RPSG & KDARs Collaborative

The RPSG

The Renal Patient Support Group

Vesicouretrical Reflux

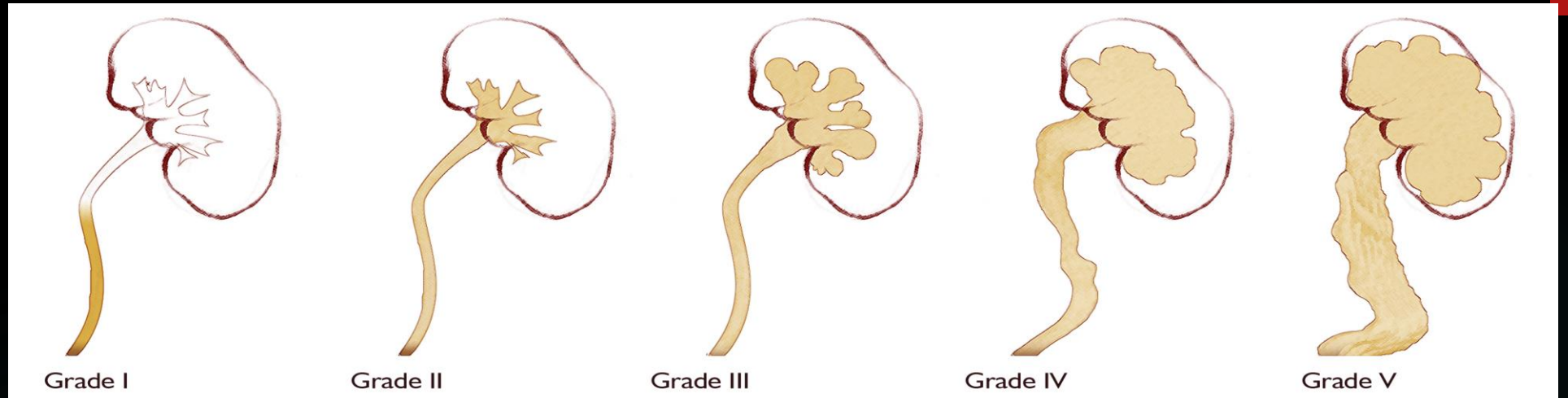
Vesicoureteral Reflux (VUR)

- It is a retrograde flow of urine from the bladder into the ureter and toward the renal tubules, secondary to a dysfunctional vesicoureteral junction. It is an anatomic and/or functional disorder.
- Serious consequences are renal scarring, hypertension, and renal dysfunction.
- VUR is common in childhood.
- VUR can be an isolated finding and called primary reflux, or associated with urological abnormalities such as posterior urethral valves or urethrocele, which are referred as secondary reflux.
- The vesicoureteral junction allows urine flow from the ureter into the bladder and prevents back flow.

Pathogenesis

Primary VUR	The most common form of reflux, occurs due to incompetent or inadequate closure of the ureterovesical junction. It usually is detected after birth.
Secondary VUR	It is a result of abnormally high pressure in the bladder that results in failure of the closure of the ureterovesical junction during bladder contraction. It is usually associated with anatomic (e.g. posterior urethral valves) or functional bladder obstruction.

VUR Grading



Grade I	Grade II	Grade III	Grade IV	Grade V
Reflux does not reach the renal pelvis; varying degrees of ureteral dilatation	Reflux reaches the renal pelvis; no dilatation of collecting system; normal forncies	Mild or moderate dilatation of the ureter, with or without kinking; moderate dilatation of the collecting system	Moderate dilatation of the ureter with/or without kinking; moderate dilatation of the collecting system; papillae still visible	Gross dilatation and kinking of the ureter, marked dilatation of the collecting system; papillary impressions no longer visible; intraparenchymal reflux

Aetiology

Due to congenital anomalous development of the ureterovesical junction

Incomplete development of the intramural ureteral tunnel causes failure of the normal valve mechanism at the ureterovesical junction thus permitting reflux of bladder urine into the ureter and renal pelvis

Reflux can occur when the tunnel is ordinarily sufficient if bladder pressure increases due to bladder outlet obstruction or dysfunctional voiding

Dysfunctional Voiding: infrequent voiding, constipation

Risk Factors: age, reflux grade, lower urinary tract dysfunction, anatomic abnormalities, and renal pathophysiology status

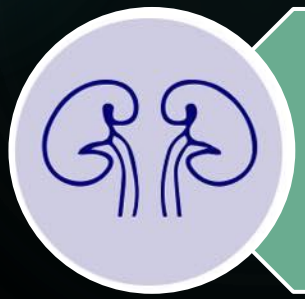
Epidemiology

- Within the general population, VUR is presented in 1-2% of all paediatric recipients.
- There are racial and gender differences. The incidence of VUR in black recipients is 1/3 to caucasian recipients.
- Boys are more likely than girls to have VUR.
- Familiar relationship, 80% of prevalence between identical twins and 35% in nonidentical or fraternal twins
- Siblings of recipients with VUR had a 27.3% risk of having VUR.
- The incidence of VUR is much higher among recipients with UTI.

