Bacterial Genital Infections

- Urethritis/Mucopurulent Cervicitis
  - Gonococcal Infection
  - Non-Gonococcal Infection
  - Coinfection with N. gonorrhoea and C. trachomatis

- Genital Ulcer
  - Syphilis
  - Chancroid
  - Lymphgranuloma Venereum
  - Granuloma Inguinale

- Vaginal Discharge
  - Bacterial Vaginosis
  - Candida Vulvovaginitis

- Gonorrhea
  - Chlamydial Infection
  - Ureaplasma Urealyticum Infection

- Primary Syphilis
  - Chancre
  - Skin rashes

- Secondary Syphilis
  - Condylomata Lata
  - Mucous Patches in mouth

- Latent Syphilis
  - Generalized Lymphadenopathy

- Tertiary Syphilis
## Bacterial Genital Infections with Urethritis and Mucopurulent Cervicitis

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<td><strong>Gonorrhoea</strong></td>
<td></td>
<td></td>
<td>Non-PPNG</td>
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</table>
| **Clinical presentations** | Acute/chronic Gonorrhoea  
Gonococcal Vulvovaginitis with Proctitis (in female and children)  
Gonococcal Ophthalmia Neonatorum (in Neonate) |                                                                                 | Non-PPNG  |
| **Causative agent** | Neisseria gonorrhoea  
**Characteristics** | Gram negative Diplococci  
Oxidase test positive  
Glucose fermenter  
Intra/extracellular organism  
Agar  
• Thayer Martin  
• Chocolate agar  
5-10% CO₂ with high humidity  
Some strains produce Beta Lactamase | Non-PPNG  |
| **Gonococcal Bactereamia** | Arthritis of both knees  
• Joint swollen and edematous  
• Joint is painful  
• Effusion  
Fever  
• Painful vesicles  
**Complications** | Reinfection  
**Male**  
• Urethral stricture  
• Prostatic damage  
• Chronic inflammation  
**Female**  
• Tubal damage and obstruction  
• Infertility  
• Pelvic Inflammatory Disease  
**Microscopic Examination** | Non-PPNG  |
| Specimen | Affected part  
• Discharge  
• Pus  
• Secretion  
• Blood  
• Systemic infection | Gram staining  
• Intra/extracellular Gram Negative Diplococci  
• Pus cells  
**Culture** | Non-PPNG  |
| Thayer Martin/ Chocolate Agar | Small  
• Translucent  
• Glistening colonies  
**Biochemical Test** | Oxidase test positive  
Glucose fermentation  
**Serological Tests** | Non-PPNG  |
| ELISA | Gonococcal antigen detection  
DNA Probe Assay | Gonococcal Ribosomal Gene detection  
• Systemic Gonorrhoea  
• Cefuroxime  
• Ceftriazone  
• Ciprofloxacin  
• Spectinomycin  
• Azithromycin  
• Systemic Gonorrhoea  
• Cefuroxime  
• Benzyl Penicillin  
• Cefuroxime  
• PPNG  
• Gonorrhoea  
• Cefuroxime  
• Ciprofloxacin  
• Spectinomycin  
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• Azithromicy

### Gonorrhoea
- **Clinical presentations**
  - Acute/chronic Gonorrhoea
  - Gonococcal Vulvovaginitis with Proctitis (in female and children)
  - Gonococcal Ophthalmia Neonatorum (in Neonate)
- **Causative agent**
  - Neisseria gonorrhoea
- **Characteristics**
  - Gram negative Diplococci
  - Oxidase test positive
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  - **Male**
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    - Prostatic damage
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  - **Female**
    - Tubal damage and obstruction
    - Infertility
    - Pelvic Inflammatory Disease
  - **Microscopic Examination**
    - Gram staining
    - Intra/extracellular Gram Negative Diplococci
    - Pus cells
  - **Culture**
    - Thayer Martin/ Chocolate Agar
    - Small
    - Translucent
    - Glistening colonies
  - **Biochemical Test**
    - Oxidase test positive
    - Glucose fermentation
  - **Serological Tests**
    - ELISA
      - Gonococcal antigen detection
    - DNA Probe Assay
      - Gonococcal Ribosomal Gene detection
- **Specimen**
  - Affected part
    - Discharge
    - Pus
    - Secretion
  - Blood
    - Systemic infection
- **Treatment**
  - **Non-PPNG**
    - **Gonorrhoea**
      - Ampicillin + Probenecid
      - Cefuroxime
    - **Systemic Gonorrhoea**
      - Benzyl Penicillin
  - **PPNG**
    - **Gonorrhoea**
      - Ceftriazone
      - Ciprofloxacin
      - Spectinomycin
      - Azithromycin
    - **Systemic Gonorrhoea**
      - Cefuroxime
## Bacterial Genital Infections with Urethritis and Mucopurulent Cervicitis

