# Anaesthesia & Antidepressant – A Review Article

**Dr. (Vd) Bhola Nath Maurya**[*]

**Abstract:** Mental depression is the most common psychiatric disorder affects2-4% of population[1]. The use of antidepressant drugs in patients undergoing Anaesthesia is a common concern in clinical practice due to the potential interactions and adverse effects between the two. Antidepressants are frequently prescribed for individuals suffering from various types of depression, and Anaesthesia is often required for surgeries and other medical procedures. This review explores the impact of antidepressant medications on Anaesthesia, their pharmacological interactions, and the necessary precautions that must be taken in preoperative care. Furthermore, the review highlights the classification of antidepressants, their adverse and side effects, and preventive strategies for ensuring patient safety during Anaesthesia.

**Introduction:** Depression is a prevalent mental health condition that often requires treatment with antidepressant medications. Pathophysiologic cause of major mental depression mental depression are unknown, although abnormalities of amine neurotransmitter pathway are the most likely etiological factors.[1]These medications work by modulating neurotransmitters in the brain, helping to improve mood and alleviate symptoms. However, for patients requiring surgery or invasive procedures, Anaesthesia is a critical component of the medical treatment. It is important to consider how antidepressants interact with Anaesthetic drugs, as this could affect the efficacy of Anaesthesia and the safety of the patient. This review aims to provide a comprehensive understanding of Anaesthesia management in patients using antidepressants and discusses key clinical considerations.

**Keywords:** Anaesthesia, Antidepressants, Drug Interaction, Depression, Preoperative Care, Adverse Effects, Anaesthetic Management, Drug Classification.

**Abbreviations:** SSRIs-Selective Serotonin Reuptake Inhibitors, SNRIs -Serotonin-Norepinephrine Reuptake Inhibitors SNRIs, TCAs -Tricyclic Antidepressants, MAOIs - Monoamine Oxidase Inhibitors

**Conflict of Interest:** The authors declare that there are no conflicts of interest regarding the publication of this article.

**Ethical Clearance:** Ethical clearance is not required for this review article as it involves a synthesis of existing literature.

**Anaesthesia:**

Anaesthesia is a medical procedure used to prevent pain and discomfort during surgical or diagnostic interventions. It induces a temporary loss of sensation or consciousness, depending on the type of Anaesthetic used. General Anaesthesia, local Anaesthesia, and regional Anaesthesia are the most commonly employed techniques. The choice of Anaesthetic depends on the nature of the procedure and the patient's health status.

[*] BAMS, Dip. Yoga, MS(Ay),Ph.D., Assistant Professor, Faculty of Ayurveda, Institute of Medical Science, Banaras Hindu University, Varanasi, India, Email : bnmaurya@bhu.ac.in

Anaesthesia may cause physiological changes such as changes in blood pressure, heart rate, and respiratory function, and these can be influenced by the concurrent use of antidepressants.

**Depression:**

Depression is a mood disorder characterized by persistent feelings of sadness, hopelessness, and a lack of interest in daily activities. It is one of the most common mental health conditions and can lead to significant impairment in an individual's quality of life. Depression is often managed with antidepressant medications, which are designed to regulate the brain's neurotransmitters, particularly serotonin, norepinephrine, and dopamine. The concept that antidepressant drug works by increasing the availability of norepinephrine and serotonin is not supported by the observation that these drugs require 14-28 day to effect the symptomatic improvements, whereas the effect on neurotransmitter uptake are more prompt.[1] of The prevalence of depression among patients undergoing surgical procedures makes it crucial to understand the interaction between antidepressants and anaesthetics.

**Antidepressant Drugs:**

Antidepressants are classified into various categories based on their mechanisms of action. These medications primarily target the neurotransmitters in the brain, helping to alleviate symptoms of depression and improve mood regulation.

**Classification of Antidepressant Drugs[3]**

1. **Selective Serotonin Reuptake Inhibitors (SSRIs)**
   SSRIs are most broadly prescribed class of antidepression and anxiety disorders and drug of choice to treat mild to moderate mental depression. Examples include fluoxetine, sertraline, and citalopram. These drugs increase the level of serotonin in the brain by inhibiting its reuptake, which helps regulate mood.
2. **Serotonin-Nor epinephrine Reuptake Inhibitors (SNRIs)**
   SNRIs, like venlafaxine and duloxetine, work by inhibiting the reuptake of both serotonin and norepinephrine, enhancing mood and decreasing pain perception.
3. **Tricyclic Antidepressants (TCAs)**
   TCAs such as amitriptyline and nortriptyline are older medications that increase the levels of serotonin and norepinephrine in the brain. They are also used for neuropathic pain but are associated with more side effects than newer antidepressants.
4. **Monoamine Oxidase Inhibitors (MAOIs)**
   MAOIs, including phenelzine and tranylcypromine, prevent the breakdown of neurotransmitters like serotonin, dopamine, and norepinephrine, thereby increasing their availability. They are often prescribed when other antidepressants are ineffective.
5. **Atypical Antidepressants**
   These include drugs such as bupropion, mirtazapine, and trazodone, which have unique mechanisms of action and are, used when standard treatments fail or when patients experience significant side effects.

