MANAGEMENT OF SPECIFIC PATIENT GROUPS

1. Management of urinary stones and related problems during pregnancy

Clinical management of a pregnant patient with urolithiasis is complex and requires collaboration between specialists. Conservative management is preferred for symptomatic hydronephrosis and ureteric calculi. If complications arise, ureteral stent or percutaneous nephrostomy (PCN) is more effective than conservative treatment. PCN and stents have similar pregnancy outcomes, but stents cause fewer admissions and infections. Ureteroscopy is a reasonable alternative with better satisfaction and fewer stent exchanges, ideally performed in the second trimester by experienced urologists. Percutaneous removal is feasible in selected centres. Pregnancy is an absolute contraindication for shock wave lithotripsy (SWL).

Recommendation	Strength rating
Treat all uncomplicated cases of urolithiasis in pregnancy conservatively (except when there are clinical indications for intervention).	Strong

2. Management of stones in patients with urinary diversion

Patients with urinary diversion are at high risk of stone formation in the upper tract and in the conduit or continent reservoir. Risk factors include metabolic abnormalities (hypercalciuria, hyperoxaluria, hypocitraturia), urinary infections (especially urease-producing bacteria), foreign bodies, mucus, and urinary stasis. Recurrent upper tract stone risk after percutaneous nephrolithotomy (PCNL) can reach 63% at 5 years.

- **Management**

SWL can be effective for small upper-tract stones. Endourological techniques are usually needed. Retrograde access may be unfeasible in long/tortuous conduits or when ureteric orifices are not visible.
Stones in conduits: trans-stomal removal using intracorporeal lithotripsy and flexible scopes.
In continent diversions: trans-stomal procedures should avoid damaging the continence mechanism.
Prior to percutaneous access: perform computed tomography (CT) to exclude overlying bowel; if unsafe, consider surgical approach.

- **Prevention**

High recurrence risk: long-term follow-up and metabolic evaluation are essential.
Prevention includes infection control, correction of metabolic abnormalities, and hyper-diuresis or regular irrigation in continent reservoirs.

Recommendation	Strength rating
Perform percutaneous lithotomy to remove large renal stones in patients with urinary diversion, as well as for ureteral stones that cannot be accessed via a retrograde approach, or that are not amenable to shock wave lithotripsy.	Strong

3. Management of stones in patients with neurogenic bladder

Patients with neurogenic bladder develop urinary calculi due to risk factors such as bacteriuria, hydronephrosis, vesico-ureteral reflux (VUR), renal scarring, and lower urinary tract reconstruction. The most common causes are urinary stasis and infection. Indwelling catheters and bowel segments used in bladder dysfunction facilitate urinary tract infection (UTI). Stones occur more frequently in the bladder, especially after bladder augmentation. Diagnosis may be delayed due to sensory impairment; difficulties in self-catheterisation should raise suspicion.
Surgery must be under general anaesthesia due to inability to use spinal anaesthesia; bone deformities may complicate positioning. Stone prevention requires correction of metabolic disorder, infection control, and restoring normal bladder function.

4. Management of stones in patients with transplanted kidneys

Stones in transplanted kidneys can be transplanted or de novo allograft stones, usually detected by routine ultrasound (US) and confirmed with non-contrast CT. Transplant patients rely on a solitary kidney, so obstruction requires urgent intervention. Stone incidence is 2%, with risk factors including immunosuppression (UTIs), alkaline urine, renal tubular acidosis, and tertiary hyperparathyroidism.
Management is similar to other solitary kidneys but influenced by transplant function, coagulative status, and iliac positioning. For large or ureteral stones, percutaneous access and antegrade endoscopy are favourable. Flexible ureteroscopes and holmium laser make URS viable, though retrograde access may be difficult due to ureteral anastomosis and tortuosity. Pre-transplant treatment of donor stones may increase transplant availability. Post-transplant stones require treatment to preserve function.

Recommendation	Strength rating
Offer patients with transplanted kidneys any of the contemporary management options, including shock wave lithotripsy, flexible ureteroscopy and percutaneous nephrolithotomy.	Strong

5. Management of stones in children

The incidence and prevalence of paediatric urolithiasis have increased, especially in older female adolescents.
Most stones are calcium oxalate; hypocitraturia, low urine volume, and hypercalciuria are common metabolic abnormalities. Children may be asymptomatic or present with age-dependent, non-specific symptoms. Conservative management is possible in selected cases; medical expulsive therapy with alpha-blockers may increase stone-free rate (SFR) but has more side effects. SWL is first-line for most ureteral stones, with 70–90% SFR but lower efficacy in stones >10 mm. Ureteroscopy (URS) (rigid/flexible) and retrograde intrarenal surgery (RIRS) are increasingly used, with good SFRs but variable retreatment and complication rates. PCNL is indicated for stones >2 cm or resistant to other methods, with high SFR but potential renal risks. Mini-PCNL reduces morbidity. Open or laparoscopic surgery is rarely needed. All paediatric stone formers require metabolic evaluation and recurrence prevention strategies.

Recommendations	Strength rating
Offer children with single ureteral stones less than 10 mm shock wave lithotripsy (SWL) if localisation is possible or ureteroscopy as first-line option.	Strong
Ureteroscopy is a feasible alternative for ureteral stones not amenable to SWL.	Strong
Offer children with renal stones with a diameter of up to 20 mm (~300 mm^2) SWL.	Strong
Offer children with renal pelvic or calyceal stones with a diameter > 20 mm (~300 mm^2) percutaneous nephrolithotomy.	Strong
Retrograde renal surgery is a feasible alternative for renal stones smaller than 20 mm in all locations.	Weak