Shedding Light on HIV and STD: Investigative Techniques

HIV testing should be done at every level of healthcare system to diagnose HIV as early as possible.

40% estimated new cases are transmitted by those who are not aware of their HIV infection.

Who to Screen

- At every clinical visit across specialties.
- All healthcare providers.
- All patients between 13 and 75 years of age.
- Men having sex with men.
- Who inject drugs.
- Who having sex with partners of unknown HIV status.
- Who have partners, known to be HIV positive.

Screening Procedure

There are three types of tests used to diagnose HIV infection.

a) Antibody tests

b) Antigen/antibody tests

c) Nucleic acid tests (NATs).

❖The standard of care test for HIV is the fourth-generation test, also called Antigen/antibody test.

❖Detects not only antibody for HIV 1 and HIV 2 but also for p24 Antigen

❖The p24 Ag is detectable as early as 14 days after exposure.

❖If the Ag test is positive and Ab negative, a reflex RNA test will confirm the test.

- If the Ag and Ab are positive, the test will confirm.
- HIV RNA test should be performed in very early infection which is (< 14 days).
- RNA also should be performed if the fourth-generation test is indeterminate.
- In the non-clinical setting, oral swab tests (ELISA) antibody tests performed as rapid tests but need to be confirmed with a serum western blot.
- ELISA tests are Ab-only tests and detect HIV as early as 3 weeks after transmission.

HIV ribonucleic acid testing is best for acute HIV infections.

Patients who are unlikely to return for follow-up should be offered a rapid point-of-care HIV test.

Results are available in less than 20 minutes but may be negative in early infections.

A reverse transcriptase (RT)-PCR-based viral load test is also recommended.

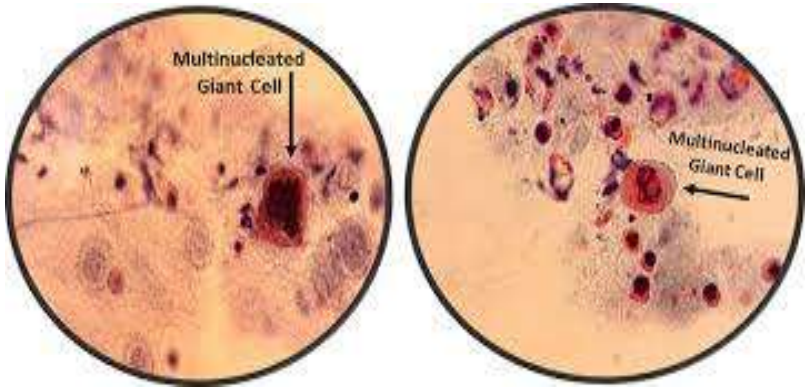
Genital Herpes

❖Tzank smear – Giemsa stain shows multinucleated giant cells

❖Diagnosis is by clinical examination, NAAT from genital ulceration, or viral culture.

❖Direct immunofluorescence assay for herpes simplex virus antibodies, but this is not currently recommended due to the test's insensitivity.

❖Histopathology – Ballooning of epidermal keratinocytes, intraepidermal vesicles with multinucleate giant cells.



HIV testing is recommended in all patients who test positive for genital herpes.

HPV and Genital Warts

Diagnosis is primarily clinical, based on the gross appearance of cutaneous lesions.

A biopsy can be performed for confirmation, but this is usually reserved for the following situations:

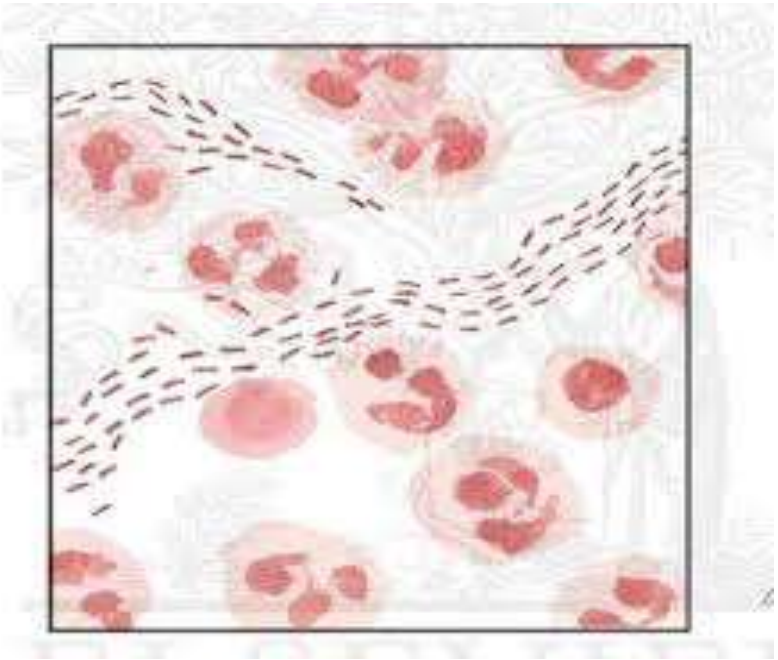
- ❖Patients who are immunocompromised (cancer risk is highest)
- ❖Diagnosis is uncertain
- ❖Atypical lesions
- ❖Lesions that do not respond to standard therapy

