

Approach to a child with dysurea

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History taking

Dysurea : symptom of burning or pain upon urination

Important points in history

1. Associated urinary symptoms: urgency, frequency, hematuria, abdominal or loin pain, fever
2. Family history of stones, dietary habits
3. History of vaginal discharge, itching

physical examination

1.temp, renal angle and suprapubic tenderness

2.genitalia exam : look for vulvitis,discharge,

Labial adhesions

Differential diagnosis

1. infections of genitourinary tract

:pyelonephritis,cystitis,urethritis

2. vulvovaginitis : infections

3. chemical irritation from soaps, poor hygiene,inproper wiping

4. stones.hypercalcuria,hyperoxlauria,
hyperuricosuria

5.others as labial adhesions,sexual abuse,pinworms ,trauma/masturbation

Urinary Tract Infections

8% girls, 2% boys had UTI by age of 8 y

5% of febrile infants had UTI

Highest incidence during first year. more in females
M > F as neonate, more in uncircumcised

Recurrence rate 12- 30% in first 6-12 m after UTI

Classification of UTI

1-Cystitis:urinary symptoms ,Low grade fever

2. Pyelonephritis :Loin pain,high grade fever,raised inflammatory markers

DMSA is gold standard,shows decreased uptake

3-Asymptomatic bacteriuria:1-2 % of school age children has no pyuria but positive culture,no treatment,normal in children with neurogenic bladder

symptoms

- In neonates: fever , sepsis,hypoactivity ,Failure to thrive,prolonged jaundice
- In children :fever ,vomiting,abdominal pain
- Urinary symptoms:dysuria,frequency,urgency ,new onset day or night time incontinence,hematuria ,smelly urine



Does This Child Have a Urinary Tract Infection?

Nader Shaikh, MD, MPH

JAMA. 2007;298(24):2895-2904

Symptoms	Positive LH
Nonblack race	1.4
History of prior UTI	2.6
Temp > 39	1.4
Temp >40	3.2
Prolonged fever >24 h	2.0
signs	
Suprapubic tenderness	4.4
No source of fever on exam	1.4
Lack of circumcision	2.8
Combination of signs ,sympt	
Temp>39,for>48 h,with no focus	4

Diagnosis

Diagnosis: urine culture and microscopy, CRP, ESR, WBC, Dipstick for LE (not specific), nitrite (specific but not sensitive)

Urine gram stain of bacteria is most sensitive and specific

Pyruia is more than 10 cells/ul, 5 cells per HPF

Pyruia may be found in febrile children, vaginitis

Microscopic hematuria is common, macroscopic

Seen in 25%



CLINICAL PRACTICE GUIDELINE

Urinary Tract Infection: Clinical Practice Guideline for the Diagnosis and Management of the Initial UTI in Febrile Infants and Children 2 to 24 Months

Subcommittee on Urinary Tract Infection, Steering Committee on Quality Improvement and Management
Pediatrics 2011;128:595; originally published online August 28, 2011;

To establish the diagnosis of UTI, clinicians should require *both* urinalysis results that suggest infection (pyuria and/or bacteriuria) *and* the presence of at least 50 000 colony-forming units (CFUs) per mL of a uropathogen cultured from a urine specimen obtained through catheterization or SPA (evidence quality: C; recommendation).

Types of Flora

80% caused by E.coli, other org
(Klebsiella, Enterobacter, enterococcus, Proteus, Pseudomonas)

