URINARY TRACT INFECTIONS(UTI) IN CHILDREN

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UTI IN CHILDREN

OBJECTIVES:-

*DEFINITION&EPIDEMIOLOGY

*AETIOLOGY&RISK FACTORS

*CLINICAL FEATURES

*INVESTIGATIONS

*DIFFIRENTIAL DIAGNOSIS

*COMPLICATIONS

*TREATMENT

*SUPRAPUBIC URINE SAMPLING

URINARY TRACT INFECTION(UTI)

DEFINITION:-PRESENCE OF A MICROORGANISM (COMMONLY BACTERIA)IN URINE.

IT CAN BE SYMPTOMATIC OR ASYMPTOMATIC.

IT IS DIVIDED INTO TWO TYPES;-

1)UPPER UTI(PYELONEPHRITIS).

2)LOWER UTI(CYSTITIS).

IT AFFECT ABOUT 3-8% OF CHILDREN.

MALES ARE AFFECTED MORE IN FIRST YEAR OF LIFE

UTI

BEYOND THE FIRST YEAR OF LIFE FEMALES ARE MORE AFFECTED(M:F RATIO IS ABOUT 1:10).

FEMALES ARE MORE AFFECTED FOR TWO REASONS:-

1)EASY FOECAL CONTAMINATION.

2)SHORT URETHRA.

IN NEONATAL PERIOD MALES ARE MORE AFFETED BECAUSE THEY ARE MORE PRON TO STRUCTURAL CONGENITAL ANOMALIES OF URINARY TRACT

UTI

AETIOLOGY:-ESCHERICIA COLI(GRAM-veBACILLUS) IS THE MOST COMMON CAUSE(80-90% OF CASES).

OTHER GRAM-ve BACTERIA MAY BE RESPONSIBLE (KLEBSIELLA, PROTEUS & PSEUDOMONS).

GRAM+ve BACTERIA(STREPTOCOCCUS AND STAPHYLOCOCCUS)MAY BE A CAUSE.

SOME VIRUSES MAY CAUSE UTI LIKE ADENOVIRUS (HEMORRHAGIC CYSTITIS).

UTI

ROUTE OF INFECTION:-BY TWO WAYS;

1)ASCENDING INFECTION(MOST COMMON).

2)HEMATOGENOUS SPREAD(IN NEONATES).

PREDISPOSING FACTORS:-

1)VIRULENCE OF INVADING BACTERIA.

2)HOST SUSCEPTIBILITY.

3) CONDITIONS LEADING TO STASIS(STONE,VUR, OBSTRUCTION &VOIDING PROPLEMS).

4)CHRONIC CONSTIPATION.

5)WIPING FROM BACK TO FRONT.

UTI

CLINICAL FEATURES:-UTI MAY BE SYMPTOMATIC OR ASYMPTOMATIC(ENEURISIS & SQUATTING).

SYMPTOMS VARRY ACCORDING TO THE AGE OF PATIENT&SITE OF INFECTION(UPPER OR LOWER).

IN INFANCY IT MAY PRESENT WITH POOR FEDING FEVER,FAILURE TO THRIVE,IRRITABILITY, LOSS OF WEIGHT, VOMITING&DIARRHEA.

IT MAY PRESENT WITH PROLONGED NEONATAL JAUNDICE OR PART OF SEPTICEMIA.

UTI

H/O PASSING RED URINE IS ANOTHER PRESENTATION.

IN LATE CHILDHOOD, IT MAY PRESENT WITH DYSURIA, INCREASED FREQUENCY,DRIPPLING, ABDOMINAL PAIN, FOULY SMELL URINE AND SECONDARY ENURESIS.

NATURE & SEVERITY OF SIGNS AND SYMPTOMS DEPENDS ON THE SITE OF INFECTION.

UTI

LOWER UTI (CYSTITIS) :PRESENT WITH LOW GRADE FEVER,LOWER ABDOMINAL PAIN ,HESITANCY AND URGENCY&BED WETING IN PREVIOUSLY DRY CHILD

UPPER UTI(PYELONEPHRITS):PRESENT WITH FLANK PAIN &TENDRNESS,HIGH GRADE FEVER,CHILLS AND RIGORS AND TOXIC LOOKING CHILD.

