

King Saud University
College of Medicine
2nd Year,
Reproduction Block



L9- Drugs used in treatment syphilis and gonorrhoea

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Objectives

- List The drugs used in the treatment of syphilis
- List the drugs used in treatment of gonorrhoea
- Describe The mechanism of action, adverse effects of & clinical indication of each drug
- Describe the contraindications of each drug used
- Describe the recommended regimens used for treatment of syphilis & gonorrhoea
- Describe the alternative treatments in allergic patients to certain antibiotics



Mind Map

Therapy of syphilis

Penicillins 1st line of treatment

Penicillin G (IV)
Short D 4-6

Procaine penicillin (IM)
Long (24-48hrs)

Benzathine penicillin (IM)
Long acting 3-4 WEAKS

Alternative "For Allergic Patients To Penicillins"

Tetracyclines:
Doxycycline
Tetracycline

Macrolides
Azithromycin

Cephalosprins:
Ceftriaxone
cefixime

Therapy of Gonorrhea

Uncomplicated gonorrheal infections (Localized)

1st line treatment

3rd generation Cephalosporins:
ceftriaxone, IM,
Cefotaxime IMI

Macrolides
Azithromycin
I.M

FLUOROQUINOLONES
Ciprofloxacin
Ofloxacin
Levofloxacin

Alternative "hypersensitivity"

Spectinomycin
I.M

Complicated gonorrheal infections

Silver nitrate

Erythromycin

Introduction

Syphilis →

- Sexually acquired infection
- Etiologic agent: **Treponema pallidum**.
- Disease progresses in stages
- May become chronic without treatment



Classification of syphilis

Primary stage

A single sore (Chancre)



Secondary stage

- Skin rash (Palmar/Plantar)
- mucous membranes lesions



Tertiary (Latent) Syphilis

- Approximately 30% of untreated patients progress to the tertiary stage within 1 to 20 years.
- Rare because of the widespread use of antibiotics.
- Complication** : Cardiovascular and neurological syphilis
- 70% may have no symptoms

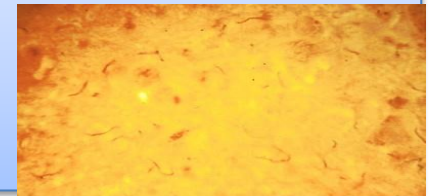
Congenital Syphilis

If a woman is pregnant and has symptomatic or asymptomatic early syphilis, hematogenously disseminating organisms may pass through the placenta to infect the fetus and cause **perforation of Palate**.



Neurosyphilis

Spirochetes in Neural Tissue



slide

doctor's note

important

explanation

1-Penicillin's (β -lactam antibiotic) 1st line of treatment

Preparations of penicillin's	Penicillin G (IV)	Procaine penicillin (IM)	Benzathine penicillin (IM)
Mechanism of action	<u>Bactericidal</u> drugs Inhibit the synthesis of bacterial cell wall		
Duration of action	Short (4-6 hrs)	Long (24-48hrs)	Long (every3-4weeks)
Pharmacokinetic	<ul style="list-style-type: none"> ▪ Acid unstable (not given orally) ▪ Penicillinase sensitive (Some Treponema pallidum has penicillinase that destroys the Penicillin which cause resistance) 		
Adverse effects	<ul style="list-style-type: none"> ▪ Hypersensitivity just in10% (up to anaphylactic shock,tests are required before injection) ▪ Nephritis ▪ Convulsions with high doses or in renal failure 		

Doses only for your information !

“Therapy for Primary, Secondary, and Early Latent Syphilis”

Benzathine penicillin G 2.4 million units IM in a single dose

2-Tetracycline's For allergic Patients to Penicillin (Alternatives)

