

**Understanding Infectious Diseases in Addicted Patients:
Associations, Transmission, Diagnosis and Treatment**



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Alcohol



Alcohol, whether consumed chronically or acutely, alters T lymphocyte functions, immunoglobulin production by B cells, NK cell function, neutrophil and macrophage activities, resulting in an **inability to mount an adequate primary immune response.**

Alcohol Abuse, HIV and Infectious Disease. NIH Guide.
Volume 24, Number 20, June 2, 1995.

Alcohol

- People who misuse alcohol, speed, crack cocaine, poppers or other drugs are more likely than non-substance users to be HIV positive and to become seropositive.
- People with a history of substance abuse are also more likely to engage in high-risk sexual activities.



Leigh BC, Stall R. Substance use and risky sexual behavior for exposure to HIV. American Psychologist. 1993;48:1035-1045.

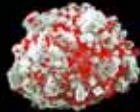
Alcohol

- Alcoholic patients often show pronounced frequency and severity of opportunistic infections.
- These infections, often arise secondary to immunosuppression and are the principal cause of morbidity and mortality in HIV.



Alcohol Abuse, HIV and Infectious Disease. NIH Guide. Volume 24, Number 20, June 2, 1995.

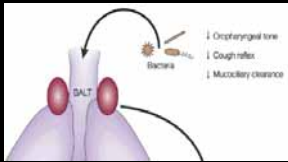
Alcohol



- Alcohol may be a co-factor in HIV infection.
- Alcohol intoxication may increase the susceptibility of the host to HIV infection.
- In the setting of binge or chronic alcohol use, more cells become infected with the virus at an early stage or infected cells produce more virus.

Bagby GJ, et al. Simian immunodeficiency virus, infection, alcohol, and host defense. Alcohol Clin Exp Res. 1998 Aug;22(5 Suppl):193S-195S. Review.

Alcohol



Alcohol use is associated with **pulmonary disease**.

- Pulmonary infections, especially **chronic bronchitis**, **bacterial pneumonia**, and **tuberculosis** have the strongest association with alcoholism.
- The incidence and prognosis of pulmonary infections is worse in alcoholics than in abstainers.

Nelson S, Kolls JK. Alcohol, host defence and society. *Nature Rev Immunol*. 2002 Mar;2(3):205-9. Review.

Injection Drug Use

heroin * **methamphetamine** * cocaine



Overview of Hepatitis

HAV

- Fecal-oral
- Most will clear virus and have life-long immunity
- Risk to IDU's = 40-70%

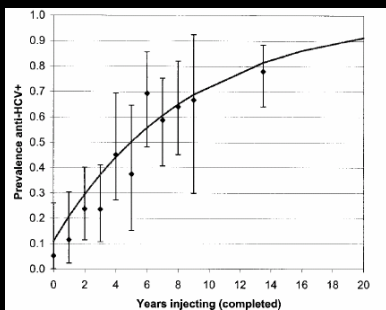
HBV

- Sexual transmission, blood, breast milk, vertical transmission (>90%) and household contacts
- 6-10% become "chronic carriers"
- Risk to IDU's = 50-90%

HCV

- Blood, sex (but not as frequent)
- >70 % become "chronic carriers"
- Risk to IDU's = 50-90%

HCV



Hepatitis C Virus Infection & Needle Exchange Use Among Young Injection Drug Users in San Francisco

Hahn, Page-Shafer, Lum, Ochoa, Moss, *Hepatology*, July 2001



HCV Risk in Injection Drug Users

- Injection drug use is the most common risk factor for new HCV infections in the United States.
- Seroprevalence in IDU 65-96%
- IDU's who are unaware of HCV+ status engage in more risk behaviors than those who are aware.
- Kwiatkowski et al. *Addiction*, Mar. 2002
- "Efforts should be made to increase the availability of the best current treatments to IDU's."
- NIH Consensus Statement 9/02

HCV Treatment

Chronic HCV

- Pegylated Interferon & Ribavirin
 - Treatment up to one year, usually weekly injections
 - Depends on viral load & genotype (genotype 2,3 > genotype 1)
 - About 50% of patients clear virus
 - Mental health services important
 - Concomitant alcohol treatment



HAV

Vaccine

- Two shots over a 6-18 month period
- One shot is probably about 95% effective
- Protection estimated to last 20 years
- Important in co-infection

Treatment

- Symptomatic
- Cleared infection = life-long immunity

HBV

Vaccine

- Three shots over a 4-6 month period
- Accelerated schedules (0-1-3)
- Protection estimated to last 15 years
- Important in co-infection

Treatment

- Most clear the virus
- 3TC, Alpha Interferon



Bacterial Endocarditis in IDU

Tricuspid valve endocarditis has been associated most frequently with IDU.

