

DRUGS USED FOR THE TREATMENT OF SYPHILIS & GONORRHEA

Dr. Mohammed Assiri

moassiri@ksu.edu.sa

15-04-2021

ILOS

At the end of lectures, the students should

- List the drugs used in the treatment of syphilis & gonorrhoea.
- Describe the mechanism of action and adverse effects of each drug.
- Describe the contraindications of drugs used
- Describe the recommended regimens used for the treatment of syphilis & gonorrhoea
- Know the alternative treatments in allergic patients.

WHAT IS SYPHILIS?

□ Sexually transmitted diseases

- Caused by *Treponema pallidum* (T.pallidum)
- a spiral-shaped, Gram-negative highly mobile bacterium
- T. pallidum enters the body via skin and mucous membranes through abrasions during sexual contact or blood transfusion or placental transfer from a pregnant woman to her fetus.



SIGNS AND SYMPTOMS

- The signs and symptoms of syphilis vary depending upon stage of disease.
- Disease progresses in multiple stages:
 - Primary
 - Secondary
 - Latent
 - Tertiary
- May become chronic if left untreated

STAGES OF SYPHILIS

PRIMARY STAGE

- Painless skin ulceration (a chancre)



SECONDARY STAGE

- Diffuse skin rash & mucous membranes lesions



SECONDARY SYPHILIS: PALMAR/PLANTAR RASH



Source: Seattle STD/HIV Prevention Training Center at the University of Washington, UW HSCER Slide Bank



Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides

TERTIARY SYPHILIS

- Approximately 30% of untreated patients progress to the tertiary stage within 1 to 20 years.
- Rare because of the widespread use of antibiotics.
- Manifestations as cardiovascular syphilis (syphilitic aortitis and an aortic aneurysm).

CONGENITAL SYPHILIS

If a pregnant woman has symptomatic or asymptomatic early syphilis, organisms may pass through the placenta to infect the fetus.

Perforation of Palate



DRUGS USED IN THE TREATMENT OF SYPHILIS

❖ **Penicillin:**

- Penicillin G
- Procaine Penicillin G
- Benzathine Penicillin G

❖ **Tetracyclines**

- Doxycycline

❖ **Macrolides**

- Azithromycin

❖ **Cephalosporins**

- Ceftriaxone
- Cefixime

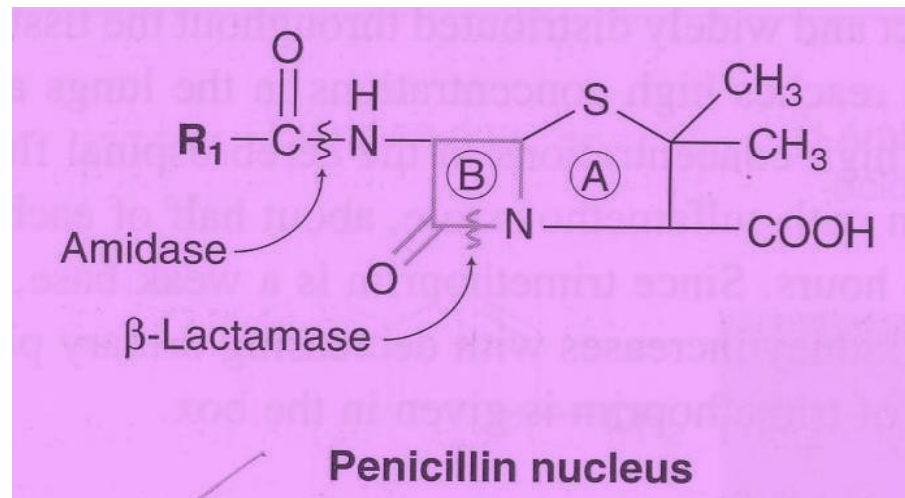
β -Lactam Antibiotics

PENICILLINS

Mechanism of action

- ❖ Inhibits bacterial cell wall synthesis through inhibition of transpeptidase enzyme required for crosslinks .

- ❖ Bactericidal



NATURAL PENICILLINS

- Benzylpenicillin (penicillin G)
- Procaine penicillin G
- Benzathine penicillin G

PENICILLINS USED FOR TREATMENT OF SYPHILIS

❖ Penicillin G

✓ Short duration of action, given i.v.

❖ Procaine penicillin G

✓ Given i.m. - delayed absorption.