	Doxycycline	Tetracycline
Mechanism of action	<u>Bacteriostatic drugs</u> Inhibit bacterial protein synthesis by reversibly binding to 30 S bacterial ribosomal subunits .	
Duration of action	Long acting (once daily)	Short acting (Given every 6hrs)
Pharmacokinetic	<ul style="list-style-type: none"> ▪ Well absorbed orally . ▪ 100 mg orally twice daily for 14 days ▪ Protein binding and cross placenta ▪ Excreted <u>through extra renal route</u> (Biliary route) so good for patient who has renal failure. ▪ Not taken with milk products or any thing contains Ca, Mg or Al due to stopping of the drug absorption . 	<ul style="list-style-type: none"> ▪ Absorption after oral administration (60-70%) . ▪ 500 mg orally 4 times daily for 14 days. ▪ Excreted through kidney
Adverse effects	<ul style="list-style-type: none"> ▪ Gastric upset (Nausea·vomiting·diarrhea) ▪ Effects on calcified tissues(discoloration of teeth) & bone deformity ▪ Hepatotoxicity ▪ Phototoxicity ▪ Vestibular problems (Vertigo·Nausea·Vomiting) → <u>only Doxycycline</u> ▪ Superinfections (Inhibit normal flora of GIT and cause severe diarrhea) 	
Contraindication	Children(below 10 years)·Pregnancy·Nursing mothers	
Note	Not effective for treatment of gonorrhea	

3-Macrolides & 4-Cephalosporins

	MACROLIDES (Azithromycin)	Cephalosporins
MOA	Inhibits bacterial protein synthesis by binding to bacterial 50S ribosomal subunits.	<ul style="list-style-type: none"> • lactam antibiotics • 3rd Generation cephalosporins e.g. cefixime e.g. Ceftriaxone <ul style="list-style-type: none"> • Inhibits bacterial cell wall synthesis Bactericidal
Pharmacokinetics	<ul style="list-style-type: none"> • Acid stable • Penetrates into most tissues except CSF • T_{1/2} 2-4 days • Once daily dose • Should given 1hour before or 2 hours after meals • Does not inactivate cytochrome P450 (only Azithromycin of all MACROLIDES) 	_____
Adverse effects	Gastric upset	<ul style="list-style-type: none"> ▪ Allergic manifestations ▪ Thrombophilitis ▪ Superinfection ▪ Diarrhea
Indications	2g single dose is effective in treatment of early syphilis	

Therapy for Neurosyphilis and Pregnancy

Therapy for Neurosyphilis

- Aqueous crystalline **penicillin G** 18-24 million units per day, administered as 3-4 million units **IV** every 4 hours or continuous infusion for 10-14 days IV
- Alternative regimen (if compliance can be ensured):
- **Procaine penicillin** 2.4 million units IM once daily **PLUS Probenecid** 500 mg orally 4 times a day, both for 10-14 days

Therapy for Syphilis in Pregnancy

- Treat with penicillin according to stage of infection.
- If allergy for penicillin take small doses of it
- if still allergic, thus using **Azithromycine OR cephalosporin**
- Erythromycin is no longer an acceptable alternative drug in penicillin-allergic patients
- Patients who are skin-test-reactive to penicillin should be desensitized in the hospital and treated with penicillin

Treatment of Gonorrhoea

	1-Cephalosporins	2-Macrolides	3-fluoroquinolones	4-Spectinomycin
MOA	<ul style="list-style-type: none"> Inhibits bacterial cell wall synthesis 	<ul style="list-style-type: none"> Inhibits bacterial protein synthesis by binding to bacterial 50S ribosomal subunits 	<ul style="list-style-type: none"> All are bactericidal Inhibit DNA synthesis by inhibiting DNA gyrase enzyme 	<ul style="list-style-type: none"> Inhibits protein synthesis by irreversible binding to 30 S ribosomal subunits
Indications	<ul style="list-style-type: none"> Uncomplicated gonorrhoeal infections Single –dose treatment with 3rd generation cephalosporins <ul style="list-style-type: none"> Ceftriaxone IM Cefotaxime IM 	<ul style="list-style-type: none"> Azithromycin as a single oral dose 1 g in combination with ceftriaxone 250 mg <u>IM</u> Or high dose 2g. As a single oral dose In pregnant & breast feeding mothers azithromycin is given as a single <u>oral dose 1 g</u> 	<p>Single oral dose of :</p> <ul style="list-style-type: none"> Ciprofloxacin 500 mg orally Ofloxacin 400 mg orally Levofloxacin <p>Contraindicated in:</p> <ol style="list-style-type: none"> Pregnancy Nursing mothers Adolescent < 18 yo 	<p>Alternative treatment in allergic patients to 1st line treatment</p> <p>2g IMI (once)</p>
Adverse effects	_____	_____	<ul style="list-style-type: none"> GIT upset Diarrhea Headache Dizziness phototoxicity arthropathy 	<ul style="list-style-type: none"> Pain at the site of injection Fever Nausea Nephrotoxicity (not common)

Treatment of Gonorrhoea

Complicated gonorrhoeal infections

- Spread through blood stream to **EYE**, Joints, Heart valves and Brain.
- Newborn eye infections, may lead to **blindness**.
- Adult eye infections, spread on fingers, can lead to blindness.