Diagnoses

The American Academy of Paediatrics recommends ultrasonography and voiding cystourethrography (VCUG) or radionuclide cystography.

The standard criteria for diagnosis of VUR is detection on VCUG.

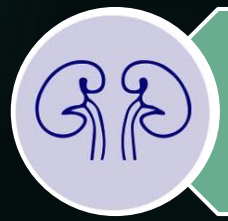


Renal and Bladder Ultrasound (RBUS): RBUS is an ideal screening tool, non-invasive and uses no radiation. However, it was found, that RBUS has a poor sensitivity and negative predictive value for determining VUR.

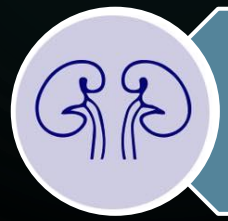
Diagnostic Work-up

Evaluate the presence of UTI, renal status, presence of VUR, and lower urinary tract function.

A basic diagnostic work-up comprises a detailed medical history, a physical examination including blood pressure, urinalysis (assessing for proteinuria), urine culture, and measurement of serum creatinine level.



The first two ultrasonography scans within first 1-2 months of life are highly important in determining the presence or absence of renal pathology.

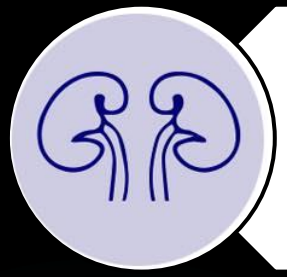


VUR is rare in infants with two normal successive postnatal ultrasonography examinations.

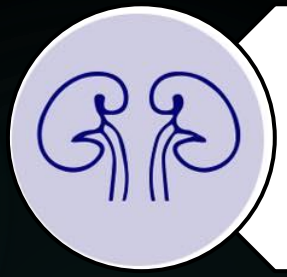
Conservative (non-surgical) Therapy

- The objective of conservative therapy is prevention of febrile UTI.
- The conservative approach includes watchful waiting, intermittent antibiotic prophylaxis or continuous antibiotic prophylaxis (CAP), and bladder rehabilitation in patients with Lower Urinary Tract Dysfunction (LUTD).
- The follow-up with imaging studies is part of conservative management to monitor spontaneous resolution and renal function.
- Biannual ultrasonography of the urinary tract and annual or less frequent cystography and DMSA contrast scanning.
- The most frequently used agents for CAP are single low doses of amoxicillin and trimethoprim and/ or trimethoprim sulfamethoxazole or nitrofurantoin.

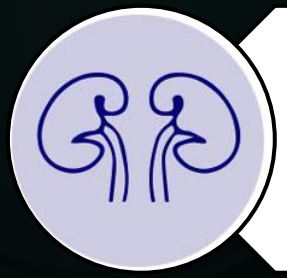
Open Surgical Treatment



All the techniques focus on lengthening the intramural part of the ureter by submucosal embedding of ureter.



All the techniques are safe, with a low rate of complications and excellent success rates (92-98%).



The most popular is the Cohen cross-trigonal reimplantation.

Voiding Cystourethrography (VCUG) Screening

VCUG remains as a gold standard imaging test for the diagnosis of VUR. VCUG testing are invasive, potential radiation exposure and the risk of potential iatrogenic UTI with urethral and bladder catheterisation.

VCUG is recommended in patients with ultrasonographic findings of bilateral high-grade hydronephrosis, duplex kidneys with hydronephrosis, urethrocele, ureteral dilatation, and abnormal bladders.

Early screening is more effective than late screening in preventing further renal damage by early diagnosis and treatment.

VCUG is recommended at age 0-2years after the first proven febrile UTI.

Management

The main goal in the management of VUR is the preservation of renal function by minimalizing the risk of pyelonephritis.

An investigation for the presence of LUTD should be performed in all paediatrics after toilet training.

Endoscopic treatment is an option for all paediatrics with low grades of reflux.

In high-risk patients who already have renal impairment, a more aggressive, multidisciplinary approach is needed.

All patients diagnosed within the first year of life should be treated with CAP.

Immediate antibiotic treatment should be initiated for febrile infections.

Surgical or endoscopic correction is the preferred treatment in patients with frequent infections.

Surgical correction should be considered in patients with high-grade reflux (grade IV/V)

Summary

- Recipients with VUR should be informed that there is a high possibility of VUR in siblings and offspring.
- If screening is performed, siblings should be screened by renal ultrasonography. VCUG is recommended if there is evidence of renal scarring on ultrasonography or a history of UTI.
- In older recipients who are toilet trained, there is no added value in screening for VUR.

RPSG & KDARs Collaborative

Orzechowska, K

Coventry University,
England – United Kingdom

The Renal Patient Support Group (RPSG),
England – United Kingdom

Christine, H

The Renal Patient Support Group (RPSG),
England – United Kingdom

The Kidney Disease and Renal Support (KDARs) for Kids,
England – United Kingdom