Pathogenesis: P Ecoli has strong adhesive capacity

Bacteria usually comes from bowel, from under foreskin in boys

Ways of collection: SPA, cath, clean catch, midstream

Bag not used has a high false positive result

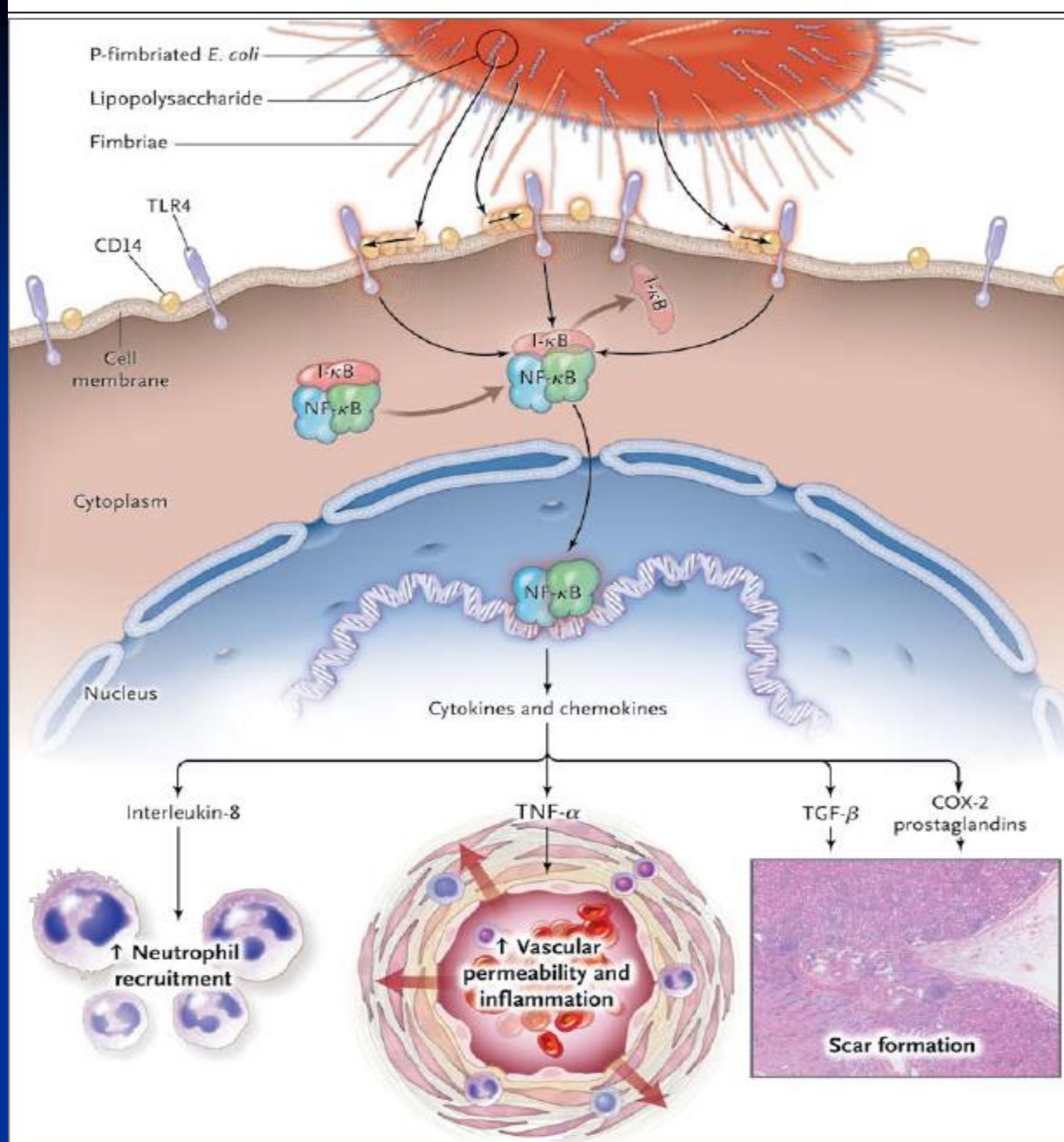
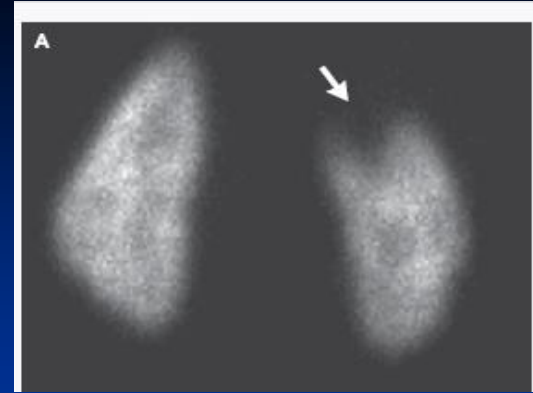


Figure 2. Pathophysiology of Acute Pyelonephritis.

