Subcapsular renal hematoma in patients underwent upper ureteroscopic lithotripsy

Thesis

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بسم الله الرحمن الرحيم

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا

إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم

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(٣٢)

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Ismail Mahdy Saleh

List of Contents

List of Abbreviations

Abbrev.	Full term
BMI	**:** Body mas index
CKD	**:** Chronic kidney disease
CT	**:** Computed tomography
DM	**:** Diabetes mellitus
EAU	**:** European Association of Urology
ESWL	**:** Extra corporeal shock wave lithotripsy
FURS	**:** Flexible ureteroscopy
FURSL	**:** Flexible ureteroscopic lithotripsy
HTN	**:** Hypertension
IVC	**:** Inferior vena cava
IVU	**:** Intravenous urography
NCCT	**:** Non-contrast CT
PCS	**:** Pelvi-calyceal system
PL	**:** Pneumatic lithotripsy
PNL	**:** Percutaneous nephrolithotomy
PULS	**:** Post ureteroscopic lesion scale
RURS	**:** Rigid ureteroscopy
RURSL	**:** Rigid ureteroscopic lithotripsy
SMA	**:** Superior mesenteric artery
SRH	**:** Subcapsular renal haematoma
URS	**:** Ureteroscopy
URSL	**:** Ureteroscopic lithotripsy
UTI	**:** Urinary tract infection
Ho:YAG	**:** Holmium**:**Yttrium–aluminum–garnet

List of Tables

List of Figures

Introduction

Urolithiasis is a major clinical and economic burden for modern health care system **(Saigal et al., 2005).**

International epidemiological data suggest that the prevalence of stone disease is steadily increasing with an estimated lifetime prevalence between 7-12% **(Turney et al., 2012).**

Meanwhile, the treatment for urinary calculi has continuously evolved in last decades from cut for stone to fish out the stone, with the number of ureteroscopies (URS) performed for stone disease increasing by 127% over last 10 period 2000-2010, as consequences of technological advances in medicine, particularly in endourology **(Miller et al., 1999).**

In addition the current guidelines recommended URS, over other treatments modalities including open surgery and in situ extra corporeal shock wave lithotripsy (ESWL), for majority of ureteric stones, with low complication rates, high stone free rate, short hospital stay and minimal contra-indications for the procedure **(Wright et al., 2004).**

The management of ureteral calculi has changed dramatically in the last two decades with the development of smaller caliber ureteroscopes, nitinol instruments such as baskets and graspers, and the holmium:yttrium–aluminum–

garnet (YAG) laser lithotripsy. Ureteroscopy (URS) has become the treatment of choice for ureteral stones, particularly in the distal and mid-thirds. It has the advantages of higher stone-free rates, cost-effectiveness and early convalescence compared with other modalities such as shock wave lithotripsy (SWL) and open surgery. The literature on semirigid URS demonstrates a stone-free rate of 85–99 % depending on stone location **(El-Nahas et al., 2009).**

Ureteroscopic treatment of ureteral stones is an effective option with high success and low complication rates **(Hofmann et al., 2006).**

Ureteroscopy was first carried out in 1929 by Young and Mckay using a cystoscope in grossly dilated ureter **(Young and Mckay, 1929)**, but it was not until the late 1970s that the rigid ureteroscope was used **(Gaizauskas et al., 2014).**

Pneumatic lithotripters are the most popular lithotripsy devices worldwide due to their safety and effectiveness **(Gonen et al., 2006).**

The subcapsular area of the kidney is a potential space where fluid can accumulate, causing compression of the renal parenchyma. Renal subcapsular hematoma is not an uncommon complication after extracorporeal shock wave lithotripsy (ESWL), trauma, renal angiographic procedures

and spontaneously in patients of malignancy and in patients on anticoagulation. **(Chao YC et al., 2009).** Subcapsular or perirenal hematoma is an unusual complication after ureteroscopy (URS) using pneumatic lithotripsy to treat ureteral stones. This complication can be classified as Grade 2b complication according to Satava classification system **(Tepeler et al., 2014).**

The probable etiology of subcapsular renal hematoma is the hydronephrosis associated with intrarenal pressure. The theory justifies that in a hydronephrotic kidney, increased intrarenal pressure causes kinking, stretching and/or obstruction of the major vessels **(Ninomiya et al., 2000).**

After ureteroscopic lithotripsy (URSL), ureteric recanalization induces the sudden expansion and rupture of the attenuated compressed parenchyma and/or capsular vessels. Blood and fluid accumulates in the subcapsular area of the kidney. Some studies claim that the renal capsule then gradually separates from the parenchyma and the hematoma is formed **(Haydar et al., 2004).**

