Sexually Transmitted Infections
An Overview

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Overview

• STI syndromes
  – Genital ulcer diseases & lesions
  – Urethritis, cervicitis
  – Pelvic inflammatory disease
  – Vaginitis
  – Proctitis
  – Ectoparasites

• STI Concepts
  – Disease vs. Health
  – Reproductive rate equation
  – Symptoms
  – Networks
  – Behavior events
  – Diagnostics
  – Prevention
  – Additional concepts

Part 1
STI SYNDROMES
Overview

• 15 million cases annually in US; 450 million new cases worldwide
• Predominantly adolescents and young adults
• Major cause of morbidity and mortality in developed and developing countries
• Women's health & child health
• Association with HIV
• Stigma

A. Genital Ulcer Diseases (GUD)/Lesions

• Syphilis (Treponema pallidum)
• HSV-2
• HSV-1
• Chancroid (Haemophilus ducreyi)
• Lymphogranuloma venereum (LGV) (Chlamydia trachomatis)
• Granuloma Inguinale (Donovanosis) (Klebsiella granulomatis)
• Human papillomaviruses (HPV)

Pain and GUD

Which ulcers are PAINFUL?
• HSV
• Chancroid

Which ulcers are PAINLESS?
• Syphilis
• LGV (but lymphadenopathy is PAINFUL)
• Granuloma Inguinale
“Key Words” in GUD

- **SYPHILIS**: Single, **painless** ulcer or chancre at the inoculation site with heaped-up borders & clean base; painless bilateral LAD
- **HSV**: multiple, **painful**, superficial, vesicular or ulcerative lesions with erythematous base
- **CHANCROID**: painful, indurated, ‘ragged’ genital ulcers & tender suppurative inguinal adenopathy (50%); kissing lesions on thigh
- **GI**: Painless, progressive (destructive), “serpiginous” ulcerative lesions, without regional lymphadenopathy; beefy red with white border & highly vascular
- **LGV**: short-lived **painless** genital ulcer accompanied by **painful** suppurative inguinal lymphadenopathy; “groove sign”

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**Syphilis**

- Epidemiology: MSM and HIV+; increasing in women
- Early and late stages; neurological manifestations may occur during any stage of syphilis
- Diagnostics: darkfield for primary syphilis; serological tests: both treponemal and non-treponemal tests may be negative in primary syphilis but they are almost always positive in secondary and early latent. Treponemal tests are almost always positive in late syphilis (once positive always positive) irrespective of treatment history
- Penicillin is the drug of choice to treat all stages of syphilis. No alternate agents should be used in pregnant women; doxycycline is acceptable alternate agent; azithromycin should not be used.

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**HSV 1 & 2**

- Both HSV-1 (particularly among young women and MSM) and 2 cause genital infections
- HSV-2 seroprevalence in US ~20%
- Most people are unaware that they are infected
- Asymptomatic shedding is the most common reason for transmission
- NAATs better than culture for dx; serology indirect method of detection
- Condoms and antiviral suppressive therapy decrease risk of transmission by 30% and 55%, respectively
- Currently, no formal screening recommendations
**Chlamydia trachomatis** L1-L3: LGV

- Classical manifestation is a short-lived **painless** genital ulcer accompanied by **painful** inguinal lymphadenopathy
- Outbreaks in US and Western Europe associated with **proctitis** particularly among MSM
  - Rectal pain, tenesmus, rectal bleeding/discharge
  - May be mistaken for inflammatory bowel disease on biopsy
- Treatment with 3 weeks of doxycycline

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**Chancroid**

- *Haemophilus ducreyi*
  - endemic in parts of the southern US
  - increased risk with HIV infection and commercial sex work
- Symptoms: painful, indurated, ‘ragged’ genital ulcers & tender suppurative inguinal adenopathy (50%); kissing lesions on thigh; 10% of patients co-infected with syphilis or HSV; bacterial superinfection not uncommon
- Dx: culture (80% sensitive) [antigen detection and PCR not widely available]
- Rx: Azithromycin 1g PO X1 OR Ceftriaxone 250mg IM X1 (erythromycin and ciprofloxacin may also be used)
- Treat all partners in preceding 60 days

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**Granuloma Inguinale OR Donovanosis**

- *Klebsiella granulomatis*
- Not endemic in US; common in SE Asia (India), Australia & Southern Africa
- Painless, progressive (destructive), “serpiginous” ulcerative lesions, without regional lymphadenopathy; beefy red with white border & highly vascular
- Dx: tissue biopsy (no culture test; PCR not FDA cleared)
- Rx: Doxycycline 100mg po BID X 3 weeks (at least) OR azithromycin 1g PO q week X3 (can also use trimethoprim/sulfa and ciprofloxacin) +/- aminoglycoside if slow to improve
- ? Treatment of sex partners in preceding 60 days
HPV

- Low risk types (e.g. 6, 11): cause warts and low grade dysplasia
- High risk (e.g. 16 and 18) cause cervical, vaginal, vulvar, anal, and upper airway cancers
- 2.5 million low-grade Pap abnormalities; 200,000-300,000 HSIL Pap lesions; 12,800 invasive cervical cancers
- Preventive vaccines available

B. Urethritis & Cervicitis

- Neisseria gonorrhoeae
- Chlamydia trachomatis D-K
- Mycoplasma genitalium
- Others
  - Ureaplasma urealyticum
  - Trichomonas vaginalis
  - Herpes simplex virus

