

**SUYASH**

# Uro Times



**A Quarterly News Letter From Suyash Nursing Home  
January 2015 - 6<sup>th</sup> Issue**

**For Private Circulation Only**

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- Oct 2013, 1<sup>st</sup> issue : Lasers in urology -  
Dr Sharad Somani
- Jan 2014, 2<sup>nd</sup> issue : Managing BPH: Part 1 -  
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Premature ejaculation -  
Dr Nagesh Nagapurkar
- Apr 2014, 3<sup>rd</sup> issue : Non surgical therapy of BPH  
- Dr Sharad Somani  
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- July 2014, 4<sup>th</sup> issue : Surgical management of  
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- Oct 2014, 5<sup>th</sup> issue : Urology - Dr Sharad Somani  
Priapism -  
Dr Nagesh Nagapurkar

## From Editors Desk

Dear colleagues,

Warm greetings from team "Suyash Uro Times"

It is my immense pleasure to publish 6th 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.

In this issue we are starting "Guest articles" to get up to date information on allied urology subjects from experts from the field.

Please feel free to write to us on [suyashnursinghome@gmail.com](mailto:suyashnursinghome@gmail.com) regarding suggestions, advice or criticism so as to make us improve on the newsletter.

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



**Dr. Sharad Somani**

# Preface

It's my pleasure to write preface for 6<sup>th</sup> issue of suyash uro times.

First of all I congratulate team Suyash for starting and continuing this academic activity.

Suyash Uro Times not only emphasizes on urological topics but also on common day to day urological and related problems. There is also mention of advance urology work done at this centre.

I have been associated with suyash uro team and aware of advanced work done at this centre which is exclusive in our region. The infrastructure and availability of latest equipments in endourology has made it possible.

In this issue there is elaboration of advanced imaging modality for helping in diagnostic and therapeutic approach towards antenatal hydronephrosis in very schematic manner which will be helpful to all medical fraternity.

My best wishes.



**DR GIRISH GUMASTE**

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**STON B6**  
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**85% Reduction in Recurrence of**  
Urinary Stones Superior  
Efficacy Than Potassium Citrate

## EVALUATION AND MANAGEMENT OF ANTENATAL HYDRONEPHROSIS



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### INTRODUCTION:

Widespread antenatal ultrasound has resulted in increased detection of fetal hydronephrosis. Depending on the diagnostic criteria and gestation, the prevalence of antenatally detected hydronephrosis ranges from 0.6 to 5.4%. The condition is bilateral in 17-54% and additional abnormalities are occasionally associated.

### ETIOLOGY:

ANH is transient and resolves by birth or during infancy in 41-88% patients. Urological abnormalities requiring intervention are identified in 4.1 to 15% and rates of Vesicoureteric reflux and urinary tract infections are several folds higher. It is important to distinguish infants with significant illness that require long-term follow up or surgery from those with transient hydronephrosis and minimum need for invasive investigation.

| Etiology  | All cases (%) |
|---|---------------|
| Transient hydronephrosis  | 41-88         |
| Pelviureteric junction obstruction  | 10-30         |
| Vesicoureteric reflux   | 10-20         |
| Vesicoureteric junction obstruction, megaureter                           | 5-10          |
| Multicystic dysplastic kidney   | 4-6           |
| Duplex kidneys (±ureterocele)   | 2-7           |
| Posterior urethral valves   | 1-2           |
| Others : Urethral atresia, urogenital sinus, prune belly syndrome, tumors | Uncommon      |

### DIAGNOSIS AND GRADING OF ANH

Antenatal hydronephrosis is defined or is said to be present if the anteroposterior diameter (APD) of the fetal renal pelvis is > 4mm in 2nd trimester and > 7 mm in the 3rd trimester.

It can be graded or classified based on renal pelvis APD or according to the new SFU grading.

