HIV in Primary Care – Screening, Diagnosis & Recognizing Acute Infection

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AIDS = CD4+ T Cells <200 OR AIDS Indicator Disease

Untreated HIV

<table>
<thead>
<tr>
<th>HIV RNA</th>
<th>CD4 Cell Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount (copies/ml)</td>
<td>(cells/mm³)</td>
</tr>
<tr>
<td>$10^3$</td>
<td>$10^6$</td>
</tr>
</tbody>
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Viral Load

CD4 Cell Count

4-8 Weeks | Up to 12 Years | 1-3 Years

Illness
Non-AIDS Problems

Bacterial pneumonia
Pulmonary TB
Zoster
Thrush
Oral hairy leukoplakia
HPV-related disease
Anemia
Immune thrombocytopenia
Neuropathy
Lymphadenopathy
USA: More Persons Living with HIV & New Infections Continue

New HIV Infections

People Living With HIV/AIDS

Era of Combination Antiretroviral Treatment (cART)

MMWR. 2008;57:1073-1075
Hall, HI, et al. 2008;300:520-529
USA: Percentage of New HIV Diagnoses by Risk Group

- Male-to-male sex (MSM)
- Heterosexual contact
- Injection drug use (IDU)

www.CDC.gov/
Proportional Distribution of HIV Diagnoses by Age at Diagnosis

USA 2012

- 13-24 years: 22%
- 25-34 years: 29%
- 35-44 years: 21%
- 45-54 years: 19%
- ≥55 years: 9%

www.CDC.gov/
Minorities Disproportionately Affected

New HIV Diagnoses, 2010

Blacks 46%
Hispanics/Latinos 20%
29% Whites

http://www.cdc.gov/hiv/surveillance/
Late HIV Diagnosis

- USA, ~33% have AIDS diagnosis within year of HIV diagnosis
- Iowa, ~42% have AIDS diagnosis
- Life-expectancy decreases with decreasing CD4 counts (AIDS results in 10-30 years of life-lost)

MMWR. Dec 3, 2010/59(47);1550-1555
Multinational cohort study in high-income countries. The Antiretroviral Therapy Cohort Collaboration. Lancet 2008; 372:293
Case 1

45 yo WM presents with recent diagnosis of ITP (treated with prednisone), 30 pound weight loss over past ~6 m, and mild anemia and generalized lymphadenopathy.

Married. 2 sons. Wife works. No injection drug use. No sex outside marriage.

Seen by consultants in 3 different subspecialty areas. Hospitalized in 2015.
Case 1

WHICH OF THE FOLLOWING IS A MANIFESTATION OF HIV INFECTION?

A. Wasting
B. Immune thrombocytopenia
C. Anemia
D. Lymphadenopathy
D. All of the above
Case 1

Screening Test

HIV-1/HIV-2 Ab/HIV-1 antigen test positive

Confirmation Test

HIV-1 and HIV-2 differentiation assay positive for HIV-1 antibody
HIV Infection

Acute Infection

Established Infection

Viral RNA Detection

HIV RNA (plasma)

HIV-1 p24 Antigen

Viral Antibody Detection

Days
Testing for HIV Antibody

Screening Tests

• ELISA - gold standard
  – Sensitivity, >99.7%; Specificity, 99.9%
  – In low risk population, false positive rate is 1/1000-2000

• Rapid point-of-care tests (whole blood or saliva)
  – Sensitivity 99.6-100%, Specificity 99.7-100%*
  – Results in <30 min

*Specificity lower for testing on saliva
Rapid Point-of-Care HIV Tests

INSTI™ HIV-1 Antibody Test
Reveal™ Rapid HIV -1 Antibody Test
Uni-Gold™ Recombigen® HIV-1/2
OraQuick ADVANCE Rapid HIV-1/2 Antibody Test
Chembio HIV 1/2 STAT-PAK™ Assay
Chembio SURE CHECK HIV 1/2 Assay
Chembio DPP® HIV 1/2 Assay
Alere Determine™ HIV-1/2 Ag/Ab Combo*

*Fourth-generation test
Rapid Home-Use HIV Test

The OraQuick In-Home HIV Test will be available in stores and online (final packaging may be different).
New Testing Algorithm

HIV-1/2 antigen/antibody combination immunoassay

(+)

