



Microbiology

team 436



Lecture : management of UTI

■ important

■ Extra notes

■ Doctors notes

"لا حول ولا قوة إلا بالله العلي العظيم" وتقال هذه الجملة إذا داهم الإنسان أمر عظيم لا يستطيعه ، أو يصعب عليه القيام به .

Objectives:

- 1- Know the principal **goal of management** of urinary tract infection (UTI)
 - 2- Understand that management of UTI **depends on several factors** .
 - 3-Know that **antibiotics** are the **main** treatment of UTI.
 - 4- Know the management/treatment of **different conditions** of UTI (cystitis, pyelonephritis, catheter associated UTI ,etc.)
-

Goal of Management of UTI

- The principal **goal** of management of UTI is to **eradicate* the offending organisms** from the urinary bladder and tissues.
- The main treatment of UTI is by **antibiotics**.

Choice of antibiotic depends on:

- Whether infection is **complicated** or **uncomplicated**.
- Whether infection is **primary** or **recurrent**.
- Type of patient (**pregnant** ,**child** , hospitalized or not, diabetic patient,.....etc)
- **Bacterial count**.
- Presence of **symptoms**.

When to consult the doctor ?

- If symptoms persist
- A change in symptoms (**fever or hematuria**)
- Pregnant women
- More than 4 infections per year
- Impaired immune system (**such as diabetes**)
- Previous kidney infections (**as pyelonephritis**)
- Structural abnormalities of urinary tract
- History of infection with antibiotic resistant bacteria.

Relapsing infection:

- Caused by **treatment failure** or **structural abnormalities** or abscesses.
- Antibiotics used at the initial infection
- Treatment for 7-14 days. **we have to treat the cause of relapsing then give the suitable antibiotic**

Uncomplicated UTI

Low-risk patient (woman) for recurrent infection:

- 3 days antibiotic without urine test.
- Cure rate 94%.

Choice of antibiotic depend on **susceptibility pattern** of bacteria, it includes :

Amoxicillin	(with or without clavulanic acid)
Cephlosporins	(first or second generation) first as cephalexin, second as cefuroxime
Fluoroquinolone (ciprofloxacin or norfloxacin)	(not for pregnant women or children) / first choice if other antibiotics are resistant .
TMP-SMX	(trade names (another names): Bactrim, Septra ,Cotrimoxazole)
Nitrofurantoin	(for long term use) As prophylactic . Only for lower UTI.

Recurrent infections **Firs treat the acute case then give him prophylactic**

- Patients with **two or more** symptomatic UTIs **within 6 months or 3 or more over a year.**
- Need preventive therapy
- Antibiotic taken as soon as symptoms develop.
- If infection occurs less than twice a year, a clean catch urine test should be taken for culture and **treated as initial attack for 3 days.**

Postcoital antibiotics

- If recurrent UTI is **related to sexual activity**, and episodes recur **more than 2 times** within 6 months
- A single preventive dose taken immediately after intercourse
- Antibiotics include: TMP-SMX, Cephalexin or Ciprofloxacin

Prophylactic antibiotics

- **Optional for patients who do not respond to other measures.**
- Reduces recurrence by up to 95%
- Low dose antibiotic taken continuously for 6 months or longer, it includes : TMP-SMX, Nitrofurantoin, or Cephalexin
- Antibiotic taken at bed time more effective.

Pyelonephritis:

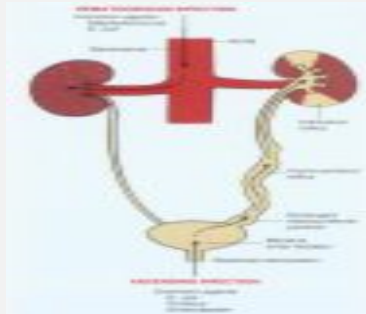
1- Uncomplicated pyelonephritis

- Patients with **fever, chills** and **flank pain**, but they are **healthy non-pregnant**, not nauseous or vomiting with **no signs of kidney involvement**.
- Always collect urine for culture
- Can be treated **at home** with oral antibiotics for 10-14 days with one of the followings: Cephalosporins : Ceftriaxone , Amoxicillin-Clavulanic acid , Aminoglycosides , **Ciprofloxacin** or **TMP-SMX**.
- First dose may be given by injection
- Avoid Nitrofurantion.
- Always collect urine for culture , the urine culture may be obtained within one week of completion of therapy and again after 4 weeks.
- A urine culture may be obtained if the patient has persistent after 48-72 hrs or recurrent symptoms.

