ADDICTION AND SUBSTANCE ABUSE IN ANESTHESIOLOGY

Essay

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Abstract

Anesthesiologists need to be aware of the use of illicit drugs because of the long-term negative consequences that it may have on health and how it impacts on anesthetic care, knowledge of a patient substances abuse postoperatively may prevent adverse drug interactions, predicts tolerance to anesthetic agents and facilitate the recognition of drug withdrawal, therefore it is important for anesthesiologists to know about the most common illicit drugs being used, to know their side effects and their clinical presentation if abused or intoxicated, and to know what anesthetic options would be the most beneficial.

Key words; Addiction -Substance abuse - Anesthesiology

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List Of Abbreviations

ASA	American Society Of Anesthesiologists
ASAM	American Society of Addiction Medicine
AWS	Alcohol Withdrawal Syndrome
BIS	Bispectral Index
BMI	Body Mass Index
CNS	Central Nervous System
CO	Carbon Monoxide
COHb	Carboxy Heamoglobin
ER	Emergency Room
ECG	Electrocardiogram
GABA	Gamma Aminobutyric acid
Hb	Heamoglobin
HIV	Human Immune Deficiency Virus
IUGR	Intra Uterine Growth Retardation
i.v	Intravenous
LSD	lysergic acid diethylamide
MDMA	Methylenedioxmethamphetamine
mg	Milligrams
OADUSA	Opioid Antagonist Detoxification Under Sedation or Anesthesia
OR	Operating Room
PACU	Post Anesthesia Care Unit
p.o	Per os
RODA	Rapid Opiate Detoxification Under Anesthesia
SOWS	Subjective Opioid Withdrawal Scale
THC	Tetrahydrocannabinol
UROD	Ultra Rapid Opiate Detoxification
ug	Micrograms

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Introduction

Addiction is a brain disease. It is characterized by intense and, at times, uncontrollable drug craving, along with compulsive drug seeking and use that persist even in the face of devastating consequences. While the path to drug addiction begins with the act of taking drugs, over time a person's ability to choose not to do so becomes compromised, and seeking and consuming the drug becomes compulsive. This behavior results largely from the effects of prolonged drug exposure on brain functioning, drug abuse and addiction increase a persons risk for a variety of other mental and physical illnesses related to the drug abusing lifestyle or the toxic effects of the drugs themselves. Additionally, a wide range of dysfunctional behaviors can result from drug abuse and interfere with normal functioning in the family, the workplace, and the broader community (***Hyman,2005).***

Because drug abuse and addiction have many dimensions and disrupt many aspects of an individuals life, treatment is not simple. Effective treatment programs typically incorporate many components, each directed to a particular aspect of the illness and its consequences. Addiction treatment must help the individual stop using drugs and maintain a drug-free lifestyle ***(McLellan, et al. 2000).***

Illicit substance abuse is a major health concern. Drug use, either acute or chronic, has potentially grave consequences which include changes affecting various body systems. Anesthesiologists come into contact with these patients in emergency and everyday situations. Due to the diverse clinical presentations that may arise from single substance or polysubstance abuse, anesthetic management should be

tailored to each individual and universal precautions should always be followed when providing care. These patients present to anesthesiologists in a variety of circumstances: in obstetrics for labor and emergencies, in trauma for emergency surgeries or life-saving (resuscitative) situations and in everyday elective surgeries. Therefore it is important for anesthesiologists to know about the most common illicit drugs being used, to know their side effects and clinical presentation if abused or intoxicated, and to know what anesthetic options would be beneficial or detrimental (***Hernandez,et al. 2005).***

Addiction remains a major issue in the anesthesia workplace. Between 1991 and 2001, 80% of US anesthesiology residency programs reported experience with impaired residents, and 19% reported at least one pretreatment fatality. A survey conducted in 2002 found the incidence of known drug abuse among anesthesia personnel to be 1.0% among faculty members and 1.6% among residents. All anesthesia personnel, should be aware of the basic nature of the problem and possess the necessary information to recognize and assist an impaired colleague (**Bryson & Silv*erstein , 2008***).

Chapter One:

The Disease Of Addiction

The term "addiction" is used in many contexts to describe an obsession, compulsion, or excessive physical dependence or psychological dependence, such as drug addiction, crime, alcoholism, compulsive overeating, etc. In these kinds of common usages, the term addiction is used to describe a recurring compulsion by an individual to engage in some specific activity, despite harmful consequences to the individual's health, mental state or social life. Terminology and definitions have become complicated in this field, many continue to speak of addiction from a physiological standpoint (some call it physical dependence), psychiatrists refer to the disease state as dependence, most other physicians refer to the disease as addiction. Common usage of the term addiction has spread to include psychological dependence, addiction often have both physical and psychological components ***(Angres & Angres, 2008).***

Physical dependence on a substance is defined by the appearance of withdrawal symptoms when the use of the substance is discontinued. Opiates, benzodiazepines, barbiturates, alcohol and nicotine induce physical dependence. Psychological dependence is a dependency of the mind, and leads to psychological withdrawal symptoms (such as cravings, irritability, insomnia, depression, and anorexia). ***(Hyman, 2005).***

Diagnostic criteria of substance use disorders (DSM -IV,2000).

