



- **How do you define UTI?**

- Presence of microorganisms $\geq 10^5$ with symptoms.
- Females have a higher risk to encounter UTIs (why?):
 - ✓ Short urethra.
 - ✓ Sexual activity through the vagina.
- Recurrence of UTIs can be due to the following factors:
 - ✓ Stones.
 - ✓ Urinary tract abnormalities.
 - ✓ Catheterization.

- **Acute pyelonephritis:**

- **What are the symptoms of acute pyelonephritis?**
 - ✓ Fever and rigors (due to bacteremia).
 - ✓ Flank pain (ألم الخصرة).
 - ✓ Urinary symptoms: frequency, urgency (the sudden desire to urinate) and incontinence.
 - ✓ Painful micturation.
- **Where does the infection which causes pyelonephritis comes from?**
 - ✓ Ascending from urinary bladder through the ureters due to vesicoureteric reflux of urine.
- **What are the complications of pyelonephritis?**
 - ✓ The most serious complication is acute renal failure which is characterized by sudden oliguria.
 - ✓ Septicemia and septic shock.
 - ✓ Chronic pyelonephritis (if not treated). If both kidneys suffer from chronic pyelonephritis → chronic renal failure will ensue (due to chronic scarring and damage of kidneys). Chronic renal failure is either managed with hemodialysis or transplantation. Chronic renal failure gets worse with pregnancy due to \uparrow GFR which results in more renal dysfunction.
- **Acute pyelonephritis in pregnancy:**
 - ✓ Risk factors during pregnancy:
 - ❖ Progesterone in pregnancy will result in relaxation of smooth muscles of ureters and urinary stasis.
 - ❖ The ureters will also be compressed by the distended uterus.
 - ❖ Catheterization during vaginal or cesarean delivery is another cause which introduces foreign organisms.
 - ❖ Right side is more affected because the uterus will be dextro-rotated in pregnancy → why is the uterus shifted to the right? → because on the left side sigmoid colon is present which prevents shifting toward the left side.
 - ✓ Diagnosis: mid-stream urine sample is collected → why? → to make sure that urine is not contaminated by organisms which are normally present in urethra.
 - ✓ Management: the patient will be admitted to hospital because treatment must be aggressive:
 - ❖ *IV fluid:* this helps in avoiding dehydration (which occurs due to vomiting associated with pyelonephritis) and increasing urine output.
 - ❖ *Antibiotics:* mostly the organism is gram (-) bacilli → ampicillin is given (but not aminoglycosides which are contraindicated in pregnancy). This treatment will continue until getting the results of urine culture and antibiotic sensitivity within 2-3 days. Then, antibiotics will be changed to oral tablets.



✓ Obstetric complications of acute pyelonephritis:

- ❖ *Pre-term labour*: the patient will be asked if she has uterine contractions → if yes → you will check for cervical dilation through vaginal examination → if the cervix is dilated, this can be delayed or prevented → if the cervix is not dilated, just observe.

- Cystitis:

- It is characterized by urinary symptoms (e.g. frequency, urgency and incontinence) without fever.
- **Pathogenesis**: ascending infection from the urethra.
- In contrast to acute pyelonephritis, pregnant ladies with cystitis will not require admission to hospital; oral antibiotics will be given.
- **Complications of cystitis**: rarely it can develop to acute pyelonephritis (if not treated well).