UTI

INVESTIGATIONS:-THESE INCLUDE;

1)URINE TESTS(ROUTINE&CULTURE)

URINE SAMPLE COLLECTION BY THREE METHODS:-

1)SUPRAPUBIC ASPIRATION(< 1 Yr OF AGE).

2)MIDSTREAM URINE/CLEAN CATCH SAMPLE IN OLDER AGE GROUP.

3)BY USING URINE CATHETER.

URINE ANALYSIS(ROUTINE) SHOWS PUS CELLS (>5CELLS/HPF),RBCs,NITRITE,PROTEIN&WBC CAST WHICH IS SUGGESTIVE OF PYELONEPHRITIS.

ALKALINE URINE PH INDICATE PROTEUS UTI.

UTI

URINE C/S: ANY BACTERIUM BY SUPRAPUBIC SAMPL OR CATHETERIZATION INDICATE UTI,BUT FOR MIDSTREAM SAMPLE MORE THAN 100,000 COLONIES ARE NEEDED FOR THE DIAGNOSIS.

FOR SYMPTOMATIC PATIENT, A GROWTH OF MORE THAN 10,000 COLONIES INDICATES UTI.

UTI

2)BLOOD TESTS:

- CBC(HIGH WBC&ESR).
  - POSITIVE CRP (ACUTE PYELONEPHRITIS).

- BLOOD CULTURE IN INFANTS WITH HIGH FEVER(UTI WITH SEPTICEMIA).

- BLOOD SUGAR, RFT&SERUM ELECTROLYTES.

UTI

3)IMAGING STUDIES;INCLUDE THE FOLLOWING:-

A)RENAL ULTRASOUND SCANING(USS)WHICH HELP IN DIAGNOSIS OF PYELONEPHRITIS AND PERIRENAL ABSCESS&HYDRONEPHROSIS.

B)INTRAVENOUS PYELOGRAPHY (IVP) WHICH IS INDICATED FOR SELECTED CASES.

UTI

C)MICTURATING CYSTOURETHROGRAM(MCUG) TO EXCLUDE VUR,ESPECIALY IN PATIENTS < 5 Yrs OF AGE.

D)RADIOISOTOP STUDY WITH THE USE OF TECHNTUM-LABELED 2,3DMSA/DTPA&MAG3.

ADVANTAGES:-1)Dx OF PYELONEPHRITIS.

2)Dx OF RENAL SCARRING.

3)SAFER&LESS RADIATION.

E)CT SCAN TO R/O PERINEPHRIC ABSCESS.

UTI

DIFFERENTIAL DIAGNOSIS:-

1)INFLAMATION OF EXTERNAL GENITALIA (VULVITIS/VULVOVAGINITIS).

2)PINWARM INFESTATION(ENTEROBIASIS).

3)CHEMICAL CYSTITIS.

UTI

COMPLICATIONS, ESPECIALY OF UPPER UTI

1)CHRONIC PYELONEPHRITIS(CHRONIC RENAL PARENCHYMAL INFECTION & SCARRING).

2)HYPERTENTION.

3)RENAL FAILURE.

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TREATMENT:-THIS INCLUDES;

A)*GENERAL* MEASURES LIKE;

1)LIBERAL FLUID INTAKE.

2)PERSONAL HYGEIN & REGULAR VOIDING.

3)ANALGESICS & ANTIPYRETICS(FEVER&PAIN).

4)TREATMENT OF CONSTIPATION

UTI

B)SPECIFIC TREATMENT:-

1)TO BE STARTED AFTER TAKING URINE C/S.

2)BACTERICIDAL DRUGS ARE PREFERED

3)PARENTERAL ROUTE IS PREFERED FOR ACUTLY SICK PATIENT(PYELONEPHRITIS) FOR 7-10DAYS.

4)ORAL ROUTE MAY BE USED FOR CYSTITIS.

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C)COMMONLY USED DRUGS INCLUDE SEPTRIN (TRIMETHOPRIM&SULPHAMETHOXAZOL). AUGMENTIN,NITROFURANTOIN,NALIDIXIC ACID AND CEPHALEXIN MAY BE USED.

