

# Anesthetic Interactions with Abused Substances

David J. Birnbach, MD, MPH

Professor and Vice Provost

University of Miami

Director, UM-JMH Center for Patient Safety

Miller School of Medicine

What's the Relevance of  
Drug Abuse  
to Pediatric Anesthesia???

Let's take a look at a few real  
cases...

## Case 1:

A 14 year old is brought to the Emergency Room by ambulance having been hit in the face with a baseball bat during a gang-related event. He has sustained a Le Fort 3 fracture. On admission his vital signs are BP: 150/100, HR=160, SpO2=94. The patient is confused and combative. Toxicology is positive for cocaine, alcohol, and 4 methyl methcannabinone (mephedrone). Maxillofacial surgery wants to operate immediately.

## Case 2:

A 13 year boy old is admitted via ambulance following a 911 call reporting what sounded like a seizure and loss of consciousness. He was at a party at a classmate's house (parents were at work) along with 6 other 8th graders. They had a combination of drugs in a bowl (found in their parent's medicine cabinets) and were taking turns taking the unknown drugs.

The EMT does not know which prescription drug(s) the young man has ingested but the following prescription bottles were found at the site:

**Adderall, Vicodin, Oxycodone, Celebrex, Lyrica (pregabalin), Lamictal, Sinemet (carbidopa), Vytorin, Abilify (Aripiprazole), Imitrex (sumatriptan), Capoten (captopril), Lopressor (metoprolol), Minoxidil, Flexeril (cyclobenzaprine), Ultram (tramadol), Nucynta (tapentadol), and Multaq (dronedarone). In addition, there are 5 unidentified pills.**

The EKG shows a right bundle branch block and sinus bradycardia. Spontaneous respirations at 4. On arrival to ED, pulse oximeter reading is 80. Anesthesia is called to intubate the patient following several failed attempts by the EMT and ED physician.

Newer Drug of Abuse

*At least according to  
Rolling Stone Magazine...*



# Hot off the press and definitely not for the squeamish!

The Rolling Stone logo is displayed in its characteristic red, stylized font with a black outline and a drop shadow effect.

## What Is Meow Meow, the Drug That Made a Teen Cut Off His Genitals?

A look at the powerful amphetamine that caused a recent user to engage in horrific self-mutilation

by Juliana Escobedo Shepherd

# JANUARY 17, 2014

Of all the nicknames for a street drug, the newish "meow meow" might be the most innocuous ever, but its effects can be gruesome. On December 29th of last year, a British 19 year old, home for the holidays and geeking on meow meow, stabbed his mother before cutting off his own penis with the same knife. According to [The Mirror](#), police responded to an emergency call placed by his mother, 46, and discovered the son "hanging out of a bedroom window with blood pouring from his wounds." As of early January, the mother was in stable condition, and the son's penis had been reattached. "He is normally a very lovely lad and very bright," reported a family friend. "But unfortunately, he had started dabbling in drugs."

# Commonly Abused Substances *(in the Adolescent and Pregnant Patient)*

- Cocaine / Crack
- Opioids
- Amphetamines
- Marijuana
- Alcohol
- Tobacco

Drug Abuse and Anesthesia  
*Where Are We Now?*

# Drug and Alcohol Arrests Increase at Colleges

By The New York Times

WASHINGTON, May 22 — Drug arrests rose by 7 percent and alcohol arrests by more than 3 percent on college campuses in 1997, the sixth consecutive year of increases, according to a survey being released on Monday by The Chronicle of Higher Education, a national newspaper that covers education and academic life.

In 1996, alcohol arrests increased by 10 percent and drug arrests by 5 percent. As in past years, college law enforcement officials and administrators attributed the rise to aggressive enforcement policies rather than to more use of drugs and alcohol.

15 in 1995 and 19 in 1996 to 13 in 1997.

