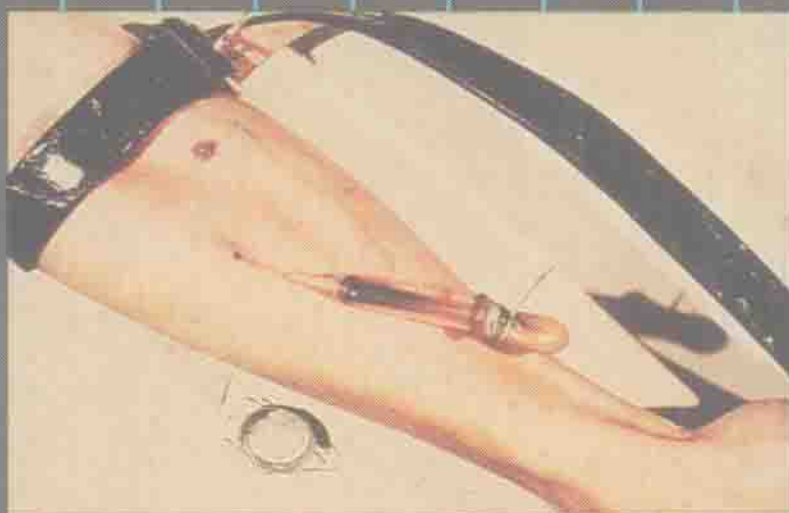


ILLUSTRATED HANDBOOK OF  
**DRUG  
ABUSE**  
RECOGNITION AND DIAGNOSIS

HOWARD S. ROBIN  
JOSEPH B. MICHELSON



# **ILLUSTRATED HANDBOOK OF DRUG ABUSE RECOGNITION AND DIAGNOSIS**

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This small volume is dedicated to the memory of Drs. Frank Raasch and Gonzalo E. Aponte, whose distinguished scholarship and generous commitment to students of medicine stimulated this book. If just one human being frees himself from the bondage of drug abuse through the assistance of this book, then our effort shall have been worthwhile.

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# FOREWORD

In January of 1988, the Centers for Disease Control reported that more than 50,000 people had developed the acquired immune deficiency syndrome (AIDS) in the United States. Although the majority of patients were homosexual and bisexual men, an additional 8% were homosexual male intravenous drug abusers, and 17% were heterosexual male and female intravenous drug abusers. The Centers for Disease Control also reported more than 700 cases of AIDS in children under the age of 13. The most common risk factor for these children was intravenous drug abuse by a parent. Thus, in the United States, intravenous drug abuse is a major risk factor for the development of AIDS, as it is reportedly in association with more than 25% of all cases.

The majority of health professionals in the United States have little, if any, experience with the complications of drug abuse. Prior to the emergence of AIDS, intravenous drug abusers commonly presented with psychosocial behavior, fevers, anemia, and respiratory failure; the differential diagnoses included dependency, a variety of infections, and acute narcotism. More recently, however, intravenous drug abusers have been exposing and infecting each other with the human immunodeficiency virus (HIV). The modes of HIV transmission are parenteral, homosexual and heterosexual intercourse, and from mother to child during the perinatal period. Once infected with HIV, many of these children and adults are depleted of T-helper lymphocytes. The HIV-infected intravenous drug abuser who presents with neuropsychiatric problems, fevers, anemia,

hepatitis, and/or respiratory distress may be profoundly immunodeficient, and the differential diagnoses must now be expanded to include a plethora of autoimmune phenomena, unusual opportunistic infections and malignancies, and subacute encephalitis. Children of drug-abusing parents who present with failure to thrive, fevers, and/or respiratory distress may be suffering from HIV-associated pulmonary lymphoid hyperplasia/lymphoid interstitial pneumonitis, recurrent bacterial infections, and the unusual opportunistic infections and malignancies seen in adults with AIDS.

