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A Case Report

Anesthesia and Mental Illness

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Abstract:- Multiple psychiatric patients are prescribed long-term drug treatment of Psychotropic agents, and the anesthesiologist must be aware of the potential interactions with anesthetic drugs. Psychotropic drugs often given in combination with each other or with other non-psychiatric drugs. Hence, prior intake of these drugs is very important in the management of the patient about to undergo anesthesia and operations. This article highlights the effects of anesthetics on patients taking antipsychotics, antidepressants, lithium carbonate. And tramadol the risk should be considered in the perioperative period and the extent of surgery, the patient's physical state, anesthesia, the effects of psychotropic drugs, risk of withdrawal effects and risk of psychiatric relapse and the risk of psychiatric emergency cases like Serotonin syndrome and Neuroleptic Malignant Syndrome must be consider

Keyword:- Anesthetic Management, antidepressants, Bipolar Disorders, Schizophrenia, Serotonin syndrome, Neuroleptic Malignant Syndrome

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Introduction:

Psychiatric patients are at increased risk for perioperative complications, as their biological response to stress is impaired. The increased complications are associated with physical disorders, antipsychotic or hazardous health behaviour and interactions between antipsychotics and anesthetic drugs. Thus, the anesthesiologist must not only be aware of the dose adjustment of the anesthetic agents but also learn how to manage their perioperative course.[1] For example, patients with hysteria require less anesthetic agents than those with neurotic depression or anxiety state. Similarly, organic psychosis requires less than acute functional psychosis, which in turn require less than chronic psychosis.

Anesthesiologists may be confronted with many potential difficulties, such as communication with patient,

concomitant pathology associated in chronic psychiatric patients and abnormalities of the endocrine, immune and cardiovascular systems. An increased mortality rate in the post-operative period for psychotic patients receiving chronic antipsychotic therapy has been demonstrated. Adverse responses during anesthesia include arrhythmias, hypotension, prolonged narcosis or coma, hyperpyrexia, post-operative ileus and post-operative confusion. In addition, chronic psychotic patients lack pain sensitivity and have pituitary–adrenal and autonomic nervous dysfunction, abnormalities of the immune system and water intoxication. These alterations may influence the post-operative outcome.[2–6] We will discuss some of the common psychiatric disorders and their management as follows

Depression Disorder

Depression is the most common psychiatric disorder, affecting 10–20% of the population, and is characterized by low mood and lake of interest. Its cause is multifactorial, but pharmacological treatment is based on the presumption that its manifestations are due to a brain deficiency of dopamine, norepinephrine and serotonin or altered receptor activities. Up to 50% of the patients with major depression hyper secrete cortisol and have abnormal circadian secretion.[7]

Antidepressants can be divided into: Tricyclic antidepressants (TCA), selective serotonin re-uptake inhibitors, Atypical antidepressants include venlafaxine and mirtazapine. Both these drugs should be continued throughout the perioperative period.

About 70–80% of the patients respond to antidepressant medications, and at least 50% who do not respond to antidepressant do respond favorably to electroconvulsive therapy (ECT). ECT is increasingly used for refractory and severe cases with suicidal attempts.

Discontinuation Syndrome

Abrupt cessation of antidepressants is associated with the risk of developing withdrawal symptoms, known as discontinuation syndrome. The common symptoms are nausea, abdominal pain and diarrhea, sleep disturbance, somatic symptoms (sweating, lethargy and headache) and, finally, affective symptoms (low mood, anxiety and irritability). These reactions start abruptly within a few days of stopping the antidepressant, are short lived (a few days to 3 weeks) and end if the antidepressant is reintroduced.[8,9]

TCA

Before the availability of selective serotonin reuptake inhibitors (SSRIs), TCAs were the most commonly used drugs for treating depression. Drugs in this group include amitriptyline, imipramine, Desipramine, nortriptyline and others. Desipramine and nortriptyline are used as tricyclic antidepressant as they are less-sedating. TCAs are thought to affect depression by inhibiting synaptic reuptake of norepinephrine and serotonin. However, they also affect other neurochemical systems including histaminergic and cholinergic systems. Consequently, they have a large range of side-effects, including postural hypotension, cardiac dysrhythmias, urinary retention, dry mouth, blurred vision and sedation.[1,7,9]

Given chronically, these drugs decrease stores of noradrenergic catecholamines. They can cause changes on the ECG (changes in the T wave, widening of the QRS complex and prolongation of QT interval, bundle branch block or other conduction abnormalities,). Ventricular arrhythmias and refractory hypotension may occur in higher doses.