COMBINATION AMPICILIN&GENTAMYCIN(I.V)OR CEFTRIAXON(ROCEPHIN)MAY BE USED IN CASES OF UPPER UTI (PYELONEPHRITIS).

UTI

D)SURGICAL TREATMENT MAY BE INDICATED IN SOME CASES(PERIRENAL ABSCESS).

E)TREATMENT OF PREDISPOSING FACTORS LIKE OBSTRUCTION(VESICOURETERIC REFLUX(VUR) OR PUJ OBSTRUCTION),RENAL STONE AND CHRONIC CONSTIPATION.

UTI

ANTIBIOTIC PROPHYLAXIS(SUPPRESSIVE THERAPY)IS INDICATED IN SOME CASES WHERE WE PUT THE PATIENT ON LOW DOSE ANTIMICROBIAL OR ANTIBIOTIC THERAPY.

ABOUT 1/3 OF THE THERAPEUTIC DOSE,TO BE GIVEN AT BED TIME.

UTI

INDICATIONS INCLUDE THE FOLLWINGS:-

1)RECURRENT UTI.

2)CASES OF OBSTRUCTIVE UROPATHY LIKE VESICOURETERIC REFLUXS(VUR),PUV, PUJ OBSTRUCTION OR URETHRAL STENOSIS.

3)RENAL STONES.

DRUGS USED SEPTRIN,AMOXYLL/AUGMENTIN, NITROFURANTOIN&CEPHALEXIN.

UTI

SUPRAPUIC URINE ASPIRATION IS THE MOST ACQURATE METHOD FOR URINE SAMPLING OR COLLECTION FOR CULTURE&SENSITIVITY IN CHILDREN < 1 Yr OF AGE.

1)EXPLAIN TO MOTHR WHAT YOU WANT TO DO.
2)BE SURE THAT BLADDER IS FULL(ASK MOTHER TO GIVE FEEDING ½-1hr BEFOR PROCEDURE).

PALPATION AND/OR PERCUSSION MAY HELP IN DETECING URINARY BLADDER,BUT ABDOMINAL ULTRASOUND(USS) MAY BE MORE ACQURATE IN DETECTING FULL BLADDER.

UTI

3)UNDER ASEPTIC TECQNIQE BY ALCOHOL AND IODINE,PUT SYRINGE WITH NEEDLE ABOUT 2Cm ABOVE PUBIS SYMPHISIS(VERTICAL POSITION) AND TAKE THE URINE SAMPLE.

4)A GROWTH OF EVEN SINGLE BACTERIUM IS CONSIDERED POSITIVE AND SIGNIFICANT.

Vesicoureteric reflux(VUR)

*VUR is retrograd flow of urine from the bladder to the ureter and renal pelvis.

*it is usually congenital and afects1% of children
*VUR predispose to recurrent UTI and to renal scarring (Reflux nephropathy) and this may lead to hypertension and end stage renal failure(15-20% of cases)

VUR

*VUR may be primary(anatomic deformity of ureterovesical junction)or secondary as in cases of posterior urethral valve or neurogenic bladder.

*VUR is an inherited trait.

VUR

*Diagnosis is by micturating cystoureterogram (MCUG)by injecting a contrast or radionucide substance a urinary catheter.

*Assessment of upper urinary tract by use of ultrasound or by intravenous pyelography(IVP) or better by radionuclid radiography by using radioactive substances(DMSA,DTPA scan).