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<th>Treatment</th>
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<tbody>
<tr>
<td><strong>Chlamydial Infections</strong>&lt;br&gt;<strong>Causative Agents</strong>&lt;br&gt;• Chlamydia trachomatis</td>
<td><strong>Men</strong>&lt;br&gt;• Urethritis&lt;br&gt;• Dysuria&lt;br&gt;• Urethral and Meatal soreness&lt;br&gt;• Urethral discharge&lt;br&gt;• Prostatitis</td>
<td><strong>Specimens</strong>&lt;br&gt;• Swabs from&lt;br&gt;○ Urethra&lt;br&gt;○ Cervix&lt;br&gt;○ Rectum</td>
<td>• First DOC&lt;br&gt;○ Doxycycline</td>
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<td></td>
<td><strong>Women</strong>&lt;br&gt;• Cervicitis&lt;br&gt;• Urethritis&lt;br&gt;• Soreness&lt;br&gt;• Dysuria&lt;br&gt;• Mucoid Vaginal discharge&lt;br&gt;• Salpingitis</td>
<td><strong>Culture</strong>&lt;br&gt;• Cell lines&lt;br&gt;○ McCoy cells&lt;br&gt;○ HeLa cells</td>
<td>• Alternative&lt;br&gt;○ Erythromycin&lt;br&gt;○ Azithromycin</td>
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<td></td>
<td><strong>Both Gender</strong>&lt;br&gt;• Proctitis&lt;br&gt;• Perihepatitis</td>
<td><strong>Serological Tests</strong>&lt;br&gt;• Antigenic detection&lt;br&gt;○ ELISA&lt;br&gt;○ Immunofluorescent Assay</td>
<td>• Systemic infection&lt;br&gt;○ Erythromycin IV</td>
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<td></td>
<td><strong>Neonate</strong>&lt;br&gt;• Inclusion Conjunctivitis&lt;br&gt;• Pneumonitis</td>
<td><strong>Chlamydial DNA detection</strong>&lt;br&gt;o PCR</td>
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<td></td>
<td><strong>Morphology</strong>&lt;br&gt;• Elementary Bodies&lt;br&gt;○ Extracellular&lt;br&gt;○ Highly infectious form&lt;br&gt;• Reticulate Bodies&lt;br&gt;○ Intracellular&lt;br&gt;○ Replicative form</td>
<td><strong>Appearance of colony on Agar</strong>&lt;br&gt;○ Fired egg colony</td>
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<td></td>
<td><strong>Ocular Trachoma</strong>&lt;br&gt;• A.B.Ba and C&lt;br&gt;<strong>Oculogenital and Neonatal Infection</strong>&lt;br&gt;• D-K&lt;br&gt;<strong>Lymphogranuloma Venereum</strong>&lt;br&gt;• L1, L2, L3</td>
<td><strong>Resistant of Penicillin</strong>&lt;br&gt;<strong>Sensitive to Erythromycin</strong></td>
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<td></td>
<td><strong>Ureaplasma urealyticum Infection</strong>&lt;br&gt;<strong>Causative Agent</strong>&lt;br&gt;• Ureaplasma urealyticum</td>
<td><strong>Appearance of colony on Agar</strong>&lt;br&gt;○ Fired egg colony</td>
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<tr>
<td></td>
<td><strong>Characteristics</strong>&lt;br&gt;• Lack rigid cell wall</td>
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<td></td>
<td><strong>Non-Gonococcal Urethritis</strong>&lt;br&gt;<strong>Reiter's Syndrome</strong>&lt;br&gt;○ Urethritis&lt;br&gt;○ Conjunctivitis&lt;br&gt;○ Arthritis</td>
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<td></td>
<td><strong>Presents with</strong>&lt;br&gt;• Prolonged Synovitis&lt;br&gt;• Connective tissues inflammation&lt;br&gt;• Affecting mainly men with HLA B27</td>
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<tr>
<td></td>
<td><strong>Appearance of colony on Agar</strong>&lt;br&gt;○ Fired egg colony</td>
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<td></td>
<td><strong>Resistant of Penicillin</strong>&lt;br&gt;<strong>Sensitive to Erythromycin</strong></td>
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<td><strong>Bacterial Genital Infections with Genital Ulcer</strong></td>
<td><strong>Pathogenesis</strong></td>
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<tr>
<td><strong>Syphilis</strong></td>
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<tr>
<td><strong>Causative Agent</strong></td>
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<tr>
<td>o Treponema pallidum</td>
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</tr>
<tr>
<td>o Characteristic</td>
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<tr>
<td>▪ Thin wall</td>
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<td>▪ Flexible</td>
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<td>▪ Spiral shaped Spirochete</td>
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<tr>
<td><strong>Clinical Presentation</strong></td>
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<tr>
<td>• Acquired Syphilis – Sexual contact</td>
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<tr>
<td>• Congenital Syphilis – Transplacental spread</td>
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<tr>
<td><strong>Pathogenesis</strong></td>
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<tr>
<td>• T. pallidum will penetrate through</td>
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<tr>
<td>o Intact mucous membrane</td>
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<tr>
<td>o Break in the Epidermis</td>
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<td>• It will then multiply locally at the site of entry</td>
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<tr>
<td>• Some can further multiply at the regional lymph nodes</td>
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<tr>
<td>• Then it is disseminated across the body through blood</td>
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<th><strong>Laboratory Investigations</strong></th>
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<td><strong>Demonstration of Causative Organism</strong></td>
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<tr>
<td>o Specimen</td>
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<tr>
<td>▪ Exudate from Primary Lesion</td>
</tr>
<tr>
<td>▪ Chancre</td>
</tr>
<tr>
<td>▪ Affected Lymph Nodes</td>
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<tr>
<td>▪ Exudate from Secondary Lesion</td>
</tr>
<tr>
<td>▪ Mucous patches</td>
</tr>
<tr>
<td>▪ Condylomata</td>
</tr>
<tr>
<td>▪ Skin rashes</td>
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<tr>
<td>▪ Affected Lymph Nodes</td>
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<tr>