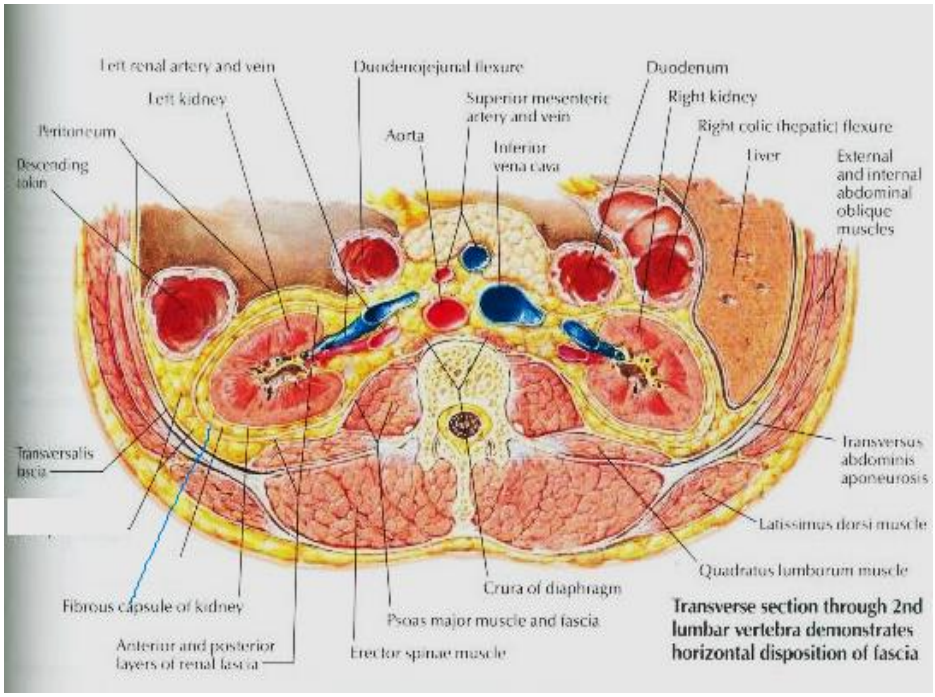

Figure (1): The subcapsular area of the kidney **(Akdeniz et al., 2014).**

The clinical presentation of these patients varies considerably based on the degree and duration of the bleeding. Acute onset of flank or abdominal pain is the most common symptom. Other patients may present with hematuria, a palpable mass or signs of blood loss **(Hsin et al., 2008).**

Small, asymptomatic hematomas resolve rapidly and spontaneously and are usually managed by conservative management. Conservative management includes antibiotics, control of pain with monitoring of vital signs, serum creatinine and haemoglobin values **(Navarro et al., 2009).**

Aim of the Study

The aim of this study is to show the risk factors of developing subcapsular or perirenal hematoma in patients underwent ureteroscopic pneumatic versus laser lithotripsy for upper ureteral calculi.

Anatomy of the kidney

The kidneys are very important organs in body forming the urinary system which excretes the excess water, salts and one of the vital organs in the human body. It receives the majority of cardiac output approximately 25% blood, through the renal arteries and these are end arteries with no anastomosis **(Shirur et al., 2014).**

The kidneys are located retroperitoneally between the level of the 12th thoracic and third lumbar vertebrae. The right kidney lies slightly lower than the left because of inferior displacement by the liver. The left kidney is slightly longer and slightly thicker than the right and lies closer to the midline **(Francis et al., 2002).**

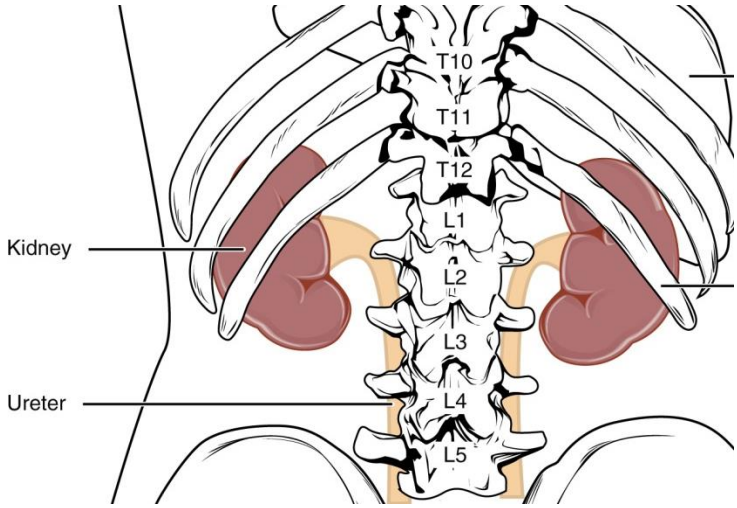

Figure (2): Kidney position in the abdomen **(Guner et al., 2010)**