

Vesicoureteral Reflux (VUR)

Treatment Options

Medical management

Aim: Prevent febrile UTI, renal scarring and allow spontaneous resolution



Observation and surveillance

- Low-grade VUR (Grades I–II)
- Regular follow-up with ultrasound, urinalysis, growth, BP and renal function



Continuous antibiotic prophylaxis (CAP)

- Recurrent febrile UTI, BBD, selected Grade III–V
- TMP–SMX, nitrofurantoin or cephalexin (dose as per age and renal function)



Treat breakthrough UTI

- Culture-guided antibiotics
- Parenteral therapy if clinically indicated



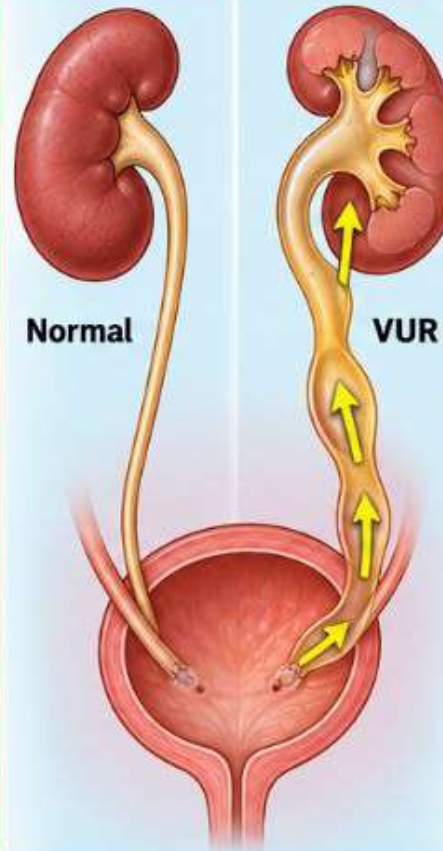
Manage bladder–bowel dysfunction (BBD)

- Timed voiding, hydration, constipation treatment, urotherapy



Circumcision

- Consider in selected uncircumcised boys with recurrent febrile UTI



Surgical management

Aim: Eliminate reflux in selected patients and prevent recurrent infection and renal damage

A. Endoscopic injection (STING/HIT)



- Dextranomer/hyaluronic acid (Deflux)
- Injection near/within the ureteric orifice
- Minimally invasive
- Success high for low–moderate grade VUR, but recurrence or repeat injection may occur

B. Ureteric reimplantation



Cohen cross-trigonal (reimplanted ureter)



Lich–Gregoir (extravesical)

- Open, laparoscopic or robotic approach
- Techniques: Cohen cross-trigonal or extravesical (Lich–Gregoir)
- High success rates (≈ 95 – 98% with open surgery)
- Suitable for high-grade or persistent VUR and recurrent infections

Indications for surgery

- ✓ Recurrent febrile UTI despite appropriate medical management
- ✓ Persistent high-grade VUR (Grades IV–V)
- ✓ New or progressive renal scarring
- ✓ Poor adherence to medical management
- ✓ Persistent VUR with complications (after correction of BBD)
- ✓ Selected cases based on family preference

Grade-wise approach

VUR grade	Recommended approach
I	Observation $\pm$ CAP
II	Observation $\pm$ CAP
III	CAP or surveillance (consider surgery if recurrent UTI or failure)
IV	CAP in many; consider surgery for recurrent infection, persistence or renal risk
V	Specialist assessment; surgery often considered, individualized based on renal function, age and infection history

Key clinical pearls



VUR alone is not an indication for surgery. Febrile UTI, renal abnormalities, BBD and likelihood of spontaneous resolution are more important.



Treat BBD before elective antireflux surgery whenever feasible.



DMSA scan may help assess cortical scarring in selected patients.



Surgical correction reduces reflux but does not reverse established renal scarring.

Children with reflux nephropathy, proteinuria or hypertension require long-term nephrology follow-up and renoprotective therapy when indicated.