<td>▪ Microscopic Examination</td>
</tr>
<tr>
<td>o Under Dark Ground Illumination</td>
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<tr>
<td>o Stain</td>
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<tr>
<td>▪ Giemsa</td>
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<td>▪ Silver Impregnation</td>
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<tr>
<td>o Findings</td>
</tr>
<tr>
<td>▪ Spiral shape</td>
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<tr>
<td>▪ Regular and evenly placed coils</td>
</tr>
<tr>
<td>▪ Movements</td>
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<tr>
<td>▪ Undulating</td>
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<tr>
<td>▪ Rotation</td>
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<tr>
<td>▪ Flexion</td>
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<tr>
<td>▪ Slow backward/forward movement</td>
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<tr>
<td><strong>Culture</strong></td>
</tr>
<tr>
<td>o Can’t be cultured on any media</td>
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<tr>
<td>o Can propagate if inoculated in the Rabbit Testis</td>
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<tr>
<td><strong>Demonstration of Antibodies Production</strong></td>
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<tr>
<td>• <strong>Standard Test for Syphilis (STS) – no confirmatory</strong></td>
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<tr>
<td>o Venereal Disease Research Laboratory Test (VDRL Test)</td>
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<tr>
<td>o Rapid Plasma Reagin Test (RPR Test)</td>
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<td>o Kahn Test (KT)</td>
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<tr>
<td>o Wassermann Reaction (WR)</td>
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<tr>
<td>• <strong>Serological Test for Treponema Pallidum Antibody – confirmatory</strong></td>
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<tr>
<td>o Fluorescent Treponemal Antibody Absorbed Test (FTA-ABS)</td>
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<td>o Treponema Pallidum Immobilization Test (TPI)</td>
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<tr>
<td>o Treponema Pallidum Passive Hemagglutination (TPHA)</td>
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<td><strong>Primary Syphilis</strong></td>
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<tr>
<td>Incubation period</td>
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<td>Chancre/ Hard Sore</td>
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<td>Affecting</td>
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<td>Genital</td>
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<td>Extragenital</td>
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<td><strong>Secondary Syphilis</strong></td>
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<tr>
<td>Develops 6-8 weeks after Primary Syphilis</td>
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<tr>
<td>4 Cardinal signs</td>
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<td>Skin Rashes</td>
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<td>Condylomata Lata</td>
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<td>Mucous patches at the mouth</td>
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<tr>
<td>Generalized Lymphadenopathy</td>
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<td>Other presentation</td>
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<tr>
<td><strong>Tertiary Syphilis</strong></td>
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<td>Multisystem infection</td>
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<tr>
<td>Presentation of Gumma (Gummatous Necrosis)</td>
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<td>Affecting</td>
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<td><strong>Congenital Syphilis</strong></td>
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<td>Can lead to</td>
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<tr>
<td>Diseases</td>
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</table>
| **Chancroid**                  | • Typical soft sore lesion  
  o Large  
  o Irregular  
  o PAINFULL  
  o Almost always affecting the Genitalia  
  o Localized Lymphadenopathy  
  o Painful  
  o Enlarged  
  o Inflamed | • Specimen  
  o Scrapping from the lesion  
  o Discharge from the Lymph Nodes  
  *inoculate into Rabbit’s blood  
  • **Microscopic Examination**  
  o Gram Negative Bacillus  
  o School of fish appearance  
  • **Culture**  
  o Blood Agar with Factor X only  
  • **Ducreyi Skin Test**  
  o Delayed hypersensitivity skin test  
  o Positive after 1-2 weeks of infection  
  o Used for specific diagnosis | • Sulfamethopyrazine  
  • Cotrimoxazole  
  (Bactrim®) |
| **Lymphogranuloma Venereum**   | • Small shallow ulcer at the Genitalia  
  • Bilateral Inguinal Lymphadenopathy  
  • Suppuration is common with draining sinuses | • Specimen  
  o Discharge from ulcer  
  o Tissue slough from Lymph Node  
  • **Microscopic Examination**  
  o Giemsa staining  
  o Intracytoplasmic Inclusion  
  • **Culture**  
  o Yold sac of Embryonated egg  
  • **Frei Test**  
  o Delayed hypersensitivity skin test  
  o Intradermal injection of LGV infection  
  o Antigen is group antigen; not specific | • Tetracycline |
| **Granuloma Inguinale**        | • Indolent progressive ulcerating condition  
  o Painless ulcer  
  • Confined to Genital and Subcutaneous tissue  
  • Due to sexual contact | • Specimen  
  o Tissue biopsy  
  • **Microscopic Examination**  
  o Giemsa staining  
  o **Donovan Bodies (Pathognomonic)**  
  • Rod shape organism inside the cytoplasm of Phagocyte/Histiocytes  
  • Deep purple intracellular inclusions are the encapsulated Gram Negative Bacilli | • Standard treatment  
  o Ampicillin – 12 weeks  
  • Other  
  o Tetracycline  
  o Erythromycin  
  o Bactrim |
### Bacterial Genital Infections with Vaginal Discharge

