Amphetamine and Hallucinogen abuse

Amphetamines stimulate the release of catecholamines, resulting in increased cortical alertness, appetite suppression, and decreased need for sleep. Approved medical uses of amphet-amines are treatment of narcolepsy, attention-deficit disorders, and hyperactivity associated with minimal brain dysfunction in children

Hallucinogens, as represented by lysergic acid diethylamine (LSD) and phencyclidine, are usually ingested orally

ANESTHETIC CONSIDERATIONS:

Acute Amphetamine abuse
- Hypertension, cardiac dysrhythmias
- Hyperthermia
- Increased requirements for volatile anesthetics
- Malnutrition
- Somnolence and anxiety or a psychotic state secondary to depletion of body stores of catecholamines

Chronic Amphetamine abuse
- Markedly decreased anesthetic requirements as a result of catecholamine depletion in the central nervous system
- Refractory hypotension reflects depletion of catecholamine stores

Hallucinogens abuse
- Evidence of sympathetic nervous system stimulation includes mydriasis, increased body temperature, hypertension, and tachycardia
- On rare occasions, LSD produces seizures and apnea
- It can produce an acute panic reaction characterized by hyperactivity, mood lability

ANESTHETIC GOALS:

- Secure a/w
- Supportive care
- Anticipation of hemodynamic instability
    - In chronic users: depletion of catecholamines
    - Acute intoxication: SNS stimulation

DEFINITIONS
- Amphetamines are most often abused orally but, in the case of methamphetamine, abuse is via the intravenous route

HISTORY & PHYSICAL

- Amphetamine overdose causes anxiety, a psychotic state, and progressive central nervous system irritability manifesting as hyperactivity, hyperreflexia, and, occasionally, seizures.
- Other physiologic effects include increased blood pressure and heart rate, cardiac dysrhythmias, decreased gastrointestinal motility, mydriasis, diaphoresis, and hyperthermia
- Metabolic imbalances such as dehydration, lactic acidosis, and ketosis may occur
- The effects of Hallucinogens develop within 1 to 2 hours and last 8 to 12 hours. They consist of visual, auditory, and tactile hallucinations and distortions of the surroundings and body image

INVESTIGATIONS

- CBC, electrolytes, serum ETOH, glucose
- ABG
- ECG

OPTIMIZATION

- Treatment of oral amphetamine overdose includes induced emesis or gastric lavage followed by administration of activated charcoal and a cathartic
- Phenothiazines may antagonize many of the acute central nervous system effects of amphetamines
- Similarly, diazepam may be useful for controlling amphetamine-induced seizures
- Acidification of the urine promotes elimination of amphetamines
- Hallucinogens can produce an acute panic reaction characterized by hyperactivity, mood lability, and, in extreme cases, overt psychosis. Patients should be placed in a calm, quiet environment with minimal external stimuli. No specific antidote exists, although benzodiazepines may be useful for controlling agitation and anxiety reactions
- Forced diuresis and acidification of the urine promotes elimination of phencyclidine

MANAGEMENT OF ANESTHESIA

- Chronic pharmacologic doses of amphetamine administered for medically indicated uses (narcolepsy, attention-deficit disorder) **need not be discontinued** before elective surgery
- Patients requiring emergency surgery and who are acutely intoxicated from ingestion of amphetamines may exhibit hypertension, tachycardia, hyperthermia, and increased requirements for volatile anesthetics
- Even intraoperative intracranial hypertension and cardiac arrest have been attributed to amphetamine abuse
- it is prudent to monitor body temperature during the perioperative period
- *Chronic* amphetamine abuse may be associated with markedly decreased anesthetic requirements, presumably as a result of catecholamine depletion in the central nervous system

- Refractory hypotension can reflect depletion of catecholamine stores. Direct-acting vasopressors, including phenylephrine and epinephrine, should be available to treat hypotension because the response to indirect-acting vasopressors such as ephedrine may be attenuated by the amphetamine-induced catecholamine depletion
- Intraoperative monitoring of blood pressure using an intra-arterial catheter is a consideration
- Postoperatively, there is the potential for orthostatic hypotension once patients begin to ambulate
- **Hallucinogens:** Anesthesia and surgery have been reported to precipitate panic responses in patients with hallucinogens abuse. If such an event occurs, diazepam is likely to be a useful treatment
- Exaggerated responses to sympathomimetic drugs are likely
- The analgesia and ventilatory depressant effects of opioids are prolonged by LSD

DISPOSITION & MONITORING

- **Monitoring:** Intraoperative monitoring of blood pressure using an intra-arterial catheter

COMPLICATIONS

- Abrupt cessation of excess amphetamine use is accompanied by extreme lethargy, depression that may be suicidal, increased appetite, and weight gain
- Benzodiazepines are useful in the management of withdrawal if sedation is needed
- β-adrenergic antagonists may be administered to control sympathetic nervous system hyperactivity
- Postamphetamine depression may last for months and require treatment with antidepressant drugs
- Overdose of LSD has not been associated with death, although patients may suffer unrecognized injuries, reflecting the intrinsic analgesic effects of the drug
- On rare occasions, LSD produces seizures and apnea
- It can produce an acute panic reaction characterized by hyperactivity, mood lability, and, in extreme cases, overt psychosis. Patients should be placed in a calm, quiet environment with minimal external stimuli. No specific antidote exists, although benzodiazepines may be useful for controlling agitation and anxiety reaction
- Supportive care in the form of airway management, mechanical ventilation, treatment of seizures, and control of the manifestations of sympathetic nervous system hyperactivity is warranted
- Forced diuresis and acidification of the urine promotes elimination of phencyclidine but also introduces the risk of fluid overload and electrolyte abnormalities, especially hypokalemia

PATHOPHYSIOLOGY

- Physiologic dependence on amphetamines is profound, and daily doses may be increased to several hundred times the therapeutic dose. Chronic abuse of amphetamines results in depletion of body stores of catecholamines
- Although there is a high degree of psychological dependence, there is no evidence of physical dependence or withdrawal symptoms when LSD is acutely discontinued. Long-term use of hallucinogens is unlikely

REFERENCES

- Stoelting's Anesthesia and Co-Existing Disease, 5th Edition