The AP diameter should always be measured in the transverse section of the kidneys

#### Grading of ANH

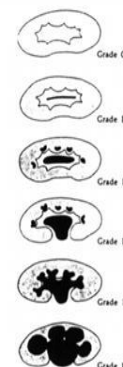
- Using APD thresholds
- ANH classified in the 2nd & 3rd trimester
- Provides prognostic information.

| Degree of ANH | Second trimester | Third trimester |
|---------------|------------------|-----------------|
| Mild          | 4 to <7mm        | 7 to <9mm       |
| Moderate      | 7 to ≤10mm       | 9 to ≤15mm      |
| Severe        | >10mm            | >15mm           |



### SFU GRADING

| GRADE | CENTRAL RENAL COMPLEX | RENAL PARENCHYMA THICKNESS |
|-------|-----------------------|----------------------------|
| 0     | Intact                | Normal                     |
| 1     | Slight splitting      | Normal                     |
| 2     | Evident Splitting     | Normal                     |
| 3     | Wide Splitting        | Normal                     |
| 4     | Further dilatation    | Thin                       |



### STANDARD WORKUP:

It is important to measure the AP diameter of renal pelvis in the transverse section of the kidneys. Look for calyceal and ureteric dilatation, measure the renal size, look for cortical cysts and measure cortical thickness. In the presence of hydroureters rule out ureterocele and ectopic insertion. All fetuses with ANH should undergo a detailed USG to rule out any major structural anomaly or soft markers of aneuploidy

### ANH AND ANEUPLOIDY

Mild hydronephrosis (APD > 4mm) is a soft marker for downs syndrome. The likelihood ratio of isolated hydronephrosis is low (1.08), hence as an isolated finding it does not increase the baseline risk for aneuploidy and karyotyping is not recommended. But if it is associated with other soft markers or major structural anomaly than karyotyping is recommended.

### ANTENATAL MONITORING:

It depends upon the grade of hydronephrosis, the gestational age which it was detected, unilateral or bilateral, hydroureter/bladder distension and amount of liquor.

In fetuses with unilateral hydronephrosis it is recommended that at least one follow up scan should be performed in the 3rd trimester. Fetuses with bilateral hydronephrosis should be monitored more frequently at 4-6 weeks interval. Fetuses with lower urinary tract obstruction may require even more frequent monitoring.

### FETAL INTERVENTION

Cases of lower urinary tract obstruction (bilateral hydroureteronephrosis, dilated bladder, oligohydramnios) may be referred to specialized centers for prenatal diagnostic and therapeutic interventions. Procedures like vesicocentesis, vesicoamniotic shunting, in utero endoscopic ablation of valves are being performed in specialized centers.

The benefits of intervention, usually performed in the 2nd trimester, are equivocal. Studies have shown that procedures like vesicoamniotic shunting improve perinatal survival in fetuses with severe obstruction with predicted poor prognosis. There is no evidence that it improves renal outcome with less severe disease. It carries along with it risk of fetal loss, chorioamnionitis and preterm labor.

Cont....

## POSTNATAL EVALUATION

Studies have shown that all fetuses with hydronephrosis in the 3rd trimester should have postnatal evaluation. Though a AP diameter cutoff of 10 mm in the 3rd trimester is recommended, for better sensitivity a cutoff of 7 mm is better.

All fetuses with ANH should undergo a postnatal ultrasound in the 1st week of life preferably within 3-7 days or before discharge. A USG done in the 1st 24-48 hours generally underestimates the degree of hydronephrosis due to dehydration and a relatively low urine output. However fetuses with suspected posterior urethral valve, oligohydramnios or severe bilateral hydronephrosis should have a ultrasound within 24-48 hours of birth.

## DIAGNOSIS AND GRADING OF POSTNATAL HYDRONEPHROSIS:

Common classification for diagnosis and grading of postnatal hydronephrosis are those based on measurement of renal pelvic AP diameter and that proposed by SFU (Society of fetal urology). USG should include evaluation of calyceal or ureteric dilatation, cortical cysts and enhanced renal echogenicity, and bladder wall abnormalities.