Pathogenesis of scarring



10-40% have scarring unrelated to age

Scarring leads to
proteinuria, hypertension, chronic kidney disease
and PET

Detected by DMSA scan 4 months after UTI

Risk factors for scarring

High grade VUR

Infants, age less than 2y

Delayed treatment of UTI. *jama ped*

Recurrent UTI

Bacterial virulence

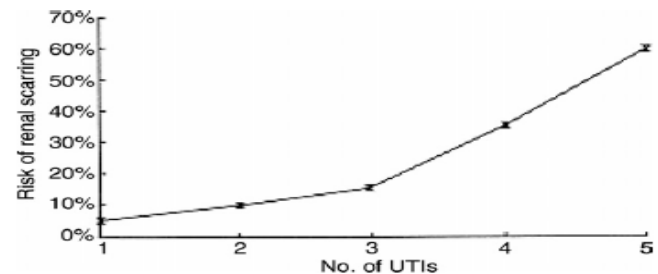


FIGURE 4

Relationship between renal scarring and number of bouts of pyelonephritis. Adapted from Jodal.⁵⁹

Complications

Bacteremia in 4-9%

Acute lobar nephronia

Renal or perirenal abscesses

decreased acid excretion, impaired urine
concentrating ability, secondary transient
pseudohypoaldosteronism

Risk factors for recurrence

Age less than 6 m

High grade VUR

Obstructive uropathy

Dysfunctional voiding

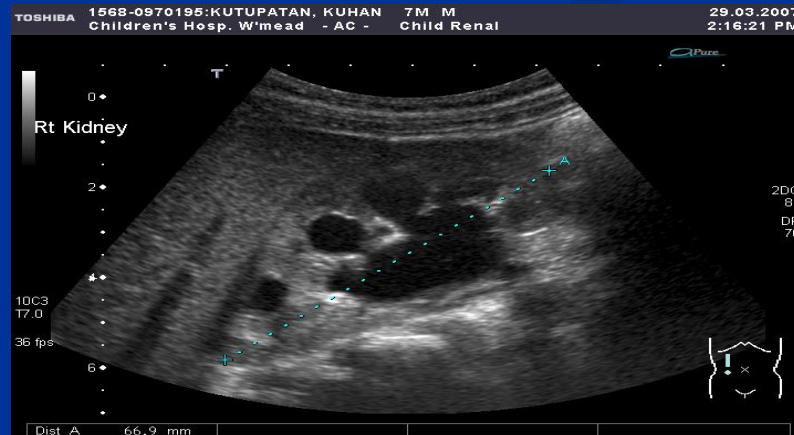
Constipation

Detrusor overactivity

Imaging in UTI

Prevalence 34 %Of reflux in children with UTI

Febrile infants with UTIs should undergo renal and bladder ultrasonography (RBUS) (evidence quality: C; recommendation).



VCUG should not be performed routinely after the first febrile UTI; VCUG is indicated if RBUS reveals hydronephrosis, scarring, or other findings that would suggest either high-grade VUR or obstructive uropathy, as well as in other atypical or complex clinical circumstances (evidence quality B; recommendation).



NICE recommendations for investigating children following febrile UTI

Table 6.13 Recommended imaging schedule for infants younger than 6 months

Test	Responds well to treatment within 48 hours	Atypical UTI ^a	Recurrent UTI ^a
Ultrasound during the acute infection	No	Yes ^c	Yes
Ultrasound within 6 weeks	Yes ^b	No	No
DMSA 4–6 months following the acute infection	No	Yes	Yes
MCUG	No	Yes	Yes

Table 6.14 Recommended imaging schedule for infants and children 6 months or older but younger than 3 years

Test	Responds well to treatment within 48 hours	Atypical UTI ^a	Recurrent UTI ^a
Ultrasound during the acute infection	No	Yes ^c	No
Ultrasound within 6 weeks	No	No	Yes
DMSA 4–6 months following the acute infection	No	Yes	Yes
MCUG	No	No ^b	No ^b

Table 6.15 Recommended imaging schedule for children 3 years or older

Test	Responds well to treatment within 48 hours	Atypical UTI ^a	Recurrent UTI ^a
Ultrasound during the acute infection	No	Yes ^{b,c}	No
Ultrasound within 6 weeks	No	No	Yes ^b
DMSA 4–6 months following the acute infection	No	No	Yes
MCUG	No	No	No



Urinary tract infection in children, National Institute for Health and Clinical Excellence

J H Baumer and R W A Jones

Arch. Dis. Child. Ed. Pract. 2007;92;189-192

Box: Definition of atypical UTI

Atypical UTI includes:

- ▶ seriously ill
- ▶ poor urine flow
- ▶ abdominal or bladder mass
- ▶ raised creatinine
- ▶ septicaemia
- ▶ failure to respond to treatment with suitable antibiotics within 48 h
- ▶ infection with non-*E coli* organisms

Table 3 Recommended imaging schedule for infants younger than 6 months

Test	Responds well to treatment within 48 h	Atypical UTI*	Recurrent UTI
Ultrasound during the acute infection	No	Yes‡	Yes
Ultrasound within 6 weeks	Yes†	No	No
DMSA 4–6 months following the acute infection	No	Yes	Yes
MCUG	No	Yes	Yes

*See box for definition.

