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,frequeny ,hematuria,abdominal or loin pain,fever

2. Family history of stones,dietary habits

3.History of vaginal discharge,itching

History of UTI

Bladder diary of voided volume,as frequency,urge incontinence,voided volume, holding manevours

Bowel habits;frequency and consistency

History of previous UTI

Relation of UTI to toilet training

physical examination

1.temp, renal angle and suprapubic tenderness

2.genitalia exam : look for vulvitis,discharge,meatal stenosis

Labial adhesions

3.Back for sacral dimple

Indicate bladder

dysfunction

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 uncircumsized
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 bacteriauria:1-2 % of school age

children has no pyuria but positive cutlure,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 incontinenance,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,

Simple urine analysis:

Pyuria is more than 5 cells per HPF

Pyruia isn't not specific may be found in febrile children,vaginitis,kawasaki

Microscopic hematuria is common,macroscopic seen in 25%

Urine gram stain of bacteria is most sensitive and specific

Negative analysis with symptoms doesn't rule out UTI

Automated urine analysis

Pyuria is more than 10 cells/ul

Dipstick for LE:(not specific)

Dipstick for nitrite :(specific but not sensitive),if negative doesn't rule out UTI

CRP, ESR,WBC, indicate pyelonephritis

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

FROM THE AMERICAN ACADEMY OF PEDIATRICS

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

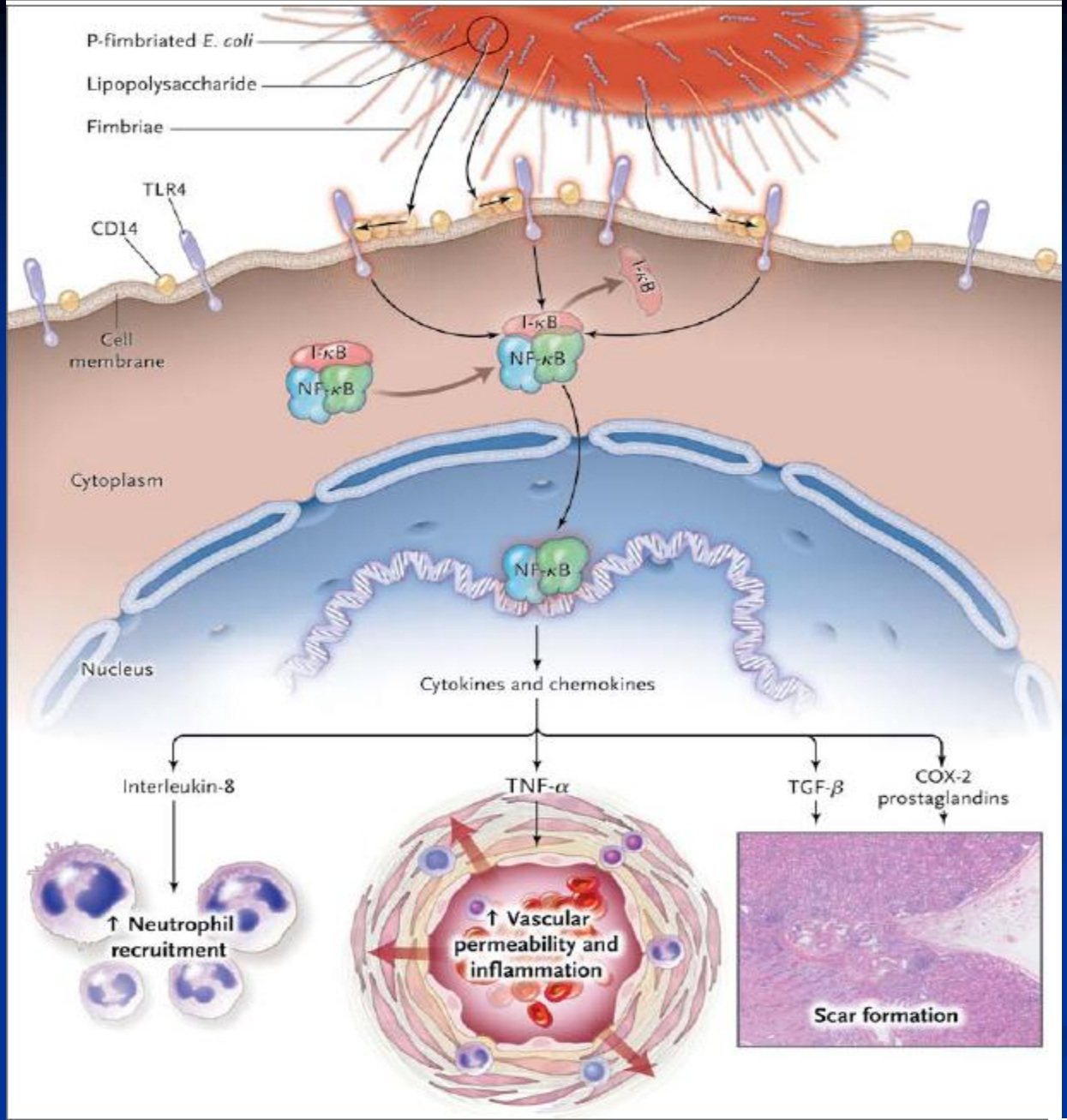
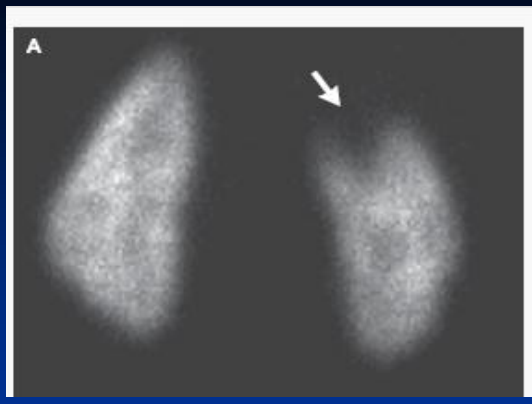


