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# Obstructive and reflux uropathy

## Guidelines

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## Vesicoureteral Reflux (Vur)

Normal flow of urine is always from ureter to bladder through ureteric orifice. It is called efflux. If urine enters the ureter from the bladder through ureteric orifice, it is called reflux. It is always pathological. It is common among children, can be unilateral or bilateral and has got 5 grades depending on the amount of reflux on micturating/voiding cystourethrography (VCUG/MCU).

Reflux Grade	Reflux grade Description
Grade I	Reflux into the non-dilated ureter
Grade II	Reflux into the renal pelvis, and calyces without dilation
Grade III	Mild to moderate dilation of thr ureter, renal pelvis, and calyces with minimal blunting of the fornices
Grade IV	Moderate ureteral tortuosity and dilation of the renal pelvis and calyces
Grade V	Gross dilation of the ureter, renal pelvis, and calyces, loss of papillary impressions, and ureteral tortuosity

## Causes

1. Congenital: It is commonly associated with posterior urethral valve (PUV).
2. Acquired: Trauma, after surgery or intervention.

## Investigations

1. Urine microscopy and C/S.
2. Blood urea and serum creatinine.
3. VCUG/MCU: Investigation of choice for identification and Grading of VUR.
4. DMSA scan (a radionuclide scan using dimercaptosuccinic acid): for the diagnosis of complication like acute pyelonephritis and/or renal scarring

# Obstructive and reflux uropathy

## Treatment

Treatment of reflux nephropathy is based on the unproven assumption that decreasing reflux and UTIs prevents renal scarring. Consensus is lacking for certain recommendations, such as when and how to image patients for diagnosis and when to prescribe prophylactic antibiotics.

### Available treatment option includes:

1. Prophylactic-long term-antibiotics for recurrent urinary tract infection prevention which depending on:
  - a. the frequency of UTIs.
  - b. the age of the child.
  - c. the severity of the VUR.

Appropriate agents include trimethoprim-sulfamethoxazole, trimethoprim alone, nitrofurantoin, and cephalexin.

2. Tailoring of the ureter with ureteric re-implantation. Indications include:
  - a. recurrent infections despite compliance with a prophylactic antibiotic regimen.
  - b. worsening of renal scars on radionuclide /DMSA scan.
  - c. non-adherence to the antibiotic prophylaxis.
3. Endoscopic injection of bulking agents:
  - dextranomer/hyaluronic acid copolymer (Deflux).
  - polydimethylsiloxane (Macroplastique).
  - polytetrafluoroethylene (Teflon).

Injections can be considered for any of the following conditions when conservative treatments have failed:

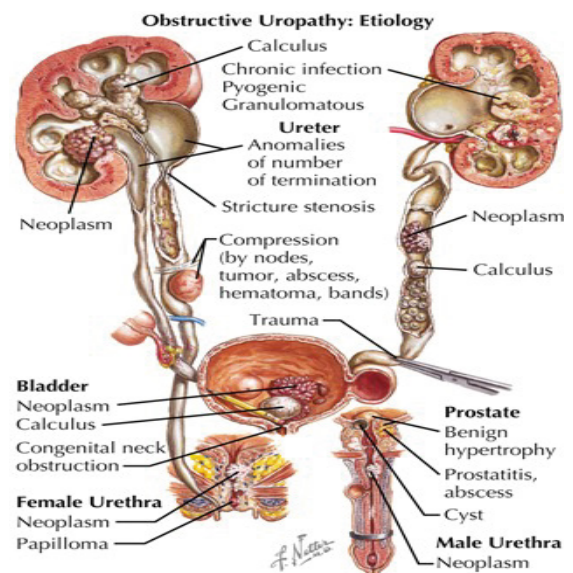
- a. previously unsuccessful ureteral re-implantation.
  - b. who have stopped taking their medication as a result of drug intolerance or non-compliance.
  - c. whose reflux is associated with a thick-walled neuropathic bladder.
  - d. deterioration of renal parameters regardless of reflux severity.
  - e. Lower grades of reflux (grades I to III).
  - f. persistent reflux in post-pubertal female members.
  - g. Recurrent and poorly controlled febrile urinary tract infections.
  - h. symptomatic VUR after renal transplantation.
4. In rare severe cases, nephrectomy, renal transplantation may be required.

## Non covered treatment

1. Endoscopic injections for bulking agents not mentioned above or patients who do not meet the above criteria.
2. When a patient fails to respond for 3 endoscopic injection sessions, further injections are not considered medically necessary.

## OBSTRUCTIVE UROPATHY

Obstructive uropathy is a disorder of the urinary tract that occurs due to obstructed urinary flow and can be either structural or functional. There are a significant number of potential causes of obstructive uropathy, and these vary widely. However, the most frequently diagnosed cause is benign prostatic hypertrophy or hyperplasia (BPH).



## BENIGN PROSTATIC HYPERPLASIA (BPH)

It is benign enlargement of the prostate which occurs after 50 years, usually between 60 and 70 years. BPH affects both glandular epithelium and connective tissue stroma that may or may not lead to lower urinary tract symptoms (LUTS). LUTS can be categorized into voiding, storage or post-micturition symptoms and can be graded into mild, moderate or severe, based on the IPSS (International Prostate Symptom Score See figure 1) as follows:

- Mild: score 0-7
- Moderate: score 8-19
- Severe: score 20-35.

# Obstructive and reflux uropathy

## Lower urinary track symptoms (LUTS)

Symptoms of voiding	Symptoms of storage
<ul style="list-style-type: none"> <li>Hesitancy</li> <li>Poor flow not improving by straining</li> <li>Dribbling even after micturition</li> <li>Intermittent stream-stops and starts</li> <li>Poor bladder emptying</li> <li>Episodes of near retention</li> </ul>	<ul style="list-style-type: none"> <li>Frequency</li> <li>Nocturia</li> <li>Urgency</li> <li>Urge incontinence</li> <li>Nocturnal incontinence</li> </ul>

## Investigation

- Digital Rectal Examination (DRE)
- Urine for microscopy and C/S.
- Blood urea and serum creatinine.
- Post voiding residual (PVR) urine in USG report:
  - A volume of less than 50 mL is considered adequate bladder emptying in the elderly.
  - between 50 and 100 mL is considered normal in general.
  - A PVR volume greater than 200 mL is considered abnormal and could be due to incomplete bladder emptying or bladder outlet obstruction (BOO).

However, there is no absolute threshold postvoid residual volume above which therapy is mandatory. Rather, the decision to intervene is based on symptom severity and whether sequelae of urinary retention (e.g., incontinence, urinary tract infection, hematuria, hydronephrosis, renal dysfunction) are present.

## Urodynamics:

Normal peak urine flow rate is 20 ml/sec. In obstruction, it is less than 10 ml/sec. Urine flow rate >15 ml/sec is normal. 10–15 ml is equivocal; <10 ml is low. Voiding pressure <60 cm of water is normal; 60–80 is equivocal; >80 is high.

## Cystoscopy.

not recommended for routine evaluation of BPH. Indications for cystourethroscopy include hematuria and the presence of a risk factor for urethral stricture disease such as urethritis, prior urethral instrumentation, or perineal trauma. Cystourethroscopy can also aid in surgical planning when intervention is considered.

- Transrectal US (TRUS) is useful to find out nodules/possibility of carcinoma prostate. It is not done routinely.
- Prostate specific antigen (PSA): Normal value is 4 ng/ml of plasma. More than 10 ng/ml is significant. PSA elevation occurs not only in carcinoma but also in prostatic hyperplasia and prostatitis. PSA more than 10 ng/ml is suggestive of carcinoma prostate. PSA more than 35 ng/ml is almost diagnostic of advanced carcinoma of prostate.
- PSA is sensitive for carcinoma prostate but not specific; PSA velocity (>2 ng/ml/year [rate of change in PSA in one year]); PSA Doubling Time (<12 months [time period where man's PSA doubles]); free to total PSA ratio (% free PSA <25); PSA density (>0.5 ng/ml/gm) and assessment of PSA isomers – are different forms of PSA assay that more accurate for prostatic carcinoma.

## Note:

Men aged >50 years with PSA >4 ng/ml should undergo prostatic biopsy.

## Medical management

Drugs for BPH include alpha-adrenergic blockers, 5-alpha reductase inhibitors(5-ARI), anticholinergics, beta-3 agonists, and phosphodiesterase-5 inhibitors

Table 1

Drug Class	Drug	Brand Name	Dosage form and strength	Package Size
Alpha-blockers		Uroxatral	10mg capsules (ER)	100 capsules
		Cardura	1mg tablets	100 tablets
		Rapaflo	4mg capsules (ER)	30 capsules
		Flomax	0.4 mg capsules	100 capsules
		Hytrin	1mg capsules	100 capsules
5 Alpha reductase inhibitor	Dutasteride	Avodart	0.5mg capsules	30 capsules
	Finasteride	Proscar	5mg tablets	100 tablets
Phosphodiesterase5 inhibitor	Tadalafil	Cialis	2.5 mg tablets	30 tablets
Anticholinergic	Oxybutynin	Ditropan	5 mg tablets	100 tablets
Beta 3 agonist	Mirabegron	Myrbetriq	25mg tablets (ER)	90 tablets

**Combination drug therapy:** A 5-ARI in combination with an alpha blocker should be offered as a treatment option only to patients with LUTS associated with demonstrable prostatic enlargement as judged by a prostate volume of > 30g on imaging, a PSA >1.5ng/dL, or palpable prostate enlargement on DRE.

# Obstructive and reflux uropathy

## Surgical Management

Several effective surgical therapies are available for men with BPH. See Table 2. Surgery is recommended for patients who have renal insufficiency secondary to BPH, refractory urinary retention secondary to BPH, recurrent UTIs, recurrent bladder stones or gross hematuria due to BPH, and in BPH with IPSS 8 or greater refractory to medical managements. Choice of surgery depends on size of prostate, presence of middle lobe enlargement, sexual side effect, and experience of surgeon. See Table 3.

**Table 2**

### Surgical treatments for benign prostate hyperplasia

	Transurethral resection of prostate (TURP)	Transurethral microwave therapy	Photovaporization of prostate	Simple prostatectomy
<b>Technique description</b>	Endoscopic resection of the prostate under direct visualization using monopolar loop electrocautery	Ablation of the prostate using a specialized catheter with a microwave antenna	Endoscopic vaporization of the prostate using high powered laser energy	Surgical removal of prostate tissue using an open, laparoscopic, or robotic approach
<b>Anesthesia</b>	Spinal or General	Local	Spinal or general	Spinal or general
<b>Typical postoperative catheterization</b>	24-48 hours (longer if hematuria)	Several Days	<24 hours	Several Days
<b>Common complications</b>	Retrograde ejaculation Blood loss anemia Urinary retention Bladder neck contracture	Urinary retention Urinary tract infection Retrograde ejaculation	Imitative urinary symptoms Hematuria Urinary tract infection	Hematuria Blood loss anemia Urinary tract infection
<b>Advantages</b>	Gold standard Mean 70% reduction in international prostate Symptom score (IPSS) and mean 12ml/sec improvement in peak urinary flow 1 year after surgery	office procedure Same-day discharge	Safe to perform while on antiplatelet therapy  can typically remove catheter and discharge home on day of surgery  Similar improvement in peak urinary flow and IPSS relative to TURP	Excellent option for men with prostates > 75g  Allows concurrent treatment of bladder diverticula or stones  reduced morbidity with robotic approach  Similar improvement in peak urinary flow and IPSS relative to TURP
<b>Disadvantages</b>	Higher risk of hematuria than other surgical options  Often requires postoperative hospitalization	Less durable results, high rate of retreatment  Less symptom improvement than with other surgical therapies  Higher incidence of urinary retention requiring prolonged catheterization  Not available in all urology practices	Requires long operative time for large prostate volumes	More invasive procedure with longer convalescence  Urologists experienced in this procedure not available in all practices  High rate of blood transfusion (lower risk with robotic approach)  Requires postoperative hospitalization

**Table 3**

Procedure	Prostate size/volume for surgery
Transurethral incision of the prostate (TUIP)	Prostate volume ≤30g
Transurethral microwave thermotherapy (TUMT)	Prostate volume 30 to 100 g and no previous prostate procedures
Transurethral needle ablation (TUNA)	Prostate volume ≤80g
Prostatic Urethral Lift (PUL), UroLift	30-80g and absence of an enlarged middle lobe
water vapor thermal therapy (WVTT) -Rezüm	Prostate volume 30-80g.

## Non covered treatment

1. Phosphodiesterase-5 (PDE5) inhibitors as treatment for erectile dysfunction not covered.
2. Surgery for members who are unwilling to use medical therapies.
3. Robotic-assisted surgery.
4. The following treatments for BPH are considered experimental, investigational, or unproven (not an all-inclusive list):
  - Prostate high intensity focused ultrasound (HIFU)
  - Prostate artery embolization.
  - Transrectal thermal therapy.
  - MRI-guided laser focal ablation.
  - Laser based prostate procedures other than contact laser ablation of the prostate (CLAP), holmium laser procedures of the prostate (HoLAP, HoLEP, HoLRP), photo selective laser vaporization of the prostate (PVP), transurethral ultrasound-guided laser induced prostatectomy (TULIP), and visually guided laser ablation of the prostate (VLAP, also called non-contact laser ablation of the prostate).
  - Absolute ethanol injection.
  - Transperineal laser ablation of the prostate (TLAP) or transperineal percutaneous laser ablation (TPLA), including imaging guidance.
  - Cryoablation of the prostate.
  - Temporary prostatic urethral stent (including implantable nitinol devices (iTind)).
  - Endoscopic balloon dilation of the prostate.
  - Transperineal laser ablation of the prostate (TLAP) or transperineal percutaneous laser ablation (TPLA), including imaging guidance.
  - Cryoablation of the prostate.
  - Water-induced thermotherapy (also known as hot-water balloon thermoablation and thermourethral hot-water therapy).

# Obstructive and reflux uropathy

Figure 1

Over the past month	Not at all	Less than 1 time 5	Less than Half time	About Half time	More than Half time	Almost Always	Your Score
<b>Incomplete Emptying</b> How often have you had a sensation of not emptying your bladder completely after you finish urinating	0	1	2	3	4	5	
<b>Frequency</b> How often have you had to urinate again less than two hours after you finishes urinating	0	1	2	3	4	5	
<b>Intermittency</b> How often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5	
<b>Urgency</b> How Difficult you found it to postpone urination ?	0	1	2	3	4	5	
<b>Weak Stream</b> How often have you had a weak urinary stream?	0	1	2	3	4	5	
<b>Straining</b> How often have you had to push or strain to befin urination	0	1	2	3	4	5	
Over the past month	No	1 time	2 times	3 times	4 times	5 times	Your Score
<b>Nocturia</b> How many times did you most typically get up to urinate from the time you went to bend until the time you got up in the morning?	0	1	2	3	4	5	
<b>Total Score</b>							

## Coding

### ICD codes:

N13.71	Vesicoureteral reflux without reflux nephropathy.
N13.72	Vesicoureteral reflux with reflux nephropathy without hydroureter.
N13.73	Vesicoureteral reflux with reflux nephropathy with hydroureter.
N13.9	Obstructive and reflux uropathy, unspecified.
N40.0	Benign prostatic hyperplasia without lower urinary tract symptoms.
N40.1	Benign prostatic hyperplasia with lower urinary tract symptoms.
N40.2	Nodular prostate without lower urinary tract symptoms.
N40.3	Nodular prostate with lower urinary tract symptoms.

# Obstructive and reflux uropathy

## CPT codes:

52327	Cystourethroscopy (including ureteral catheterization); with sub ureteric injection of implant material.
53850	Transurethral destruction of prostate tissue; by microwave thermotherapy.
53852	Transurethral destruction of prostate tissue; by radiofrequency thermotherapy.
53854	Transurethral destruction of prostate tissue; by radiofrequency generated water vapor thermotherapy.
53855	insertion of a temporary prostatic urethral stent, including urethral measurement.

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