

Sexually Transmitted Diseases (STDs) / Infections (STIs) – Part I

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Introduction

STDs are infections transmitted through sexual contact (vaginal, anal, oral) and sometimes via blood or vertically (mother → child).

They may present with ulcers, discharge, urethritis, systemic illness, or asymptotically.

STD Classification with Causative Organisms

I. Diseases Characterized by Genital Ulcers

Disease	Causative Organism
Chancroid	<i>Haemophilus ducreyi</i>
Herpes simplex virus ulcer	HSV-1 & HSV-2
Granuloma inguinale (Donovanosis)	<i>Klebsiella granulomatis</i> (formerly <i>Calymmatobacterium granulomatis</i>)
Lymphogranuloma venereum (LGV)	<i>Chlamydia trachomatis</i> (L1, L2, L3)

Syphilis (Chancre)

Treponema pallidum ✓

2. Diseases Characterized by Urethritis & Cervicitis

Disease

Causative Organism

Gonorrhoea ✓

Neisseria gonorrhoeae

Nongonococcal
Urethritis (NGU)

Chlamydia trachomatis

Non-specific Urethritis

Trichomonas vaginalis

3. Diseases Characterized by Vaginal Discharge

Disease

Causative Organism

Bacterial Vaginosis

Gardnerella vaginalis

Watery Vaginal Discharge

Trichomonas vaginalis

Vulvovaginal Candidiasis

Candida albicans

4. Other Important STDs

- Congenital Syphilis → *Treponema pallidum* ✓
- HIV/AIDS → Human Immunodeficiency Virus

- Pelvic Inflammatory Disease (PID) → Often polymicrobial (commonly *N. gonorrhoeae* & *C. trachomatis*)
 - Human Papilloma Virus (HPV) → Genital warts, cervical cancer
 - Hepatitis B & C → Sexual & parenteral transmission
 - Giardiasis → *Giardia lamblia* (esp. in homosexual males)
 - Ectoparasites →
 - *Pediculosis pubis* (pubic lice)
 - *Sarcoptes scabiei* (scabies)
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Gonorrhoea (*Neisseria gonorrhoeae*)

◆ General Features

- 2nd most common bacterial STI

- Age group: 15-24 years
- Described historically as condition where semen "flowed without erection"
- Sites affected: cervix, urethra, rectum, pharynx, conjunctiva
- Gender difference:
 - Men → usually symptomatic (discharge, dysuria)
 - Women → often asymptomatic
- Treatment: Antibiotics

Microbiology of *N. gonorrhoeae*

- Gram-negative, kidney-bean shaped diplococci
- Capsulated, facultative anaerobe
- Capnophilic (needs 2-8% CO₂)
- Growth requirements:
 - Enriched media: Blood agar, Chocolate agar

- Special selective medium: VCNT agar (Vancomycin, Colistin, Nystatin, Trimethoprim)

- Sensitive to cold ❄️
- Oxidase positive

Clinical Features

In Females

- Increased vaginal discharge (yellow/white)
- Dysuria
- Lower abdominal cramps/pain
- Intermenstrual or post-coital bleeding
- Dyspareunia (pain during sex)
- Menstrual irregularities (heavier, painful)
- Occasionally fever/nausea
- Incubation: 2-21 days

In Males

- Thick, yellow-green urethral discharge
- Painful urination
- Testicular pain/swelling
- Rectal pain, discharge, itching

Gonococcal Infections by Site

1. Lower Genital Tract Infections

- Cervicitis
- Urethritis (male & female)
- Glandular abscesses (Skene's, Bartholin's glands)

2. Upper Genital Tract Infections

- Endometritis
- Epididymitis
- Pelvic Inflammatory Disease (PID)

3. Other Localized Sites

- Proctitis (rectal gonorrhoea)
- Pharyngitis
- Ophthalmia neonatorum 🤖 (newborn conjunctivitis)
- Perihepatitis → Fitz-Hugh-Curtis syndrome

4. Disseminated Gonococcal Infection (DGI)

- Dermatitis-arthritis-tenosynovitis syndrome
- Monoarticular septic arthritis
- Rarely: Endocarditis, Meningitis

Diagnosis

Test	Key Point
Gram Stain	Intracellular Gram-negative diplococci in pus
Culture	Blood/Chocolate agar + VCNT medium (candle jar, CO ₂)
Biochemical	Carbohydrate fermentation
Immunological	Direct immunofluorescence
Serology	Antibody detection (ELISA)

Gonorrhea – Gram Stain of Urethral Discharge

- Diagnosis by Gram stain: reliable in men only
- Appearance: Gram-negative diplococci, often intracellular in polymorphonuclear leukocytes

Biochemical Reactions of Neisseria spp.

