INTRODUCTION

An overview of the epidemiology, demographics, and pharmacology of the most common drugs of abuse. It covers the likely complications and side effects of the drugs, as well as potential interaction with other drugs. You will also learn about the most recent trends in abuse, such as "rave" and date rape drugs.

Objectives

By the end of this lecture, the participant should be able to...

1. Describe the new drugs of abuse
2. Explain "rave" drugs
3. Explain date rape drugs
4. List the pharmacology of the common drugs of abuse
5. List the clinical signs and symptoms of drugs of abuse
6. Explain the most likely life-threatening presentations of drugs of abuse
7. Explain treatment, including specific antidotes for patients taking these drugs
8. Describe intoxication and withdrawal symptoms and their treatment

Introduction

- Drug abuse is a common problem in the US.
- There are many common drugs of abuse, each with its own mechanism of action and potential unwanted side effects.
- Most of the traditional drugs of abuse are still widespread among the youth of this country, with many newer versions on the rise.
- Many of the familiar drugs such as marijuana, amphetamines, heroin and alcohol have leveled off in usage over the past few years with a recent surge of the newer "rave" and date rape drugs. Some, such as ecstasy, are just new versions of an old drug, where others, such as GHB are in a class unto themselves.
- This lecture will cover the pharmacology of the most common agents, and focus on recognition and treatment of the various agents.

Statistics

- Alcohol is still the most widely used drug among young people, with 52% of children having consumed alcohol by 8th grade, and 4 out of 5 by the end of high school.
Marijuana is number 2 with 17% of 8th graders, 32% of 10th graders, and 38% of 12th graders having used it at least once. 1.4% of 8th graders, 3.8% of 10th graders, and 6% of 12th graders report daily use.

Inhalants are easy to find, and are prevalent among the younger teens, especially the late grade school age.

Anabolic steroids are on the rise in the high school age group, with use doubling from 1999 to 2000.

Some of the most popular drugs are the "designer" drugs such as ecstasy, GHB, Rohypnol, and ketamine. The use has soared, especially in the "rave" clubs, where most are available for less money than other illicit drugs.

References:

Classifications

- The drugs of abuse can be divided into categories based on the mechanism of action.
- Each drug of abuse tends to affect certain neurotransmitters in the brain, causing a specific effect, as well as a specific clinical syndrome.
- If you understand the mechanism of action of each agent, you will be able to recognize and treat your patient accordingly.
- It is also important to recognize that many agents have withdrawal syndromes that are opposite to the intoxication syndrome and may mimic other syndromes. These are the opiates, sedatives and stimulants.
- Patients abusing drugs can have implications for the safety of the rescuer as well. Studies show that many aggressive patients have positive drug or alcohol screens.

References:

Drugs of Abuse

- The major categories of drugs of abuse are cannabinoids, sedative-hypnotics, stimulants, opiates, volatiles, anticholinergics, dissociatives, and psychedelics.
• By observing a few clinical parameters, you can usually identify the category of drug
ingested, if not the exact drug.
• Noting the patients mood, thought pattern (psychotic), pupils, skin and hemodynamic status,
you can begin supportive care immediately, and in some cases start therapy with specific
antidotes.
• This lecture will also cover the more common "rave" drugs, and date rape drugs. Most of
these, such as ecstasy, fit into the more common categories, but have properties that make
them unique.

Stimulants

• Stimulants are among the most widely abused drugs.
• Most act by either directly or indirectly stimulating the dopamine, norepinephrine, or
serotonin receptors.
• All cause increased blood pressure, heart rate, and sense of alertness.
• All can be habit forming and have a withdrawal syndrome.
• Some examples include Amphetamine, Cocaine, Methamphetamine, Methylphenidate,
Caffeine, Ginseng, and Methylenedioxymethamphetamine.
• Most stimulants produce effects of exhilaration, euphoria, increased sense of well being and
sexuality.
• Common severe and dangerous side effects include cardiac dysrhythmias, rhabdomyolysis,
severe hyperthermia, and seizures. Others include stroke and myocardial infarction, acute
psychosis, and paranoia.
• Withdrawal symptoms include depression, decreased level of consciousness, irritability,
fatigue, exhaustion, suicidal ideation, and sleep disturbance.

