semirigid and flexible ureteroscopes and the improvement of the instruments, lead to development of ureteroscopy as a safe and effective treatment for ureteral stones in all locations ***(Leone et al., 2010).***

Meanwhile, laparoscopy is gradually gaining place in the treatment of urinary stones because it is now considered as a minimally invasive treatment ***(Hruza et al., 2009).***

The highest level of evidence proved that laparoscopic ureterolithotomy are recommended for large ureteral stones or when ureteroscopy or shock wave lithotripsy has failed ***(Skolarikos et al., 2010).***

Ureteroscopic lithotripsy (URSL) using holmium laser has good outcomes with low complications, while stone migration still existed ***(Mugiya et al., 2000; de la Rosette et al., 2014).***

AIM OF THE WORK

To assess the result of ureteroscopic lithotripsy using holmium laser with laparoscopic ureterolithotomy in treatment of proximal ureteral stones more than 10mm. regarding:

1- Intraoperative data:

a. Operation time.

b. Intraoperative Blood loss.

2- Post operative data:

a. Residual stones.

b. Mean hospital stay.

3- Complications among the studied groups:

a. Stone migration.

b. Major vessels injury.

c. Bleeding and need to Blood transfusion.

4- Prolonged drainage and need to DJ stenting.

Chapter 1

ANATOMY

The ureters

Anatomic Relations:

Ureteral Course in the Abdomen

The ureter, measured from the pelvi-ureteric junction to the bladder, is 28 to 34 cm long. The left ureter is longer than the right. It is enclosed in the intermediate stratum of the retroperitoneal fascia within the envelope of the renal fascia, which is intimately attached to the peritoneum. Evidence of this attachment is the adherence of the ureter to the peritoneum as it is mobilized medially at operation. Each ureter passes over the medial part of the psoas major. It goes over the genitofemoral nerve and at its midpoint passes under the gonadal vessels into the pelvis near the bifurcation of the common iliac vessels. The ureter adheres to the mesocolon, so that injury to its abdominal portion during surgery on the sigmoid colon occurs, especially when the mesosigmoid is involved in an inflammatory disease. The proximity of the inferior mesenteric artery to the ureter presents another hazard ***(Gregory, 2012).***

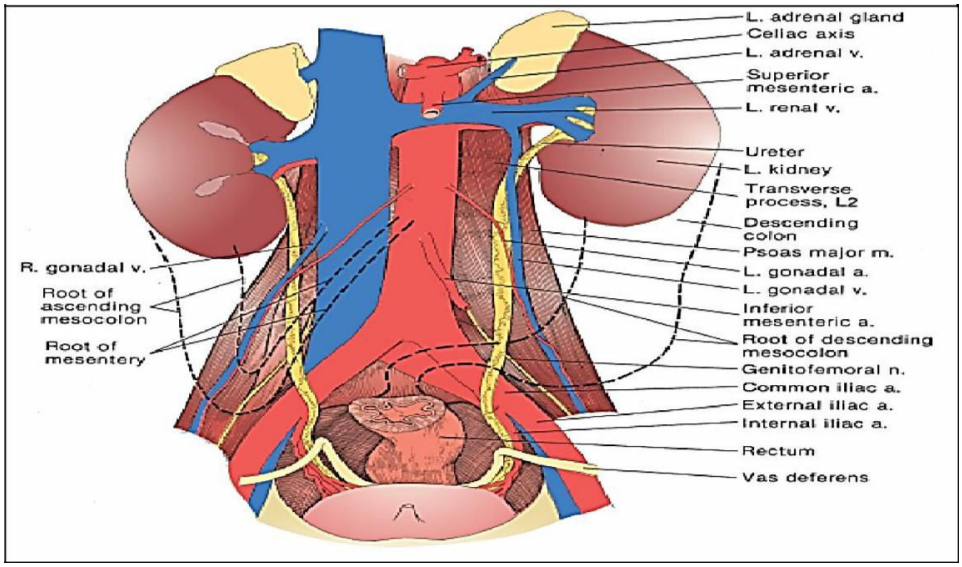

Fig. (1): Ureteral relations in the abdomen ***(Hinmans Atlas of Urosurgical Anatomy, 2012)***.