Organism	Glucose	Maltose	Fructose	Sucrose
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N. meningitidis	+	+	-	-
N. gonorrhoeae	+	-	-	-
Other Neisseria	+	+/-	+/-	+/-

Syphilis

Causative Agent: Treponema pallidum (subsp. pallidum)

◆ General Features

- Caused by a spirochete bacterium (*Treponema pallidum subsp. pallidum*).
- Other subspecies (non-STDs):
 - *T. pallidum endemicum* → Bejel
 - *T. pallidum carateum* → Pinta
 - *T. pallidum pertenue* → Yaws
- Morphology & Motility: corkscrew-like motility.
- Visualization methods:

- Dark-field microscopy 
- Silver stains (Warthin-Starry, Dieterle)
- Direct immunofluorescence

- Transmission:

- Sexual contact
- Transplacental (→ congenital syphilis)

Clinical Stages of Syphilis

Stage	Time after infection	Key Features
Primary	3 days - 3 months	Single, firm, painless chancre (hard ulcer), heals spontaneously in 4-6 weeks.
Secondary	2 - 24 weeks	Copper-colored rash  (palms & soles), patchy alopecia, condyloma lata (moist papules), systemic symptoms (fever, malaise).
Latent	Months → decades	Asymptomatic; lesions may recur.
Tertiary (Late)	3 - 30 years	Gummas (granulomas), cardiovascular syphilis (aortitis,

aneurysm), neurosyphilis (tabes dorsalis, general paresis), multi-organ involvement.

🕒 Flowchart: Progression of Syphilis

Exposure → Primary syphilis (Chancre) → Secondary syphilis (Rash, condyloma lata, systemic signs) → Latent phase (Asymptomatic, bacteria persist) → Tertiary syphilis (Gummas, cardiovascular lesions, neurosyphilis)

⚠️ Complications of Untreated Syphilis

- Cardiovascular: aortitis, aneurysm, valvular disease
- Neurosyphilis:
 - *General paralysis of the insane* (psychiatric + dementia)
 - *Tabes dorsalis* → dorsal column degeneration (loss of proprioception)
- Other organ damage: liver, skin, bones, testes
- Death if untreated

👶 Congenital Syphilis

- Transmission: transplacental
- Symptoms:
 - Nonimmune hydrops
 - Jaundice, hepatosplenomegaly
 - Snuffles (syphilitic rhinitis) 🦷
 - Skin rash, pseudoparalysis of an extremity
- Investigations:
 - Dark-field microscopy or DFA of nasal discharge/lesions
 - Serology (Infant serum VDRL/RPR; TPHA/FTA-ABS if needed)
 - CSF analysis (VDRL, protein, cell count)
 - Imaging (long bone X-ray, cranial US)
 - Hearing & vision testing

Laboratory Diagnosis

I. Microscopy

- Dark-field microscopy of chancre exudate

- Direct immunofluorescence

2. Serological Tests

Type	Examples	Features
Non-treponemal (Screening)	VDRL, RPR	Use cardiolipin antigen; may show false positives; useful for prognosis (titers fall after treatment).
Treponemal (Confirmatory)	FTA-ABS, TPHA, MHA-TP, TPI	Detect antibodies to <i>T. pallidum</i> ; positive within 2-3 weeks of infection; remain positive for life (not prognostic).

3. Culture

- Not on artificial media ✗
- Can be maintained in rabbit testes (research use).

Exam Pearls

- Hallmark of primary syphilis: painless chancre ✓
- Secondary syphilis: rash on palms & soles, condyloma lata ✓

- Tertiary syphilis: gummas, aortic aneurysm, neurosyphilis ✓
- Congenital syphilis clue: snuffles (syphilitic rhinitis) ✓
- Always remember: VDRL/RPR = screening, FTA-ABS/TPHA = confirmation

✱ STDs That Can Transmit Without Sexual Contact

1. Congenital Syphilis (*T. pallidum*)
2. Ophthalmia neonatorum (*N. gonorrhoeae*)
3. Hepatitis B
4. Hepatitis C
5. HIV
6. Herpes simplex
7. Giardia lamblia
8. Scabies (*Sarcoptes scabiei*)
9. Pediculosis pubis (pubic lice)