Anesthesia &Psychiatric Disorders

Essay Submitted For Partial Fulfillment of Master Degree in Anesthiology

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جامعة عين شمس
كلية الطب
قسم التخدير والرعاية المركزة

Anesthesia & Psychiatric Disorders

التخدير والأختلالات النفسية

Essay Submitted For Partial Fulfillment of Master Degree in Anesthiology
رسالة مقدمة توطئة للحصول على درجة الماجستير فى التخدير

مقدمة من

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Rimon Ibrahim Fares

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5-HT	***5-Hydroxytryptamine***	***LDH***	***Lactate dehydrogenase***
ACTH	***Adrenocorticotrophic hormone***	***LSD***	***Lysergic acid diethylamide***
ADH	***Antidiuretic hormone***	***MAOI***	***Monoamine oxidase inhibitor***
BBB	***Blood brain barrier***	***MH***	***Malignant hyperthermia***
COMT	***catechol-o-methyl transferase***	***MHPG***	***Methoxy hydroxy phenylglycol***
CPK	***Creatine phosphokinase***	***NMS***	***Neuroleptic malignant syndrome***
CPR	***Cardiopulmonary resuscitation***	***Na***	***Sodium***
CSF	***cerebrospinal fluid***	***NMDA***	***N-methyl Daspartate***
CTZ	***Chemoreceptor trigger zone***	***O2***	***Oxygen***
DOPA	***Dihydroxyphenyl-alanine***	***PCP***	***Phencyclidine***
ECG	***Electrocardiogram***	***PFC***	***Prefrontal cortex***
ECT	***Electroconvulsive therapy***	***SGOT***	***Serum glutamate oxaloacetic acid***
EEG	***Electroencphalogram***	***SGPT***	***Serum glutamate pyruvate***
EAA	***Excitatory aminoacids***	***SSRI***	***Selective Serotonin reuptake inhibitor***
GABA	***γ-aminobutyric acid***	***TCA***	***Tricyclic anti-depressant***
HIAA	***Hydroxyindol acetic acid***	***TSH***	***Thyroid stimulating hormone***
HVA	***Homovanillic acid***		
K	***Potasium***		

INTRODUCTION

Recently statistics show that psychiatric disorders become one of the common medical diseases e.g. Mental Depression affects 2-4% of the adult population. The prevalence of psychiatric disorders increase the likelihood that such disorders will be present as co-existing problems in patients requiring anesthesia. Psychotropic drugs are important in the treatment of schizophrenia, mania, and severe depression and play an essential role in the practice of medicine. Hence, prior intake of these drugs is an important consideration in the management of the surgical patient.

It is now accepted that anesthesia can be safely administered to patients being treated with drugs used to treat mental illness. ***(El-Ganzouri et al., 1985)*** There appears to be growing acceptance that the problem of drug interactions between psycho-pharmacologic drugs and drugs administered in the perioperative period is less than previously perceived and that past recommendations for discontinuation of antidepressant therapy are not justified. Nevertheless, it remains important to remain alert for potential drug interactions. This is particularly true in elderly patients, who constitute the majority of patients on antidepressant drugs ***(Wells, Bjorksten, 1989)***. Some of the anesthetic drugs were found to have psychiatric side effects, as for example Ketamine which is a phencyclidine hydrochloride (PCP) derivative commonly used for minor surgical procedures produces a state of unconsciousness termed "dissociative anesthesia" ***(Lodge et al., 1989)***. Some of the physiological and psychological effects of ketamine are the schizophrenia-like behavioral state

induced in healthy subjects and exacerbated in schizophrenic patients. ***(LaPorte, 1996)***

This essay will include a review of some psychiatric disorders, pharmacology of the psychotropic drugs, the anesthetic management for these disorders, drug interaction between anesthetic and psychotropic drugs, also a review of Electroconvulsive therapy (ECT) is a known anesthetic challenge, in which using a short acting intravenous barbiturate and depolarizing muscle relaxant is accepted as simple, safe, regimen for modified ECT. ***(Aitkenhead, Smith, 1996)***

Mood Disorders

It contains two important groups:

1- Major depressive disorder.

2- Bipolar disorder. It is the recurrence and alteration between manic episodes and depressive episodes with a disease free interval in between.

Major Depression Disorder

Epidemiology

Major depression disorder is a common disorder, with life time prevalence of about 15%, perhaps as high as 25% for women. Almost universal observation, independent of country, or culture, is two fold greater prevalence of major depression disorder in women than in men. The mean age of onset for major depression is about 40 years. In general, depression occurs most often in persons who have no close interpersonal relationship or who are divorced or separated. ***(Coryell and Tsuang, 1992)***

Etiology

The causative factors can artificially be divided into biological, genetic and psychological factors.