Pelvic Relations of the Ureter in the Male:

After crossing the common iliac artery in the pelvis, the ureter follows the course of the internal iliac artery and passes along the anterior border of the greater sciatic notch, and turns medially at the ischial spine to lie along the levator ani untill reaching the bladder. The vas deferens crosses in front of it, and the ureter, in turn, passes in front of the tip of the seminal vesicle. For an endoscopic approach, the first portion of the ureter will be found to run posterolaterally, passing under the vas deferens. It then curves up over the obturator artery to the crossing of both internal and external iliac arteries or of the common iliac artery. The site of crossing is marked by a pulsatile indentation in the posteromedial aspect of the ureter. After passing over the common iliac vessels at the sacral

promontory, the ureter then goes posteriorly to take a more or less straight course under the spermatic vessels to the renal pelvis. On the left, the ureter runs under the left colic artery at the junction of its middle and upper third, while on the right, the right colic and ileocolic vessel are not a problem because they lie at a high level and more anteriorly ***(Gregory, 2012).***

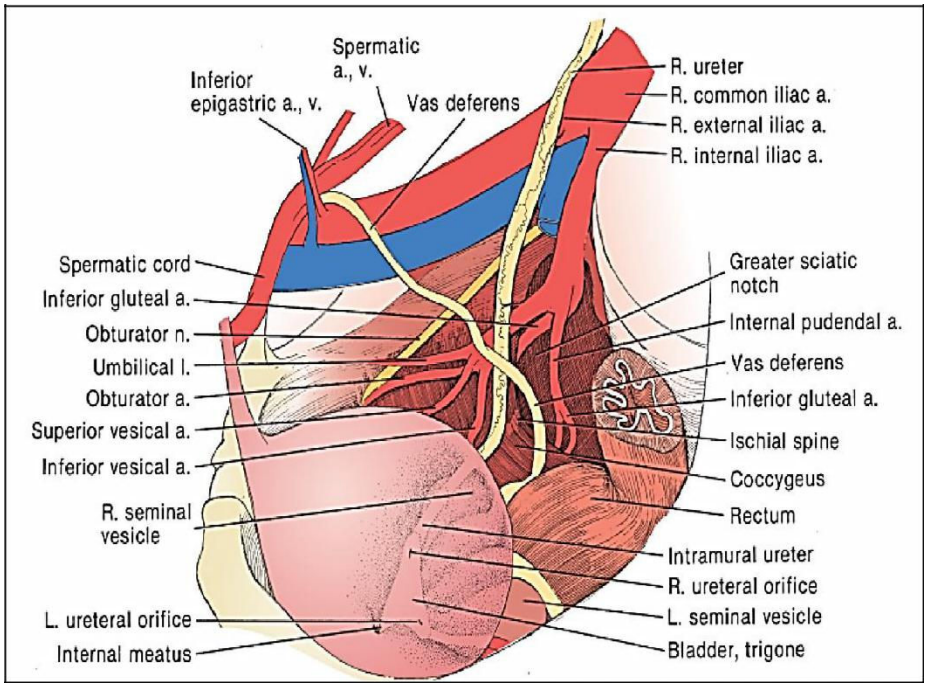

Fig. (2): Pelvic relations of the ureter in male ***(Hinmans Atlas of Urosurgical Anatomy, 2012)***.

Pelvic Relations of the Ureter in the Female:

Because of the comparative frequency of female nonurologicpelvic surgery, the course of the ureter is of greatersurgical importance in the female than in the male. From an oblique view of the right side of the pelvis, the right ureter is

seen running over the common iliac and internal iliac artery to enter the pelvis. Passing medially at the level of the ischial spine, it lies behind the ovary in close association with the suspensory ligament of the ovary and forms the posterior limit of the ovarian fossa. The ovarian vessels make an oblique crossing over the ureter. Entering the parametrium of the broad ligament, it runs successively through the uterosacral ligament, the cardinal ligament, and the vesicouterine ligament. In its course, the ureter goes for a short distance with the uterine artery, which, originating from the internal iliac artery lies lateral and anterior to it. The artery then crosses over the ureter and runs medial to it on its course to the uterus, Manipulation of the ovarian and uterine vessels during gynecologic procedures ureteral injury may occur. For a retrograde endoscopic approach, the course of the ureter is found to be similar to that in males, but the ovarian vessels, especially prominent on the right side, must be negotiated ***(Gregory, 2012).***