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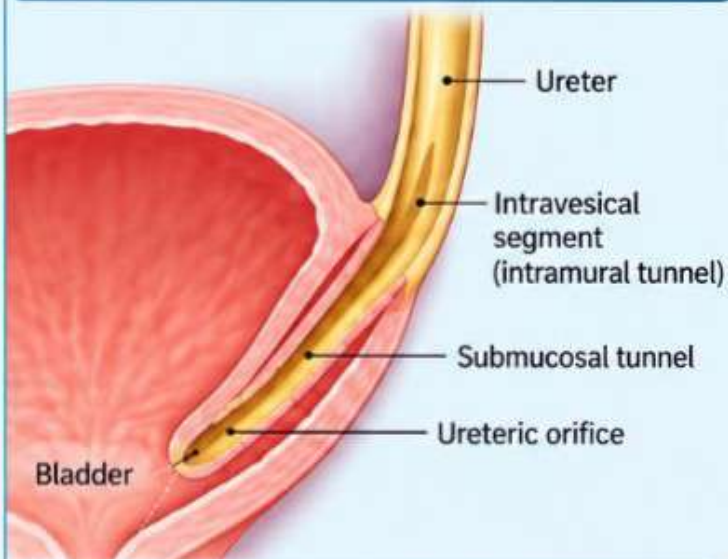
Extracorporeal Nephrology Group

An Academic Initiative for Nationwide Nephrology Education
In Association with Cochin Kidney Foundation (CKF)

Vesicoureteral Reflux (VUR) How Reflux Occurs

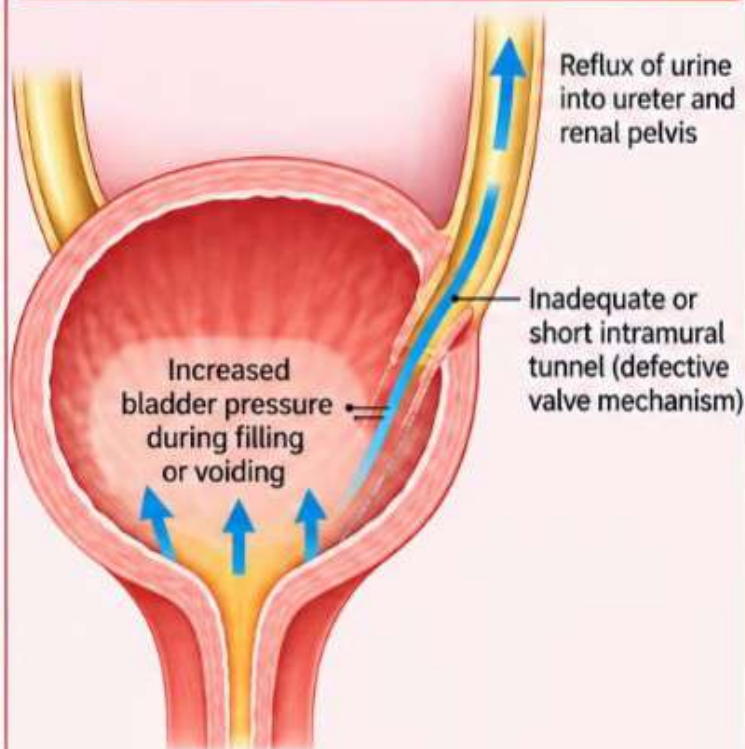


Normal – Antireflux Mechanism



Normal ureter enters the bladder obliquely and runs a submucosal tunnel. During bladder filling and voiding, increased intravesical pressure compresses the intramural ureter, acting as a one-way valve.

VUR – How Reflux Occurs



Causes of VUR

Primary VUR (congenital)

- Short or inadequately developed intramural ureteric tunnel
- Abnormal ureterovesical junction
- Incompetent flap-valve mechanism
- Reflux occurs during bladder filling or micturition



Short intramural tunnel

Secondary VUR (acquired/functional)

- Bladder outlet obstruction (e.g. posterior urethral valves)
- Neurogenic bladder
- High-pressure bladder due to poor compliance or dysfunctional voiding
- Chronic bladder dysfunction can overcome the normal antireflux mechanism

Grade of reflux



Mechanism

Defective ureterovesical junction
↓
Failure of flap-valve mechanism
↓
Retrograde urine flow into ureter and kidney

Clinical consequences

- Recurrent febrile UTI
- Acute pyelonephritis
- Renal scarring
- Hypertension
- Progressive renal impairment (in some cases)

Clinical pearl

- Length of intramural ureter relative to diameter is important for valve competence (normal ratio $\approx$ 5:1).
- Short tunnel predisposes to reflux.
- VUR does not always cause renal damage. Renal scarring usually occurs due to recurrent febrile urinary infections or associated congenital renal dysplasia.