Biological Factors

A large number of studies have reported various abnormalities in biogenic amine metabolites such as 5-

hydroxyindol acetic acid (5-HIAA), homovanillic acid (HVA) and 3-methoxy,4-hydroxy phenylglycol (MHPG) in blood, urine and cerebrospinal fluid (CSF). The data reported are most consistent with heterogeneous dysregulatuion of the biogenic amines. Norepinephrine and serotonin are the two neurotransmitters most implicated in the pathophysiology of depression. ***(Kumar and Clark, 1998)***

Norepinephrine. The correlation suggested by basic science studies between the down regulation of β-adrenergic receptors and clinical antidepressant responses is the single most compelling piece of data about the direct role of noradrenergic system in depression. ***(Coldecott et al., 1991)***

Serotonin. The huge effect that the selective serotonin reuptake inhibitors (SSRIs), for example Fluoxetine, have made on the treatment of depression made serotonin to become the biogenic amine neurotransmitter that it's deficiency is most commonly associated with depression. ***(Coryell and Tsuang, 1992)***

Dopamine. The data suggested that dopamine activity may be reduced in depression and increased in mania. Drugs that reduce dopamine concentration -for

example Reserpine- are associated with depressive symptoms. Also, drugs that increase dopamine concentration –for example Amphetamine- reduce symptoms of depression. ***(Kumar and Clark, 1998)***

Although the data are not conclusive at this time, amino acid neurotransmitters particularly γ-aminobutyric acid (GABA) and neuroactive peptides (particularly vasopressin and the endogenous opiates) have been implicated in the pathophysilogy. Also, some investigators have suggested that second messenger system -such as adenylate cyclase, phoshotidylinsitol, and calcium regulation- may be implicated in depression. ***(Coldecott et al., 1991)***

Diagnosis

The essential features of major depression are the presence of depressed mood or loss of interest and pleasure, together with at least four of the following symptoms for at least two weeks period. Depressed mood most of the day, nearly every day**,** markedly diminished interest or pleasure in all or almost all activities most of the day**,** significant weight loss (loss of 5% of body weight in a month)**,** insomnia with early morning waking or hypersomnia**,** psychomotor retardation (slowed cognition, impaired attention and concentration)**,** Fatigue and loss of energy**,**

feeling of worthlessness and feeling of inappropriate guilt**,** diminished ability to think and indiciviness& and recurrent thoughts of death, recurrent ideation without specific plan or attempt. ***(Rich and Smith, 1990)***

Mania

Is one of the affective mood disorders. It comes into attacks. It is presented as inappropriate euphoria, cheerfulness with loud, rapid and copious speech. Accelerated train of thought (flight of ideas), expansive ideas are common which are accompanied by grandiose delusions. Patient switches from laughter to tears, from an attitude of familiarity to aggression, to outbursts of temper. Delusions of persecution as believing that people conspiring against him or may accompanied with social disinhibition mainly sexual, sleep is often reduced, appetite is increased, excessive movement and constant agitation. Hallucinations also occur, consistent with the mood, taking the form of voices speaking to the patient about his special powers. ***(Cassano et al., 1992)***

Schizophrenia

Epidemiology

The prevalence of schizophrenia ranging from 1-1.5%. Equally common among men and women. More in

early adulthood and late teens. Increased prevalence in lower social classes. ***(Adel, 2000)***

Etiology

Dopamine hypothesis. The simplest formulation of the dopamine hypothesis posists that schizophrenia results from too much dopaminergic activity. The theory evolved out of two observations. First, the efficacy and potency of antipsychotic drugs are correlated with their abilities to act as antagonists of dopamine type 2 (D2) receptors. Second, drugs that increase dopaminergic activity, notably amphetamine, are psychomimetic. The basic theory doesn't elaborate on whether the dopaminergic overactivity is due to excessive release of dopamine, too many dopamine receptors, hypersensitivity of the dopamine receptors, or combination of these mechanisms. Neither does the basic theory specify which dopamine tracts in the brain may be involved, although the mesocortical and mesolimbic tracts are most often implicated. The dopaminergic neurons in these tracts project from their cell bodies in the midbrain to dopaminoceptive neurons in the limbic system and the cerebral cortex. ***(Adel, 2000)***

The hypothesis has a major problem. As dopamine antagonists are effective in virtually all psychotic and