❖Reflex HPV testing can be done on cervical cells from a Pap smear to identify HPV subtypes specially in women.

❖Suspicious Pap smear results can be further evaluated by colposcopy using acetic acid to highlight specific white-colored areas that can be biopsied.

Chancroid

❖Gram stain may show a typical "school of fish" pattern, but this is only 80% sensitive.



❖The definitive diagnosis requires culture, which requires high humidity and high CO2, which is not generally available to most clinical laboratories.

❖No FDA-approved polymerase chain reaction (PCR) serological test is available for *H ducreyi*.

Chlamydia

- ❖Culture is usually not done for chlamydia as the organism is difficult to grow in laboratory
- ❖NAAT has better sensitivity than bacterial culture
- ❖Diagnosis is made by using a nucleic acid amplification test (NAAT) on a vaginal swab, first-catch urine sample, or self-endocervical swab.
- ❖Diagnosis is made using NAAT of a first-catch urine or urethral sample in men.

Gonorrhea

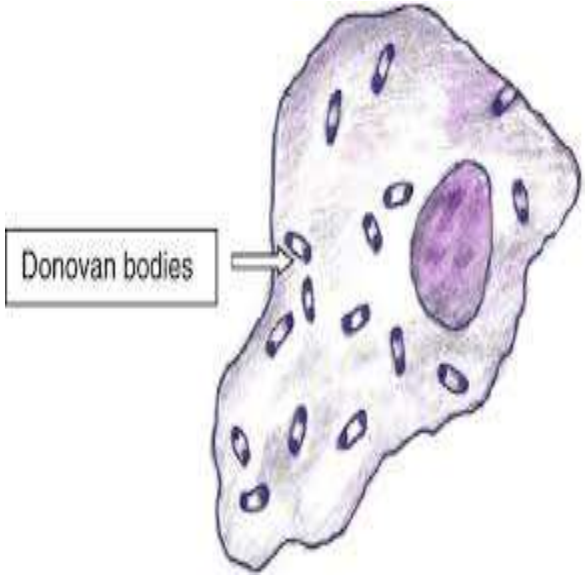
- ❖Culture is also a gold standard in Dx of gonococcal urethritis
- ❖Diagnosis is made using a NAAT vulvovaginal or endocervical swab.
- ❖Diagnosis is made using NAAT of a first-catch urine or urethral sample.

Granuloma inguinale

❖The diagnosis is primarily clinical, based and Donovan bodies in tissue smear.

❖Donovan bodies are rod or oval-shaped intracellular inclusions in the cytoplasm of histiocytes or mononuclear phagocytes which stain dark purple.

❖The infecting organism is difficult to culture, and no FDA-approved molecular diagnostic laboratory test is currently available.



Lymphogranuloma venereum

❖Initial diagnosis is based on clinical presentation and by eliminating other causes of genital ulcerations with inguinal lymphadenopathy.

❖Ulcerative infections of the genitalia to exclude, which also cause inguinal lymphadenopathy, would be chancroid, herpes, granuloma inguinale, and syphilis.

❖Lymphoma, penile cancer, and HIV are additional causes of lymphadenopathy.

❖Serological testing with complement fixation, micro-immunofluorescence, or NAAT can confirm the diagnosis, but PCR-based genotyping is the most definitive.

❖Due to availability, NAAT testing is usually preferred and recommended for all patients with proctocolitis.

❖Finding *Chlamydia trachomatis* in a genital, lymph node, or rectal specimens through culture, direct immunofluorescence, or NAAT is diagnostic and confirmatory.

❖Men who have sex with men and have proctocolitis should be tested for all strains of *C trachomatis*.

❖HIV testing is especially recommended in this patient population.

Pelvic Inflammatory Disease

Diagnosis is primarily clinical based on the presence of lower abdominal pain, pelvic discomfort, purulent vaginal discharge, abnormal vaginal bleeding, or dyspareunia.