Substance dependence:

A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by three (or more) of the following:

1-Tolerance, as defined by either of the following:

(a) A need for markedly increased amounts of substance to achieve intoxication or desired effect.

(b) Markedly diminished effect with continued use of the same amount of the substance.

2-Withdrawal, as manifested by either of the following:

a)The same substance (or another substance) is taken to relieve or avoid withdrawal symptoms.

b)The characteristic withdrawal symptoms for the substance.

3- The substance is often taken in larger amounts or over a longer period than was intended.

4-There is a persistent desire or unsuccessful efforts to cut down or control use of the substance.

5- A great deal of time is spent in activities necessary to obtain the substance (e.g., visiting multiple doctors or driving long distances).

6-The substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance (e.g., current cocaine use despite recognition of cocaine-induced depression, or continued drinking despite recognition that an ulcer was made worse by alcohol consumption) .

Substance abuse :

A) A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following,

occurring within a 12-month period:

1-Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to substance use, suspensions or expulsions from school, neglect of children or household).

2-Recurrent substance use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine when impaired by substance use).

3-Recurrent substance-related legal problems (e.g., arrests for substance-related disorderly conduct).

4-Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (e.g., arguments with spouse about consequences of intoxication, physical fights).

B) The symptoms have never met the criteria for Substance Dependence for this class of substance.

The physiology of drug addiction

Drugs of abuse tap into the brain's communication system and disrupt the way nerve cells normally send, receive, and process information. There are at least two ways that drugs are able to do this, by imitating the brain's natural chemical messengers, and/or by overstimulating the "reward circuit" of

the brain. Some drugs, such as marijuana and heroin, have a similar structure to neurotransmitters, which are naturally produced by the brain. Because of this similarity, these drugs are able to stimulate the brain's receptors and activate nerve cells to send abnormal messages ***(McLellan, et al. 2000).***

Nearly all drugs, directly or indirectly, target the brain's reward system by flooding the circuit with dopamine. dopamine is a neurotransmitter present in regions of the brain that control emotion, motivation, and feelings of pleasure. The overstimulation of this system, which normally responds to natural behaviors that are linked to survival (eating, spending time with loved ones, etc.), produces euphoric effects in response to the drugs. This reaction sets in motion a pattern that "teaches" people to repeat the behavior of abusing drugs ***(Volkow ,et al. 2001).***

As a person continues to abuse drugs, the brain adapts to the overwhelming surges in dopamine by producing less dopamine or by reducing the number of dopamine receptors in the reward circuit. As a result, dopamine's impact on the reward circuit is lessened, reducing the abuser's ability to enjoy the drugs and the things that previously brought pleasure. This decrease compels those addicted to drugs to keep abusing drugs in order to attempt to bring their dopamine function back to normal. Therefore, they may require larger amounts of the drug than they first did to keep the dopamine high, an effect known as tolerance (***Di Chiara, et al. 1998).***

Drugs of abuse facilitate nonconscious (conditioned) learning, which makes the user to experience uncontrollable cravings when they see a place or person they associate with the drug experience, even when the drug itself is not available. Brain imaging studies of drug-addicted

individuals show changes in areas of the brain that are critical to judgment, decision-making, learning and memory, and behavior control. Together, these changes can drive an abuser to seek out and take drugs compulsively despite adverse consequences in other words, to become addicted to drugs (***Noël, et al. 2006).***

No single factor can predict whether or not a person will become addicted to drugs. Risk for addiction is influenced by a person's biology, social environment, and age or stage of development. The genetic factors account for about half of the addiction vulnerability, additionally, gender, ethnicity, and the presence of other mental disorders may influence risk for drug abuse and addiction. A person's environment includes different influences from family and friends to socioeconomic status and quality of life in general. Factors such as physical and sexual abuse, stress, and parental involvement can greatly influence the course of drug abuse and addiction in a person's life. Genetic and environmental factors interact with critical developmental stages in a person's life to affect addiction vulnerability. Although taking drugs at any age can lead to addiction, the earlier that drug use begins, the more likely it is to progress to more serious abuse. Adolescents brains are still developing in the areas that govern decision-making, judgment, and self-control, this is why they are especially prone to the risk-taking behaviors, including trying drugs of abuse ***(Kalivus,2003).***

Management Approaches

Medication and behavioral therapy, in combination, are aspects of an overall therapeutic process that often begins with detoxification, followed by treatment and relapse prevention. Managing withdrawal symptoms can