Management of anesthesia for a patient on TCA

Patients being treated with TCA may have altered responses to drugs administered during the perioperative period. Increased availability of neurotransmitters in the central nervous system can result in increased anesthetic requirements. TCAs may result in increased response to intraoperative administered anticholinergic, and those that cross the blood–brain barrier, such as atropine, may cause postoperative confusion. Likewise, increased availability of norepinephrine at the post-synaptic nervous system can be responsible for exaggerated blood pressure responses following administration of indirect acting vasopressors such as ephedrine. The most important interaction between anesthetic agents and tricyclic antidepressant drugs is an exaggerated response to both indirect acting vasopressors and sympathetic stimulation. Ketamine, meperidine and epinephrine containing solutions should be avoided. There are two hazardous drug interaction risks to be avoided: The direct effect on the cardiac system and the interactions with anesthetic drugs regulating the cardiovascular system.[7,9]

Chronic therapy with tricyclic antidepressant drugs depletes cardiac catecholamine's, potentiating the cardiac depressant effects of anesthetic agents. During anesthesia and surgery, it is important to avoid stimulating the sympathetic nervous system. If hypotension occurs and vasopressors are needed, direct acting drugs such as

phenylephrine are recommended. The dose should probably be decreased to minimize the likelihood of an exaggerated hypertensive response.

SSRIs

SSRIs comprise the most widely prescribed class of antidepressants, and are the drugs of choice to treat mild to moderate depression. SSRIs block reuptake of serotonin at the pre-synaptic membranes, with relatively little effect on adrenergic, cholinergic, histaminergic or other neurochemical systems. As a result, they are associated with few side-effects. Examples include fluoxetine, paroxetine and sertraline.

Among SSRIs, fluoxetine is a potent inhibitor of certain hepatic cytochrome P-450 enzymes. Their principal side-effects are headache, agitation and insomnia. As a result, this drug may increase the plasma concentration of drugs that depend upon hepatic metabolism for clearance, such as warfarin, theophylline, phenytoin and benzodiazepines. Some cardiac antidysarrhythmic drugs are also metabolized by this enzyme system, and fluoxetine inhibition of the enzyme system may result in potentiation of their effects.[1,7,9]

SSRIs should be continued throughout the perioperative period to prevent discontinuation syndrome. Avoid the use of pethidine, tramadol, and pentazocine.

Serotonin syndrome

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Bipolar Disorders

Bipolar disorder is characterized by marked mood swings from depressive episodes to manic episodes with normal behavior in between these episodes. Valproate is the drug of choice for treating acute episodes. Mood stabilizers are used to treat bipolar affective disorders. Lithium and valproate remains a mainstay of treatment. In some cases, olanzapine and other antipsychotics are also used in the beginning of treatment to control excitement and agitation.

Lithium inhibits the release of thyroid hormones and results in hypothyroidism. Lithium is eliminated by the kidneys and, therefore, if renal function is compromised or there is dehydration, lithium levels rise dramatically. Toxic blood concentration produces confusion, sedation, muscle weakness tremors and slurred speech. Cardiac problems may include sinus bradycardia, sinus node dysfunction, AV block, T wave changes, hypotension and ventricular irritability. Lithium toxicity occurs when levels are >1.5 mmol/L, and is exacerbated by dehydration, diuretics and renal impairment.[7,9]

Lithium carbonate is used to treat manic depression, but it is more effective in preventing mania than in relieving depression. Lithium prolongs neuromuscular blockade and may decrease anesthetic requirements because it blocks brainstem release of norepinephrine, epinephrine and dopamine. [7,9]]

Drug interactions with lithium

Thiazide diuretics reduce the clearance of lithium by the kidneys. Non-steroidal anti-inflammatory drugs may increase the lithium levels up to 40%, which can result in toxicity. Angiotensin converting enzyme inhibitors not only reduce the excretion of lithium but may also cause renal failure.

