



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكرو فيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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**Prediction of surgical outcomes as regards
stone free rate and complications after
percutaneous nephrolithotomy using
S.T.O.N.E. versus sResc scoring systems**

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سَبَّحَانَكَ لَا يَلْمُ لَنَا
إِلَّا مَا عَلِمْنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

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List of Abbreviations

Abb.	Full term
<i>AUC</i>	<i>Area under curve</i>
<i>BMI</i>	<i>Body mass index</i>
<i>CCI</i>	<i>Charlson Comorbidity Index</i>
<i>CROES</i>	<i>Clinical Research Office of the Endourologic Society</i>
<i>CT</i>	<i>Computed tomography</i>
<i>DMSA</i>	<i>Dimercaptosuccinic acid</i>
<i>DTPA</i>	<i>Diethylene triamine pentaacetic acid</i>
<i>EBL</i>	<i>Estimated blood loss</i>
<i>ESWL</i>	<i>Extracorporeal shock wave lithotripsy</i>
<i>GSS</i>	<i>Guy's stone score</i>
<i>ICU</i>	<i>Intensive care unit</i>
<i>IVC</i>	<i>Inferior vena cava</i>
<i>IVP</i>	<i>Intravenous pyelography</i>
<i>KUB</i>	<i>kidney, ureter, bladder</i>
<i>NCCT</i>	<i>Non contrast computed tomography</i>
<i>OT</i>	<i>Operative time</i>
<i>PCNL</i>	<i>Percutaneous nephrolithotomy</i>
<i>RIRS</i>	<i>Retrograde intrarenal surgery</i>
<i>RLRV</i>	<i>Retro-aortic left renal vein</i>
<i>ROC</i>	<i>Receiver operating characteristic</i>
<i>SFR</i>	<i>Stone-free rate</i>
<i>SIRS</i>	<i>Systemic inflammatory response syndrome</i>
<i>S-ReSC</i>	<i>Renal Stone Complexity</i>
<i>SWL</i>	<i>Shock wave lithotripsy</i>
<i>UPJ</i>	<i>Ureteropelvic junction</i>
<i>URS</i>	<i>Rigid and flexible ureteroscopy</i>
<i>US</i>	<i>Ultrasonography</i>
<i>UTI</i>	<i>Urinary tract infection</i>

Introduction

Nephrolithiasis is a major worldwide source of morbidity affecting 10-15% of the world population (*Alelign and Petros, 2018*). It is an expanding problem associated with major economic and health consequences. Consistent technical advancements provided surgeons and patients with several options for the treatment of renal calculi, including extracorporeal shock wave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL), retrograde intrarenal surgery (RIRS), and conventional open surgery (*Scales et al., 2012, Pfau and Knauf, 2016*).

Percutaneous nephrolithotomy (PCNL) is generally considered the gold standard treatment in renal stones >2cm or lower calyceal >1cm offering high stone-free rates after the first treatment compared to the other minimal invasive lithotripsy techniques. However, serious complications although rare could be expected following this percutaneous procedure (*Chung et al., 2019*).

Perioperative bleeding, urine leak from nephrocutaneous tract, pelvicalyceal system injury, and postoperative pain are individually confronted complications after PCNL. Thus a universally accepted scoring system in percutaneous management of nephrolithiasis such as: S.T.O.N.E. nephrolithometry score, and Renal Stone Complexity (S-ReSC) score have been described to enable appropriate

counselling of patients, expect adverse outcomes, and provide a mean of standardized reporting of stone complexity and patient outcomes (*Basiri et al., 2013; Kyriazis et al., 2014*).

S.T.O.N.E. nephrolithometry score, uses non-contrast-enhanced computed tomography (CT) scans parameters to describe and classify the most relevant features that affect the percutaneous management of renal calculi (*Jeong et al., 2013*). It represents five variables: stone size, tract length, degree of obstruction, number of involved calyces, and stone essence (stone density). On the basis of these variables, a score of 5–13 can be calculated; a higher score correlates with higher stone complexity. A score from 5 to 6 is considered low grade, from 7 to 8 moderate grade and ≥ 9 is high grade (*Noureldin et al., 2015*).

