

DISEASE MANAGEMENT I:

The treatment of urolithiasis is based on many parameters and is individualised for each patient. Parameters such as the size, number, location, and constitution of the stones are cornerstones for deciding the treatment.

RENAL COLIC

Pain relief:

Non-steroidal anti-inflammatory drugs (NSAIDs) (including metamizolopyridone), and paracetamol are effective in patients with acute stone colic and have better analgesic efficacy than opioids. The addition of antispasmodics to NSAIDs does not result in better pain control.

Recommendations	Strength rating
Offer a non-steroidal anti-inflammatory as the first drug of choice; e.g., metamizole* (dipyrone); alternatively paracetamol or, depending on cardiovascular risk factors, diclofenac**, indomethacin or ibuprofen***.	Strong
Offer opioids (hydromorphone, pentazocine or tramadol) as a second choice.	Weak
Offer renal decompression or ureteroscopic stone removal in case of analgesic refractory colic pain.	Strong

* Maximum single oral dose recommended 1000 mg, total daily dose up to 5000 mg, not recommended in the last three months of pregnancy [122].

** Affects glomerular filtration rate (GFR) in patients with reduced renal function.

*** Recommended to counteract recurrent pain after ureteral colic.

MANAGEMENT OF SEPSIS AND/OR ANURIA IN OBSTRUCTED KIDNEY:

The obstructed kidney with all signs of urinary tract infection (UTI) and/or anuria is a urological emergency. Urgent decompression is often necessary to prevent further complications in infected hydronephrosis secondary to stone-induced, unilateral or bilateral, renal obstruction.

Little evidence to support the superiority of percutaneous nephrostomy over retrograde stenting for primary treatment of infected hydronephrosis.

Recommendations	Strength rating
Urgently decompress the collecting system in case of sepsis with obstructing stones, using percutaneous drainage or ureteral stenting.	Strong
Delay definitive treatment of the stone until sepsis is resolved.	Strong
Collect (again) urine for antibiogram test following decompression.	Strong
Start antibiotics immediately (+ intensive care, if necessary).	Strong
Re-evaluate antibiotic regimen following antibiogram findings.	Strong

MEDICAL EXPULSIVE THERAPY (MET)

Seems to be efficacious for treating patients with ureteral stones who are amenable to conservative management.

Recommendation	Strength rating
Consider α -blockers as medical expulsive therapy as one of the treatment options for (distal) ureteral stones > 5 mm.	Strong

CHEMOLYSIS

Uric acid stones >5mm can be dissolved based on oral alkalinisation of the urine above 7.0.

For obstructing uric acid stones, a combination of oral chemolysis with tamsulosin is more effective than each substance alone.

Recommendations (oral chemolysis of uric acid stones)	Strength rating
Inform the patient how to monitor urine-pH by dipstick and to modify the dosage of alkalinising medication according to urine pH, as changes in urine pH are a direct consequence of such medication.	Strong
Carefully monitor patients during/after oral chemolysis of uric acid stones.	Strong
Combine oral chemolysis with tamsulosin in case of (larger) ureteral stones (if active intervention is not indicated).	Weak

EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY (ESWL)

The success of SWL depends on the efficacy of the lithotripter and the following factors:

- Size, location (ureteral, pelvic or calyceal), and composition (hardness) of the stones
- Patient's habitus
- Performance of SWL (best practice)

Recommendations	Strength rating
Ensure correct use of the coupling agent because this is crucial for effective shock wave transportation.	Strong
Maintain careful fluoroscopic and/or ultrasonographic monitoring during shock wave lithotripsy (SWL).	Strong
Use proper analgesia because it improves treatment results by limiting pain-induced movements and excessive respiratory excursions.	Strong
Prescribe antibiotics prior to SWL in the case of infected stones or bacteriuria.	Strong

URETEROSCOPY (URS)

The current standard for rigid ureteroscopes is a tip diameter of < 8 French (F). Rigid URS can be used for the whole ureter, however, technical improvements, as well as the availability of digital scopes, also favour the use of flexible ureteroscopes in the ureter.

Recommendations	Strength rating
Use holmium:yttrium-aluminium-garnet (Ho:YAG) laser lithotripsy for (flexible) ureteroscopy (URS).	Strong
Perform stone extraction only under direct endoscopic visualisation of the stone.	Strong
Do not insert a stent in uncomplicated cases.	Strong
Offer medical expulsive therapy for patients suffering from stent-related symptoms and after Ho:YAG laser lithotripsy to facilitate the passage of fragments.	Strong
Use percutaneous antegrade removal of ureteral stones as an alternative when shock wave lithotripsy (SWL) is not indicated or has failed, and when the upper urinary tract is not amenable to retrograde URS.	Strong
Use flexible URS in cases where percutaneous nephrolithotomy or SWL are not an option (even for stones > 2 cm). However, in this case there is a higher risk that a follow-up procedure and placement of a ureteral stent may be needed.	Strong

PERCUTANEOUS NEPHROLITHOTOMY

Percutaneous nephrolithotomy remains the standard procedure for large renal calculi. Different rigid and flexible endoscopes are available, and the selection is mainly based on the surgeon's own reference.

Recommendations	Strength rating
Perform pre-procedural imaging, including contrast medium where possible or retrograde study when starting the procedure, to assess stone comprehensiveness and anatomy of the collecting system to ensure safe access to the renal stone.	Strong
Perform a tubeless (without nephrostomy tube) or totally tubeless (without nephrostomy tube and ureteral stent) percutaneous nephrolithotomy (PNL) procedure, in uncomplicated cases.	Strong
Take a stone culture or urine culture directly from the renal pelvis at time of PNL, if possible.	Strong

Standard access tracts are 24-30 F. Smaller access sheaths, <18F, were initially introduced for paediatric use, but are now increasingly utilised in the adult population.

Both prone and supine positions are equally safe with equivalent stone free rate (SFR).