Findings suggestive of pelvic inflammatory disease include:

- ❖Fever higher than 101 °F (38.3 °C)
- ❖Cervical friability
- ❖Mucopurulent cervical discharge
- ❖Saline microscopy of vaginal fluid shows abundant WBCs
- ❖Elevated erythrocyte sedimentation rate (ESR) or C-reactive protein

- ❖Laboratory confirmation of *N gonorrhea or C trachomatis* by NAAT or culture
- ❖A diagnosis of pelvic inflammatory disease is unlikely if the cervical discharge is normal and no white blood cells are seen on a wet prep of the vaginal fluid.
- ❖NAAT testing for *N gonorrhea, C trachomatis, and M genitalium* is recommended.
- ❖Serological testing for HIV and *T pallidum* should also be performed.
- ❖Pregnancy testing should be done, and pelvic ultrasonography should be considered if there is any suspicion of a tubo ovarian abscess.

Mycoplasma genitalium

Women/Men:

❖Initial diagnosis is primarily clinical based on symptoms and the exclusion of chlamydia and gonorrhea.

❖NAAT assays for *M genitalium* are now available and FDA-approved, with a 96% or higher sensitivity.

❖*M genitalium* should be suspected in all patients with recurrent or persistent gonorrhea or chlamydia infections and intractable urethritis.

Syphilis

The diagnosis is confirmed by a positive finding on serological tests, which include at least one nontreponemal and one treponemal assay.

- ❖No NAAT tests for syphilis are currently available.
- ❖PCR tests for *T pallidum* have been developed, but none are FDA-approved.

Nontreponemal testing, including the

- ❖Venereal Disease Research Laboratory (VDRL)
- ❖Rapid plasma reagin (RPR).

❖A negative test would be non-reactive, while a positive test would demonstrate a titer of at least 1:8.

❖If the titer is lower than 1:8, the test should be repeated, and a treponemal assay should also be performed.

❖Nontreponemal tests are simple, inexpensive, and are usually the initial screening tests for syphilis.

❖They will identify roughly 80% of patients with primary syphilis and close to 100% with secondary syphilis.

❖They typically turn positive only after the appearance of the primary chancre.

❖However, they are not specific for syphilis and can often give false-positive results, so they are inadequate for a definitive diagnosis alone without confirmation from a treponemal test.

Treponemal testing

- Including the fluorescent treponemal antibody absorption and the *Treponema Pallidum* particle agglutination assays, are needed to confirm the diagnosis.
- They typically remain positive for life even after successful treatment, making them ineffective for disease tracking.
- Only quantifiable nontreponemal tests can be used for disease tracking.
- Darkfield microscopy can identify the infecting spirochete in 80% of cases even before serological testing becomes positive but is rarely performed due to technical difficulties.

❖Patients who present with possible neurosyphilis will need a cerebral spinal fluid sample to assist with the diagnostic workup.

❖VDRL testing of the cerebrospinal fluid is highly specific for neurosyphilis but not very sensitive (opposite of blood testing).

❖Treponemal testing of the cerebrospinal fluid is highly sensitive but less specific than the VDRL test for neurosyphilis (the treponemal antibodies often diffuse from the blood into the cerebral spinal fluid, which can also be contaminated by blood cells).

❖HIV testing should especially be performed on all patients testing positive for syphilis.

Trichomoniasis

Women: Diagnosis using NAAT of the vagina, endocervical swab, urine analysis, or urethral sample.

Alternatively, a wet mount will show motile flagellated protozoa.

Patients diagnosed with trichomoniasis should also be tested for chlamydia, gonorrhea, HIV, and syphilis.

Pregnancy—STI Screening Recommendations from the CDC 2021 Guidelines:

❖Sexually transmitted infections can potentially cause serious health consequences for the mother and fetus.

❖Therefore, the CDC currently recommends the following routine STI screenings in pregnancy:

First Prenatal Visit:

❖All pregnant women should be tested for HIV, hepatitis B, hepatitis C, and syphilis.

❖All pregnant women who are at increased risk for infection should also be tested for chlamydia and gonorrhea.

❖Pregnant women who test positive for chlamydia should be retested 3 to 4 weeks after treatment and again within 3 months.

Third Trimester Visit (preferably at or before 36 weeks):

❖Rescreen women younger than 25 years of age or at continued high risk and all those not previously tested for chlamydia, gonorrhea, and syphilis.

❖Pregnant women with high-risk factors or who were not previously tested should be screened for HIV and hepatitis B.

❖Those patients who tested positive for syphilis at the prenatal visit should be retested.

Thank You