Figure 2. Pathophysiology of Acute Pyelonephritis.

Pathogenesis of scarring



10-40% have scarring

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

Detected by DMSA scan 4 months after UTI

Risk factors for scarring

Young age,but some studies found older age

High grade VUR

Delayed treatment of UTI.*jama ped*

Bowel and bladder dysfunction

Recurrent UTI

Bacterial virulence:non Ecoli organisms higher risk

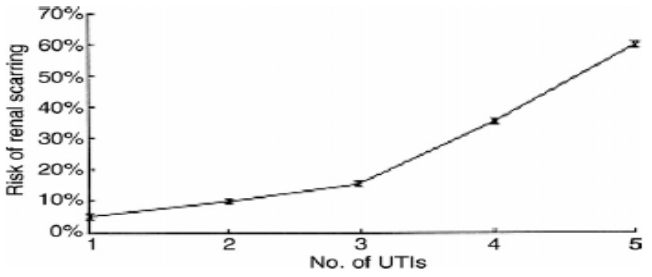


FIGURE 4
Relationship between renal scarring and number of bouts of pyelonephritis. Adapted from Jodal.[59]

Complications

Bacteremia in 4-9%

Acute lobar nephronia

Renal or perirenal abscesses

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

Risk factors for recurrence

Age less than 6 m

High grade VUR

Obstructive uropathy

Dysfunctional voiding

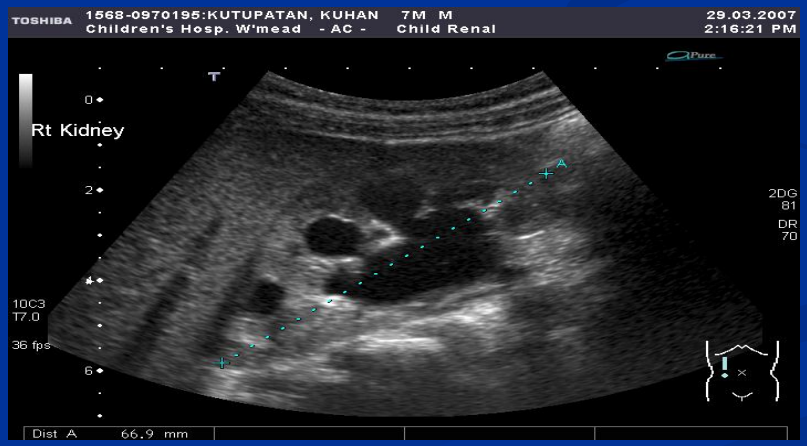
Constipation

Detrussor 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 E
for Par

Antimicrobial Agent
Ceftriaxone
Cefotaxime
Ceftazidime
Gentamicin
Tobramycin
Piperacillin

TABLE 3 Some Empiric Antimicrobia

Antimicrobial Agent
Amoxicillin-clavulanate
Sulfonamide
Trimethoprim-sulfamethoxazole
Sulfisoxazole
Cephalosporin
Cefixime
Cefpodoxime
Cefprozil
Cefuroxime axetil
Cephalexin

Antibiotics used

For Pyelonephritis: third generation cephalosporin as ceftriaxone,ampicillin and aminoglycoside

If pervious cultures or ESBL bcateria used carbapenem or aminoglycosides

For cystitis: second or third generation cephalosporin as cefuroxime,cefixime.or amoxicillin-clavulanic acid

After empirical treatment,can change antibiotics according to sensitivities

Course of disease

Patients usually afebrile after 48 hour

If still febrile consider upgrading antibiotics due to resistant strains or complications

No need to repeat the culture

Can continue oral antibiotics after intravenous

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

Area of management	*Updates from the 1999 guideline*
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

Prophylactic antibiotics:

Studies showed a benefit on prevention of UTI but none on scarring

Circumcision

increased fluid intake,treatment of constipation

Treatment of bladder dysfunction as regular voiding,pelvic floor relaxation,double void