The S-ReSC scoring system is based solely on stone distribution within the collecting system and does not take into account any patient characteristic (*Okhunov et al., 2013*). They devised the collecting system into 9 locations in which the stone is determined with preoperative CT, with 1 point assigned to each location of the nine. The score up to 9 is assigned by adding the cumulative sites involved. A score of 1 to 2 is considered low, 3 to 4 is medium, and ≥ 5 is high. (*Jeong et al., 2013*).

Aim of the Work

To compare the S.T.O.N.E versus sResc scoring system in prediction of the surgical outcomes; stone free rate and perioperative complications after PCNL.

Chapter 1**Applied Renal Anatomy**

The kidneys are paired retroperitoneal structures that are normally located between the transverse processes of T12-L3 vertebrae, with the left kidney typically superior in position than the right. The upper poles are normally oriented more medially and posteriorly than the lower poles (*Kriz and Elger, 2014*).

Renal anatomy:

Grossly, the kidneys are bean-shaped structures and weight about 150 g in the male and about 135 g in the female. They are typically 10-12 cm in length, 5-7 cm in width, and 2-3 cm in thickness (*Marley, 2007*). (**Figure 1**)

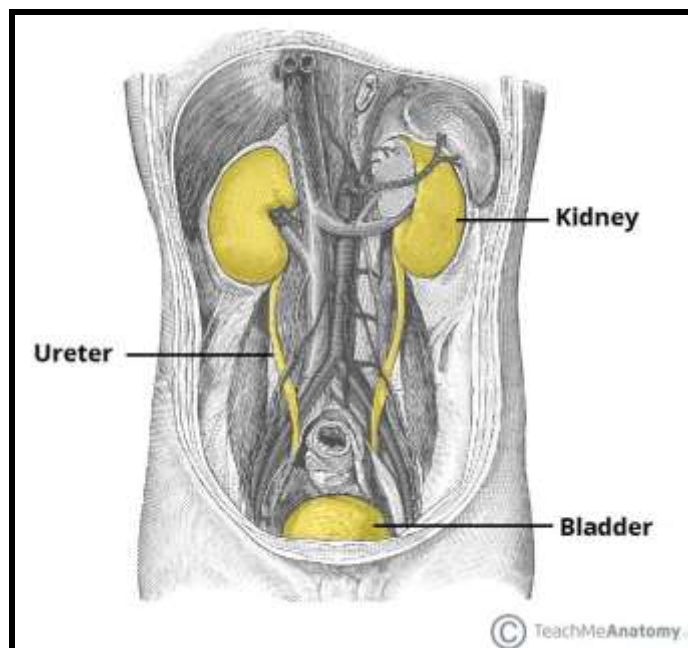


Figure 1: kidney anatomy (*Jones, 2019*)

The kidneys are retroperitoneal organs and, therefore, during an open surgery, one may choose to use an extraperitoneal flank approach, incising over the 11th-12th rib, plus or minus rib excision and staying retroperitoneally. This is particularly useful in obese patients, but not in patients with severe scoliosis or cardiorespiratory disorders, and provides direct access to the retroperitoneal space without traversing the peritoneal cavity (*Kriz and Elger, 2014*).

Relation of the kidneys to the neighboring organs (Figure 2):

Superiorly, the suprarenal (adrenal) glands sit adjacent to the upper pole of each kidney.

On the right side, the second part of the duodenum (descending portion) lies on the medial aspect of the kidney, and the liver lies anterior to the upper pole of the kidney and can extend in some individuals to cover the entire anterior surface.

On the left side, the greater curvature of the stomach lies over the superior medial aspect of the kidney, the tail of the pancreas extend to overlies the renal hilum, and the spleen covers small part of the upper pole anteriorly and is connected by the spleno-renal (lienorenal) ligaments.

Both the liver and the spleen can extend lateral to the kidney and are therefore at risk of injury with a lateral puncture during PCNL (*Kriz and Elger, 2014*).