

College of Medicine

Department of Medical Education

Curriculum Development Unit

Template for a lecture summary

Year 1

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| Title of the lecture: Management of Urinary Tract Infection |

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Department : Pathology

Block / week: Renal block / Week 2

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Lecture Objectives:

1. To know the principal goal of management of urinary tract infection (UTI) is to eradicate the offending organisms from the urine and tissues.
2. To understand that management of UTI depends on several factors .
3. To know that antibiotics are the main treatment of UTI.

4- To know the management/treatment of different conditions of UTI ( cystitis, pyelonephritis, catheter associated UTI ,etc.)

Background and Main Concepts of the lecture:

The principal goal of management of UTI is to eradicate the offending organisms from the urine and urinary tissues.

The choice of antibiotic depends on the following factors :

- Whether the infection is complicated or uncomplicated

- Whether the infection is primary or recurrent.

- Type of patient (man or women, pregnant or non-pregnant, child , hospitalized or non-hospitalized, diabetic patient, ..etc.)

- Bacterial count

- Presence of symptoms

Treatment of Uncomplicated UTIs

UTI in low-risk women for recurrent infection (who do not have vaginitis) can besuccessfully treated with 3-days antibiotic without the need of urine test. Cure rate is about 94%.

Antibiotic regimen commonly used depending on hospital susceptibility pattern :

Amoxicillin (with or without clavulanate)

Cephalosporins ( first or second generation, Cephradine or Cefuroxime , respectively) .

Fluoroquinolone ( Ciprofloxacin or Norfloxacin) antibiotics. Pregnant women and children less than 8 years of age should not take these drugs.

Trimethoprim-Sulfamethoxazole , commonly called TMP-SMX ( Bactrim, Septra, Cotrim).

*Other options:*

Nitrofurantoin: should be given for longer than 3-days ( for prophylaxis).

*Relapsing infection*: caused by treatment failure or structural abnormalities or abscesses, should be treated similarly to a first infection but antibiotics are usually continued for 7-14 days.

*Treatment for recurrent infections*

Women who have two or more symptomatic UTIs within 6 months or three or more over the course of a year may need preventive therapy.

The patient should take the antibiotic as soon as she develops symptoms. However, if the infection occurs less than twice a year , a clean catch urine test should be taken for culture and usually treated with a single dose or as an initial attack with 3-days of antibiotic.

A patient should NOT have 3-days self -treatment and should consult the doctor under the following circumstances:

- If symptoms persist

- If there is a change in symptoms

- If the patient was pregnant

- If the patient has more than 4 infections a year.

- Patients with impaired immune system

- Patients with previous kidney infections

- Patients with structural abnormalities of the urinary tract

- History of infection with antibiotic resistant bacteria.

*Postcoital antibiotics*

If recurrent UTI is clearly related to sexual activity and episodes recur more than two times within 6 months period, a single preventive dose taken immediately after intercourse is very effective.

Antibiotics for such cases include : TMP-SMX, Nitrofurantoin , Cephlexin or Ciprofloxacin.

*Prophylactic antibiotics*

This is an option for some patients who do not respond to other measures. It reduces recurrences by up to 95%. A low-dose antibiotics are taken continuously for 6 months or longer. For example: Nitrofurantoin, TMP-SMX or Cephalexin. Taking the antibiotic at bed time may be most effective.

Treatment for Kidney Infections ( Pyelonephritis)

Treatment of uncomplicated pyelonephritis: those patients are healthy, non- pregnant women and do not have nausea or vomiting and show no symptoms of kidney involvement , they can be treated at home with oral antibiotics.

The standard treatment is a 14-day course of oral antibiotics usually Cephalosporin, TMP-SMX or Ciprofloxacin. Some patients may receive first dose by injection. Oral Amoxicillin or Amoxicillin-Clavulanate ( Augmentin) may be prescribed for infection with gram-positive organisms, including *Enterococcus* species and *S.saprophyticus*) that do not respond to standard regimen.

A urine culture may be obtained within one week of completion of therapy and again 4 weeks later.