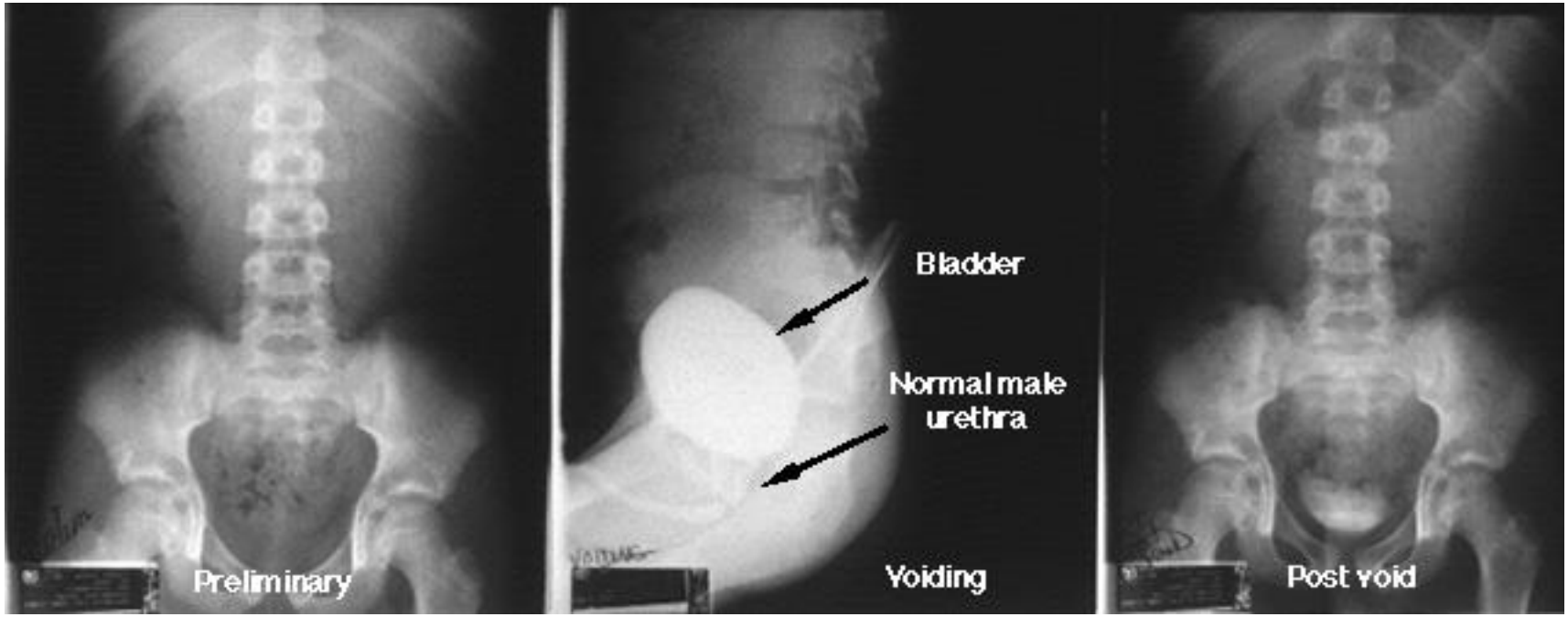
VUR

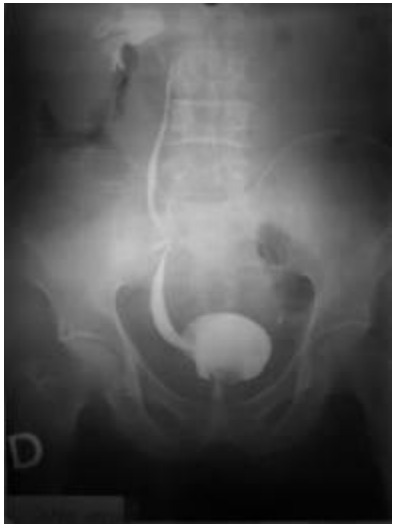
*Other investigations include CBC,RFT&urineC/S

*Assessment of growth (Weight&Height)and check for Blood Pressure.

*Treatment is conservative for Grade1&2 and sometimes Grade3.

Grade4&5need surgery(ureteric reimplantation).