At a time when drug abuse is rampant within our population, and there is no efficacious vaccine or cure for AIDS, our only effective weapon is education. Now, more than ever before, medical professionals must become familiar with the complications of drug abuse. The authors of *Illustrated Handbook of Drug Abuse: Recognition and Diagnosis* present an intelligent and comprehensive review of a most complicated problem. Using hundreds of excellent illustrations, photographs, and photomicrographs, the reader is guided through:

1. A historical perspective of the opiates, depressants, stimulants, and hallucinogens.
2. The diagnosis and recognition of drug abuse.
3. The psychiatric presentation of substance abuse.
4. The dermatologic, ophthalmologic, cardiovascular, pulmonary, hepatic, renal, obstetrical, and central nervous system complications of drug abuse.

An entire chapter is devoted to the acquired immune deficiency syndrome. Its epidemiology, virology, immunology, diagnostic serologies, and infectious and malignant complications are explored. Yet another chapter describes the laboratory support needed for the diagnosis of infections in parenteral drug abusers.

As drug abuse continues to disrupt lives, families, and the health of a nation, we must learn to deal with this chaotic dilemma. The *Illustrated Handbook of Drug Abuse: Rec-*

*ognition and Diagnosis* clearly provides the vast information so desperately needed by health professionals in this time of crisis.

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## **AUTHORS' NOTE**

This atlas utilizes anatomic and clinical pathology photographs, diagnostic radiographs, cardiographic studies, and descriptive clinical features to illustrate the medical complications of prescription and illicit drugs taken via the parenteral route. The objective of this book is to assist the professional in the recognition, treatment, and prevention of drug abuse and its protean complications.

*Howard S. Robin, M.D.*

*Joseph B. Michelson, M.D., F.A.C.S.*

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## **CHAPTER 1**

# **INTRODUCTION**

## **GENERAL CONSIDERATIONS**

One of the most pervasive problems facing our society today is drug abuse. Disgruntled segments of our society are prone to the seduction of drugs and their mood-altering capabilities. The feelings of alienation, stress, grief, and depression present in our society can be and often are chemically alleviated.

### **Causes of Dependence**

The underlying cause of drug dependence is still elusive. Theories about susceptibility to dependence include at least three elements: (1) psychologic factors, (2) genetic factors, and (3) the dose-time relationship, or how often or how much of the drug is taken. Any of three paths can lead to drug dependence: experimentation and curiosity, a search for oblivion, and a desire to alter one's mood. If the experimenter finds that the pleasurable effects outweigh the bad effects, he or she will probably develop a desire to repeat the experience. Desire can develop to such an intensity that the abuse becomes an obsession and the abuser's life centers around seeking and using the drug.

### **Complications of Parenteral Drug Abuse**

Drugs of abuse can be "snorted," smoked, injected into the soft tissues ("skin popping"), or injected directly into a vein ("mainlining"). The most profound morbidity of drug abuse is associated with the intravenous injection of drugs.

The drug culture is "indebted" to the treatment of schistosomiasis in Egypt in the 1930s for the introduction of the syringe as the ultimate vehicle for opiate abuse.

Currently, drugs are prepared for injection by dissolving a powder, tablet, or capsule in water and heating it in a small receptacle (frequently a bottle cap or spoon) known as a "cooker." The solution is then drawn into a cylinder, syringe, or eyedropper, known as the "works." A wisp of cotton may serve as a filter over the orifice to prevent injection of large particulate material undissolved by the heating process, but often this procedure is unsatisfactory. The end of the needle is usually crudely sterilized over a match. When the needle is inserted into the vein, blood is drawn back into the syringe and mixed with the drug-containing solution. Often, to verify that the contents were infused into the vessel, additional blood is drawn into the cylinder and mixed with residual drug and reinjected. The "works" are then passed to a companion who repeats the same procedure with the blood-contaminated needle and syringe. The initial venous entry sites are often the antecubital fossae. These veins soon become sclerosed, and the addict begins using the veins of the back of the hand or the lower extremities. As a last resort, the parenteral drug abuser will resort to "skin popping," often into joint spaces and bursae, when he or she can no longer locate or inject into a subcutaneous vein.