†If abnormal consider MCUG.

‡In an infant or child with a non-*E coli*-UTI, responding well to antibiotics and with no other features of atypical infection, the ultrasound can be requested on a non-urgent basis to take place within six weeks.

Table 4 Recommended imaging schedule for infants and children 6 months or older but younger than 3 years

Test	Responds well to treatment within 48 h	Atypical UTI*	Recurrent UTI
Ultrasound during the acute infection	No	Yes‡	No
Ultrasound within 6 weeks	No	No	Yes
DMSA 4–6 months following the acute infection	No	Yes	Yes
MCUG	No	No†	No†

*See box for definition.

†While MCUG should not be performed routinely it should be considered if the following features are present: dilatation on ultrasound; poor urine flow; non-*E coli*-infection; family history of VUR.

‡In an infant or child with a non-*E coli*-UTI, responding well to antibiotics and with no other features of atypical infection, the ultrasound can be requested on a non-urgent basis to take place within six weeks.

Treatment

Action Statement 4a

When initiating treatment, the clinician should base the choice of route of administration on practical considerations. Initiating treatment orally or parenterally is equally efficacious. The clinician should base the choice of agent on local antimicrobial sensitivity patterns (if available) and should adjust the choice according to sensitivity testing of the isolated uropathogen (evidence quality: A; strong recommendation).

Action Statement 4b

The clinician should choose 7 to 14 days as the duration of antimicrobial therapy (evidence quality: B; recommendation).

TABLE 2 Some Empiric Antimicrobials for Par

Antimicrobial Agent

Ceftriaxone
Cefotaxime

Ceftazidime

Gentamicin

Tobramycin

Piperacillin

TABLE 3 Some Empiric Antimicrobials

Antimicrobial Agent

Amoxicillin-clavulanate

Sulfonamide

Trimethoprim-sulfamethoxazole

Sulfisoxazole

Cephalosporin

Cefixime

Cefpodoxime

Cefprozil

Cefuroxime axetil

Cephalexin

Table 1. AAP Clinical Practice Guideline on UTI in Febrile Infants and Young Children: Key Updates

<i>Area of management</i>	<i>Updates from the 1999 guideline</i>
Diagnosis	Both an abnormal urinalysis result and a positive urine culture result are needed to confirm inflammation A positive culture result is defined as at least 50,000 colony-forming units per mL, rather than the previous criterion of at least 100,000 colony-forming units per mL Guidance is added for using clinical criteria to establish a threshold to decide whether to obtain a urine specimen
Treatment	Oral treatment is as effective as parenteral treatment
Imaging	Voiding cystourethrography is not recommended routinely after the first febrile UTI; ultrasonography should include the bladder and the kidneys
Follow-up	Emphasis is on urine testing with subsequent febrile illnesses, rather than on regularly repeated urine cultures after treatment

NOTE: The guideline applies to infants and children two to 24 months of age with unexplained fever.

AAP = American Academy of Pediatrics; UTI = urinary tract infection.

Information from reference 4.

Treatment

RCT showed no difference between IV antibiotic followed by oral with oral in treatment of pyelonephritis in:

- 1-Time to fever resolution
- 2-Recurrent UTI
- 3-Renal parenchymal defects

Role of prophylactic antibiotics



Table 11 Prophylactic antimicrobial agents

Antibiotic	Dose
Trimethoprim (TMP)-sulfamethoxazole	2 mg TMP/kg/day daily
Nitrofurantoin	1-2 mg/kg/dose daily
Cephalexin	10 mg/kg/dose daily
Amoxicillin	10 mg/kg/dose daily