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<td><strong>Bacterial Vaginosis</strong></td>
<td>Greyish fishy vaginal discharge</td>
<td><strong>3 out of 4 of the following criteria</strong>&lt;br&gt;1. Presence of thin homogenous gray-white non-inflammatory discharge&lt;br&gt;2. Vaginal discharge pH &gt;4.5 (normal is &lt;4.5)&lt;br&gt;3. Presence of Clue Cells&lt;br&gt; a. Epithelial cells with indistinctive border due to adherent of bacteria&lt;br&gt;4. Amine fishy odor&lt;br&gt; a. Before/after KOH&lt;br&gt; b. Positive&lt;br&gt; i. Amine test&lt;br&gt; ii. Whiff test</td>
<td>• Metronidazole&lt;br&gt; o Cream&lt;br&gt; o Oral&lt;br&gt; • Clindamycin&lt;br&gt; o Oral&lt;br&gt; o Cream</td>
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<td><strong>Pathogenesis</strong></td>
<td>Greyish fishy vaginal discharge</td>
<td><strong>3 out of 4 of the following criteria</strong>&lt;br&gt;1. Presence of thin homogenous gray-white non-inflammatory discharge&lt;br&gt;2. Vaginal discharge pH &gt;4.5 (normal is &lt;4.5)&lt;br&gt;3. Presence of Clue Cells&lt;br&gt; a. Epithelial cells with indistinctive border due to adherent of bacteria&lt;br&gt;4. Amine fishy odor&lt;br&gt; a. Before/after KOH&lt;br&gt; b. Positive&lt;br&gt; i. Amine test&lt;br&gt; ii. Whiff test</td>
<td>• Metronidazole&lt;br&gt; o Cream&lt;br&gt; o Oral&lt;br&gt; • Clindamycin&lt;br&gt; o Oral&lt;br&gt; o Cream</td>
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<td><strong>Vulvovaginitis</strong></td>
<td>Vulva itching&lt;br&gt; Burning pain at the end of urination&lt;br&gt; Voluminous cheesy vaginal discharge with little odor</td>
<td>• <strong>Specimen</strong>&lt;br&gt; o Vaginal discharge&lt;br&gt; • <strong>Microscopic Examination</strong>&lt;br&gt; o Budding yeasts&lt;br&gt; • <strong>Culture</strong>&lt;br&gt; o Media&lt;br&gt; ▪ SDA&lt;br&gt; ▪ Blood agar&lt;br&gt; o Colony appears Star-shaped</td>
<td>• Bactrim vaginal tab/cream&lt;br&gt; • Econazole passeries&lt;br&gt; • Nystatin passeries&lt;br&gt; • Fluconazole</td>
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**Pathogenesis**
- Lactobacillus spp. insufficiently produces Lactic Acid and Hydrogen Peroxide
- This will impair the inhibition of growth of Anaerobes
- Multiplication of G. vaginalis

**Predisposing factors**
- Diabetes Mellitus
- Antibiotic therapy
- Steroid therapy

**Microscopic Examination**
- Budding yeasts

**Culture**
- Media
  - SDA
  - Blood agar

**Treatment**
- Metronidazole
  - Cream
  - Oral
- Clindamycin
  - Oral
  - Cream