✓ Long acting

❖ Benzathine penicillin G

✓ Given i.m. - Delayed absorption.

✓ Long acting, 2.4 million units is given once.

PENICILLINS USED FOR TREATMENT OF SYPHILIS

All these penicillin preparations are:

- Acid unstable
- Penicillinase sensitive (β -lactamase sensitive)
- Not metabolized
- Excreted unchanged in urine through acid tubular secretion.
- Renal failure prolong duration of action.

ADVERSE EFFECTS OF PENICILLINS

- Hypersensitivity
- Convulsions with high doses or renal failure
- Super infections

DRUGS USED IN ALLERGIC PATIENTS TO PENICILLINS

- **Macrolides e.g.**
 - Azithromycin
- **Tetracyclines e.g.**
 - Doxycycline
- **Cephalosporins**
 - Ceftriaxone
 - Cefixime

TETRACYCLINES

- Inhibit bacterial protein synthesis by reversibly binding to 30S bacterial ribosomal subunits.

Bacteriostatic

TETRACYCLINES

Doxycycline

- Given orally
- Well absorbed orally
- Long acting
- 100 mg BID daily for 14 days.

SIDE EFFECTS

- Nausea, vomiting ,diarrhea & epigastric pain (given with food)
- Brown discoloration of teeth in children
- Deformity or growth inhibition of bones in children
- Hepatic toxicity (prolonged therapy with high dose).
- Vertigo
- Superinfections.

CONTRAINDICATIONS

- Pregnancy
- Breast feeding
- Children (below 10 yrs)

MACROLIDES

AZITHROMYCIN

MECHANISM OF ACTION

Inhibits bacterial protein synthesis by binding to bacterial 50S ribosomal subunits.

PHARMACOKINETICS

- Acid stable
- Penetrates into most tissues except CSF
- Half life : 2-4 days
- Once daily oral dose
- Should be given 1hour before or 2 hour after meals
- No effect on cytochrome P450

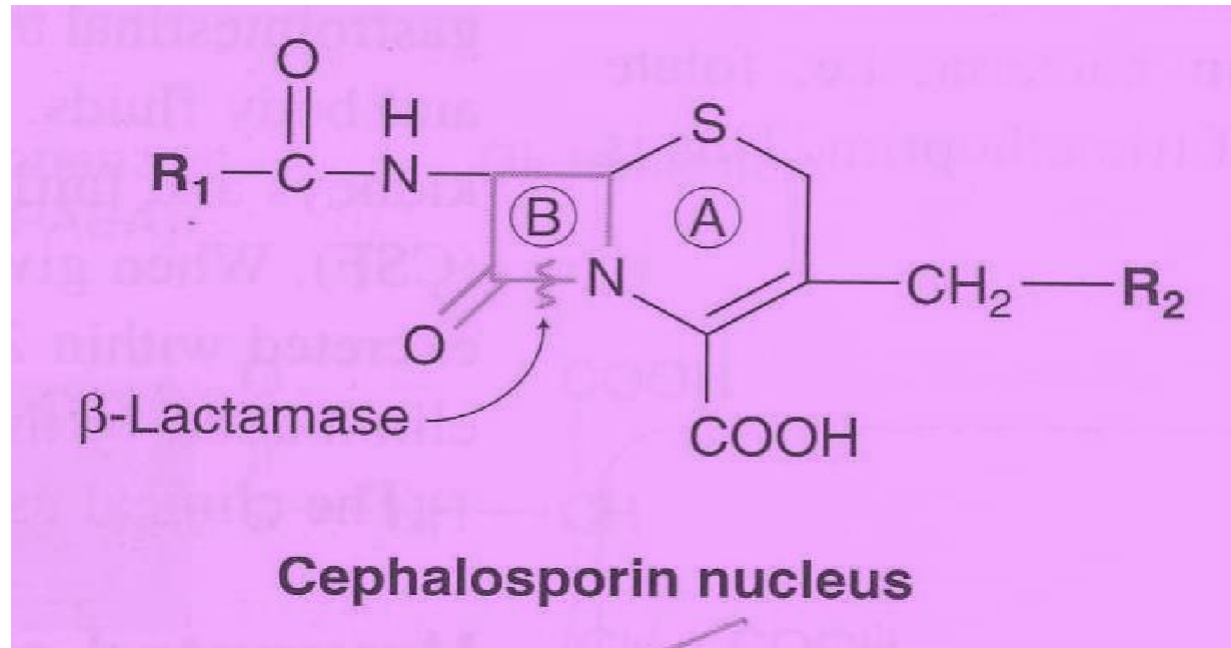
SIDE EFFECTS

- GIT upset:
 - Nausea,
 - Vomiting,
 - Abdominal pain
 - Diarrhea.

