

SUBSTANCE ABUSE AND ITS INTERACTION IN ANAESTHETIC PRACTICE

ESSAY
SUBMITTED FOR PARTIAL FULFILLMENT
OF MASTER DEGREE IN ANAESTHESIOLOGY

BY

RANDA ABD EL-NASER SAMAHA

MB, BCh.
AIN SHAMS UNIVERSITY

617.96

R . A

SUPERVISED BY

PROF. DR. BAHEERA MOHAMED TAWFIK
PROF. OF ANAESTHESIOLOGY
AIN SHAMS UNIVERSITY

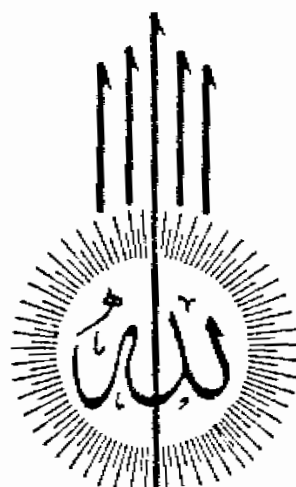
DR. SOHEIR ABBAS SADEK
ASSISTANT PROF. OF ANAESTHESIOLOGY
AIN SHAMS UNIVERSITY

DR. ALAA EL-DIN KORRAA
LECTURER OF ANAESTHESIOLOGY
AIN SHAMS UNIVERSITY

FACULTY OF MEDICINE
AIN SHAMS UNIVERSITY

1993





قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

سُورَةُ الْبَقَرَةِ - آيَةُ ٢٢ -



*TO THE SOUL OF
MY FATHER*

CONTENTS

	Page
1. INTRODUCTION	1
2. TERMINOLOGY AND MECHANISM OF SUBSTANCE ABUSE	3
3. PHARMACOKINETICS AND DRUG INTERACTIONS	28
4. CLASSIFICATION OF SUBSTANCE ABUSE	59
I. CNS depressants	61
1. <i>Opiates & opioids</i>	
2. <i>Sedative-hypnotics</i>	
a. <i>Barbiturates and related sedative-</i>	
<i>hypnotics</i>	96
b. <i>Alcohol</i>	130
3. <i>Cannabinoids</i>	160
II. CNS Stimulants	180
1. <i>Amphetamine.</i>	
2. <i>Cocaine</i>	
5. INTERACTION IN ANAESTHETIC PRACTICE	210
6. SUMMARY	290
7. REFERENCES	297
8. ARABIC SUMMARY	

LIST OF TABLES

	Page
Table -1- AMERICAN PSYCHIATRIC ASSOCIATION DIAGNOSTIC CRITERIA FOR PSYCHOACTIVE SUBSTANCE DEPENDENCE	10
Table -2- CRITERIA FOR DRUG DEPENDENCE	11
Table -3- CLINICAL PHARMACOKINETIC TASKS	28
Table -4- PERFUSION OF ORGANS AND TISSUES	32
Table -5- CHARACTERISTICS OF NONIONIZED AND IONIZED DRUG MOLECULES	35
Table -6- COMMONLY USED DRUGS THAT ALTER MICROSOMAL ENZYME ACTIVITY	50
Table -7- CLASSIFICATION OF OPIOID AGONISTS AND ANTAGONISTS	62
Table -8- NARCOTIC AGONIST COMPARATIVE PHARMACOLOGY	75
Table -9- TYPES OF OPIOID RECEPTORS	77
Table -10- ABSTINENCE SYNDROME FOR A FEW REPRESENTATIVE NARCOTICS AND NARCOTIC ANTAGONISTS	86
Table -11- A COMPARISON OF NARCOTIC ANALGESICS	94
Table -12- COMMONLY USED AND ABUSED BARBITURATES	98
Table -13- COMMONLY USED AND ABUSED NONBARBITURATE SEDATIVE-HYPNOTICS	99

Table -14-	SEDATIVE-HYPNOTIC DRUG INTOXICATION	117
Table -15-	FEATURES OF BARBITURATE ABSTINENCE SYNDROME	120
Table -16-	SOME ASPECTS OF DEPENDENCE ON BARBITURATES AND OTHER SEDATIVE DRUGS	122
Table -17-	ABUSE POTENTIAL RATING OF BARBITURATES	127
Table -18-	COMPARISON OF FIVE TYPES OF ALCOHOLIC BEVERAGES	132
Table -19-	ALCOHOL DOSES IN GRAMS PER KILOGRAM BODY WEIGHT (G/KG)	137
Table -20-	CLINICAL EFFECTS OF ETHANOL AT VARIOUS BLOOD CONCENTRATIONS	149
Table -21-	CLINICAL FEATURES OF ALCOHOL WITHDRAWAL	156
Table -22-	DRUG ENFORCEMENT ADMINISTRATION SCHEDULE	183
Table -23-	SIGNS AND SYMPTOMS OF COCAINE TOXICITY	195
Table -24-	MEDICAL COMPLICATIONS OF COCAINE INTOXICATION	197
Table -25-	PHASES OF COCAINE ABSTINENCE	202
Table -26-	SYMPTOMS AND SIGNS OF DRUG ABUSE	206
Table -27-	DRUG WITHDRAWAL SYMPTOMS AND TREATMENT.	207
Table -28-	OBSTETRICAL CONDITIONS ENCOUNTERED IN PREGNANT NARCOTIC ADDICTS	224
Table -29-	INTERACTION OF ETHANOL WITH SEDATIVES. TRANQUILIZERS, AND MORPHINE	243

ACKNOWLEDGEMENT

I gratefully acknowledge all professors in the Department of Anaesthesia with speical regard to PROF. DR. YEHIA HEMAIMY; Professor and Chairman of Anaesthesia Department.