The number of reported sex assaults grew from 1,049 to 1,053. Other sex offenses — including statutory rape, incest, indecent exposure and lewd behavior — were down 29.5 percent to 93. But safety experts noted that sex offenses are the crimes least likely to be reported by victims.

About 40 percent of the schools surveyed indicated that hate crimes had occurred on their campuses in 1997; only about a third reported this in the previous survey.

The University of California at Berkeley (with an enrollment of 29,797), the top institution in drug

arrests in 1996, topped the list in 1997 with 179. It was followed again by San Jose State University, with 162. There were 142 arrests at the University of Arizona, 127 at Arizona State University and 126 at the University of Utah.

For the second year in a row, Michigan State University (with an enrollment of 41,545) reported the highest number of alcohol arrests, 633. Next came the University of Minnesota-Twin Cities, with 555. They were followed by the University of California at Berkeley, with 460; Western Michigan University, with 401, and the University of Wisconsin at Madison, with 342.

## *Florida Reports Record Of Dead With Cocaine*

MIAMI, April 15 (Reuters). — The number of people in Florida who died with cocaine in their bodies last year rose to a record 1,039, more than 25 percent of them in Miami, the Florida Department of Law Enforcement said today.

It was the fifth yearly increase in a row, after 1,011 in 1996, according to figures from medical examiners. The department said that the deaths had not necessarily been caused by overdoses but that traces of the drug had been found in the bodies.

The highest number of deaths was 266 in Miami, though this represented a 19 percent decline over last year. Miami was followed by Orlando, with 93 reported deaths, and Tampa with 83.

“Florida’s medical examiners are finding the presence of this illegal drug in all categories of death investigations, including those who die as the result of an accident, suicide, homicide or natural causes,” said Dr. Joan Wood, who heads the Medical Examiners Commission.

# Cocaine / Crack

# The New York Times

**Late Edition**  
New York: Today, rain ending at 47. Tonight, rain ending at Low 39. Tomorrow, showers. High 46. Yes low 34. Details are

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NEW YORK, SUNDAY, FEBRUARY 28, 1999

\$3 beyond the greater New York metropolitan area.

While the crack cocaine scare of the 1980's ushered in an unprecedented Government campaign to eliminate the drug trade, use of crack has remained relatively low and static compared with other drugs. The National Household Survey on Drug Abuse, conducted by the Department of Health and Human Services, began monitoring crack use in 1988. Below is a comparison of the survey's findings for three illegal drugs.

**Estimated number of users in the United States, 1997**



MARIJUANA

11 million



POWDER COCAINE

1.5 million



CRACK

0.6 million

## War on Crack Retreats, Still Taking Prisoners

By TIMOTHY EGAN

VICTORVILLE, Calif. — Every 20 seconds, someone in America is arrested for a drug violation. Every week, on average, a new jail or prison is built to lock up more people in the world's largest penal system.

It was not always so. Ten years ago, half as many people were arrested for drug crimes, and the nation's incarceration rate was closer to those of other democracies. But in the 1980's crack cocaine scared the country, and the criminal justice system has never been the same.

Crack poisoned many communities. Dealers turned neighborhoods into drug markets. As heavily armed gangs fought over turf, murder rates shot up. Authorities warned that crack

**CRACK'S LEGACY**

First of two articles.

was instantly addictive and spreading rapidly, and predicted that a generation of crack babies would bear the drug's imprint. It looked like a nightmare with no end.

But for all the havoc wreaked by crack, the worst fears were not realized. Crack appealed mainly to hard-core drug users. The number of crack users began falling not long after surveys began counting them. A decade later, the violence of the crack trade has burned out, and murder rates have plunged.

Yet crack left its mark, in ways that few

people anticipated. Crack prompted the nation to rewrite its drug laws, lock up a record number of people and shift money from schools to prisons. It transformed police work, hospitals, parental rights, courts.

Crack also changed the racial makeup of American prisons. More whites than blacks use crack, according to surveys, but as the war on drugs focused on poor city neighborhoods, blacks went to prison at a far higher rate. Here in California, five black men are behind bars for each one in a state university.