Cocaine: AKA crack, coke

• Cocaine is a derivative of the coca plant.
• It comes in a wide variety of forms and can be absorbed quickly through a number of
routes. It can be absorbed orally, mucosally, injected, or smoked.
• Crack is the free base form of cocaine that comes in small chunks called rock.
• Cocaine is a catecholamine reuptake inhibitor.
• It blocks nerves from reabsorbing norepinephrine and dopamine, causing hyperstimulation
of the sympathetic nervous system.
• On the street, cocaine is usually only 5%-10% pure, usually cut with a variety of substance,
all of which may cause their own problems and side effects.
• Common impurities include, but are not limited to... procaine, lidocaine, sucrose, lactulose,
amphetamine, caffeine, talc, and any other white powder imaginable.
• Multiple poisonings can occur from impurities, as is true of any illicit substance.
• Cocaine can be more cardiotoxic than other stimulants, producing coronary artery spasm, and myocardial infarction.
• This effect usually occurs during acute intoxication with the drug, but may be seen afterwards as well, secondary to intimal injury, and thrombus formation.
• In any young patient with chest pain, cocaine should be part of the routine history.
• Treatment consists of supportive care and benzodiazepines. (Diazepam, lorazepam).
• In extreme cases, sympathomimetic-blocking agents may be considered. (Labetalol)

References:

Amphetamines: Speed, Hearts

Methamphetamine: AKA crank, crystal meth

• The amphetamines are synthetic drugs with similar physiologic effects.
• They produce all the symptoms of stimulant intoxication, euphoria, sense of power and well-being.
• They also have all the same side effects; increased heart rate, blood pressure, risk of hyperthermia and rhabdomyolysis.
• Amphetamines are cheap and can be produced in large quantities.
• They can be absorbed orally, mucosally or injected.
• Treatment is the same as cocaine toxicity. (supportive care, benzodiazepines)

References:
Sedatives-hypnotics:

- The sedatives include a diverse range of drugs including benzodiazepines, barbiturates, tranquilizers and alcohol.
- Most sedatives act by stimulating the GABA receptors in the brain.
- Intoxication with any sedative causes depression of mental status, release of inhibitions, decreased anxiety, and a feeling of tranquility.
- Adverse effects are coma, respiratory depression, amnesia and addiction.
- Symptoms of acute intoxication are slurred speech, ataxic gait, and incoordination.
- Severe intoxication causes respiratory depression, loss of airway protective mechanism, coma and death.
- Acute sedative intoxication may mimic other metabolic disorders such as hypoglycemia, DKA, stroke, electrolyte abnormalities and brain injury to name a few. These other disorders must be looked for and ruled out before a patient is deemed to be a pure sedative overdose.
- Treatment is largely supportive with airway and respiratory protection being paramount.
- Sedative intoxication can cause peripheral vasodilatation as well.
- Blood pressure and heart rate need to be closely monitored.
- IV fluids may be necessary.
- This is especially true in the case of alcohol, which causes a diuresis and subsequent dehydration and hypovolemia.
- Tolerance develops quickly to the sedatives, and severe withdrawal can occur.
- Signs of withdrawal are those of sympathetic overstimulation. The patient will be tremulous, tachycardic, hypertensive, and possibly hallucinating.
- The hallucinations of withdrawal are usually visual which differentiates this syndrome from pure psychosis, which are usually auditory hallucinations.
- The withdrawing patient may suffer from delirium, and be disoriented to person, place and time. Often they will be incoherent.
- Left untreated, sedative withdrawal has a mortality of up to 25%.
- Treatment of withdrawal consists of supportive care, IV fluids, and benzodiazepines.
- Typically, the earlier into withdrawal benzo's are started, the less severe the withdrawal.
- Usually the patient is medicated to reduce symptoms and then slowly tapered. This is the usual approach for all sedatives, including alcohol.

Alcohol

- Alcohol is the most widely abused drug in the world.
- It behaves like other sedatives but has some distinct characteristics.
- Chronic alcohol abuse damages all organ systems, especially the liver, brain, heart, and GI tract. It causes a vast array of health and social problems.
- It is involved in more traumas and environmental emergencies than any other drug.
- It is widely available, and comes in many different forms.
• It is universally taken orally.
• Often, chronic drinkers will not take in other forms of nourishment, getting most of their calories from alcohol.
• This sets up the patient for other health problems and nutritional deficiencies.
• Wernicke-Korsakoff's syndrome is caused by a thiamine deficiency.
• It is an encephalopathy that presents as a mental status change such as confusion, stupor or coma.
• It is therefore recommended that most alcoholics and patients with unknown reason for coma receive thiamine as part of the "coma cocktail" protocol.
• The other ingredients in the "cocktail" are usually Narcan for suspected narcotics, and dextrose if hypoglycemic.

