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Calculus of kidney and ureter
Guidelines

Table of content

المظلة هيلثكير مانجمنت
ALMADALLAH
HEALTHCARE MANAGEMENT

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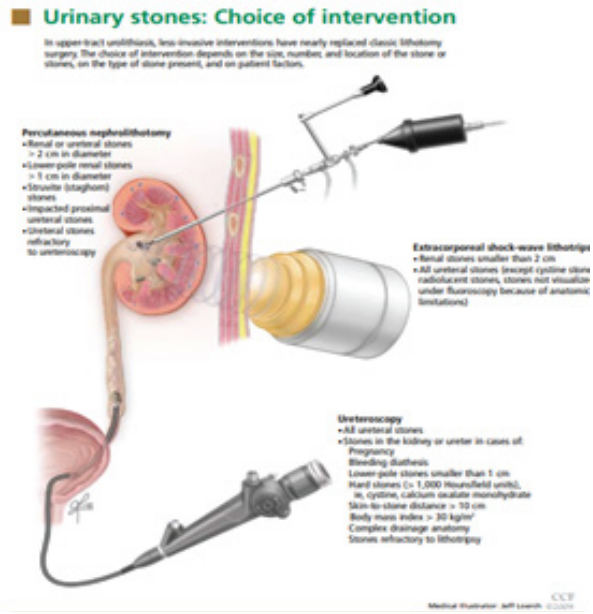
Introduction

Kidney and ureteral stone (urolithiasis) disease is a widespread problem in primary care practice. Patients may present with the classic symptoms of renal colic and hematuria. Some patients may be asymptomatic or have atypical symptoms such as vague abdominal pain, while others will have more typical symptoms, such as acute abdominal or flank pain, nausea, urinary urgency or frequency, difficulty urinating, penile pain, or testicular pain. Surgical interventions are available, such as extracorporeal shock-wave lithotripsy (ESWL/SWL), ureteroscopy stone removal (URS), and percutaneous nephrolithotomy (PNL). Each of these options has advantages and disadvantages, depending on the characteristics of the stone or stones, such as size, number, location, and composition, as well as patient factors such as renal anatomy, body habitus, and comorbidities.



Calculus of kidney and ureter

Stone composition

Knowing the composition of the stone assists with clinical decision-making for the treatment of existing stones and prevention of new stone formation. The stone material that retrieved / passed should be sent for analysis of stone composition.

A. Cystine stones and calcium oxalate stones
are hard, with a density greater than 1,000 Hounsfield units. Lithotripsy has a high failure rate with these types of stones.

B. Uric acid stones
are softer and do not show up well on x-ray imaging. While it is technically feasible to perform lithotripsy under ultrasonographic guidance, most practitioners prefer to use fluoroscopy to locate the stone. For this reason, patients with radiolucent stones (i.e., uric acid stones) are also not good candidates for lithotripsy.

C. Struvite (staghorn) stones
are by definition infected, with bacteria residing within the stone itself. Thus, it is imperative to remove all stone fragments during treatment to prevent sepsis and stone reformation. Over time, an untreated staghorn calculus will lead to failure of the renal unit. Percutaneous nephrolithotomy has the best stone-free rate (78%), and lithotripsy has the lowest (54%). Therefore, percutaneous nephrolithotomy is recommended as the first treatment for these stones. SWL, with placement of adequate drainage of the kidney prior to the procedure, is an alternative option for patients who have a smaller stone volume (less than 20 mm) with normal non dilated collecting system anatomy or in pediatric population.

Medical management

Several drug classes including α-blockers, calcium channel inhibitors and phosphodiesterase type 5 inhibitors (PDEI-5) are used for medical expulsive therapy (MET). The use of PDEI-5 or corticosteroids is not recommended. As of this date, MET is well established only for stones in the distal ureter. The applicability of this treatment for stones in the proximal ureter and kidney is still being investigated. In patients who have stones smaller than 1 cm in diameter and whose symptoms are under control, observation with medical expulsive therapy may well be appropriate. However, after 4 weeks, intervention is indicated, as the risk of complications and renal deterioration increases.