Recent reports have suggested that involvement of left-sided valves is seen more often now than in the past.

Transesophageal echocardiography has greatly advanced the ability to diagnose infective endocarditis.

Look for **fever, chills, malaise, heart murmur, petechiae.**

Get **blood culture.** Most IDU's have **Staph aureus.** Tx: **oxacillin & gentamicin.**



Enterobacter Agglomerans "cotton fever"

Cotton plants are heavily colonized by a strain of bacteria known as Enterobacter Agglomerans.

First noted in the early 1940s with farm workers who breathed in large quantities of unprocessed cotton.

Cotton fever is usually a febrile, leukocytic syndrome.

Benign, self-limited.

May mimic sepsis, pneumonia or endocarditis in IDU.



Soft Tissue Infections

Skin and soft tissue infections are the **most common cause for hospital admission** of injection drug users.

Abscesses, cellulitis, necrotizing fasciitis (flesh eating bacteria).

Most are **polymicrobial** infections and include anaerobic organisms as well as aerobic gram-positive cocci.

Highly lethal "outbreak" infections often with **Clostridia** spp, including *C. novyi* and *C. perfringens*.



Care of Injection Drug Users With Soft Tissue Infections in San Francisco, California

Hobart W. Harris, MD, MPH; David M. Young, MD
Arch Surg. 2002;137:1217-1222.

Costs to SFGH for ED and inpatient care:
20 million per year

Integrated Soft Tissue Infection Services:
ISIS Clinic reduced emergency department visits (-33.9%)
surgical service admissions (-47.3%)
inpatient acute care bed days (-33.7%)
operating room procedures (-71%)
saving approximately \$8.7 million in the first year

Osteomyelitis

Insidious onset, present with indolent symptoms, diagnosis is frequently delayed.

Left shift on CBC. Elevated CRP, Alkaline Phosphatase, ESR.

For etiologic diagnosis of these infections, bone biopsy or needle aspiration of the involved bone or joint is required.

Failure to manage acute bone and joint infection aggressively inevitably leads to chronic, often incurable, infection.



MRSA

Staphylococcus aureus is the single most common cause of bacterial infections among drug users.



Six of 14 patients with necrotizing fasciitis due to community-associated MRSA at Harbor UCLA Medical Center were current or former injection-drug users.

Community-associated MRSA infections have also been reported among prisoners, and men who have sex with men who use crystal methamphetamine.

Many MRSA strains are susceptible to **TMP-SMX, clindamycin, and rifampin***. Virtually all are susceptible to **vancomycin**.

*Rifampin decreases methadone levels and PI levels.

Methamphetamine

Methamphetamine has been linked to "outbreaks" of STI's across the country, including Gonorrhea in Wyoming, Syphilis in San Francisco, and one highly resistant strain of rapidly progressive HIV in New York City.

Methamphetamine may act as an HIV cofactor expression of a receptor called DC-SIGN, a "virus-attachment factor," allowing more HIV virus to invade the immune system.



Nair et al. Methamphetamine Modulates DC-SIGN Expression by Mature Dendritic Cells. Journal of NeuroImmune Pharmacology, 2006

Crack/Meth Pipe

crack cocaine or methamphetamine is placed in the pipe



some pipes are designed with a water bowl which cools the vapor prior to being drawn into the lungs

heat is added, usually with a cigarette lighter, causing the crack or meth to vaporize so it can be drawn into the lungs

Crack Cocaine



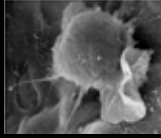
Crack strongly associated with Sexually transmitted diseases: HIV, Treponema pallidum, Herpes Simplex Type 2 infections, Chlamydia and Gonorrhea.

In a Contra Costa County study, 16% of patients with newly-diagnosed tuberculosis smoked crack cocaine, and 1/3 of these persons frequented crack houses where cocaine was sold and used.

"Crack Lung": eosinophilic pneumonia vs. bacterial pneumonia in the setting of shortness of breath, fever and hemoptysis in a crack smoker (response to steroids vs. antibiotics).

Heffner J, Harley R, Schabel S. Pulmonary reactions from illicit substance abuse. Clin Chest Med 1990; 11:151-162.