Preliminary
Bladder
Normal male urethra
Voiding
Post void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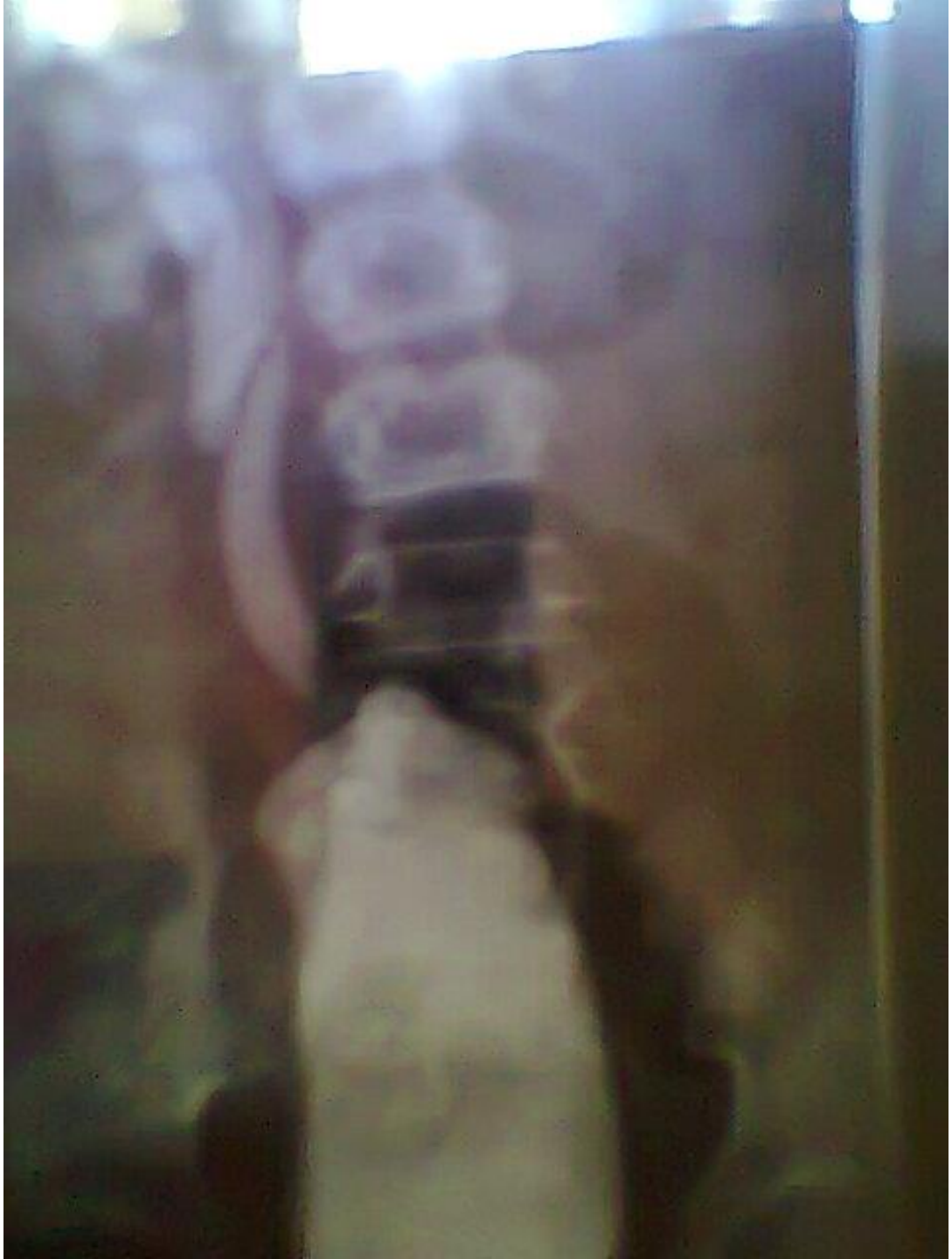