## POSTNATAL MONITORING

It is recommended that neonates with normal ultrasound in the 1st week of life should undergo a repeat study at 4-6 weeks of life. The frequency of subsequent monitoring in patients with persistent postnatal hydronephrosis depends on its severity.

Some of the neonates will require other investigations depending on the ultrasound findings.

The two important investigations are Micturating cystourethrography and Diuretic renography.

Moderate to severe unilateral or bilateral hydronephrosis, dilated ureters or bladder or urethral abnormalities are indications for MCU.

Moderate to severe unilateral or bilateral hydronephrosis who do not show VUR is an indication for diuretic renography.

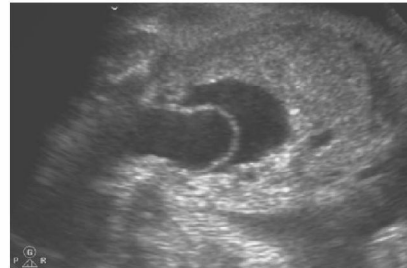
## PROTOCOL FOR POSTNATAL MANAGEMENT RECOMMENDED IN THE REVISED GUIDELINES ON MANAGEMENT OF ANH (For Society of pediatric nephrology)

Indian Journal of nephrology-2013

## PUJ Obstruction



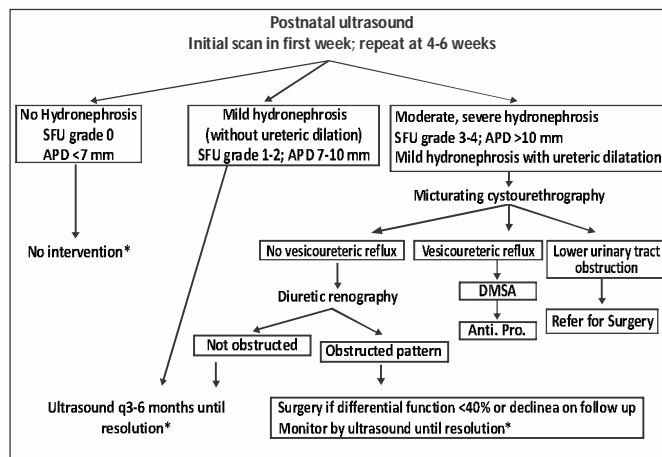
## Ureterocele



## Posterior urethral valve



## Cystic dysplasia



## LAST WORDS

- Antenatal Cutoff of APD= 4 mm in 2nd trimester and 7 mm in 3rd trimester
- The most common etiology of antenatal pelviectasis is transient or non obstructive dilatation
- Upto 80% of mild hydronephrosis resolve in utero or in the early neonatal period
- All neonates with hydronephrosis in the 3rd trimester should undergo an ultrasound in the 1st week .
- It is all about observation, No aggression required except for a few specific situations
- No Termination of pregnancy for antenatal hydronephrosis, except in presence of extrarenal life threatening abnormality
- Counseling most important
- Follow protocols



## Role of Nuclear Medicine Imaging in management of antenatal hydronephrosis



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### Introduction:

With widespread use of antenatal ultrasonography, there is increase in detection of antenatal hydronephrosis (ANH). ANH is defined by several criteria, as per latest Indian academy of pediatrics ANH is present when anteroposterior diameter (APD) of the fetal renal pelvis is 4 mm in second trimester and 7 mm in the third trimester. Once ANH is diagnosed, the postnatal management is guided by different factors like presence or absence of vesico-ureteric obstruction (VUR) & grade of hydronephrosis (mild, moderate or severe) to name a few.

Large proportion of ANH are transient and rest can be caused by variety of pathologies of urinary tract. Hence pinpointing the diagnosis is crucial in management.