2-Moderate to sever pyelonephritis

- Patients need hospitalization
- Antibiotic given by IV route for **3-5 days until symptoms relieved** for 24-48 hrs.
- Ciprofloxacin or ceftriaxone for 10-14 days
- If fever and back pain continue after 72 hrs of antibiotic, **imaging tests** indicated to exclude abscesses, obstruction or other abnormality.

In male slides



3- Chronic pyelonephritis

- Those patients need **long-term antibiotic treatment even** during periods when they have **no symptoms**.

Treatment of specific populations:

Pregnant women

- **High risk** for UTI and complications
- Should be **screened** for UTI
- Antibiotics during pregnancy includes: **Amoxicillin, Ampicillin, Cephalosporins**, and Nitrofurantoin.
- Pregnant women should **NOT** take Quinolones. **as Ciprofloxacin it cause damage of the growing cartilage for the fetus**
- Pregnant women with asymptomatic **bacteriuria** (evidence of infection but **no symptoms**) have 30% risk for acute pyelonephritis in the second or third trimester.*
- **Screening** and **7-10 days** antibiotic needed.
- For **uncomplicated** UTI, need **3-7 days** antibiotic treatment.

Diabetic patients**

- Have more frequent and more severe UTIs.
- Treated for **7-14 days** with antibiotics even patients with uncomplicated infections.
- **They develop abscess in the kidney, so they have to be treated carefully.**

*If the culture is positive and the count is high and there are no symptoms although this should be treated, because in many cases it develops into Pyelonephritis and miscarriage

**Diabetic patients are immune compromised. So They may have infection but without any symptoms although this should be treated If the culture is positive.

Drug safety During pregnancy

- Avoid Ceftriaxone on day before delivery
 - Avoid nitrofurantoin and trimethoprim (FA) in the first trimester can lead to birth defects
 - Avoid near term and hemolytic anemia in G6PD deficiency (0.0004%)
 - Sulfonamides should be avoided in the last days before delivery because they can increase the level of unbound bilirubin in the neonate
-

Treatment of specific populations:

Urethritis in men It is considered a sexually transmitted disease caused by Chlamydia and N. gonorrhoea. (يعالجهم Doxycycline)

- Require 7 days regimen of **Doxycycline**.
- A single dose Azithromycin may be effective but not recommended to avoid spread to the prostate gland.
- Patients should also be tested for accompanying STD (Sexually transmitted diseases).

Children with UTI

- Usually treated with TMP-SMX or Cephalexin.
- Sometimes given as IV. إذا الطفل ما قدر يأخذ يبلعها
- Gentamicin may be recommended as **resistance** to Cephalexin is increasing.

Vesicoureteric reflux (VUR) it is a Congenital disease

- **Common in children with UTI**
- Can lead to pyelonephritis and kidney damage.
- **Long-term antibiotic + surgery** used to correct VUR and prevent infections.
- Acute kidney infection : use **Cefixime** (Suprax) or 2-4 days **Gentamicin** in a one daily dose. Oral antibiotic then follows IV.

If you have a child with UTI it may be of a congenital disease so you have to investigate, if you neglect it, it can cause vesicoureteric reflux

Management of catheter-induced UTI:

- Very common **bacteria**
- **Preventive measures important**
- Catheter should not be used unless **absolutely necessary** and they should be removed **as soon as possible**.
the catheter is a foreign body to the bladder.

Intermittent use of catheters

- If catheter is required for long periods ,it is best to be used **intermittently**. (بشكل متقطع)
- May be replaced every 2 weeks to reduce risk of infection and **irrigating** (غسل / ري / شطف) bladder with antibiotics between replacements.*
- **Daily hygiene** and use of **closed system** to prevent infection.



*يفضل في استعمال الكاتتر اننا نبدله بين فترة وفترة بحيث ما يطول ويسبب انفكشن ، ولما يحين وقت التبديل نسوي زي الشطف للمثانة بسائل معقم يحتوي على مضادات حيوية

Catheter induced infections:

- Catheterized patients who develop UTI with symptoms or at risk for sepsis should be treated for each episode with antibiotics and catheter should be removed, if possible.
- Associated organisms are constantly changing. ولما نأخذ عينة من البول عشان الكلتشر ناخذها من المثانة مباشرة وليس من كيس القسطرة.
- May be **multiple** species of bacteria.
- Antibiotic use for prophylaxis is **rarely recommended** (in **Catheterized patients**) since high bacterial counts present and patients do not develop symptomatic UTI. تزيد مقاومة البكتيريا.
- Antibiotic therapy has **little benefit** if the catheter is to remain in place for long period.