Surgery indications and contraindications

In general, the main indications for surgical treatment of stones include persistant pain, infection, and urinary tract obstruction. No specific surgical therapy is required for asymptomatic stones, particularly those that are less than 5 mm in diameter.

A. Indications for emergency surgery

1. Patients with obstructing stones and suspected or confirmed urinary tract infection (UTI).
2. Patients with bilateral obstruction and acute kidney injury (AKI).
3. Patients with unilateral obstruction with AKI in a solitary functioning kidney.

B. Indications for elective surgery

Specific indications for surgical stone treatment are provided by the 2016 American Urological Association /Endourological Society guidelines, which recommend surgical management in the following clinical settings :

1. Ureteral stones >10 mm (>15mm in european guidelines).
2. Uncomplicated distal ureteral stones ≤ 10 mm that have not passed after four to six weeks of observation, with or without MET.
3. Symptomatic kidney stones in patients without any other etiology for pain not responding to pain medications.
4. Pregnant patients with ureteral or kidney stones in whom medical observation has failed (In pregnant patients who require surgical stone removal, URS is the procedure of choice. SWL and PNL are contraindicated during pregnancy).
5. Persistent kidney obstruction related to stones.
6. Recurrent UTI related to stones.

C. Contraindications

There are no absolute contraindications to stone removal surgery. However, shock wave lithotripsy (SWL) should not be performed in patients who are obese, are pregnant, or have an uncontrolled bleeding diathesis.

Calculus of kidney and ureter

4- Robotic surgery:

Robot assisted repair of inguinal hernias has demonstrated safety and efficacy in surgeries repairing inguinal hernias that present on both sides of the pubic bone (bilateral) as well as inguinal hernias that present on one side (unilateral).[69] In comparing robot assisted repair of inguinal hernias to traditional laparoscopic techniques, robot assisted surgeries repairing inguinal hernias have longer operating times and can be more costly. However, measures of safety, complication rates, and readmission rates did not significantly differ between robot assisted repair and traditional laparoscopic repair

Surgical approach

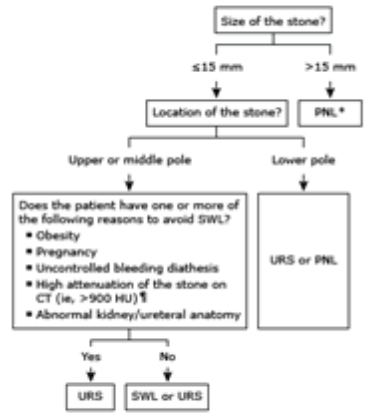
Approach to the selection of surgical modality, which is largely consistent with the 2016 American Urological Association (AUA) /Endourological Society, and 2018 European Association of Urology (EAU) guidelines as follows:

I. Renal stone (algorithm 1):

- For stones that are ≤15 mm that are in the upper pole, middle calyx, or pelvis of the kidney, SWL or URS as first-line therapy, rather than PNL or other surgical options.
- For stones that are ≤15 mm that are in the lower pole of the kidney, URS or PNL, rather than SWL or other surgical options.
- For stones that are >15 mm, regardless of location in the kidney, PNL as first-line therapy, rather than other surgical options. If PNL is not available or contraindicated, staged URS (i.e., performed in separate planned sessions) is an alternative option.
- SWL should be avoided in patients with obesity, pregnant patients, patients with an uncontrolled bleeding diathesis, patients with abnormal kidney/ureteral anatomy, and patients whose preoperative imaging with CT demonstrates high attenuation of the stone (i.e., >900 Hounsfield units).
- In general, laparoscopic, robot-assisted, and open surgery should not be offered as first-line therapy for most kidney stones. However, such procedures may be considered for patients in whom SWL, URS, and PNL are unsuccessful, with complex kidney or ureteral anatomy, with large (>20 mm) or complex stones or requiring concomitant reconstructive surgery for anatomic defects (e.g., ureteropelvic junction [UPJ] obstruction or ureteral stricture).

algorithm 1

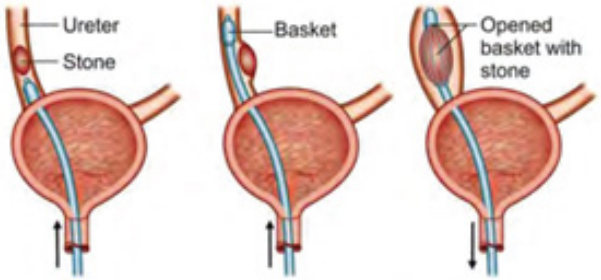
Selection of surgical procedure for elective kidney stone removal



PNL: percutaneous nephrolithotomy; CT: computed tomography; HU: Hounsfield units; URS: ureteroscopy; SWL: shock wave lithotripsy.