Management of bipolar cases

Lithium's direct effects cause hazardous risks in surgery. This is specifically true when hemodynamic instability occurs and renal excretion becomes impeded through interference with sodium and potassium metabolism. Therefore, lithium discontinuation is recommended. Lithium can be stopped at once because no withdrawal symptoms occur. Taking a half-life of 24–36 h into

account, lithium should be discontinued 72 h before surgery.

Sodium depletion decreases renal excretion of lithium and can lead to lithium toxicity. To prevent significant renal absorption of lithium, it is reasonable to administer sodium-containing IV fluids during the perioperative period. Stimulation of urine output with thiazide diuretics must be avoided. ECG monitoring should be done to monitor various cardiac abnormalities due to lithium. The association of sedation with lithium suggests that anesthetic requirement may be decreased in these patients.

In the post-operative period, when the patient has normal ranges of potassium, sodium and creatinine, is aerodynamically stable, able and allowed to drink, lithium should be restarted, with control of blood levels within 1 week. This is most important because the psychiatric risk of recurrence or relapse is hazardous.[1,7,9] The only reason not to stop lithium is minor surgery with local anesthesia.

Schizophrenia

It is the major psychotic mental disorder. It is characterized by abnormal reality testing or thought process. This disorder has multifactorial etiology and is thought to be related to an excess of dopaminergic activity in the brain. Its exact etiology is yet to be established. Antipsychotic drugs used are classified into two groups:

Neuroleptic or typical antipsychotics (chlorpromazine, haloperidol,) cause extrapyramidal side-effects like acute dystonia, akathisia, Parkinsonism and tardive dyskinesia.

Atypical antipsychotics (clozapine, olanzapine, risperidone, quetiapine and aripiprazole), which do not have a tendency to cause extrapyramidal side-effects. They act via the D2 receptor blockade, but also act on other receptors like histamine (H1), serotonin (5HT2), acetylcholine (muscarinic) and Alfa adrenergic receptors. Clozapine causes seizures and neutropenia. Weight gain, postural hypotension and gynaecomastia are also very common with antipsychotic drugs.

The pre-operative use of antipsychotics makes schizophrenic patients more susceptible to the hypotensive action of general anesthesia.

Discontinuation of antipsychotics may increase the episodes of psychotic symptoms such as hallucinations delusion's and agitation. Therefore, patients with schizophrenia should continue their antipsychotics pre-operatively as abrupt withdrawal may result in recurrence of psychotic symptoms.[10]

Anesthetic problems and management in patients with schizophrenia

Antipsychotic drugs remain the only effective treatment for controlling this disease. For the anesthesiologists, important effects of antipsychotic drugs include α-adrenergic blockade causing postural hypotension, prolongation of QT intervals, seizures, hepatic enzyme elevation, abnormal temperature regulation, sedation and Parkinsonism-like manifestations. Drug-induced sedation may decrease anesthetic requirement.

Anesthetics, whether general or regional anesthesia, whatsoever are best suited for schizophrenic patients remains controversial. Bronchospasm and persistent hypotension during spinal anesthesia were reported in a chronic schizophrenic patient.[11] Lanctot et al.[12] suggested that 21% of the patients receiving antipsychotics had a serious side-effect, such as extrapyramidal symptoms, sedation or hypotension, and disturbances of the cardiovascular and autonomic nervous systems. Minor cardiovascular adverse effects such as postural hypotension and tachycardia are extremely common in schizophrenic patients taking antipsychotics.[13] The heart rate during anesthesia tends to increase in schizophrenic patients due to the use of antipsychotic drugs.[5,14] Schizophrenic patients treated with chlorpromazine are especially prone to develop hypotension after anesthesia induction.[10] The risk factors for hypotension during anesthesia include increased age, use of antihypertensives, increased individual sensitivity to anesthetics and the influence of the renin–angiotensin system. Therefore, it is important during anesthesia to note the presence of risk factors and adjust the anesthetic dose according to individual response. Ketamine should probably be avoided as antipsychotics decrease the seizure threshold.[7,9] The increased incidence of cardiovascular disease in chronic schizophrenic patients is associated with increased body weight, diabetes mellitus and frequent smoking.[15] Weight gain is a common problem in patients receiving antipsychotics.[16] Antipsychotics can produce glucose intolerance by decreasing insulin action.[2] Commonly observed electrocardiographic changes caused by antipsychotic drugs are prolongation of the QT and PR intervals and T wave changes. Torsade's de pointes and sudden death occurs in 10–15 of 10,000 patients taking antipsychotic drugs, which is almost twice as often as in