- Allergic reactions:
 - Urticaria,
 - Mild skin rashes.

CEPHALOSPORINES

- Inhibit bacterial cell wall synthesis
- Bactericidal



CEPHALOSPORINES

Ceftriaxone

- Third generation cephalosporins
- Given parenterally (i.v.)
- Eliminated via biliary excretion
- Long Half-life

ADVERSE EFFECTS OF CEPHALOSPORINS

1

- Hypersensitivity reactions

2

- Thrombophlebitis

3

- Superinfections

4

- Diarrhea

Early syphilis

WHO GUIDELINES FOR THE Treatment of *Treponema pallidum* (Syphilis)

Adults
(primary,
secondary and
early latent
syphilis of not
more than two
years' duration)

Benzathine penicillin G
2.4 million units once I.M.

Procaine penicillin G
1.2 million units I.M. for 10-14 days
If penicillin is not allowed due to allergy, use

Doxycycline 100 mg twice daily orally for 14 days or
Ceftriaxone 1 g IM once daily for 10-14 days or,
Azithromycin 2 g once orally.

Pregnant woman

Benzathine penicillin G
2.4 million units once I.M.

Procaine penicillin G
1.2 million units I.M. for 10-14 days
If penicillin is not allowed due to allergy, use

Erythromycin 500 mg orally four times daily for 14 days
Ceftriaxone 1 g IM once daily for 10-14 days or,
Azithromycin 2 g once orally.

Late syphilis

WHO GUIDELINES FOR THE Treatment of *Treponema pallidum* (syphilis)

Adults

(infection of more than two years' duration without evidence of treponemal infection)

Benzathine penicillin G

2.4 million units nits I.M. once weekly for three consecutive weeks.

Procaine penicillin G

1.2 million units I.M. for 20 days

If penicillin is not allowed due to allergy, use

Doxycycline 100 mg twice daily orally for 30 days or

Pregnant woman

Benzathine penicillin G

2.4 million units nits I.M. once weekly for three consecutive weeks.

Procaine penicillin G

1.2 million units I.M. for 20 days

If penicillin is not allowed due to allergy, use

Penicillin desensitization

Erythromycin 500 mg orally four times daily for 30 days

Ceftriaxone 1 g IM once daily for 10-14 days or,

Azithromycin 2 g once orally.

Congenital syphilis

WHO GUIDELINES FOR THE Treatment of *Treponema pallidum* (syphilis)

In infants with confirmed congenital syphilis or infants who are clinically normal, but whose mothers had untreated syphilis

Aqueous crystalline penicillin G 100,000–150,000 units/kg/day, administered as 50,000 units/kg/dose IV every 12 hours during the first 7 days of life and every 8 hours thereafter for a total of 10 days

OR

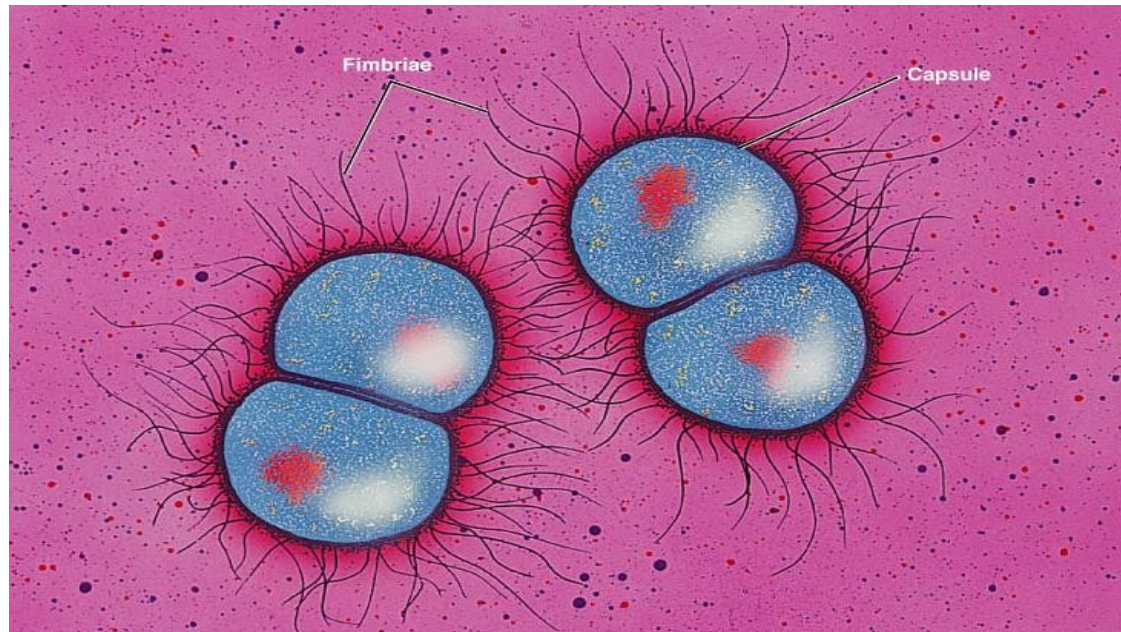
Procaine penicillin G 50,000 units/kg/dose IM in a single daily dose for 10 days