FDA pregnancy categories:

- **Category A**

Adequate and well-controlled studies have failed to demonstrate a risk to the fetus in the first trimester of pregnancy (and there is no evidence of risk in later trimesters).

- **Category B**

Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

- **Category C**

Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

- **Category D**

There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

- **Category X**

Studies in animals or humans have demonstrated fetal abnormalities and/or there is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience, and the risks involved in use of the drug in pregnant women clearly outweigh potential benefits.

Extra notes from males lecture

Category	antibiotic
A	
B	Cephalosporin ,Nitrofurantoin , Azithromycin , Amoxicillin , Ampicillin.
C	TMP-SMX ,Fluoroquinolone
D	Gentamicin , Doxycycline
X	Ribavarin

Summary

The treatment of UTI depends on many factors affecting the condition. Your choice of antibiotic depends completely upon your understanding, managing and diagnosing of the disease for that each individual will be treated differently.

Asymptomatic Bacteriuria is only treated in these cases:
Kidney transplant, Pregnant women and patients going for cystoscopy.

When a UTI patient must see a doctor during the course of disease?

- Pregnant women.
- Structural abnormalities.

Urinary catheters are not something you will do unless it is necessary for that it induces the UTI highly. You use when a patient can't pass urine or when delicate urinary measures' are required.
The associated organisms are constantly changing.

How to know if this infection will relapse?

When the treatment failed, structural abnormalities or abscesses.

Summary

Antibiotic	The type of UTI
Amoxicillin	Uncomplicated UTI (with or without Clavulanate), Uncomplicated Pyelonephritis (with Clavulanate), Pregnant women (Complicated UTI).
Cephalosporin	Uncomplicated UTI (First or second generations), Recurrent infection (Cephalexin), Uncomplicated Pyelonephritis, Pregnant women, Children (Cephalexin).
Fluoroquinolone	Uncomplicated UTI, Recurrent infections (Ciprofloxacin), Uncomplicated Pyelonephritis(Ciprofloxacin).
TMP-SMX	In all types except; Pregnant women, Urethritis in men, VUR*.
Nitrofurantoin	Uncomplicated UTI (Long use), Recurrent infections, Pregnant women.
Ampicillin	Pregnant women.
Doxycycline	Urethritis in men.
Azithromycin	Urethritis in men.
Gentamicin	Children, VUR*.
Cefixime (Suprax)	VUR*.

Notes:

- Any uncomplicated UTI has a low risk of a recurrence.
- Fluoroquinolone shouldn't be given to women or children.
- If other antibiotics are resistant then the first choice becomes Fluoroquinolone.
- Moderate to severe Pyelonephritis needs HOSPITALIZATION.
- If a man is complaining from Urethritis, we must test him for the presence of any sexual transmitted diseases.
- VUR* can lead to pyelonephritis and kidney damage. Common in kids with UTI.

*Vesicoureteral reflux.

-فيه ملف وورد أيضا ملخص فيه الأدوية اللي
ذكرت في هذه المحاضرة من أعداد زميلتنا
اللولو الصليهم جزاها الله خير
- و شكراً لتيم 435 جزاكم الله خير

Test yourself!

1) A patient is complaining from cystitis for three months. To choose the antibiotic, you must know which of the following:

- A) Bacterial count.
- B) The age of patient.
- C) GFR
- D) A&B

2) A sample of urine was taken from a 6 years old female patient having a Urethritis and on microscope there was a feature led you to this conclusion "This is a relapsing infection". What could it be?

- A) High WBC count.
- B) Abscesses.
- C) Red blood cells.
- D) C&B.

3) One of the following is contradicted with pregnant women:

- A) Quinolones
- B) Amoxicillin
- C) Losartan
- D) Nitrofurantoin

4) A 3 years old boy came to the ER complaining of severe back pain and painful urination with blood. The boy was given Cephalexin but he developed a bacterial resistant. Which of the following drugs will be given to him for treatment:

- A) TMP-SMX
- B) Quinolones
- C) Gentamicin
- D) Suprax

5) A young married man was diagnosed with urethritis. To complete your diagnoses what you have to do next?

- A) Test him for any sexual transmitted diseases.
- B) Urine sample.
- C) Look for abscesses.
- D) Nothing should be done.

1- D

2- B

3- A

4- C

5- A

GOOD LUCK!

MICROBIOLOGY TEAM:

- Hamad Alkhudhairi (leader)
- Talal Alhuqayl
- Shrooq Alsomali (leader)
- Ghadah Almazrou
- Shatha Alghaihb
- Hayfaa Alshaalan
- Aseel Badukhon

[The Editing File](#)

We are waiting for your feedback



[@microbio436](#)

436microbiologyteam@gmail.com