II. Ureteral stone (algorithm 2):

- For proximal and mid-ureteral stones that are ≤ 10 mm, SWL or URS as first-line therapy, rather than PNL and other surgical options.
- For proximal and mid-ureteral stones that are >10 mm, URS as first-line therapy, rather than SWL or other surgical options.
- For all distal ureteral stones, regardless of size, URS / Dormia basketing is used as first-line therapy, rather than SWL or other surgical options. However, for patients who decline URS, SWL is an alternative option.



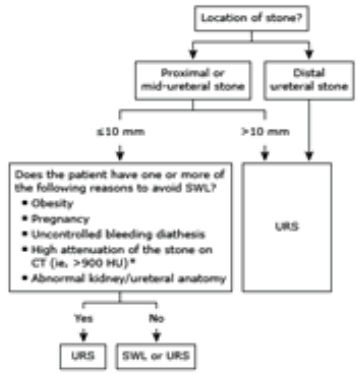
- SWL should be avoided in patients with obesity, pregnant patients, patients with an uncontrolled bleeding diathesis, patients with abnormal kidney/ureteral anatomy, and patients whose preoperative imaging with CT demonstrates high attenuation of the stone (i.e., >900 Hounsfield units).

Calculus of kidney and ureter

• In general, PNL and laparoscopic, robot-assisted, and open surgery should not be offered as first-line therapy for most ureteral stones. However, such procedures may be considered for patients in whom SWL and/or URS are unsuccessful, with complex kidney or ureteral anatomy, with large (>20 mm) or complex stones or requiring concomitant reconstructive surgery for anatomic defects (e.g., UPJ obstruction or ureteral stricture).

algorithm 2

Selection of surgical procedure for elective ureteral stone removal



SWL: shock wave lithotripsy; CT: computed tomography; HU: Hounsfield units; URS: ureteroscopy.

Ureteral stent placement

Ureteral stents are placed after URS, in part to help prevent ureteric obstruction and pain resulting from ureteral edema or passage of a stone fragment. In three meta-analyses of trials evaluating patients who underwent ureteroscopic lithotripsy, compared with those who did not receive a stent, patients receiving stents had lower urinary tract symptoms (dysuria, frequency or urgency, and hematuria). The 2016 American Urological Association guidelines state that ureteral stent placement can be omitted in patients who meet all of the following criteria: No suspected ureteric injury during URS, no evidence of ureteral stricture or other anatomical impediments to stone fragment clearance, Normal contralateral kidney, no kidney function impairment, No secondary URS procedure planned.

In addition, routine placement of a ureteral stent prior to URS (pre-stenting) is not recommended. Although some clinicians advocate for pre-stenting prior to URS in order to dilate the ureter and improve stone-free rates, authors Assimos et al., believe that the added health care costs and negative impact on quality of life associated with stents outweigh the potential benefits.

Routine ureteral stenting should not be performed in patients undergoing SWL. Although stent placement prior to SWL may reduce the accumulation of stone fragments in the ureter, it has not been shown to improve stone-free rates with SWL compared with no stent placement.

Residual stone fragments and additional surgery

In addition, routine placement of a ureteral stent prior to URS (pre-stenting) is not recommended. Although some clinicians advocate for pre-stenting prior to URS in order to dilate the ureter and improve stone-free rates, authors Assimos et al., believe that the added health care costs and negative impact on quality of life associated with stents outweigh the potential benefits.

Routine ureteral stenting should not be performed in patients undergoing SWL. Although stent placement prior to SWL may reduce the accumulation of stone fragments in the ureter, it has not been shown to improve stone-free rates with SWL compared with no stent placement.

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