normal populations.[17] Paralytic ileus is caused by the anticholinergic and noradrenergic effect of antipsychotic drugs.[18]

There are some reports on changes in pain responsiveness in schizophrenic patients, many of whom do not complain of pain after abdominal surgery. Pain insensitivity in schizophrenic patients may also be a result of antipsychotics, as most antipsychotics have analgesic effects.[19]

Temperature regulation during anesthesia may be impaired in schizophrenic patients because of the direct effect on hypothalamic thermoregulation caused by dopamine blockade with antipsychotics.[20] Therefore, temperature monitoring and appropriate thermal management are especially helpful for schizophrenic patients. Schizophrenic patients have abnormalities in the hypothalamic–pituitary–adrenal and autonomic nerve function, particularly if there is no response to stress. Use of antipsychotic decreases the plasma cortisol concentration.

Post-operative problems and management

Molnar and Fava[21] suggested that surgical stress worsens the psychotic symptoms after surgery in schizophrenic patients. Schizophrenic patients are at greater risk of developing post-operative confusion than are normal patients. It is associated with increased cortisol [22] and norepinephrine,[23] because psychological disturbances in schizophrenic patients have been extensively related to hypersecretion of cortisol. Increased rate of infectious disease have been demonstrated in schizophrenic patients. This may be a consequence of dysregulation of the immune system. Life-threatening water intoxication often occurs in chronic schizophrenic patients. Water intoxication is associated with vasopressin hypersecretion as a result of chronic administration of antipsychotics.[6]

Neuroleptic Malignant Syndrome

Neuroleptic Malignant Syndrome is a rare but potentially life-threatening, neurological disorder that is most often caused by an adverse reaction to neuroleptic or antipsychotic drugs. The incidence is estimated to range from 0.02 to 2.4% with conventional antipsychotics. It causes acute hyperthermia, muscular rigidity, altered mental status, elevated creatinine phosphokinase and autonomic dysfunction. Awareness of diagnosis, cessation of medication, early medical intervention and consideration of specific remedies can reduce morbidity and mortality when Neuroleptic Malignant Syndrome occurs.[7,24]

Patients should be treated in the intensive care unit. Dentrolene is used along with supportive treatment.

Tramadol and Anesthesia.

The use of tramadol in patients taking antipsychotic drugs is of particular interest as tramadol may itself cause psychiatric symptoms, e.g. altered mood (elation or dysphoria), hallucinations, confusion, sleep disturbance and nightmares. Tramadol may precipitate the serotonin syndrome when combined with antidepressant medication, which raise the level of this transmitter.

When combined with antipsychotics, selective serotonin re-uptake inhibitors or TCA, tramadol reduces the seizure threshold.

Carbamazepine induces the metabolism of tramadol and, therefore, co-administration of these drugs leads to reduced efficacy of tramadol.[25]

Conclusion:

The focus of the anesthesiologist should be on risk management to prevent perioperative mortality, physical morbidity, withdrawal problems and acute or long-term relapse of psychiatric illness, thereby preventing last minute cancellation of surgery. Selective serotonin re-uptake and TCA should be continued throughout the perioperative period to avoid discontinuation syndrome.. Mood stabilizers and antipsychotic drugs should be continued throughout lithium should be discontinued 72 h before surgery the perioperative period to avoid the risk of relapse. The prevention of perioperative and post-operative complications is an important task for the anesthesiologist

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