Table 2 Properties of an ideal prophylactic agent

- Active against uropathogenic bacteria
 - Enteric uptake in the small intestine leading to minimal activity against bacteria in the colon and the periurethral area
 - Adequate urine concentration
 - Few short- or long-term adverse effects
 - Low selection of resistant bacteria
 - Available in formulas suitable for children
 - Good taste
 - Easily degradable to minimize negative environmental effect
-

Prevention of recurrent UTI

Cranberries

Circumcision

Prophylactic antibiotics

Increased fluid intake, treatment of constipation, regular voiding, pelvic floor relaxation

VUR

Causes: Primary or secondary to PUV, neurogenic bladder

Associated with renal agenesis, ectopia, lower pole of duplex kidney

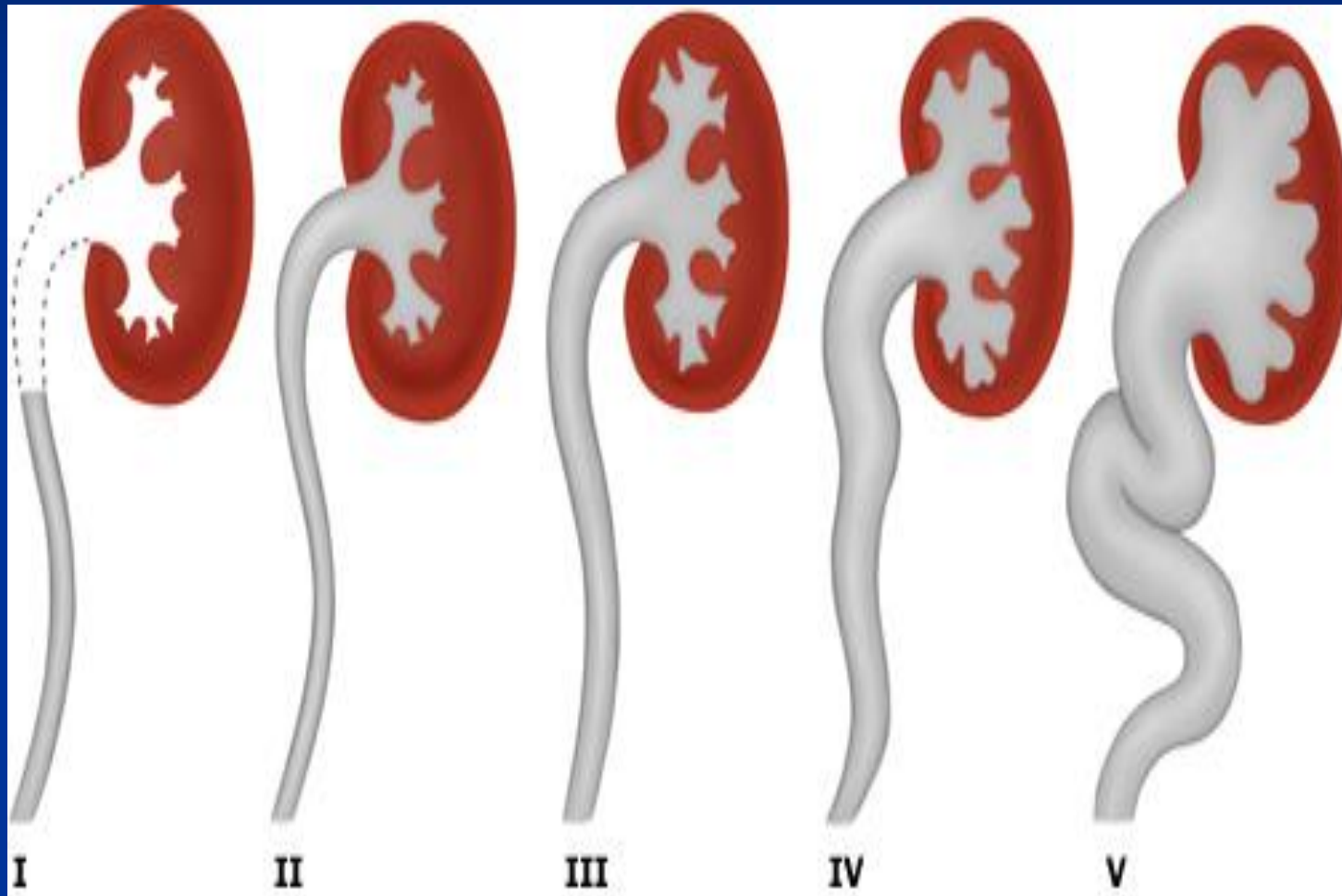
33% of UTI cases have VUR

Incidence of reflux in siblings 27-45 %

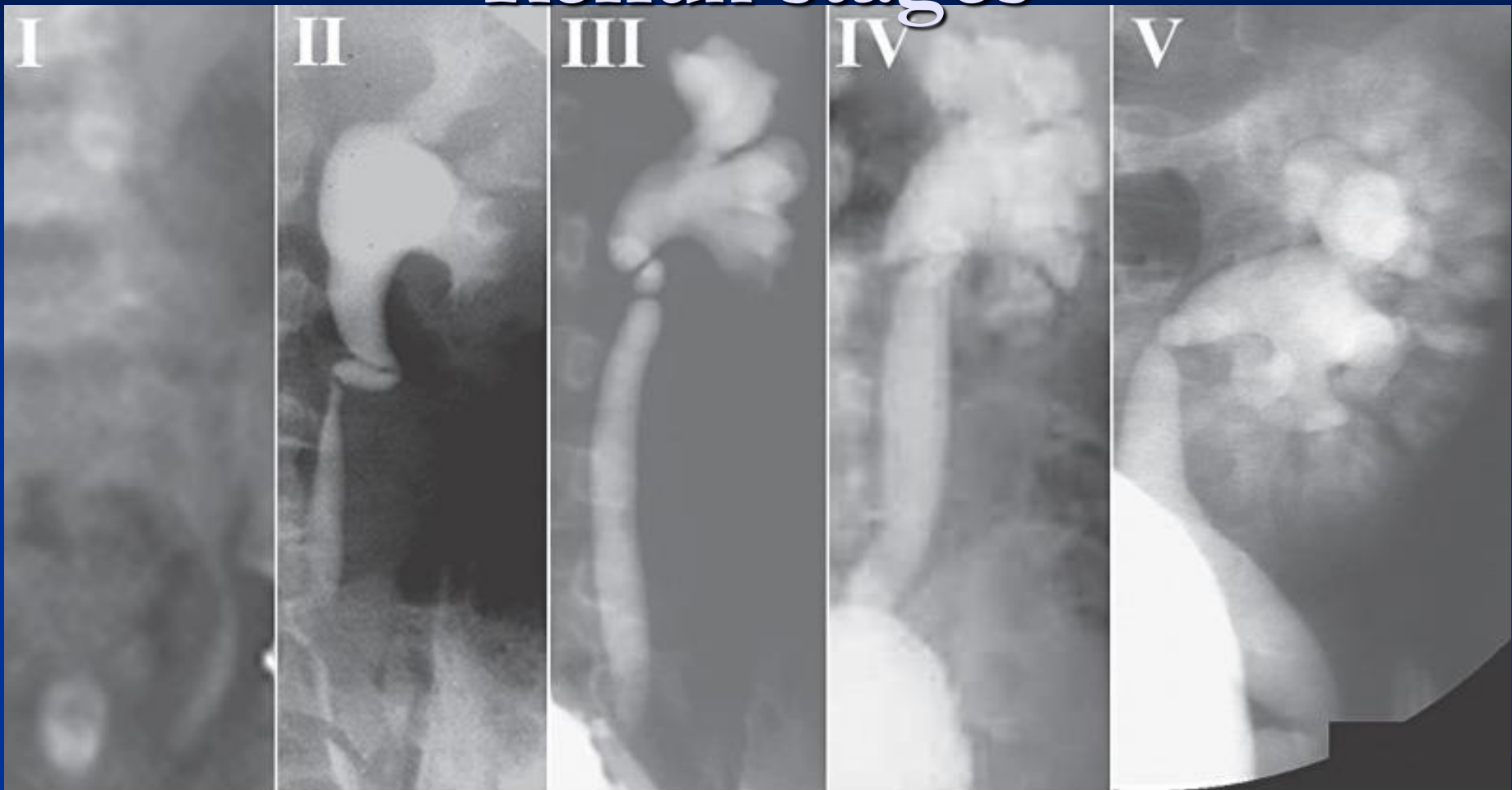
Rate of resolution of VUR over 5 years

Grade 1	82%
Grade 2	80%
Grade 3	46%
Grade 4	30%
Grade 5	11%

International classification of VUR



Reflux stages





THANK YOU