Crack Cocaine



Pulmonary alveolar macrophages from crack smokers are less active than those of nonsmokers in destroying *Staphylococcus aureus* (a common cause of bacterial lung infection).

People with HIV are at increased risk for **bacterial pneumonia** when they smoke crack.

Laposata E, Mayo G. A review of pulmonary pathology and mechanisms associated with inhalation of freebase cocaine ("crack"). Am J Forensic Med Pathol 1993; 14:1-9.

Marijuana



Studies suggest that cannabinoids modulate the function of T and B lymphocytes as well as NK cells and macrophages. Thus, cannabinoids increase susceptibility to infectious disease.

Cabral et al. Drugs and immunity: cannabinoids and their role in decreased resistance to infectious disease. J Neuroimmunol, 1998.

Smoking marijuana increases a smoker's risk of developing chronic bronchitis and bacterial pneumonia.

Marijuana smoke can be also contaminated by pathogenic bacteria and fungi that can cause pneumonia.

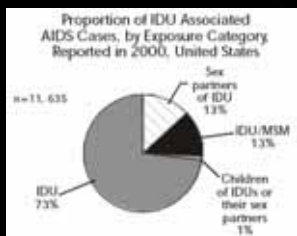
Hubbard et al. Marijuana: medical implications. Am Fam Physician, 1999.

People with HIV are at increased risk for bacterial pneumonia when they smoke marijuana.

Caiaffa et al. Am J Respir Crit Care Med, 1994.

IDU Associated AIDS Cases

Since the epidemic began, injection drug use has directly and indirectly accounted for more than one-third (36%) of AIDS cases in the United States



Drug-Associated HIV Transmission Continues in the United States, CDC.

HIV

- People who abuse alcohol, speed, crack, poppers or other non-injected drugs are more likely than non-substance users to be HIV positive.
- Crack cocaine use has been shown to be strongly associated with the transmission of HIV.
- Often believed that unprotected sex while under the influence accounts for drug/alcohol HIV risk.
- Sexual networks and sexual mixing might better explain risk.
- 25% of those who are HIV+ are co-infected with HCV in U.S.

Center for AIDS Prevention Studies, UCSF

HIV

Treatment

Begin HAART in any of the following situations:

- Symptomatic (any CD4 or viral load)
- Asymptomatic with CD4 <200 and any viral load
- Pregnant women

Regimens should include 3 drugs, preferably from different 2 different categories such as one nucleoside reverse transcriptase inhibitor (NRTIs) a protease inhibitor, and a non-nucleoside reverse transcriptase inhibitor (NNRTI).

Center for AIDS Prevention Studies, UCSF

Tuberculosis

- Those who use alcohol and drugs are at increased environmental risk for TB (shelters, jail/prisons, treatment programs) and because of their elevated risk for HIV infection.
- Chronic alcoholism has been associated with tuberculosis for 50 years in the medical literature.
- Drug users are from 2-6 times more likely to contract TB than nonusers.



Sources: NIDA, SAMHSA, NIH

Tuberculosis

Recommended screening for latent TB:

- Immigrants, HIV+, Homeless persons, Health care workers, IDU's, Chronic illnesses
- 5mm (HIV, TB contacts)
- 10mm (IDU, immunocompromised, us)
- 15mm (everybody else)

Treatment:

Active TB: "RIPE"

Rifampin*, INH, Pyrazinamide, Ethambutol

Latent TB: INH (for 9 months)

Hepatotoxicity: Monitor liver function if abnormal at baseline



*Rifampin decreases methadone levels and PI levels.

STI's

Chlamydia (urine DNA)

For most cases of uncomplicated chlamydial infections, doxycycline 100mg orally twice a day for 7 days or azithromycin 1,000mg orally one time is the treatment of choice. Treat partner, treat for gonorrhea.

Gonorrhea (urine DNA)

Ceftriaxone 125mg IM one time dose, or single-dose ciprofloxacin 500mg, cefixime 400mg, or ofloxacin 400mg. Treat partner, treat chlamydia.

Syphilis (RPR, VDRL, FTA-ABS)

Penicillin IM is treatment of choice for all stages of syphilis. For patients who cannot take penicillin: doxycycline, tetracycline, or erythromycin.

Genital Herpes (culture, clinical observation)

There is no treatment that can cure genital herpes; the virus will always be in the body. Acyclovir, valacyclovir, and famciclovir can shorten outbreaks and make them less severe, or stop them from occurring.



Thank you.