Complications of drug abuse include physical or chemical injury and bacterial, fungal, protozoan, and viral infections.

### **Drug and Chemical Injury**

Drug-mediated injury is the result of side effects, toxic effects, allergic or immune-mediated reactions, and idiosyncratic response. A side effect of intravenous cocaine injection is an accelerated ventricular rhythm. Cocaine acts by enhancing cardiac automaticity through direct sympathetic stimulation, alterations at the peripheral nerve endings, and direct action on myocardial tissue. The toxic effects of cocaine include hyperthermia, convulsions, and respiratory failure.

An immune-mediated complication of intravenous abuse of heroin, cocaine, or amphetamine is necrotizing cerebral

vasculitis, histologically identical to polyarteritis nodosa. Secondary forms of systemic amyloidosis, an immune-mediated disorder, are associated with the chronic subcutaneous injection of heroin. Injection of foreign particulate material is believed to impair the immune system and lead to reduced immune responsiveness to infectious agents. The virulence of the human immunodeficiency virus (HIV) for causing acquired immune deficiency syndrome (AIDS) in parenteral drug abusers may be related in part to the synergistic effect of antigenic overload caused by chronic exposure to chemical contamination with illicit drugs, thus leading to activation of the virus.

Sudden death after the intravenous injection of heroin is an idiosyncratic reaction to the drug.

### **Infectious Complications of Drug Abuse**

The intravenous drug abuser is susceptible to a vast array of infections of all organ systems. The total disregard for aseptic technique, contaminated illicit drugs and diluting substances, the sharing of injection paraphernalia by several people, and the direct infusion of organisms into the bloodstream and subcutaneous tissue are all responsible for these devastating complications of parenteral drug abuse.

Viral hepatitis is the most common infectious complication of addiction, associated with three hepatotropic viruses all with a potential for the chronic carrier state. Seventy-five percent to 98% of parenteral drug abusers have shown serologic evidence of hepatitis B virus (HBV) infection, past or present, as compared with 13% of controls. NonA/nonB viral hepatitis has been reported in 14.3% of drug addicts in a Sydney study, in 25% from a Swedish report, and in 20%–25% of U.S. drug addicts. The recently identified hepatitis delta virus (HDV) is virtually confined to parenteral drug addicts and their contacts currently coinfecting with the HBV. The prevalence of HDV infection among addicts with HBs-Ag-positive hepatitis was 64% (104/161) in Italy; 44% (8/18) in Denmark; 33% (11/33) in Switzerland; 31% (15/49) in Ireland, and 43.6% (24/55) in the United States. Fulminant hepatitis is a prominent feature of acute HDV infection.

Bacterial infections of the heart (endocarditis) or eye (en-



dophthalmitis) in an otherwise healthy young person should suggest the possibility of parenteral drug abuse. Bacterial endocarditis is a frequent and well-recognized complication of parenteral drug addiction. The tricuspid valve is the most frequently involved and also the easiest valve lesion to detect. The most common bacteria isolated is *Staphylococcus aureus*.

Fungi, most commonly *Candida* species, are responsible for endocarditis with a resultant high mortality rate among intravenous (IV) drug users. More than 20% of fungal endocarditis cases are associated with parenteral drug abuse. *Candida* is also the most common fungal agent associated with eye infections in parenteral drug addicts.

The protozoan infection most commonly associated with intravenous drugs is malaria. Halpern reported 136 malaria-related deaths of heroin addicts during the early 1930s in New York City. Servicemen with parenteral drug problems returning from Southeast Asia were incriminated as the source of malaria outbreaks in the late 1960s and early 1970s in the U.S.

Acquired immune deficiency syndrome is the deadliest infectious complication of parenteral drug abuse. The use of intravenous drugs predisposes to AIDS through the transmission of the human immunodeficiency virus (HIV). Almost one in four AIDS victims in the U.S. is a parenteral drug abuser. Studies in New York and other large eastern cities show that nearly 80% of intravenous drug abusers have antibody to the HIV. Male IV drug addicts frequently transmit the HIV to their female sexual consorts, and these women may transmit the infection to their children. In the future, many of the presently asymptomatic HIV-infected drug addicts and their sexual contacts will develop severe opportunistic infections and unusual neoplasms as a result of acquired immune deficiency.