Treatment of moderate to sever pyelonephritis: those patients had symptoms or other complications , may need *hospitalization*. Antibiotics are given by intravenous ( IV) route for 3-5 days or until symptoms and signs are relieved for 24-48 hours.

If fever and back pain continue after 72 hours of antibiotic administration, *imaging tests* are to be done to exclude abscesses, obstructions or other abnormalities.

Treatment of chronic pyelonephritis: those patients often treated with long-term antibiotics, even during periods when they have no symptoms.

Treatment for specific populations

Pregnant women: should be screened for UTIs, since they are at high risk for UTIs and their complications.

Antibiotics used during pregnancy include: Amoxicillin, Ampicillin, Cephalosporins and Nitrofurantoin. Pregnant women should NOT take Quinolones.

Pregnant women with asymptomatic bacteriuria ( *evidence of infection without symptoms*) have a 30% risk for acute pyelonephritis in their second or third trimester. Screening and treatment are needed with a short course antibiotics (3-5 days).

For uncomplicated UTI , pregnant women may need 7-10 days antibiotic treatment.

Diabetic patients: have more frequent and more sever UTIs than non diabetic patients. It is recommended that these patients treated for 7-14 days with antibiotics even patients with an uncomplicated infections.

Urethritis in men: typically treated with 7-days regimen of Doxycycline. A single dose Azithromycin may be effective as well but is not recommended to avoid spread to the prostate gland. These patients should also be tested for an accompanying sexually transmitted disease such as gonorrhea.

Children with UTIs: children usually treated orally with TMP-SMX or Cephalexin. Sometimes given as a shot or IV. As resistance to Cephalexin is increasing, some doctors recommend Aminoglycoside ( Gentamicin) which is given by IV route.

Vesicoureteral reflux ( VUR) is a concern for children with UTIs .It can lead to pyelonephritis which can cause kidney damage. Long-term antibiotics or surgery have traditionally been options to correct VUR and prevent infections.

Children with acute kidney infection are treated with oral Cefixime ( Suprax) or a short course (2-4 days) of an IV Gentamicin given in one daily dose. An oral antibiotic then follows the IV.

Management of Catheter-Induced UTIs

A very common problem and preventive measures are very important.

*Catheters should not be used unless absolutely necessary and they should be removed as soon as possible.*

Intermittent use of catheters: if catheter is required for long periods, it is best to use it intermittently. Some doctors recommend replacing it every 2 weeks to reduce the risk of infection and irrigating the bladder with antibiotics between replacements.

Daily hygiene and use of closed bag system to prevent infection.

Antibiotics for catheter-induced infections

Catheterized patients who develop UTI with symptoms or at risk of sepsis, should be treated for each episode with antibiotics and the catheter should be removed, if possible. The organisms in catheter associated UTI are constantly changing. They are likely to be multiple species of bacteria, so an antibiotics that is effective against wide variety of microorganisms is indicated. Antibiotic use for prophylaxis is NOT recommended since high bacterial counts present in most patients and they do not develop symptomatic UTI . Antibiotic therapy has little benefit if the catheter is to remain in place for long period.

Conclusion and Take Home Messages:

* The main goal of treatment and management of UTI is to eradicate the causative organisms from the urine and tissues and is mainly by the use of antibiotics.
* Treatment of un-complicated and complicated UTI is different and depending on whether it is recurrent or relapsing .
* Pyelonephritis is a serious condition and management /treatment is important to prevent complication.
* Treatment is important for specific population ( pregnant women, children and diabetic patients) to prevent renal damage.
* Cather associated UTI does NOT require antibiotics but catheter removal ( if possible) . However, in case of systemic involvement or bacteremia antibiotics is recommended.
* Antibiotic treatment of UTIs should be guided by antimicrobial susceptibility testing.

Further reading:

*Sherris Medical Microbiology* ,An Introduction to Infectious Diseases. Latest edition.

Authors: Kenneth Ryan, C.G.Ray. Chapter 66. Publisher: Mc Graw Hill.