Treatment of Complicated gonorrhoeal infections

- With conjunctivitis in new born => **Silver nitrate**
 1. **Its germicidal** effects are due to precipitation of bacterial proteins by liberated silver ions.
 2. Put into conjunctival sac **once immediately after birth** (not later 1 h after birth)
- **Erythromycin**
 1. 0.5% ointment for treatment & prevention of corneal & conjunctival infections.
 2. Put into conjunctival sac **immediately after birth** (no later 1 hr after delivery)

Antibiotics that are no longer recommended for gonorrhoea treatment

- Sulfonamides
- Penicillins
- Tetracyclines
- Oral cephalosporins

SUMMARY *TREATMENT OF SYPHILIS*

First line therapy	Adverse effects
Penicillin G (IV) Procaine penicillin (IM) Benzathine penicillin (IM)	Hypersensitivity Nephritis Convulsions with high doses or in renal failure

If the Patient Allergic To Penicillins

Drugs	Tetracyclines (Doxycycline , Tetracycline)	Macrolides (Azithromycin)	Cephalosprins (Ceftriaxone, cefixime)
MOA	Bacteriostatic binding to 30 S bacterial ribosomal subunits	Bacteriostatic binding to bacterial 50S ribosomal subunit	Bactericidal
Side effects	-Dicoloration of teeth, deformity -Hepatotoxicity, Phototoxicity -vestibular problems, Superinfection (Contraindication: Children, Pregnancy, Nursing mothers)	Gastric upset	Thrombophilbitis Superinfection Diarrhea

***Pregnant women Treat with penicillin**



slide



doctor's note



important




explanation

SUMMARY *Treatment of gonorrhoea*

Uncomplicated gonorrhoeal infections		Complicated gonorrhoeal infections
1 st line treatment	In allergic patient to 1 st line	
<ul style="list-style-type: none">- (ceftriaxone, Cefotaxime)- Azithromycin (can be given in pregnant & breast feeding mothers)- (Ciprofloxacin, Ofloxacin, Levofloxacin)	Spectinomycin	<ul style="list-style-type: none">- Silver nitrate- Erythromycin

Quiz yourself



Q1. One of the first treatments of the Uncomplicated gonorrheal infections ?

- a- Penicillin G
- b- Cefotaxime
- c- Doxycycline
- d- ERYTHROMYCIN

Q2. Why Penicillin G is given i.v ?

- a- because of its long duration of acting
- b- it's acid unstable
- c- to avoid hypersensitivity

Q3. The 1st drug of choice for treating Syphilis is:

- A. Penicillin
- B. Macrolides
- C. Tetracycline
- D. Ceftriaxone

Q4. Which of the following would you use to treat a newborn with conjunctivitis due to gonorrhoea:

- A. Silver nitrate
- B. Cefixime
- C. Erythromycin
- D. A+C

Q5. Adverse effects of penicillins ?

- A- arthropathy
- B- phototoxicity
- C- Superinfection
- D- Nephritis

Q6. Tetracyclines are contraindicated to ?

- a- Children
- b- Pregnancy
- c- Nursing mothers
- d- all of the above

Q7. One of the ADVERSE EFFECTS of fluoroquinolones ?

- a- arthropathy
- b- phototoxicity
- c- Thrombophlebitis
- d- both A+B

Q8. Mechanism of action of Cephalosporins is ?

- A- Inhibits bacterial protein synthesis by binding to bacterial 50S ribosomal subunits
- B- Inhibits bacterial cell wall synthesis
- C- Inhibits bacterial protein synthesis by reversibly binding to 30S bacterial ribosomal subunits

Answer 1. B 2. B 3. A 4. D 5. D 6. D 7. D 8. B

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