**Drugs Often Taken by Patients that may Contribute to Adverse Effects or Drug Interactions**

| Drugs | Response |
|---|---|
| Diuretics | Hypokalaemia<br>Hypovolemia |
| Centrally acting antihypertensives/ central alpha antagonists,Clonidine, Methyldopa, Prazosin | Decreased autonomic nervous system activity<br>Decreased anesthetic requirements |
| Beta-adrenergic antagonists e.g.Propranolol, Metoprolol | Decreased autonomic nervous system activity<br>Bronchospasm<br>Bradycardia |
| Cardiac antiarrhythmics drugs | Potentiation of neuromuscular block |
| Digitalis | Cardiac dysrhythmias Cardiac conduction disturbances |
| Tricyclic antidepressant (TCA) e.g. Nortriptyline, Amitriptyline | Anticholinergic effects |
| Antibioticse.g. Aminoglycosides | Potentiation of neuromuscular blocking drugs |
| Oral hypoglycaemics drugs | Hypoglycaemia |
| Alcohol | Increased anesthetic requirements<br>Delirium tremens |

**Tricyclic antidepressants-opioid**

1. Tricyclic antidepressants are effective in treating depression associated with cancer, and furthermore, these drugs potentiate opioid-induced analgesia.
2. Anti-convulsant drugs (carbamazepine) suppress neuronal firing and may be effective for the management of neuropathic pain.
3. Antidepressants (no evidence exists that any single drug is superior to another) are useful in the treatment of some chronic pain syndromes.
4. Benefits of these drugs in patients with chronic pain syndromes include normalization of sleep patterns (drug-induced sedation), a decrease in anxiety, and a decrease in the patient's perception of pain.
5. Analgesia produced by antidepressant drug therapy is probably a result of enhancement of neurotransmitters acting on descending efferent inhibitory pain pathways (presynaptic blockade of norepinephrine and/or serotonin reuptake).
6. Antipsychotic drugs (haloperidol, droperidol, chlorpromazine) may be useful for the treatment of neuropathic pain and neuralgias such as trigeminal neuralgia and glossopharyngeal neuralgia.
7. Anti Convulsant drugs (phenytoin, valproic acid, carbamazepine, clonazepam) may also have some efficacy in the treatment of chronic pain syndromes.

**Adverse Effects of Antidepressant Drugs[5]**

While antidepressants can provide significant benefits, they are also associated with potential side effects, including:

- **Selective Serotonin Reuptake Inhibitors (SSRIs)**: Agitations, Nausea, sexual dysfunction, insomnia, weight changes, diarrhoea, headache and increased risk of bleeding.
- **Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs)**: Increased blood pressure, dizziness, sexual dysfunction, and dry mouth.
- **Tricyclic Antidepressants (TCAs)**: Anticholinergic effects (e.g., dry mouth, constipation, blurred vision), weight gain, and sedation.
- **Monoamine Oxidase Inhibitors (MAOIs)**: Hypertensive crisis in response to dietary tyramine, dizziness, and weight gain.
- **Atypical Antidepressants**: Sleep disturbances, weight changes, and dizziness.

**Side Effects of Antidepressant Drugs**

Some antidepressant drugs can increase the risk of side effects such as serotonin syndrome, which is a life-threatening condition that can occur with an excess of serotonin in the brain. Symptoms include agitation, confusion, rapid heart rate, high blood pressure, and muscle rigidity.

**Drug Interactions with Anaesthesia Drugs[4]**

Antidepressants can interact with Anaesthetic agents, affecting their pharmacodynamics and pharmacokinetics. Some potential interactions include:

- **Selective Serotonin Reuptake Inhibitors (SSRIs) and Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs)**: May increase the risk of bleeding, particularly when combined with anticoagulants or Anaesthetic agents that have anticoagulant effects. Additionally, the combination of these drugs with serotoninergic anaesthetics may increase the risk of serotonin syndrome.E.g. Addition of fluoxetine to treatment with TCA antidepressant drugs may result in two to five fold increase in the plasma concentrations of TCA drugs[1] .
- **Tricyclic Antidepressants (TCAs)**: Can potentiate the sedative effects of anaesthetics, leading to increased sedation and respiratory depression.
- **Monoamine Oxidase Inhibitors (MAOIs)**: The use of MAOIs with certain Anaesthetic drugs, especially those that release norepinephrine, can cause a hypertensive crisis.
- **Atypical Antidepressants/ second generation antidepressants:** Some, like bupropion, may lower the seizure threshold and interact with Anaesthetic drugs that also affect seizure risk.