But the harsh laws responding to crack have not reduced overall drug use. And now the

Continued on Page 22

### INSIDE

**Internal G.O.P. Battles**

California's Republican Party regulars gathered this weekend, licking their wounds from November's defeats and spoiling for fights. Page 14.

**Fear Itself**

Scientists can now see what terror and anxiety look like in the brain, and may soon know how to treat them.

MAGAZINE

**Waiting for Lindros**

In Philadelphia, the Flyers are waiting for Eric Lindros to deliver on his star power.

SPORTS SUNDAY

**Ozzie and Who?**

Suburbia has become ever more varied by race, class and ethnicity, but artists and entertainers haven't caught on. They're mostly peddling the same old homogenized image of white split-level affluence.

ARTS & LEISURE

**Rotten Youth**

The British schoolboy is at his 1950's worst in "The Peculiar Memories of Thomas Penman," a novel by the screenwriter and director Bruce Robinson; reviewed by Patrick McGrath.

BOOK REVIEW

**SPECIAL TODAY  
Going Places**



Walking in the Lake District, cruising down the river to Venice, taking to the road to Ladakh (not easy) and from Alaska

to New Mexico (great diners on the way). Hanging out in Buenos Aires, to a tango, or in Vienna, to a waltz. Or vegging out in Jamaican resorts. SOPHISTICATED TRAVELER

306 DAYS TO GO! THE NEW YORK TIMES Magazine Millennium Countdown — ADVT.

**The Never Ending Story**

Just when you thought it was over, the Clinton scandal saga limps forward.

WEEK IN REVIEW

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In New York City and the metropolitan region.

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Updated news: [www.nytimes.com](http://www.nytimes.com)

# Cocaine

- Inhibits Nerve Conduction
- Prevents Re-Uptake and Deactivation of Norepinephrine at Adrenergic Neuron
- Results in Increased Levels of Circulating Catecholamines



# Drug Abuse Statistics

## Cocaine

- > 5 Million Abuse Cocaine Regularly
- >15% of the U.S. Has Used Cocaine
- >30 Million Americans Have Tried Cocaine
- Parturients use cocaine
- Adolescents use cocaine

# NOT JUST INNER CITIES:

*COCAINE USE HAS BEEN  
DETECTED IN PRIVATE  
PATIENTS UNDERGOING  
ELECTIVE SURGERY IN  
SUBURBAN HOSPITALS*

# The Underreporting of Cocaine- Related Trauma: Drug Abuse Warning Network Reports vs. Hospital Toxicology Tests.

Brookhoff D, Campbell EA, Shaw LM

Am J Public Health 1994;84:1340

# Results:

- 38% of Trauma Cases Tested Positive for Cocaine
- Of All Patients Injured in Motor Vehicle Accidents, 20% Were Positive for Cocaine
- Patients Under the Age of 40 Involved in MVA, 30% Tested Positive for Cocaine
- Greater Than 50% of Patients Who Were Victims of Violent Assault Tested Positive for Cocaine

## *For Example....*

Patient is admitted to L&D at 34 weeks gest in labor. She is “unregistered”. Her admission BP is 160/110 (with +1 proteinuria and edema). She asks for labor analgesia, which is provided by a Combined Spinal Epidural technique. Spinal fentanyl is administered and an infusion of bupivacaine plus fentanyl is begun.

Post procedure pruritus is treated with naloxone. Shortly thereafter, she is noted to have a diastolic BP of 130 and fetal bradycardia. On exam she is noted to have vaginal bleeding. Diagnosis of *abruptio placenta* is made and patient is brought to OR for an emergency cesarean delivery. General anesthesia is induced and surgery starts. Newborn is unresponsive, Apgar score at 1 minute is 1 and anesthesia is asked to help provide neonatal resuscitation.