VUR

Causes: Primary or secondary to PUV,neurogenic bladder

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

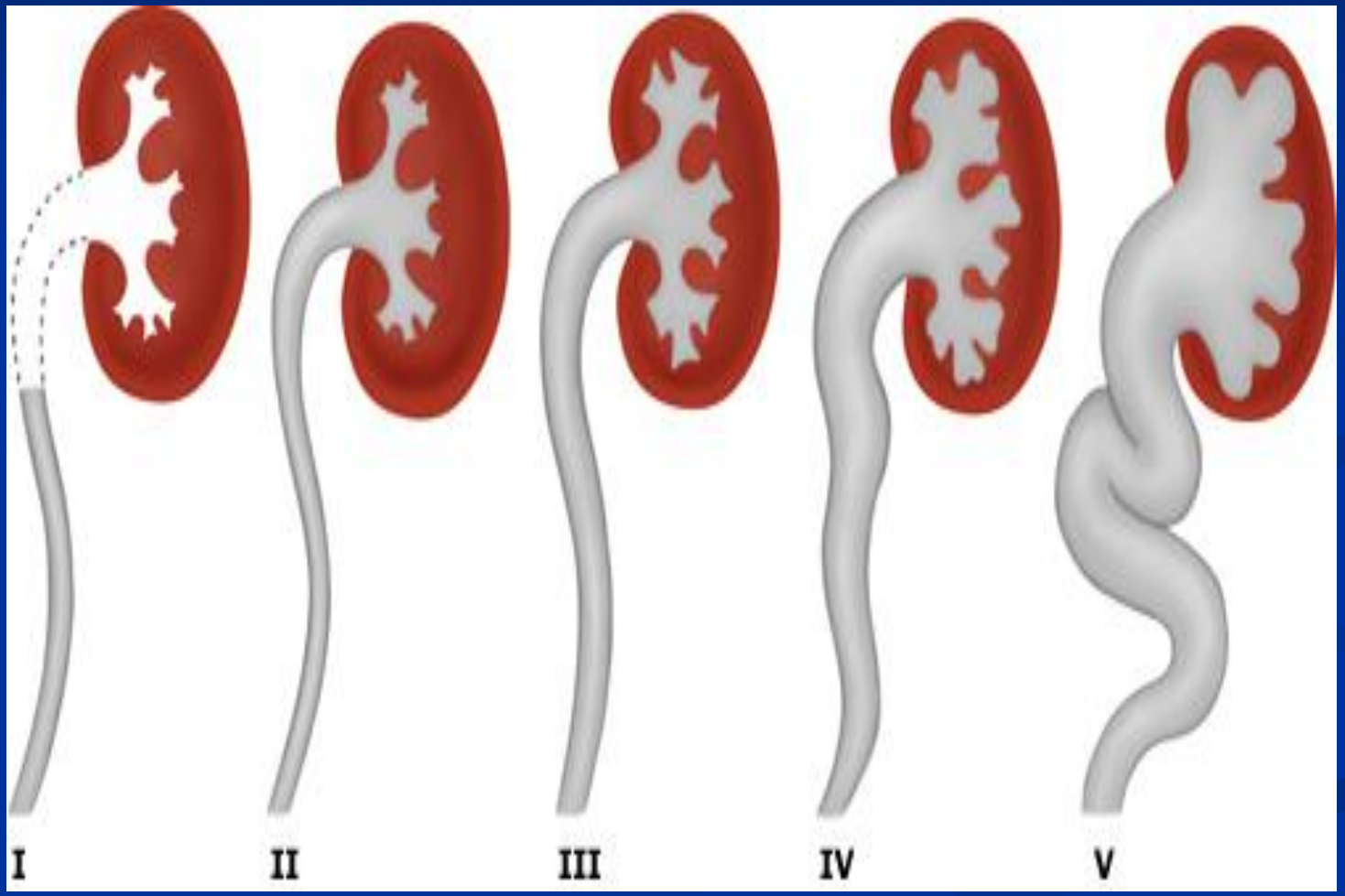
33% of UTI cases have VUR

Incidence of reflux in siblings 27-45 %

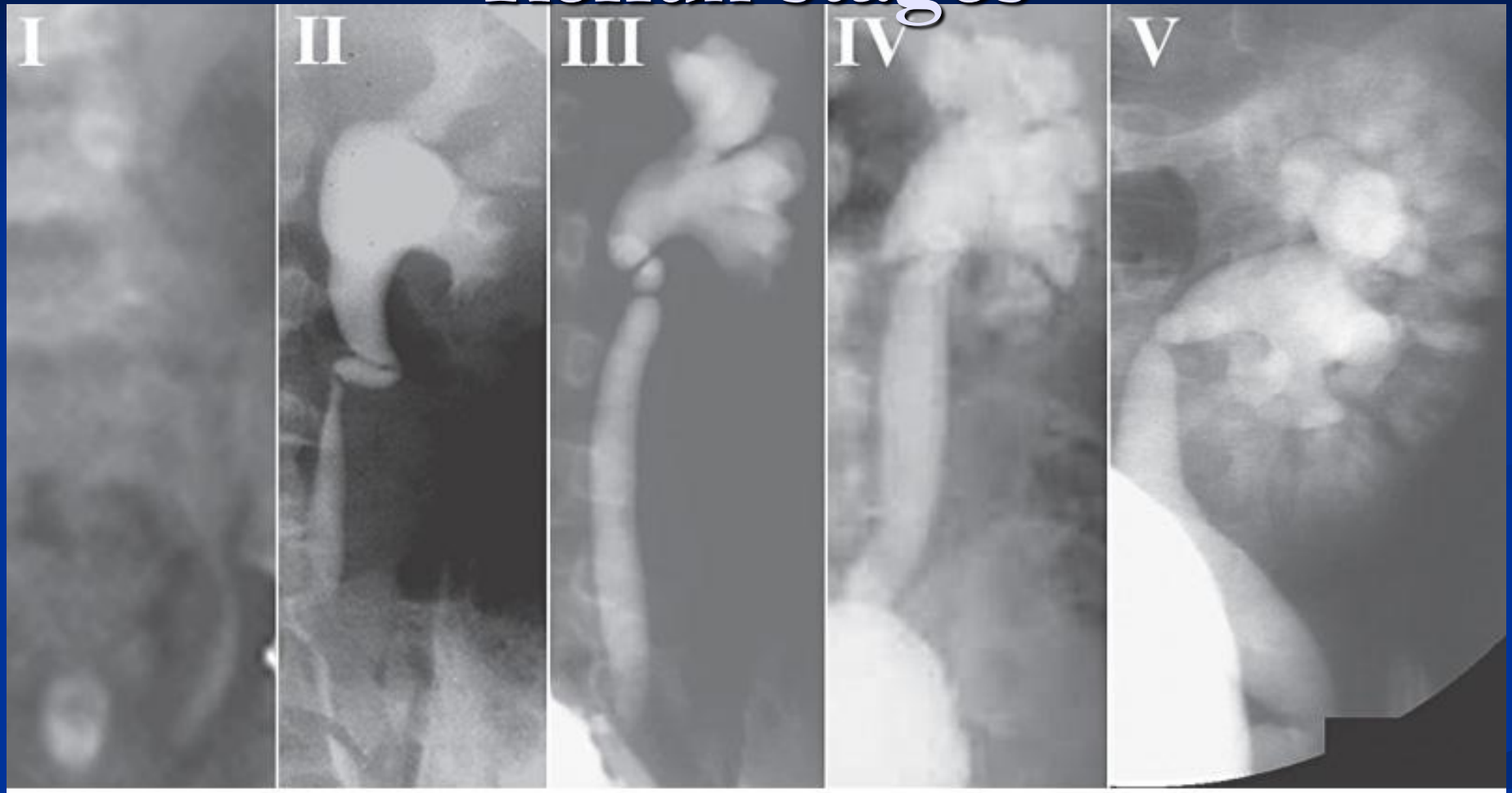
Rate of resolution of VUR over 5 years

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

International classification of VUR



Reflux stages




THANK YOU

Approach to a child with edema

Onset

Distribution: periorbital,abdomen,leg

Associated symptoms

1.cardiac as dyspnea to rule out heart failure

2.jaundice to look for liver disease

3. chronic diarrhea to look for protein losing enteropathy

4.urine output ,red urine,frothy urine

Examination

1.look for periorbital swelling, redness

2.examine for ascites