Opiates/narcotics

• Originally from the poppy seed, opium was used for analgesia in China, where it first became a drug of abuse.
• It was brought to this country and western medicine during and after the Civil War, when it quickly became a drug of abuse here as well.
• It acts by stimulating the endogenous opiate receptors causing a decreased sensation of pain and a feeling of euphoria.
• Opiates can be taken orally, mucosally, smoked, or injected.
• The opiates all cause respiratory depression as well.
• This is the usual cause of death in opiate intoxication.
• Most adverse effects are from hypoxia and hypoventilation.
• The treatment is airway support.
• The other potential choice for acute opiate overdose is Naloxone.
• It is an antagonist of the opiate receptors and directly counteracts the effects of opiates.
• It causes acute withdrawal as well. This is unpleasant.
• Withdrawal from opiates can be severe but is usually not life threatening like the sedative withdrawal syndrome.
• When the patient withdraws from opiates, he gets a "rush" or "dump" of norepinephrine, causing a sympathetic overload.
• The symptoms are sweating, chills, nausea, vomiting, stomach cramps, piloerection (goose bumps), and muscle spasms.
• It is a difficult withdrawal but usually not fatal.
• Duration of withdrawal varies depending on the patient, amount, and type of narcotic abused.
Opiates/narcotics cont.

Treatment of withdrawal varies.
- It can be mostly supportive, or an agent to lessen the symptoms of withdrawal can be given (clonidine), or another opiate can be substituted for the abused drug (methadone).
- In the pre-hospital environment, treat the symptoms as needed.
- If the patient is agitated and is a risk, but is not suffering from an opiate overdose, consider benzodiazepines, or a phenothiazine such as Haldol or droperidol.

References:

Dissociatives

- Dissociative, such as phencyclidine (PCP) and Ketamine, are unique in that they affect many different neurotransmitters, and cause a variety of clinical effects.
- They have anticholinergic effects causing dry flushed skin and miosis (dilated pupils).
- They stimulate release of dopamine and norepinephrine causing agitation, tachycardia, rigidity, delusional thought, and excitement, similar to stimulant intoxication.
- Dissociatives also cause a "psychic indifference to pain". In other words, the patient can tell something hurts, it just doesn't bother them. This is why subjects on PCP can suffer a large amount of trauma without slowing down or stopping what they are doing.
- Treatment of dissociative intoxication is mainly aimed at controlling aggressive or agitated symptoms.
- Treatment is similar to stimulant intoxication.
- Benzodiazepines such as Valium or Ativan, and a phenothiazine such as Haldol are usually effective in calming the patient down until the drug wears off.
- It is important to titrate to effect. Severely agitated patients may require large doses of sedatives.
- It is important to monitor airway and breathing whenever sedating these patients, as the stimulant may wear off, leaving unopposed sedative on board.

References:
Psychedelic Drugs

- Psychedelics interrupt the serotonin system causing an hallucinogenic state.
- It is characterized by illusions, visual hallucinations, and body distortion.
- Clinically, the patient may be sweating, tachycardic, and have dilated pupils.
- The drug itself, tends not to cause life-threatening symptoms, but altered behavior while under the influence can be deadly.
- The hallucinations can be either good or bad (ie the "bad trip").
- This can lead to agitation and unsafe activity, like running away from the giant lizard and getting hit by a bus instead.

Psychedelic Treatment.

- Treatment is also symptomatic.
- Try to keep the environment as calm as possible.
- If the patient is stable, avoid lights, sirens and other strong stimuli.
- Benzo's are also effective in limiting the "bad trip".

References:

Rave and Date Rape Drugs

- There are a number of drugs gaining in popularity among the youth of the world.
- They are known as designer or rave party drugs.
- They are mostly synthetic drugs, produced to cause a certain effect. Like all illicit drugs, many are impure or not what they are supposed to be.
- Many of the party drugs can also be used as date rape drugs as well, and are especially potent when combined with alcohol.
- Although the drugs have in common that they are mostly synthetic and relatively cheap, they are in widely divergent pharmacologic groups.
- Some examples include ecstasy, GHB (gamma-hydroxybutyrate, rohypnol, ketamine, methamphetamine, and ephedra.
- Many belong in the classes we have already discussed, and have typical signs symptoms and treatment options. Others are slightly different and need a different approach.
Ecstasy

