



SUYASH Uro Times



A Quarterly News Letter From Suyash Nursing Home
April 2016 - 11th Issue

From Editor's Desk

Dear colleagues,

Warm greetings from team "Suyash Uro Times"

It is my immense pleasure to publish 11th issue of the newsletter.

We started this activity as a continuous medical education. I am happy to inform you that we are getting overwhelming response from the doctors all over. General practitioners, specialists & super specialists have communicated personally and appreciated the activity.

We are Continuing series of issues on most common urological disease of Pelvi ureteric junction obstruction.

This issue includes 1) Guest article on Role of Nuclear Medicine Imaging in Management of Hydronephrosis in adults and 2) Management Considerations in UPJ obstruction.

Please feel free to write to us on suyashnursinghome@gmail.com regarding suggestions, advice or criticism so as to make us improve on the scientific stuff.

Looking forward to communicate with you time to time through this newsletter.

Dr. Sharad Somani

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- **Role of Nuclear Medicine Imaging in Management of Hydronephrosis in adults**



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- **Management considerations in UPJ obstruction**



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*Previous Issues of Suyash Uro Times are available
at www.suyashurology.com*

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10th issue - Jan. 2016	:	Ureteropelvic Junction Obstruction Introduction, Etiopathogenesis & Presentation - Dr. Sharad Somani Imaging in PUJ Obstruction - Dr. M.D. Kulkarni

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<p>The only Single dose-First line antibacterial for Acute Uncomplicated Cystitis</p> <p>SINGLE DOSE UTI Management</p>  <p>Fosiroil Fosfomycin Trometamol Powder</p> <ul style="list-style-type: none"> Super susceptibility against E.coli Optimal urinary concentrations allow one-time dosing! Lower resistance rates towards E.coli One time dosing offers better patient compliance! 	<p>In the treatment of acute uncomplicated cystitis & prophylaxis of recurrent UTI</p>  <p>Urifast Nitrofurantoin Monohydrate/Macrocrystal 100mg Capsules</p> <p>Minimise Resistance, Maximise Benefits</p> <p>THE BID NITROFURANTOIN</p>	<p>A non-antimicrobial solution to take away the fear of recurrent UTI</p>  <p>Cranfit™ Cranberry and D-Mannose Tablets</p>	<p>In the Management of Complicated Lower UTIs</p>  <p>Pruflox Prulifloxacin Tablets 600 mg</p> <p>THE • POWER • IN • BEING • TRUE</p>
<p>First time in India with OCDS Technology Oral Controlled Delivery System</p>  <p>Urimax 0.4 Capsules</p> <p>Once Daily Urimax Also available in 15's Strips</p>	<p>World's First Combination of Tamsulosin (0.4 mg) & Dutasteride (0.5 mg)</p>  <p>Once Daily Urimax D</p> <p>Tamsulosin Hydrochloride 0.4 + Dutasteride 0.5</p> <p>Relax, it works like a charm.</p> <p>For Symptomatic BPH Patients with Enlarged Prostate</p>	<p>For Symptomatic BPH Clinically Uroselective Alpha_{1A}- Blocker</p>  <p>Once Daily Alfusin (Alfuzosin Hydrochloride 10 mg Extended Release Tablets)</p> <p>Be in full flow.</p> <p>Reduces PVR, Effective in the Management of AUR Improve success rate of TWOC in Patient with AUR for Sexually Active BPH Patients</p>	<p>For Urolithiasis</p>  <p>STON 1B6 Potassium Citrate, Magnesium Citrate & Vit B6</p> <p>85% Reduction in Recurrence of Urinary Stones Superior Efficacy Than Potassium Citrate</p>

Role of Nuclear Medicine Imaging in Management of Hydronephrosis in Adults

Dr. Prathamesh Vijay Joshi

'Obstructive uropathy' refers to the structural impedance to the flow of urine anywhere along the urinary tract leading to Hydronephrosis, which is the dilation of the renal pelvis and calyces. Acute obstruction (mostly caused by nephro/urolithiasis) is managed based on clinical picture & conventional radiological investigations (USG, IVP, CT). Role of nuclear medicine imaging methods is more prominent in chronic obstructive uropathy & conditions where hydronephrosis (HN) is suspected to be due to functional obstruction (ie no obvious obstructing pathology/ calculus is seen on radiological imaging). The diuretic renogram (or diuretic renal scintigraphy) is the investigation of choice in these scenarios. In this article, we will present the technique & role of nuclear medicine in various clinical scenarios.

Nuclear renal scan/ diuretic renography is the most reliable technique to quantitatively assess the split and total renal function in the presence of hydronephrosis. It is a non-invasive study, can be done even in patients with deranged renal function, has no risk of contrast-induced nephrotoxicity and also has much less radiation exposure than IVP or CT scan.

The nuclear scans utilized in evaluation of HN are- Technetium 99m diethylenetriaminepentaacetic acid (DTPA), Technetium 99m ethylenedicysteine (EC) & Technetium 99m mercaptoacetyltriglycine (MAG3) scans with diuretic intervention. The procedure utilizes agents which are physiologically extracted by kidneys either by glomerular filtration (DTPA) or by tubular function (EC, MAG3). The diuretic used is furosemide in the dose of 1mg/kg & is injected along with the injection of radiopharmaceutical (F0 protocol) at our department. The radiopharmaceuticals used (EC, DTPA, MAG3) are referred as tracers in the article. The scan provides following information

1. Cortical function & differential function of the kidneys - assessed by visual analysis of the radiopharmaceutical/tracer uptake by the kidneys as well as by computer generated region of interests.
2. Drainage of urine across the outflow tract- by evaluating post diuretic wash out of tracer from kidneys. A delayed image after 1 to 2 hours is also obtained to evaluate for delayed wash out in cases, where post diuretic wash out is equivocal.

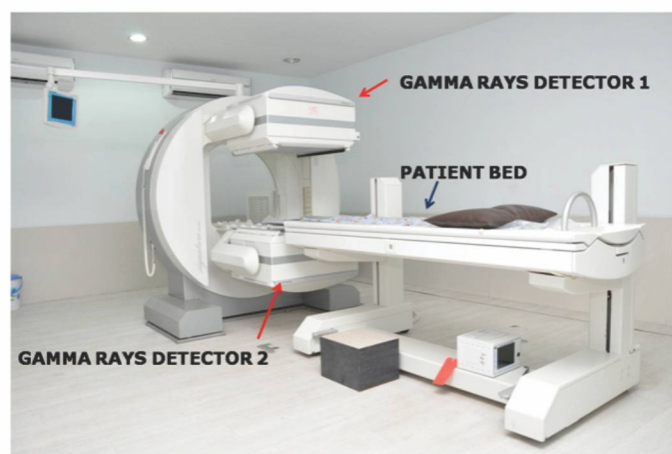
Due to better extraction by kidneys the tubular tracer (EC or MAG3) are preferred over DTPA in patients with deranged renal function.

Protocol of diuretic renography

Patient preparation: Fasting is not required. Plenty of oral fluids (around 500 ml of water) are recommended to maintain adequate hydration. Bladder catheterization is not recommended in most of the cases and is reserved for specific pathologies like - megaureter, vesicoureteral reflux, neurogenic bladder or a small capacity bladder. Except pregnancy, there is no other contraindication for diuretic renogram.

Scan procedure : The patient is injected intravenously with radiotracer (Technetium 99m -EC) and diuretic (lasix) is injected along with the EC. This is called as F0 protocol (ie. Diuretic injected at 0 min after EC).

The injection is performed under a special imaging equipment called as gamma camera which detects the gamma rays emitted from the drug (EC) extracted by the kidneys & then eventually cleared along the urine outflow tract(From kidneys into pelvicalyceal system then into ureter and lastly in bladder). Figure 1 shows a prototype of gamma camera, also known as SPECT camera used in our department.



Conclusion

To summarize, nuclear renal scans play important role in management of adult HN by providing functional information of kidneys. The diuretic renography is a valuable tool in diagnosis of obstruction in HN, differential function evaluation & also in serial monitoring of renal function. The non-toxicity to kidneys, is additional advantage of nuclear scans over radiological contrast studies; especially in patients with deranged renal function.

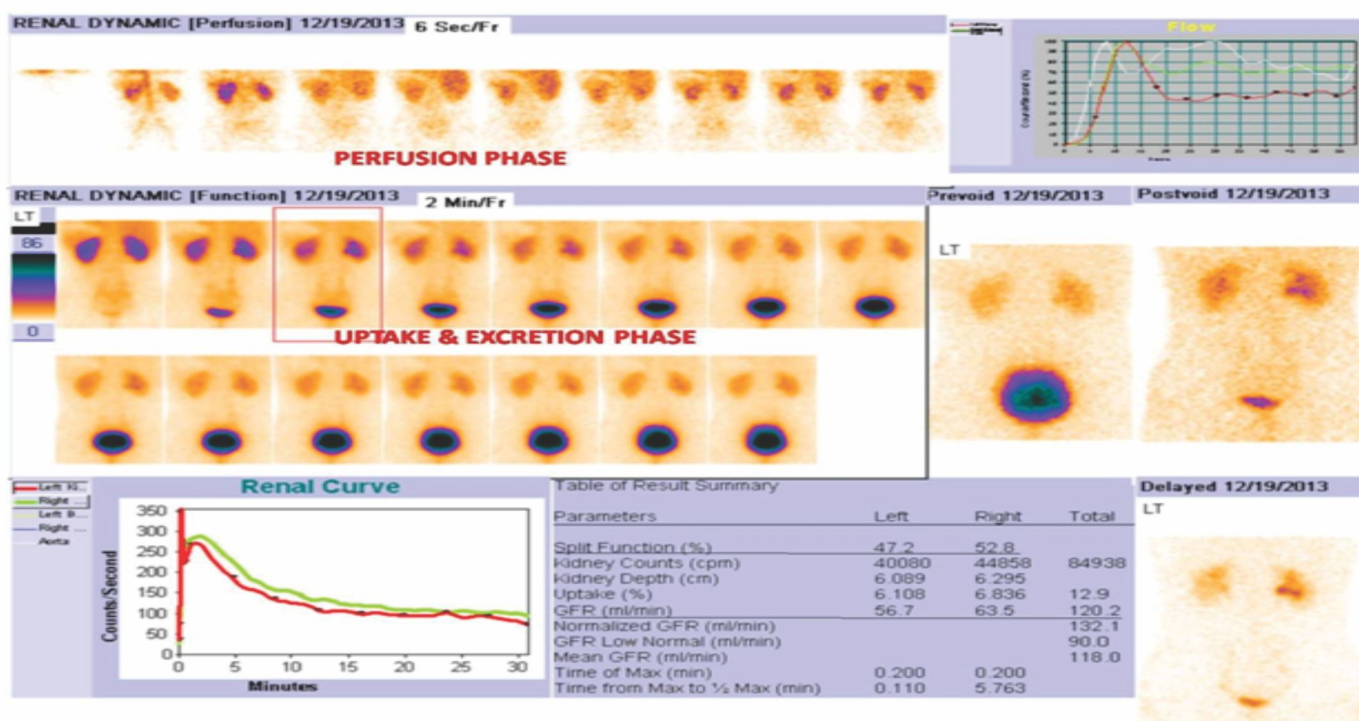
The indications with examples of clinical scenarios are depicted in table 1

Sr. No.	Indication	Clinical scenario
1	Hydronephrosis / hydroureteronephrosis without obvious obstructing cause ? functional obstruction	1. Hydronephrotic kidney with non-dilated ureter & no evidence of obstructive calculus on USG/IVP? functional PUJ obstruction 2. Hydroureteronephrosis with no calculus/ stricture of ureter on USG/IVP & normal MCU ? VUJ obstruction? primary megaureter
2	Differential function & GFR/ERPF evaluation	1. In diagnosed cases of obstructive uropathy/ nephropathy, nuclear scans are utilized for evaluation of baseline differential function & GFR/ERPF, so that serial/ follow up evaluation can be performed. 2. Patients of hydronephrosis, being followed up without surgical intervention, can be followed up using serial nuclear scans. The temporal change in differential function/ GFR can predict need of surgical intervention if renal parameters are worsening
3	Surgical protocol decision	1. In kidneys suspected to have poor or non-functioning status on IVP / USG revealing paper-thin parenchyma with gross hydronephrosis; nuclear scans can reveal accurate functional status & help in making for or against nephrectomy.
4	Follow up post surgery	1. Patients who have undergone surgical management of obstruction (eg pyeloplasty) with new or recurrent symptoms 2. Patients with old surgical history for renal calculus/PUJO & recent USG showing hydronephrosis with possibility of obstruction

Case 1 – Technetium 99m DTPA diuretic renogram of a twenty year old male with right HN without hydroureter/ calculus . Clinical suspicion was right PUJ obstruction.

The scan (figure 1) shows normal perfusion to both the kidneys, the tracer uptake phase shows adequate cortical uptake of DTPA in both the kidneys. The differential function is indicated by numbers given in split function panel. In this case the hydronephrotic left kidney & right kidney have differential function of 47 % & 53 % respectively (lower limit of normal differential function is 44%) . The tracer clearance is prompt bilaterally as evident by wash out of DTPA from both the kidneys. The renogram curves reveal normal excretory fall.

Hence the nuclear renal scan , in this particular case; shows- Normal function of hydronephrotic right kidney along with prompt, non-obstructed drainage across PUJ. Such patients are commonly followed up with USG & clinical evaluation. In event of worsening of HN on USG, a follow up diuretic renogram scan can be used to monitor temporal change in function & drainage.

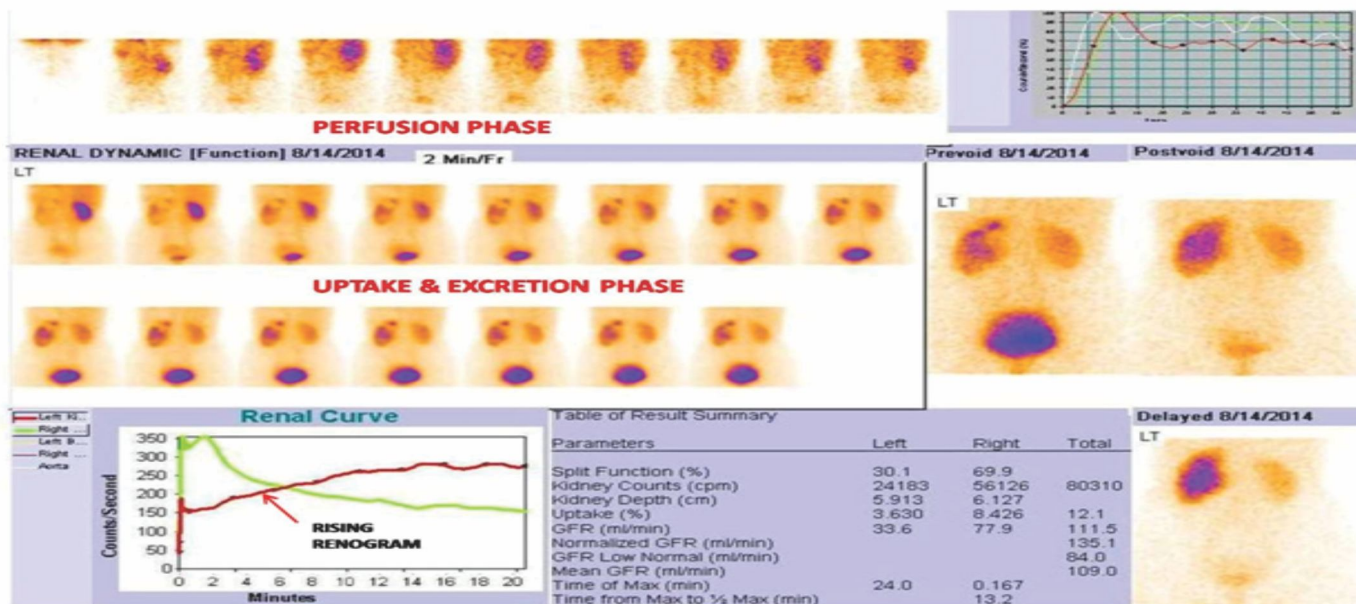


Case 2 – Technetium 99m DTPA diuretic renogram of a thirty year old lady with left HN without hydronephrotic. Clinical suspicion was left PUJ obstruction.

The scan (figure 2) reveals reduced perfusion to Hydronephrotic left kidney. The reduced cortical tracer (EC) uptake suggests suboptimal left renal function. The differential function is 30 %.

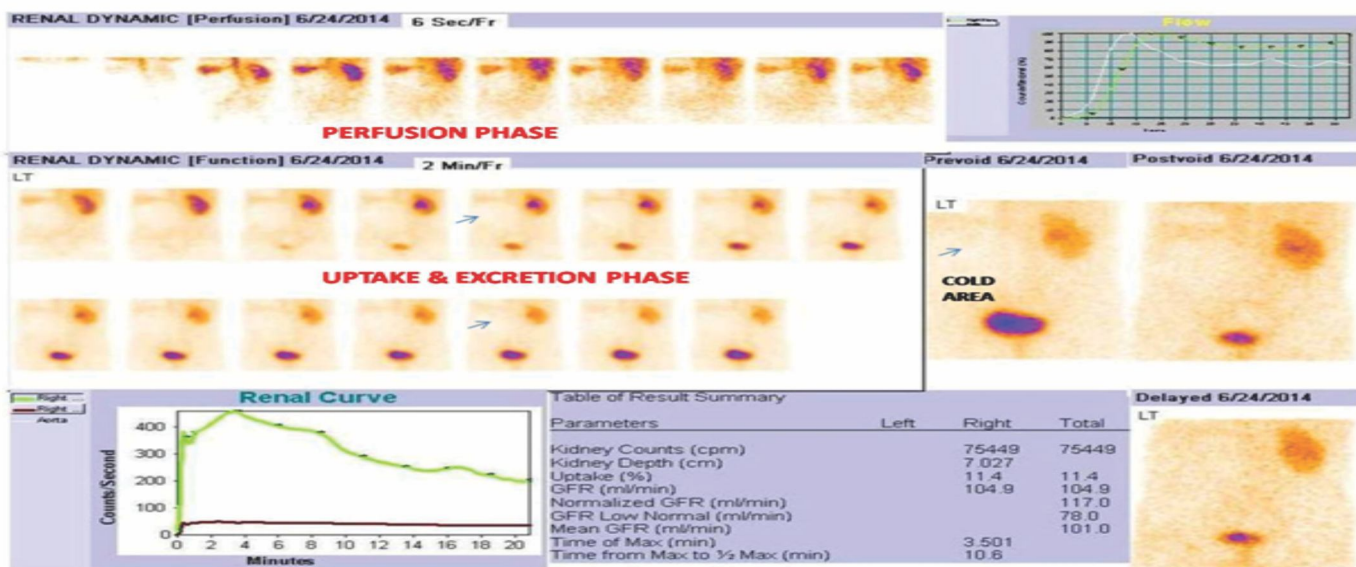
The tracer gets pooled in dilated left PCS that does not wash out after diuretic challenge. In such case a delayed image is also acquired after gap of one hour to look for delayed clearance if any. In this case even the delayed image (right hand, down corner image) reveals persistent tracer retention in left PCS. The renogram curve of left kidney is rising – suggestive of progressive tracer pooling in left kidney with no washout.

Hence the nuclear renal scan , in this case; shows- reduced function of hydronephrotic left kidney along with obstructed drainage at PUJ. These patients are the ones which are usually managed surgically with pyeloplasty to preserve the renal function & improve drainage.



Case 3 : Technetium 99m DTPA diuretic renogram of a thirty eight year old lady with left side gross HN with multiple calculi in pelvis, the parenchyma was thinned out. Opposite (right) kidney was normal on USG. Clinical suspicion was chronic obstructed left kidney .Serum creatinine was normal.

The diuretic renal scan (figure 3) reveals no appreciable perfusion or tracer extraction (DTPA extraction) by left kidney. Instead, a cold area (arrow marked) is seen in left renal fossa. This finding suggests non-functional left kidney. Right kidney reveals normal cortical function & non-obstructed drainage. The GFR of right kidney is 105 ml/min- suggesting compensatory increased function. This finding has important management implication, as it suggests that if this patient is treated with nephrectomy, the residual kidney has adequately increased compensatory function.



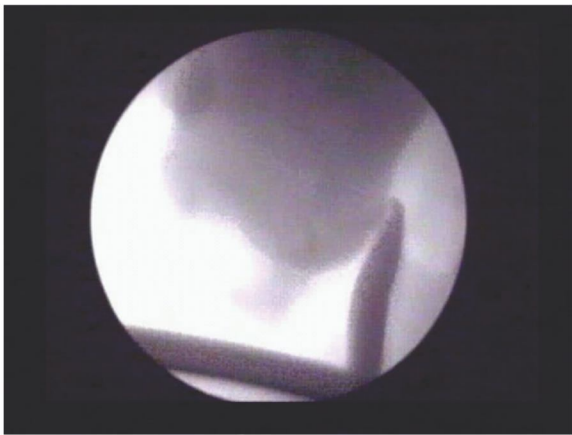
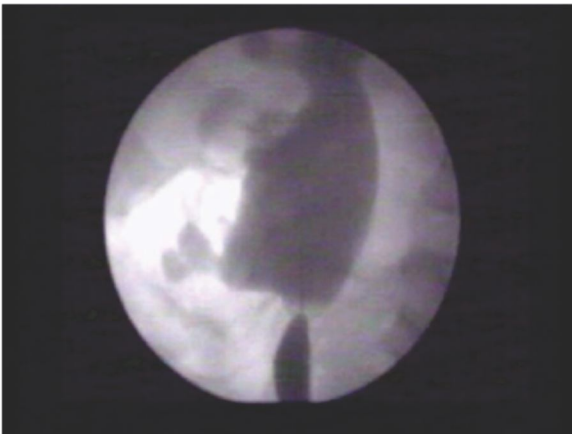
MANAGEMENT CONSIDERATIONS IN UPJ OBSTRUCTION

Dr. Sharad Somani

- The diagnosis of UPJ obstruction can be made with high degree of certainty on the basis of clinical presentation and results of any one or more of the imaging studies.
- It is preferable to have a combination of anatomical and functional study, in order to plan best definitive treatment.

Retrograde pyelography

- Important for confirmation of diagnosis and for demonstration of exact site and nature of obstruction before repair
- In most cases, this is performed at the time of planned operative intervention in order to avoid the risk of introducing infection in an obstructed kidney
- However, retrograde pyelography is indicated urgently when obstruction requires acute decompression (infection or compromised renal function)



Pre operative drainage

Before definitive surgical treatment, drainage of a kidney with

UPJ obstruction is recommended in select circumstances including

- Infection associated with obstruction
- Azotemia due to UPJ obstruction in solitary kidney or bilateral disease.
- Severe, uncontrolled pain requiring urgent relief of obstruction.

Such drainage can be achieved by placement of an internal DJ stent or a percutaneous nephrostomy tube.

DJ Stents - most commonly used

Per cutaneous nephrostomy Indications

- Neonates and infants
- Grossly infected systems
- Compromised renal function
- Cases where DJ stenting is contraindicated or failed

Advantages

- Minor procedure under local anesthesia
- Allows antegrade contrast study that will help define nature and exact anatomical site of obstruction
- Allows decompression of obstructed system in cases of infection or compromised renal function
- Allows assessment of recoverability of renal function
- Allows access for dynamic pressure perfusion studies in cases where there is doubt of clinical significance of a dilated collecting system whether obstructed or non obstructed



Pressure perfusion study / Whitaker test

- First described by Whitaker in 1973
- The renal pelvis is continuously perfused at 10 mL/min with normal saline solution or dilute radiographic contrast solution under fluoroscopic control. Renal pelvic pressure is monitored during the infusion, and the pressure gradient across the UPJ is determined. During the infusion, the bladder is continuously drained with an indwelling catheter to prevent transmission of intravesical pressures.
- Renal pelvic pressure ranging up to 12 to 15 cm H₂O during this infusion suggests a nonobstructed system. In contrast, pressures in excess of 15 to 22 cm H₂O are highly suggestive of a functional obstruction. Pressures between these extremes may be nondiagnostic.
- Although pressure perfusion studies can often provide valuable information regarding the functional significance of an apparent obstruction, these studies can at times be inaccurate. This inaccuracy may be a result of variations in renal pelvic anatomy and compliance or positional variations.

Indications for Intervention in UPJ obstruction

- The presence of symptoms associated with obstruction
- Impairment of overall renal function or progressive impairment of ipsilateral function
- Development of stones
- Infection
- Renal hypertension

Goals of intervention

- Relief of symptoms
- Preservation or improvement of renal function
- Restoring nonobstructed urinary flow

Some important considerations

- In neonates, infants, or children early repair is desirable because these patients will have the best chance for improvement in renal function after relief of obstruction.
- If the patient is asymptomatic and the physiologic significance of the obstruction is indeterminate. Careful observation with serial follow-up may be appropriate using diuretic renography.

Principles of repair

A newly prepared UPJ should be

- Widely patent
- Water tight
- Without tension
- Dependently positioned,
- Funnel shaped
- Reduction of size of the renal pelvis

Options for Intervention

A) Open Operative Intervention

- Dismembered Pyeloplasty most widely used
- Non dismembered procedures :-
 - Foley Y-V-Plasty
 - Flap Procedures
- Flap Procedures :-
 - Culp-DeWeerd Spiral Flap
 - Scardino-Prince Vertical Flap
- Davis intubated ureterotomy - rarely used today, was used for

repair of long or multiple ureteral strictures.

- Ureterocalycostomy

Indicated in upj obstruction with

Small renal pelvis

In upj obstruction in kidneys with rotational anomalies so as to provide completely dependent drainage

As a salvage procedure for failed pyeloplasty

- Rarely, nephrectomy.

Indications for nephrectomy in UPJ obstruction

- Diminished function or nonfunction of involved kidney.
- PUJ obstruction with extensive stone disease with chronic infection and significant loss of function.
- Patients in whom repeated attempts at repair have already failed and in whom further intervention would be extremely complicated.
This option should be considered only when the contralateral kidney has normal function.

B) Endourologic Management

Advantages of endourologic approaches include reduced hospital stay and early postoperative recovery. However, success rate does not approach that of open, laparoscopic or robotic pyeloplasty.

Factors to be taken into account before considering endourological management are degree of hydronephrosis, ipsilateral renal function, associated stones and presence of crossing vessels.

Basic concept of the endopyelotomy is a full-thickness lateral incision through the obstructing proximal ureter, from the ureteral lumen out to the peripelvic and periureteral fat. A stent is placed across the incision and left to heal.

Efficacy wise there is little differences between endopyelotomy techniques. The differences lie in technical considerations and complications.

Various endurological techniques are

- Percutaneous Antegrade Endopyelotomy
- Percutaneous Endopyeloplasty
- Retrograde Ureteroscopic Endopyelotomy
- Retrograde Cautery Wire Balloon Endopyelotomy

C) Laparoscopic and Robotic Intervention

Laparoscopic Pyeloplasty

Approches

Transperitoneal Laparoscopic Approach

Retroperitoneal Laparoscopic Approach

Anterior Extraperitoneal Laparoscopic Approach

Robotic-Assisted Laparoscopic Approach

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Complete Urology Setup

FACILITIES AVAILABLE

- ▶ Endoscopic Treatment Of Stone
In Kindey, Ureter and Bladder
- ▶ Endoscopic Treatment Of Prostate (TURP)
- ▶ LASER - 50 Watt, German Technology
Auriga XL excellent energy source for
all Urology applications
- ▶ Female Urology
- ▶ Paediatric Urology (Endoscopy, LASER)
- ▶ Male Infertility
- ▶ Kidney Transplant
- ▶ Laparoscopy
- ▶ Video Endoscopy
- ▶ Physician with EEG, PFT Stress rest
- ▶ Well equipped Operation Theatre
- ▶ Multipara monitor, defibrillator
- ▶ C - arm X - Ray machine
- ▶ Lithotripsy
- ▶ Central oxygen & monitoring system
- ▶ Uroflometry
- ▶ Ultra sonography Department
- ▶ Pathology Laboratory
- ▶ Digital X-Ray Machine
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