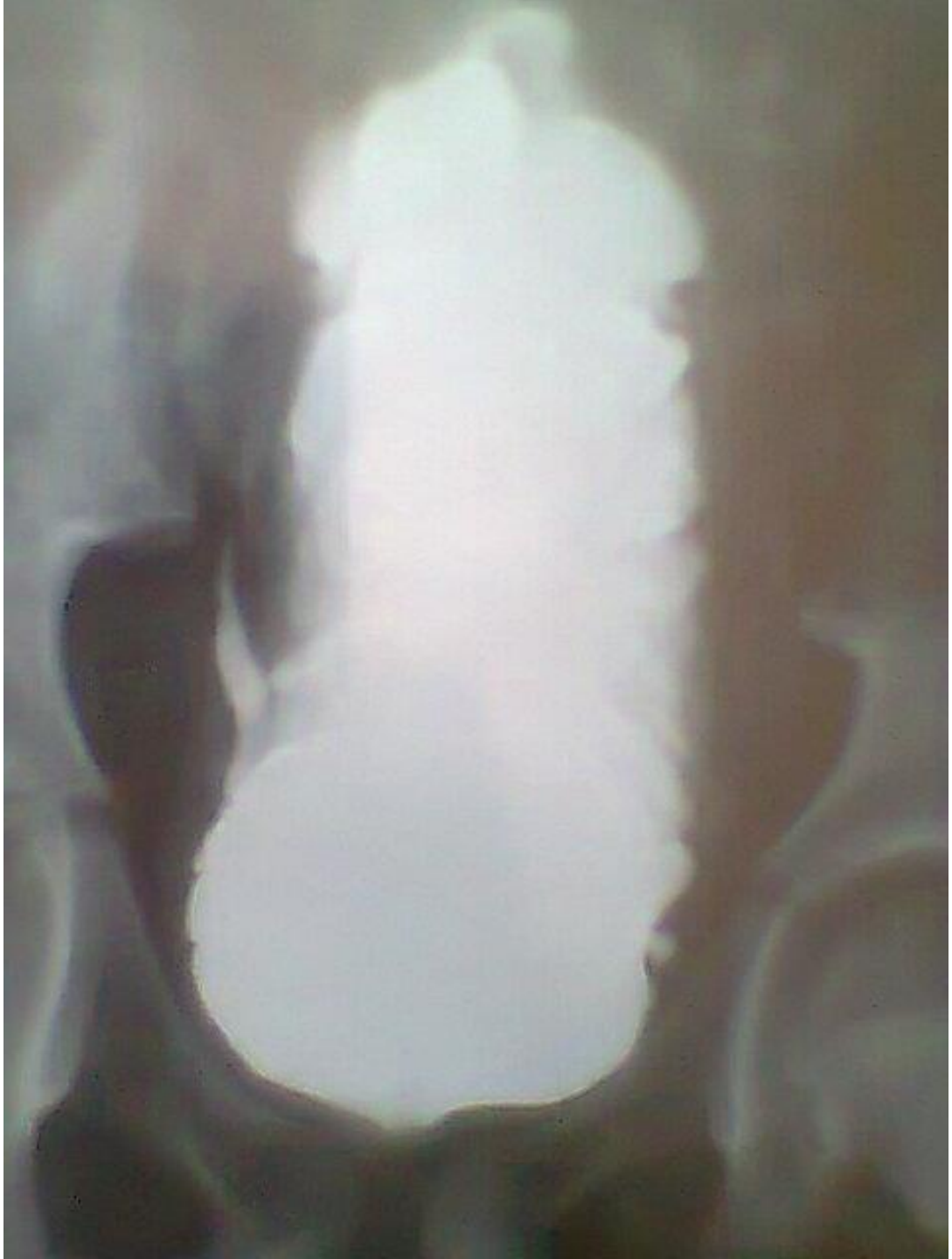

UTI

IMPORTANT POINTS:-

***FEMALES ARE MORE AFFECTED BEYOND FIRST YEAR OF LIFE.** •

*E.COLI IS THE MOST COMMON CAUSE.

*MAY PRESENT WITH CHRONIC DIARRHEA.

*ACUTE PYELONEPHRITIS NEEDS PARENTERAL ANTIBIOTIC

*CONSTIPATION &INFREQUENT VOIDING ARE IMPORTANT PREDISPOSING FACTORS.

*UPPER UTI IS MORE SERIOUS THAN LOWER UTI.

*HYPERTENSION&RENAL FAILURE ARE SERIOUS COMPLICATIONS.

VUR

*VUR is usually congenital& sibs of affected child may need screening.

*Any child especially male in first years of life who present with recurrent UTI need to rule out VUR by doing MCUG.

*Grade 1&2 resolve spontaneously with growth while Grade4&5 need surgery.

*Follow up is mandatory.