The first & foremost investigation after birth of child who is known case of ANH is USG in 1st week after birth to confirm antenatal findings. Once diagnosis of hydronephrosis is confirmed on postnatal USG, a micturating cystourethrogram (MCU) is recommended to determine the presence of vesicoureteral reflux (VUR) and exclude the presence of posterior urethral valves. Antibiotic prophylaxis is recommended until the voiding cystourethrogram has determined that vesicoureteral reflux is absent. Depending on result of MCU further investigations & management is guided.

### The nuclear medicine techniques useful in evaluation of ANH

The NM techniques used in evaluation of ANH consist of 1) Diuretic renography, 2) cortical scintigraphy

### Scenario 1

**In cases of ANH, where vesico-ureteric reflux (VUR) is excluded or unlikely;** These are children with ANH in whom either a MCU has ruled out VUR as possible cause of HN or those with USG revealing HN with abrupt cut off at PUJ suggestive of PUJO.

In these patients the primary objectives of nuclear renal scans are

1. To differentiate between obstructive Vs non-obstructive hydronephrosis
2. To evaluate differential function of kidneys
3. To determine level of obstruction (eg at pelvi-ureteric junction-PUJ, Vesico-ureteic junction- VUJ)

The nuclear scans utilized in evaluation of ANH without VUR are- Technetium 99m diethylenetriaminepentaacetic acid (DTPA) , Technetium 99m ethylenedicysteine (EC) & Technetium 99m mercaptoacetyl triglycine (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 frusemide 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 analysis of computer generated region of interests.
2. Drainage of urine across the outflow tract- by evaluating post diuretic clearance of tracer from kidneys.

Due to glomerular immaturity & better extraction by kidneys the tubular tracer (EC or MAG3) are preferred over DTPA in infant population. In our department (as well as in most departments in the country) EC is the drug of choice for ANH evaluation due to lesser cost & wider availability as compared to MAG3.

### Protocol of diuretic renography

Patient preparation: No fasting required. Breastfeeding or other liquid intake is encouraged to promote hydration. Bladder catheterization is not recommended in most of the cases and is reserved for specific pathologies like - megaureter, vesicoureteral reflux, neurogenic bladder, a small capacity bladder or posterior urethral valves.

The child 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).

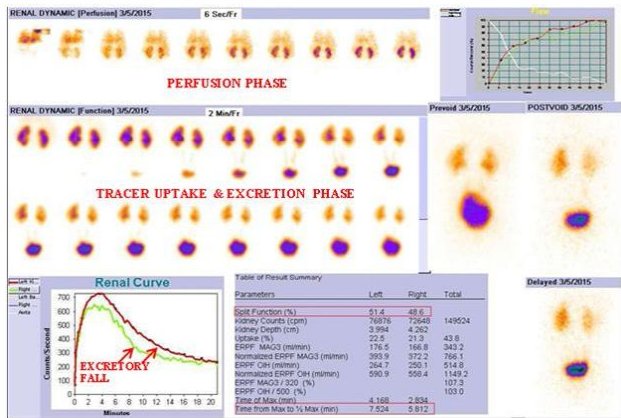
### Timing of diuretic renography

Most of the guidelines recommend that the nuclear scan should be performed at 4-6 weeks after birth. However if the clinical need is urgent & ANH is severe, scan can be performed in earlier period as well.

For better understanding two case examples are shown in figures.

**Case 1 -** Technetium 99m EC diuretic renogram of a one month old male child with left ANH (pelvis APD = 12 mm) without hydroureter. Clinical suspicion was left PUJ obstruction.

The scan shows normal perfusion to both the kidneys, the tracer uptake phase shows adequate cortical uptake of EC 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 51 % & 49% respectively (lower limit of normal differential function is 44%) . The tracer clearance is prompt bilaterally as evident by wash out of EC from both the kidneys. The renogram curves reveal normal excretory fall. The T ½ (time of wash out of 50% tracer from kidneys) is normal bilaterally. Upper limit of normal T ½ is 12 minutes.