It is with considerable pleasure that I also acknowledge the helpful criticism, advice, and patience of PROF. DR. BAHEERA MOHAMED TAWFIK ; Professor of Anaesthesiology, during the time that this essay has been in preparation.

I would like to extend my special thanks to DR. SOHEIR ABBAS SADEK ; Assistant Professor of Anaesthesiology, for her guidance, and kind advice.

My thanks are also due to DR. ALAA EL-DIN KORRAA; Lecturer of Anaesthesiology; whose help with the preparation of drafts, and advice have been of great value.

ABSTRACT

The practice of anaesthesia entails a daring incursion into human pharmacology. The anaesthesiologist performs daily a complex experiment in patients with drugs that profoundly affect essential functions, such as respiratory, cardiovascular, and neuromuscular activity. To achieve anaesthesia speedily and effectively often requires many agents (six to ten on the average) in patients who may have been exposed to 20 or even more drugs in the preoperative period. This renders anaesthesia a branch of medicine in which polypharmacy is such a necessity and drug interactions such an inevitable consequence. Selection and adjustment of drug dosage schedules, therefore, are facilitated by an understanding of pharmacokinetic and pharmacodynamic principles and mechanisms of drug interactions.

INTRODUCTION

INTRODUCTION

Today, there is much concern about drug interaction because many patients receive more than one drug at a time, many doctors are unaware of the risks to which their patients are exposed when treated with multiple drugs.

A drug interaction occurs whenever the presence of one chemical substance changes the pharmacological effects of a therapeutically administered drug.

The term chemical substance in this context should be extended to include alcohol, foods, insecticides, possibly food additives, environmental chemical agents as well as drugs therapeutically administered and drugs of abuse such as cannabis, tobacco.

Drug abuse is a serious sociomedical problem. Although mostly youth is involved, other age groups have also been affected to varying extents. Drug abuse is no longer restricted to lower socioeconomic strata of the society. The problem, which was considered to be waning a few years ago from its peak at the early sixties, is

again becoming serious . Abuse of older drugs like heroin and amphetamine are on the rise again; sniffing of industrial solvents and other inhalants is popular; introduction of newer drugs for abuse continues.

The number of possible drug interaction seems almost limitless. We have restricted ourselves to those that occur during anaesthesia and operations, or those that may otherwise be important to the anaesthesiologist. The latter group takes into account the anaesthesiologist's role in areas outside the operating room, such as in the intensive care unit.

THE AIM OF THIS WORK IS TO DISCUSS THE FOLLOWING ITEMS:

- 1- Terminology and mechanism of substance abuse.
- 2- Pharmacokinetics and drug interactions.
- 3- Classification of substance abuse.
- 4- Substance abuse and its interaction in anaesthetic practice.

***TERMINOLOGY & MECHANISM
OF SUBSTANCE ABUSE***

TREMINOLOGY

NONMEDICAL USE OF DUGS:-

Although drugs in the usual sense of the term are mainly intended for medical uses, they have also been used for nonmedical purposes. However, in the broad sense, a drug may be defined as *"any substance that, when taken into the living organism, may modify one or more of its functions."* (Isbell, and Chrusciel, 1970).

Many substances that possess psychoactive properties but may not have any approved medical uses have also been used for some other purposes. The nonmedical uses of drugs may vary from occasional drinking of alcohol or smoking of marijuana to compulsive use of opioids. Such use may be "casual" or "recreational" such as when a modest amount of a drug is taken for pleasurable effects; or use may be experimental, just to test the effects of drug out of curiosity or under peer pressure. (Pradhan, and Dutta, 1977).

Such self-administration of a drug that is not approved medically or that deviates from the social pattern within a given culture may be considered as drug abuse.

DRUG ADDICTION AND DRUG HABITUATION:-

An important early attempt to characterize different patterns of drug abuse with pharmacological criteria was made by Tatum and Seevers in 1931 with their definitions of the terms "drug addiction" and "drug habituation". In drug addiction, physical dependence to a drug developed and the withdrawal or abstinence syndrome was produced when the use of the drug was reduced or stopped, drug habituation was associated with psychological, but not physiological involvement. (Tatum, and Seevers, 1931).

In subsequent years much confusion arose in connection with the use and implication of the word "addiction".

In 1950 The expert Committee on Drugs Liable to Produce Addiction (now a subdivision of the World Health Organisation) defined "drug addiction" as :..... " a state of periodic or chronic intoxication detrimental to the individual and society, produced by the repeated consumption of a drug (natural or synthetic). Its characteristics include :

1. An overpowering desire or need (compulsion) to