# Signs and Symptoms of Cocaine Use

- Hypertension / Tachycardia
- Convulsions
- Hyperreflexia / Tremors
- Hyperpyrexia
- Acidosis
- Emotional Lability
- Dilated Pupils

When things are going wrong,  
you need to consider that cocaine  
may be the cause....



## For example:

Patient comes to OR for elective testicular biopsy. General anesthesia is induced with Propofol and Succinylcholine. During intubation, patient goes into Vtach followed by Vfib.

CPR initiated and patient eventually resuscitated. CPR continued for a total of 6 minutes. VS return to normal, but patient does not awaken for 24 hours.

Patient appears to recover, but has impaired memory and eventually sues. Expert neurologist states that it is a clear case of post-anoxic brain injury.

On preparation for trial, previous ER records found and reported use of cocaine.

Legal motion made to dismiss case based on clear symptoms of cocaine use.

State Supreme Court ruled against anesthesiologist. They ruled that if cocaine use was considered, it should have been tested for at the time of cardiac arrest. “Previous use of cocaine did not prove cocaine was involved in the cardiac arrest.”

# The Cocaine Abusing Patient

- Recognition
- Detection
- Treatment
- Anesthetic Implications

# Preoperative Detection of Cocaine Abuse

*Can We Rely on History Alone?*

# How Often Do Cocaine Abusing Patients Admit to Drug Use?

- Patient Unaware of Testing  
*>60% Denial Rate*
- Patient Aware of Testing  
*>50% Denial Rate*
- Patient Specifically Warned About Potential Lethal Consequences of Anesthesia plus Cocaine  
*>40% Denial Rate*

# Cocaine Abuse

## Methods of Detection

- Gas Chromatography
- Mass Spectrometry
- Immunoassays

# Urine Toxicology

Drug	Positive if tested within:
Amphetamines	24-72 Hours
Cocaine	24-72 Hours
Opioids	2-4 Days
Marijuana	7-30 Days
Benzodiazepines	2-3 Weeks