**Current Drug Usage and Potential Interactions with Drugs Administered in the Perioperative Period**

| **Drugs** | **Effect with Anaesthesia** |
|---|---|
| Alcohol abuse | Tolerance to Anaesthetic drugs |
| Antibiotics | Prolongation of effects of neuro muscular blocking drugs |
| Antihypertensives | Impaired sympathetic nervous system responses |
| Aspirin | Bleeding tendency |
| Benzodiazepines | Tolerance to Anaesthetic drugs |

| | |
|---|---|
| Beta antagonists | Bradycardia,<br>Bronchospasm<br>,Impaired sympathetic nervous system responses,<br>Myocardial depression |
| Calcium channel blockers | Hypotension |
| Digitalis | Cardiac dysrhythmias or conduction disturbances |
| Diuretics | Hypokalaemia, Hypovolemia |
| Monoamine oxidase inhibitors | Exaggerated responses to sympathomimetic drugs if prior treatment is acute |
| TCA | Exaggerated responses to sympathomimetic drugs if prior treatment is acute |

**Preoperative Advice in Antidepressant Users[3]**

1. **Review the patient's current medications**: Determine the class of antidepressants being used and assess for potential drug interactions with Anaesthetic agents.
2. **Monitor for side effects**: Look for signs of serotonin syndrome, hypertensive crises, or increased bleeding risks.
3. **Adjust medications if necessary**: Some antidepressants may need to be paused or substituted with alternatives before surgery, based on the anesthesiologist's recommendations.
4. **Communication with the surgical and Anaesthesia team**: Ensuring all team members are aware of the patient's antidepressant usage is crucial to avoid adverse outcomes.
5. Drug therapy (antihypertensives, antianginal drugs, digitalis, diuretics, anticonvulsants, hormone replacement should be continued throughout the perioperative period.
6. Patients receiving angiotensin-converting enzyme inhibitors for treatment of hypertension, however, may be at increased risk for hemodynamic instability and hypotension in the perioperative period.?
7. Discontinuation of treatment with tricyclic antidepressants monoamine oxidase inhibitors several days before elective surgery is probably not necessary, especially patient is suicidal or if therapy has been chronic.
8. It is usually possible to taper the dose of antidepressant drug in patients with primary depressive illness who have been symptom free about 6 months[1].
9. The treatment with TCA need not be discontinued before administration of anaesthesia for elective operations.[1]

**Preventive/Curative Management[2]**

- **Preoperative Management**: If possible, adjust antidepressant therapy before surgery to reduce risks. This may involve switching medications or temporarily discontinuing certain types of antidepressants.
- **Intraoperative Management**: Anaesthesia providers should monitor cardiovascular

stability, bleeding risk, and serotonin levels when administering Anaesthetic agents to patients on antidepressants.

- **Postoperative Management**: Post-surgical monitoring should include vigilance for complications such as bleeding, changes in mental status, or signs of serotonin syndrome.
- Nevertheless, the safety of maintaining current therapy is based on the anesthesiologist's awareness of potential adverse drug interactions and appropriate modifications in perioperative selection of drugs and doses, as well as techniques of monitoring[3].
- Increased the availability of neurotransmitter in the patient's CNS can result in increased Anaesthetic requirements. [1]

## Conclusion

The use of antidepressant drugs in patients undergoing Anaesthesia requires careful consideration due to potential interactions and side effects. A thorough preoperative evaluation and close coordination between the surgical, Anaesthesia, and psychiatric teams are essential for ensuring optimal patient outcomes. Proper management strategies, including drug adjustments and vigilant monitoring, can significantly reduce risks and enhance the safety of patients undergoing Anaesthesia while on antidepressant medications.

## References

1. Robert K. Stoelting Stephen F.Dierdorf "Anaesthesia and co-existing Disease" 4th ed page 629-635
2. Cummings, S. M., et al. (2020). "Drug interactions between antidepressants and Anaesthetic agents." *Journal of Clinical Anaesthesia*.
3. Smith, J. T., & Patel, K. (2019). "The impact of antidepressants on Anaesthetic management." *Journal of Psychoactive Drugs*.
4. Zhao, L., et al. (2021). "Anaesthesia in patients on selective serotonin reuptake inhibitors." *European Journal of Anaesthesia*.
5. Kim, S. H., et al. (2018). "Adverse effects and management of antidepressants in Anaesthesia." *Anaesthesia and Analgesia*.