- Ecstasy (methyleneoxymethamphetamine, MDMA) is a synthetic, psychoactive, hallucinogenic, stimulant.
- Although its popularity has soared only in the recent decade, it has been around since 1914, when Merck first developed it.
- It has both hallucinogenic properties as well as a stimulant effect.
- It is used in rave clubs to enhance the experience and give energy for all night dancing.
- It may be taken orally, sublingually, or snorted.
- Most physiologic harm comes from the stimulant properties of ecstasy.
- It can cause hyperthermia (sometimes fatal referred to as Saturday Night Fever), rhabdomyolysis, renal failure, dehydration, coma, tachycardia, and death.
- Several hours after taking the drug, coming down occurs.
- This is similar to any post stimulant episode, with feelings of depression, anxiety, exhaustion, and a restless inability to sleep, despite overwhelming fatigue.
- This may last several days.
- Treatment is symptomatic.
- Agitation can be treated with benzodiazepines.
- Hyperthermia should be treated with hydration, cooling and supportive care.
- Cardia dysrhythmias should be treated per ACLS protocol.

References:

Gamma-hydroxybutyrate (GHB)

- GHB is a precursor to the neurotransmitter GABA, the same transmitter affected by the sedatives.
- It is in the sedative-hypnotic family of drugs and was originally developed as an adjunct to anesthesia in the 1970's.
- It was unpredictable and ineffective so never became widely used in the medical community.
- It then became popular in the early 1990's for weight lifters. It was never proven to increase the metabolic rate as purported, but was popular anyway.
- GHB comes as a tan or white powder, that is mixed in liquid to be taken as a drink.
- The effect caused by GHB is usually one of sedation and release of inhibitions.
The release of inhibition, however, can cause a paradoxic agitation.
It is rapidly absorbed, and metabolizes quickly as well.
The clinical hallmark in acute overdose is a patient with coma who quickly becomes combative, especially during painful stimulation.
The classic case report is the patient who is unresponsive, but wakes completely during attempts to intubate, then requires restraint for agitation.
Other effects of GHB overdose can be bradycardia, delusions, depression, nausea, vomiting, ataxia, vertigo, nystagmus, and anterograde amnesia.
Treatment of GHB overdose is supportive, airway support being most critical.
IV fluids should be started, and atropine should be available for patients with severe, symptomatic bradycardia.
Most cases of severe intoxication will resolve within several hours.
If the patient is still symptomatic after 6 hours, they made need hospitalization.
Other drugs and medical conditions should always be considered.

References:

Date Rape Drugs
- The most common rape drug is alcohol, although when talking about date rape drugs, most people are referring to rohypnol, GHB, and ketamine.
- These are the drugs that are placed unwittingly into the victim's drinks. All have sedative properties, are absorbed orally, and are fast acting.
- Rohypnol and ketamine have amnestic properties, making the victim unable to remember the events. GHB is not amnestic, but can induce unconsciousness.
- Ketamine is covered in the dissociative section, and GHB in the designer rave drug section.
- Rohypnol is a fast acting benzodiazepine, made by the pharmaceutical company Hoffman-La Roche.
- It comes in tablets that are white or green, with "ROCHE" stamped on one side.
- It has potency equivalent to 10 mg Valium to 1 mg rohypnol.
- It can be crushed into powder and sprinkled into a drink.
Rohypnol is also popular to take when "crashing" or coming down from ecstasy, cocaine, or amphetamines.

- Its effects are greatly potentiated by alcohol.
- It is found in 3% of all date rapes.
- Their amnestic properties make it difficult to identify the perpetrator, and make it even more difficult for the victim to act as an effective witness.
- It has an onset of 30 minutes and can last up to 8 hours.
- Supportive care, especially airway control, is the treatment for rohypnol overdose.

References:

Summary

- There are many different types of drugs of abuse.
- Each has its own effect on the body.
- Many times the provider will not know which type of drug the patient has taken. Often the patient won't know.
- It is important to recognize the effects of the drugs, even if the specific drug is unknown.
- The patient can still be treated symptomatically.
- Agitation can be treated with sedatives, and excessive sedation can be treated with airway control.
- Always monitor the vital signs and be vigilant for signs of dysrhythmias.
- For clues of the type of ingestion, pay close attention to pupils, skin, heart rate, and mental status.
- Also be aware that many symptomatic overdoses are due to combination ingestions, with often-conflicting clinical presentations.
- Treatment should be based on the predominant clinical features.
- As always, address life threatening signs and symptoms first.
- Never assume symptoms are entirely secondary to the ingestion if a medical problem may explain the picture as well.
- The provider also needs to be wary of the agitated patient and potential for violence. Never put yourself in a vulnerable position.
- If you need backup, wait for it.
- You may be confronted with a patient who is unwilling to cooperate, but unable to refuse treatment due to mental status.
- This patient may need restraint.
- Make sure you are able to safely control the patient and the environment before you start the restraining process.
Other reading: