Urinary Tract Infection:

It is defined as presence and multiplication of bacteria or other microorganisms in urine or CNT which is normally sterile. 1) Lower UTI (cystitis & urethritis)
2) Upper UTI (Pyelonephritis)

1) Lower UTI (Cystitis and urethritis)
Inflammation of Bladder and urethra - caused by microorganism.

Causes: Bacteria from anal region ascending.

Gram Negative	Gram Positive
1) E. Coli (Most common)	1) Staphylococcus saprophytic (2nd common)
2) Klebsiella	2) Enterococcus.
3) Proteus	
4) Enterobacter.	

Risk Factors

1) Sexual Intercourse (Honeymoon Cystitis).
2) Female Gender due to
   1) Short urethra → Bacteria travels less.
   2) Post-Menopausal → Decreased estrogen → Loss of Normal Vaginal Flora.
3) Foley's Catheter.
4) Diabetes Mellitus → Hyperglycemia → Causing inhibition of Neutrophils action against foreign.
5) Infant Boys with Foreskin around
6) Impaired Bladder Emptying.

Symptoms

1) Suprapubic pain.
2) Dysuria 3) Frequency 4) Urgency

Infants → Fever, Fussy, Feed poorly.
Adults → Fatigue, Delirium.

Symptoms not present in Lower UTI are
1) Systemic signs - Fever, Nausea, Vomiting.
2) Pain at costovertebral angle. [12th rib and vertebra]
↳ Suggest upper UTI.

Investigation: Urinalysis
1) Pyuria → WBC >10 WBCs/ml.
2) Dipstick test → Leukocyte esterase enzyme, Nitrate
↳ Ecoli
3) Urine Culture [Gold standard].
↳ >1,00,000 CFU/ml.

If Pyuria(+), Urine culture(-) → Sterile Pyuria
↓
Suggest Urethritis caused by Neisseria gonorrhea, Chlamydia Trachomatis

4) Imaging → i) Renal ultrasound → Kidney malformation
ii) Voiding cystourethrogram → Reflux.
iii) Renal Scintigraphy (DMSA scan) → Renal scarring.

Management → Drink fluids, Wipe from urethra to rectum, Sexual act

ii) Upper UTI

Acute Pyelonephritis → Inflammation.
↳ Renal Pelvis → kidney

Causes: From Ascending Infection from Lower UTI
1) Vesicoureteral orifice Failure — Primary Congenital defect
↳ Urinary stasis → Reflux of Urine — Bladder outlet obstruction.
↓
Bacteria grows.

Ascending Infection
↓
- E-Coli
- Proteus
- Enterobacter
→ Common in Bowel

Haematogenous Infection
↓
Less common
1) Septicemia
2) Infective Endocarditis.
↳ Staphylococcus.

Pathology: Ascending Infection in Tubules (Glomerulus & vessels are spared)
↓
↑ Neutrophils infiltration
↓
Die of Neutrophils → ↑ WBC in Urine (Cast) WBC

C/F: 1) Fever 2) Nause & Vomiting 3) Chills
4) Flank Pain at costrovertebral angle.

Complication → 1) Renal abscess
2) Recurrent infection from anatomical problem
↳ Chronic pyelonephritis.
Papillary Necrosis → Worse prognosis.