Neisseria gonorrhoeae

- Affects genital and extragenital sites (rectum and oropharynx)
- Many/most cases asymptomatic
- NAATs are the diagnostic test of choice
- Epidemiology: young; AA; SE U.S. (big cities)
- **********DRUG RESISTANCE
**Chlamydia trachomatis D-K**

- Most common reportable infection
- Affects genital and extragenital sites
- Most cases asymptomatic
- Epidemiology: YOUNG AGE
- NAATS are the diagnostic test of choice
- Screen ALL sexually active women <26 years of age
- Treat with doxycycline or azithromycin

**Mycoplasma genitalium**

- Associated with urethritis, cervicitis, & PID
- NAATs best diagnostic; not widely available
- Epidemiology: 20% of cases of urethritis; 10-25% of cases of cervicitis
- Treatment: doxycycline only 50% effective; azithromycin 85% effective

**C. Pelvic Inflammatory Disease**

- PID; Endometritis; Salpingitis
- Multifactorial process
- Association with *C. trachomatis* and *N. gonorrhoeae*; M. genitalium; BV
- Sequelae
  - Infertility
  - Pelvic Pain
  - Tubo-ovarian abscesses
C. Vaginitis

- Bacterial vaginosis
  - Sexually-associated
- Trichomonas vaginalis
- Vulvo-vaginal candidiasis (VVC)

Bacterial Vaginosis

- Most common cause of vaginal discharge
- Sexually associated not necessarily STI
- Highly recurrent
- Unclear pathophysiology; healthy lactobacilli are replaced by anaerobes
- Amsel’s clinical criteria: discharge; low pH; whiff test; clue cells. Nugent’s score mainly for research
- Molecular tests available but unclear utility

Trichomonas vaginalis

- Parasite
- Most common non-viral STI
- May be asymptomatic
- NAATS most sensitive diagnostic; culture is reasonable; wet mount POOR sensitivity
- Treatment with metronidazole or tinidazole
- 1% of strains drug resistant
Vulvovaginal Candidiasis

- Dx: presence of yeast + discharge + vaginal or vulvar erythema
- Associated with antibiotic use and DM
- Most cases caused by *C. albicans*; more exotic species occur particularly among immunocompromised
- Topical antifungals are adequate; single dose azole also appropriate

D. Proctitis

- *Neisseria gonorrhoeae*
- *Chlamydia trachomatis D-K*
- *Chlamydia trachomatis L1-L3 (LGV)*
- *Treponema pallidum*
- *HSV 1 & 2*

Ectoparasites

- Pubic lice (“crabs”)
- Scabies
Sexual health is a state of physical, emotional, mental, and social wellbeing in relation to sexuality; it is not merely the absence of disease, dysfunction, or infirmity. Sexual health needs a positive and respectful approach to sexuality and sexual relationships, and the possibility of having pleasurable and safe sexual experiences that are free of coercion, discrimination, and violence. For sexual health to be attained and maintained, the sexual rights of all individuals must be respected, protected, and satisfied.
B. Reproductive Rate Equation

\[ R_o = \beta \cdot c \cdot D \]

- Reproductive Rate
- Probability of transmission
- Number of sexual contacts
- Duration of infectiousness

(Source: Anderson and May, 1992)

- **Transmission Efficiency** - Interventions
  - Condom Use and Barrier Methods
  - Microbicides
  - Hormonal Contraceptives
  - Circumcision?
  - Antiviral Therapy
    - “Doc, now that my viral load is zero, do I still have to use a condom......Can I get a prescription for Viagra?...”
C. STIs and Symptoms

D. Networks
E. Sexual Behavior Events

- Age of Sexual Debut
- Numbers of Partners: Serial/Concurrent
- Condom Use Patterns

F. STI Diagnostics

- Nucleic acid amplification tests (NAATs) are the diagnostic modalities of choice to detect most infections (GC, CT, TV, HSV)
- Culture is very specific but sensitivity is lower than NAATs (GC, TV, HSV)
- Serology is an indirect diagnostic (syphilis, HSV)

G. Prevention

- Abstinence
- Monogamy
- Condoms (HIV, GC, CT, syphilis, HPV, HSV)
- Antivirals (HIV, HSV)
- Circumcision (HIV, HPV, GUD)
- Vaccines (HBV, HPV)
- Behavioral interventions (RESPECT)
CONDOM EFFICACY STUDIES
- Reduced acquisition of genital HSV-2 by M/W
- Reduced acquisition of syphilis by M/W;
- Reduced acquisition of chlamydia M/W;
- Reduced acquisition of gonorrhoea by women
- Accelerated regression of cervical and penile HPV-associated lesions and accelerated clearance of genital HPV infection by women.

H. STD as cofactors in HIV transmission

STD increase HIV transmission
- May influence HIV replication
- Viral load in genital secretions
  - (ex: HSV-2 associated with higher HIV levels in plasma and in genital secretions)

STD increase susceptibility to HIV
- Disrupt mucosal barrier
- Number of receptor cells in genital tract
- Receptors expressed per cell

I. Additional Concepts
- Pronounced racial disparity in most STIs which is REAL
- How to treat partners
  - Expedited partner therapy
  - Internet
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CDC STD website: http://www.cdc.gov/std/

American Social Health Association-Excellent lay information site
www.ashastd.org

United Kingdom Department of Health: Sexual Health
http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/SexualHealth/en