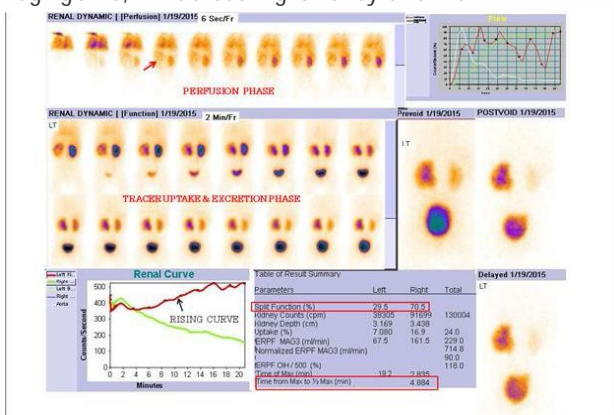


Hence the nuclear renal scan, in this particular case; shows- Normal function of hydronephrotic left kidney along with prompt, non-obstructed drainage across PUJ. Such patients are commonly followed up with USG & clinical evaluation expecting uneventful resolution of HN. In event of worsening of HN on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

**Case 2** - Technetium 99m EC diuretic renogram of a one month old male child with left AHN (pelvis APD = 14 mm) without hydroureter. Clinical suspicion was left PUJ obstruction.

The scan reveals reduced perfusion to Hydronephrotic left kidney. The reduced cortical tracer (EC) uptake suggests suboptimal left renal function. The differential function is 29%.

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. The T 1/2 of left kidney is not reached in imaging time, while that of right kidney is normal.



Hence the nuclear renal scan, in this particular 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.

The widely accepted criteria for surgical intervention are

1. Obstructive hydronephrosis with differential function < 35-40%.

2. Worsening of differential function on repeat evaluation, a fall by 5-10% is considered significant in this scenario

### Scenario 2

**In cases of ANH, with vesico-ureteric reflux (VUR);** These are children with ANH in whom MCU has revealed presence of VUR.

In these patients cortical scintigraphy using Technetium 99m dimercaptosuccinic acid (DMSA) is utilized for

1. Suspected pyelonephritis
2. Suspected scarring
3. Evaluation of differential function

The tracer DMSA binds to proximal tubules, however it does not wash out like EC, DTPA or MAG3. DMSA provides excellent morphological images of kidneys.

### Protocol of cortical scintigraphy

Patient preparation is same as for diuretic scintigraphy. The tracer (DMSA) is injected intravenously. The imaging of kidneys is performed under gamma camera after 2-3 hours. This period is needed for background clearance of tracer.

Normal DMSA scan is shown in figure, Bilateral kidneys reveal normal, uniform tracer uptake. The differential function of left kidney : right kidney = 49 : 51. There is no cortical defect in either of the kidneys ruling out pyelonephritis or scarring.

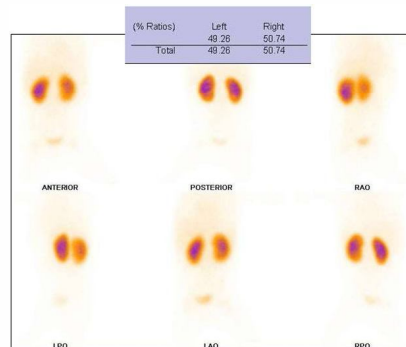
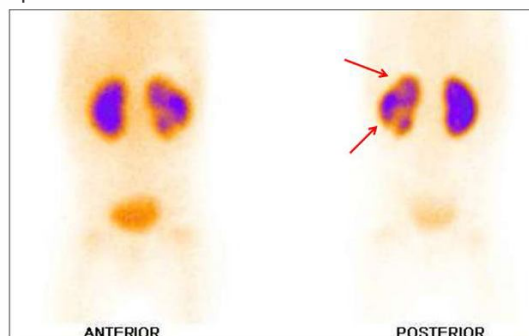


Figure : DMSA scan of 8 month old female child, known case of left HN & grade IV VUR on left side with recurrent febrile illness. The scan shows cortical defects (cold areas) along supero-lateral & infero-lateral cortical margin of left kidney suggestive of pyelonephritis.