## **DIAGNOSIS AND RECOGNITION OF DRUG ABUSE**

The skin, subcutaneous tissues, lungs, eyes, liver, kidneys, brain, heart, placenta, and unborn child can all

be injured by drugs of abuse. All health professionals responsible for the management of individuals who take drugs via the parenteral route must be well-versed in the clinical, radiologic, and laboratory aspects of AIDS. The appropriate use of the clinical microbiology laboratory will lead to the rapid diagnosis of the specific organism responsible for the drug abuser's infection, essential for successful therapy. The psychologic profile of the parenteral drug abuser can only be described in words. This atlas utilizes anatomical and clinical pathology photographs, diagnostic radiographs, cardiographic studies, and clinical features to assist in the recognition, treatment, and prevention of drug abuse and its protean complications. This book will discuss and illustrate the medical complications of prescription and illicit drugs taken by the parenteral route.

## **HISTORICAL PERSPECTIVE**

Drugs are classified into categories according to their primary somatic effects. These include the opiates, the depressants, the stimulants, and the hallucinogens.

### **Opiates**

The early use of opium seems to have been limited mostly to medical practice and religious ritual. All of the major ancient civilizations had knowledge of the opiates, beginning with the Sumerians around 3000 B.C. By the fifth century B.C., Greek physicians recommended the avoidance of opium. Homer's nepenthe was one such drug, used to banish pain and sorrow. It may have been an extract of cannabis or a form of opium.

Arabs carried opium to eastern Asia, where the Indians and Chinese incorporated it into their pharmacopeia. When tobacco smoking began in the 1600s, the Chinese mixed this with opium and soon a drug problem was extant in all of China. By the middle of the 19th century, millions of Chinese men, but very few women, habitually smoked opium. Much of the opium used in China came from India's exportation by the British, eventuating in the opium wars of 1842 and 1858. The British triumphed, and China continued in its opium daze.

Meanwhile, the West discovered morphine and invented the hypodermic syringe. Their use during the Civil War produced a large wave of addicts in the U.S. Morphine was first thought to be the answer to the opium addiction. Then in 1898, a "cure" for morphinism was hailed. It was called heroin because it was thought to be the "heroic" cure.

Control of opium abuse began in 1875 with an act passed in San Francisco to suppress opium smoking. In 1914, the Harrison Narcotic Act imposed a tax on the importation and manufacture of opiates and cocaine, in effect outlawing these substances. Illegal use of opiates, especially heroin, continued at a chronic low level until the 1950s when a meteoric increase began in heroin abuse. The government responded by increasing narcotic penalties. The 1960s and early 1970s saw an epidemic rise in narcotic-related deaths, especially in New York City. In 1970, Congress passed the Comprehensive Drug Abuse Preventions and Control Act. Unfortunately, this control has not stemmed a fabulously lucrative illicit drug market that extends from Iran, Pakistan, Afghanistan, and Colombia to France, Yugoslavia, Turkey, Germany, and Mexico, finally wending its way surreptitiously into the United States.

### Depressants

Except for alcohol, the sedative-hypnotic drugs have had a shorter and less colorful history than narcotics. Bromine salts and the first medicinal sedatives came into use during the latter half of the 19th century and were followed by chloral hydrate and paraldehyde. Barbituric acid was synthesized in 1863, but the depressant activity of barbitol (a diethyl derivative) was not reported until 1902. Three years later, the Germans reported chronic barbiturate intoxication and withdrawal reactions, but not until 1950 did Isbell and coworkers firmly establish the capability of barbiturates to produce physical dependence. The discovery of other sedatives and hypnotics progressed with the growth of the legitimate drug industry. The later-arriving minor tranquilizers with pharmacologic qualities similar to the sedatives now account for a large share of the legally prescribed mind-altering drugs.