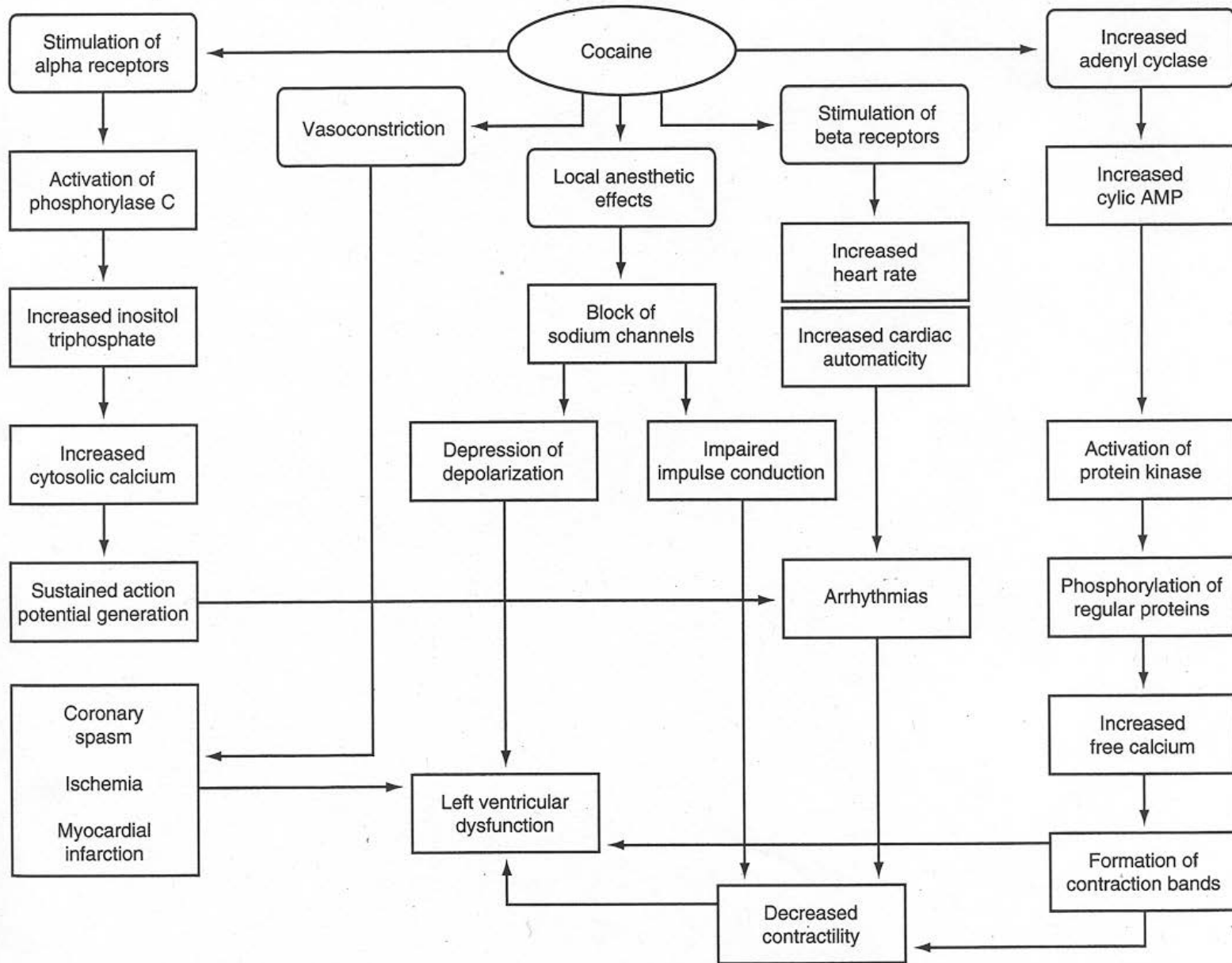


# Intraoperative Problems Associated with Cocaine Abuse

- Cardiac Dysrhythmias
- Myocardial Infarction
- Stroke
- Drug Interactions

# Mechanisms of Cocaine-Related Myocardial Ischemia

- Increased Myocardial Oxygen Demand
- Coronary Artery Vasoconstriction
- Premature Atherosclerosis
- Left Ventricular Hypertrophy



# Treatment for Cocaine-Induced Myocardial Ischemia.

The Following Must Be Corrected:

- Increased Myocardial Oxygen Demand
- Coronary Artery Vasoconstriction
- Arrhythmias

# Treatment of Ventricular Tachycardia in the Cocaine Abusing Patient

- Sodium Bicarbonate - reverses cocaine-induced QRS prolongation
- Benzodiazepines - attenuate the cardiac toxicity by decreasing heart rate, blood pressure, O<sub>2</sub> demand

# Beta Blockade in the Cocaine Abusing Patient

“Profound hypertension may occur during the treatment of cocaine intoxication with propranolol. This is most likely due to unopposed alpha stimulation.”

Ramoska. Ann Emerg Med 14:1112;1985

# Beta Adrenergic Antagonists in the Cocaine Abusing Patient

- Enhance coronary vasoconstriction
- Increase blood pressure
- Fail to control heart rate
- Increase the likelihood of seizures
- Decrease survival

# Labetalol for Use in the Cocaine Intoxicated Patient

- Increased seizure activity
- Occasional unopposed alpha stimulation
- No effect on coronary vasoconstriction
- Increased mortality rates

Hollander JE. N Eng J Med 333:1267-1272;1995



# Labetalol in the Cocaine Abuser

“Labetalol offers the advantage of alpha and beta blockade in attenuating the hyperdynamic cardiovascular state, thus obviating the paradoxical hypertensive exacerbation.”