3.examine for lower limbs edema

4.look for sacral edema

Laboratory result

1. electrolytes
2.urea, creat
3.albumin
4.urine analysis for protein
5.liver function test

Normal protein is less than 4 mg/m2.hour

DD OF proteinurea

1.tubular : fanconi syndrome,drugs,ATN

2.glomerular ; could be with GN

3.transient: fever,infection,exercise

4.glomerular

NEPHROTIC SYNDROME

Nephrotic range proteinuria, (>40mg/m^2/hour), (> 50mg/kg/day), urine to protein creat ratio (>2mg/mg), +3-4 on dipstick

Hypoalbumenia (<2.5g/dl)

Hyperlipidemia
edema

Prevelance 2/100000

M:F 2:1, 80% <6 years

History and examination

Periorbital swelling mistaken as allergy

Increase in weight,abdominal distention ascitis

Scrotal and sacral edema,pleural effusion

Abdominal pain due to hypovolemia,peritonitis

Decrease in urine output

Symptoms preceded by URTI

Blood pressure normal or high

Laboratory investigation

Electrolytes: low Na,low albumin and calcium

ANA,C3,C4,hepatitis B,C

Hemoglobin high,platlet high

Urine Na less than 10

Urine analysis: proteinuria,microscopic hematuria

Urine protein/creatinine more than 2 mg/mg

Elevated cholesterol and triglycerides

COMPLICATIONS

1-Infections:losses of IgG in urine,abn T cell function,low factor B (C3 proactivator),steriod use,impaired opsonization

Encapsulated bact streptococcus pneumonia,staph,Ecoli

Primary bacterial peritonitis

Immunization against pneumococcus,varicella

2-Thromboembolism:inc clotting factors,fibrinogen,low AT3,plat aggreg,hyperviscosioty

Venous,RVT,sagital sinus,veins of legs

3.ARF