HIV-1/HIV-2 antibody differentiation immunoassay

(-)

Negative for HIV-1 and HIV-2 antibodies and p24 Ag

HIV-1 (+) HIV-1 (-) HIV-1 (+) HIV-1 (-) or indeterminate
HIV-2 (-) HIV-2 (+) HIV-2 (+) HIV-2 (-)
HIV-1 antibodies detected HIV-2 antibodies detected HIV antibodies detected
HIV-1 NAT

(+), indicates reactive test result
(-) indicates nonreactive test result
NAT: nucleic acid test

HIV-1 NAT (+) HIV-1 NAT (-)
Acute HIV-1 infection Negative for HIV-1
Fourth Generation Screen: HIV-1/2 Antibody and HIV-1 Antigen Combo Assays

ARCHITECT HIV Ag/Ab Combo
Alere Determine™ HIV-1/2 Ag/Ab Combo
GS HIV Ag/Ab Combo EIA

http://www.fda.gov/BiologicsBloodVaccines/BloodBloodProducts/ApprovedProducts/LicensedProductsBLAs/BloodDonorScreening/InfectiousDisease/default.htm
HIV-1/HIV-2 Discriminatory Assay
Multispot HIV-1/HIV-2 Rapid Test
Results in 10 min
Use as confirmatory test

http://stacks.cdc.gov/view/cdc/23447
http://www.fda.gov/downloads/BiologicsBloodVaccines/BloodBloodProducts/ApprovedProducts/
Case 2

19 yo WM presents with 3 days of fever, sore throat, headache, malaise, & myalgias

Sex with men

WBC 3.6; lymphs 576 (low), & reactive lymphs 360 (high); platelets 60 (low)

Monospot negative; HIV 1/2 antibody negative
Case 2

Plasma HIV viral load >750,000 cpm
Testing of HIV-1 Viral Load in Diagnosis of Acute Infection

- Nucleic acid amplification test (e.g., PCR)
- HIV-1 RNA detected ~1-3 wks before HIV antibody test
- Typically high viral load (>50,000-100,000 copies/mL)

Requires confirmatory testing if positive
Acute Retroviral Syndrome

- Flu or mono syndrome in ~75%
- Pharyngitis, rash, &/or headache in ~50%

Vanhems P et al. AIDS 2000; 14:0375
Acute Retroviral Syndrome

- Aseptic meningitis, 24%

- Oral ulcers, 15%; genital ulcers, 10%
Routine HIV Testing

Opt-out testing

- Routine voluntary testing for all patients ages 13-64 in healthcare settings, UNLESS rates of undiagnosed HIV <1/1000 (<0.1%)
- Repeat testing based on risk
- All pregnant women*

*It is the law in Iowa

2007 - Iowa Code 141A

Endorsed by American College of Obstetricians and Gynecologists & American College of Physicians in 2008
Cost-Effectiveness

- 1-time HIV screening of low-risk persons and annual screening of high-risk persons
- <$23,000 per QALY gained
- Comparable to screening for type 2 diabetes and breast cancer mammography

(QALY, quality-adjusted life-years)

Treatment is Prevention

More effective than condoms
U.S. Preventive Services Task Force: Grade A Recommendation

- Screen persons ages 15 to 65 for HIV
- "If no HIV-infected patients are found after screening of approximately 4000 patients… routine screening may be discontinued and replaced with risk-based screening”

http://www.uspreventiveservicestaskforce.org/uspstf13/hiv/hivdraftrec.htm
Diagnosed in & Living with HIV in Iowa

Three Counties with Prevalence >0.1%

Statewide average: 68 HIV+ Iowans per 100,000 population (~1/5 of the national prevalence)

Living in 93 of 99 counties

IDPH: 2013 Data
HIV Testing Ever
Ages 18-65
2011

#46
Iowa 31.3%

CDC Report
What to do with a confirmed HIV positive test

- Link to care
- Report to state
  - State handles partner notification & testing*
- Counseling
  - Law mandates, OK to refer

*Iowa Department of Public Health: telephone 515-242-5150
CONCLUSIONS

- Epidemic continues
- Testing made easier, better, faster
- Have low threshold to test, consider routine testing

NIH, CDC, HIVMA/IDSA Guidelines:
http://www.aidsinfo.nih.gov/