OR

Benzathine penicillin G 50,000 units/kg/dose IM in a single dose

GONORRHEA

- Caused by, *Neisseria gonorrhoea*,
- Pus producing bacteria
- Gram –ve cocci



GONORRHEA

- Transmitted during sexual contact with affected person.
- Many people have no symptoms.
- Men may have burning with urination, discharge from the penis or testicular pain.
- Women may have burning with urination, vaginal discharge, vaginal bleeding between periods, or pelvic pain.

DRUGS USED IN THE TREATMENT OF GONORRHEA

- **3rd generation Cephalosporins**
 - Ceftriaxone, Cefixime
- **Fluoroquinolones****
 - Ciprofloxacin
- **Spectinomycin**

RECOMMENDED REGIMENS (1ST LINE TREATMENT)

Uncomplicated gonorrheal infections

3rd generation cephalosporins

500 mg ceftriaxone, i.m. or

400 mg of cefixime, po

Typically given in combination with

a single dose of azithromycin(1gm, po)

or doxycycline(100 mg BID, p.O.) for 7

days.

FLUOROQUINOLONES

Single oral dose of :

Ciprofloxacin(500 mg)

Ofloxacin(400 mg)

MECHANISM OF ACTION OF FLUOROQUINOLONES

- All are bactericidal
- Inhibit DNA synthesis by inhibiting DNA gyrase enzyme (required for DNA supercoiling).

SIDE EFFECTS

- GIT: Nausea, vomiting & diarrhea
- CNS: Headache & dizziness
- May damage growing cartilage and cause arthropathy.
- Phototoxicity, avoid excessive sunlight

CONTRAINDICATIONS

- Pregnancy
- Nursing mothers
- Children (younger than 18 years)

**WHAT IS THE ALTERNATIVE TREATMENT IN
PTS THAT CANNOT TOLERATE OR BE
TREATED WITH CEPHALOSPORINS OR
QUINOLONES ?**

SPECTINOMYCIN

- Inhibits protein synthesis by binding to 30 S ribosomal subunits.
- 2 g, i.m, once

SIDE EFFECTS

- Pain at site of injection
- Fever
- Nephrotoxicity (not common).

COMPLICATED GONORRHEAL INFECTIONS

If left untreated, it can spread through blood stream into:

- Eyes
- Joints
- Heart valves
- Brain

HARMFUL EFFECTS OF GONORRHEA

It can also spread from a mother to a child during birth.

Newborn eye infections **conjunctivitis**, may lead to blindness



Prophylaxis of neonatal conjunctivitis

WHO guidelines suggest one of the following options for topical application to both eyes immediately after birth:

- Silver nitrate 1% solution or
- Erythromycin 0.5% eye ointment or
- Tetracycline hydrochloride 1% eye ointment or
- Povidone iodine 2.5% solution (water-based) or
- Chloramphenicol 1% eye ointment

SILVER NITRATE

- **It has germicidal effects** due to precipitation of bacterial proteins by liberated silver ions.
- Put into conjunctival sac once immediately after birth (no later than 1h after birth)

ERYTHROMYCIN

- 0.5% ointment for treatment & prevention of corneal & conjunctival infections.
- Put into conjunctival sac immediately after birth (no later than 1 hr after delivery)

Thanks