Gay GR. Ann Int Med 17:282-283;1988

# Calcium Channel Blockers in the Treatment of Cocaine Toxicity

Nifedipine protects the heart from the acute deleterious effects of cocaine -

*but only if it is administered before the cocaine.*

Hale et al. Circulation 83:1437-1443;1991

Calcium Channel Blockers are  
the First Line Treatment for the  
Effects of Cocaine Toxicity.

Hollander JE. N Eng J Med 333:1267;1995

# Confusing, but here's my take: Therapy for Cocaine Intoxication

- Hypertension: Calcium channel block
- Convulsions: Benzodiazepines
- Angina + EKG Changes: Nitroglycerine

Anesthetic Management  
of the  
Cocaine Abusing Patient

# Intraoperative Problems Associated with Cocaine Abuse

- Death
- Cardiac Arrhythmias
- Myocardial Infarction
- Stroke
- Drug Interactions

# Drug Sensitivities in Cocaine Abusing Patients

- Halothane
- Ketamine
- Succinylcholine
- Beta Blockers

Cocaine using patients may have increased intraoperative and postoperative pain.



# Possible Explanations for Increased Intraoperative and Postop Pain:

- **Psychological**
  - Addictive personality seeking drugs
  - Depressed patient
- **Anesthesiologist**
  - ? Faster to sedate a drug abusing patient
- **Effects of Other Drugs**
- **Cocaine Effect on the Endorphin System**
- **? Altered Pain Modulation**

Is Neuraxial / Regional  
Anesthesia Contraindicated in the  
Cocaine Abusing Patient?

# Sometimes...

- The patient with massive hemorrhage
- The patient with severe thrombocytopenia
- The unconscious or intubated patient  
(eg, following a cardiac event)

# Causes of Thrombocytopenia in Drug Abusing Patients

- Autoimmune
- Bone Marrow Suppression
- Chronic Hepatitis
- Sepsis
- DIC
- AIDS

# Ephedrine Resistance

	Pts. receiving ephedrine	Pts. not responding to 20 mg ephedrine
Cocaine Positive n=145	100 (68.9%)	32/100 (32%)
Cocaine Negative n=95	30 (31.5%)	0/30 (0%)
p value	<0.001	<0.001

If a patient is using one illicit drug, how often are they using multiple drugs?

Urines of 26 patients who tested positive for cocaine were studied. Of these, six patients (23%) were also positive for opioids. Given the high frequency of concomitant opioid abuse in cocaine-abusing patients, anyone suspected of cocaine abuse should be tested for other illicit substances.

Birnback DJ et al. Br J Anaesth. 2001 Sep;87(3):488-90.

# Other Substances Commonly Associated with Cocaine Use

- Narcotics
- Amphetamines
- Marijuana
- Alcohol
- Tobacco

# Narcotic Abuse in Teenagers (8<sup>th</sup>, 10<sup>th</sup> and 12<sup>th</sup> graders)

Oxycontin: 1.6%, 3%, and 4.3%

Vicodin: 1.3%, 4.4% and 7.5%



# Anesthesia Implications of Narcotic Abuse

Hypothermia (environmental exposure and/or impaired thermogenesis)

Respiratory failure - Hypoventilation, aspiration, non-cardiogenic pulmonary edema

Opioid intoxication- typically treated with intravenous administration of naloxone 0.05-2.0mg.

Opioid maintenance to prevent withdrawal. If withdrawal symptoms occur, clonidine should be considered.

## Introoperative management – Narcotic Abuse:

1. Airway management and Aspiration prophylaxis
2. Support of circulatory system (fluids and ABGs).
3. Avoidance of withdrawal syndrome
4. Glucose control (Avoidance/Tx of hypoglycemia)
5. Pain management (these patients may develop exaggerated postoperative pain and decreased pain tolerance)

# Marijuana

# Anesthetic considerations of marijuana use:

Tachycardia

Myocardial depression

Supraventricular or ventricular ectopic activity

Upper airway irritability

Bronchospasm

**What's the bottom line?**

**Drug Abuse is endemic in our society and  
anesthesiologists need to be prepared.**