### Conclusion

To summarize, nuclear renal scans play vital role in management of ANH by providing functional information of kidneys. The diuretic renography is an excellent tool in diagnosis of obstruction in ANH & also in serial monitoring of renal function. Cortical scintigraphy is utilized in cases of ANH with VUR, where it helps in diagnosing pyelonephritis & scarring.

# INTERESTING CASES – COMPLEX PCNL

## Case 1:



Pre op Plain X KUB showing right staghorn calculus & multiple satellite calculi



IVU Prone film showing complex renal anatomy & stones filling up complete pelvicalyceal system



Immediate Post PCNL (2 tracts) KUB showing total clearance with nephrostomy tubes in situ

## Case 2:



Pre op Plain X KUB showing right staghorn calculus & multiple satellite calculi



IVU Prone film showing complex anatomy and stones filling complete kidney except upper calyx



Immediate Post PCNL (2 tracts) KUB showing total clearance with nephrostomy tubes in situ

## Case 3:



Pre op Plain X KUB showing bilateral staghorn calculi & multiple bilateral satellite



IVU Prone film showing complex anatomy and gross hydronephrosis left side

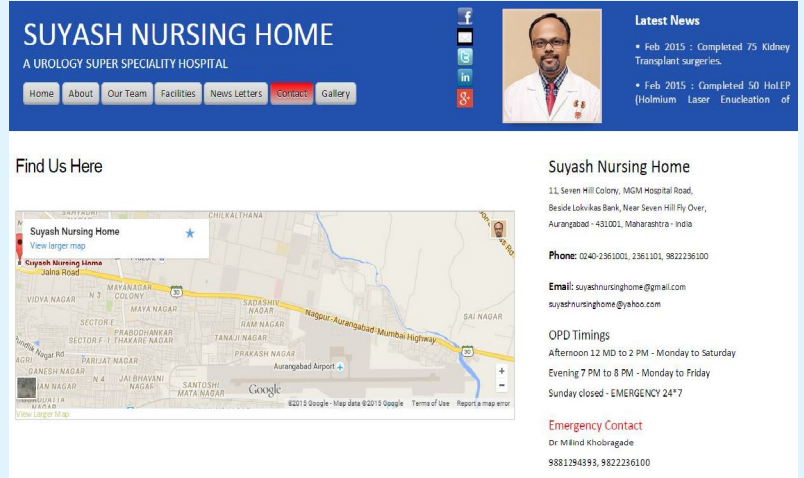
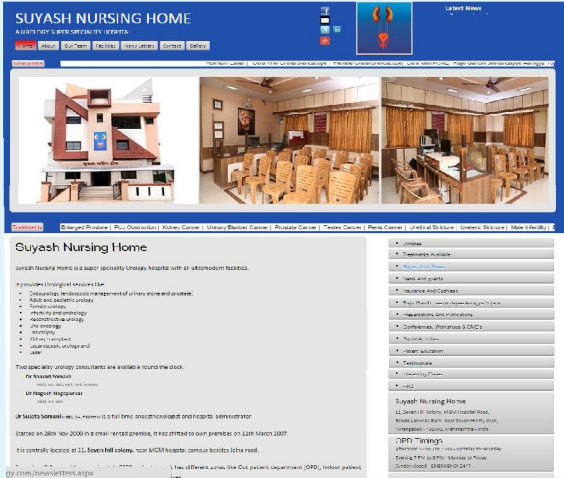


Immediate Post left PCNL (single track) X<sup>→</sup> KUB showing total clearance left side with nephrostomy tubes in situ & non operated right side.

( All Cases Operated at Suyash Nursing Home)



## Launched Website [www.suyashurology.com](http://www.suyashurology.com)



## FACILITIES AVAILABLE

- ▶ Endoscopic Treatment Of Stone In Kindey, Ureter and Bladder
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