

# Serotonin Syndrome: Patient Information



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**Summary:** Serotonin syndrome (aka serotonin toxicity) is a serious condition that can occur when taking medications that cause too much serotonin in the brain. Mild symptoms include feeling agitated, restless, shivering and having diarrhea. Severe symptoms can include fever, muscle rigidity and seizures. Symptoms usually occur within a day or two of starting or changing a medication that affects serotonin. If serotonin syndrome is suspected, it is always good to seek medical attention, just in case. Most cases are mild to moderate and can be treated by stopping the medication. However, in severe cases, it can be life-threatening.

## Introduction

Serotonin is an essential neurotransmitter in your brain.

And there are many life-changing medications that affect serotonin, such as serotonin-specific reuptake inhibitors (SSRIs).

Most of the time, people can use serotonin medications without any problems.

However, sometimes medications can carry a risk of adverse effects, such as when:

- A person is taking more than medication that boosts serotonin (e.g. using two antidepressant SSRIs at the same time; taking recreational drugs that affect serotonin; taking nutritional supplements that affect serotonin.)
- A person is taking a serotonin medication (such as an SSRI) along with another medication that prevents the SSRI from being broken down (e.g. erythromycin).
- A person is taking a high dosage of a single serotonin medication.

## Symptoms

Symptoms usually occur within a day or two of starting or changing a medication that affects serotonin.

### Mild to moderate symptoms may include

- Mental symptoms
  - Feeling restless, agitated, anxious
  - Trouble sleeping
  - Hallucinations

- Headaches
- Autonomic symptoms (symptoms that affect your internal organs and your fight/flight system)
  - Pupils wide and dilated
  - Sweating, feeling hot
  - Goose bumps
  - Rapid heart rate
  - High blood pressure that can lead to headaches.
  - Diarrhea.
  - Sore muscles, muscle spasms (clonus).
  - Teeth chattering, shivering.

## Severe symptoms may include

- Headache, agitation,
- Fever
- Muscle rigidity (hypertonia)
- Seizures
- Confusion,
- Hallucinations
- Unresponsiveness
- Loss of consciousness, coma

When symptoms are severe and left untreated, it can be potentially life-threatening.

## Medications That Can Cause Serotonin Syndrome Include:

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Amphetamines and derivatives     | 3,4-methylenedioxymethamphetamine<br>Methylenedioxymetamphetamine (MDMA aka "Ecstasy")<br>Dextroamphetamine<br>Methamphetamine<br>Sibutramine (Meridia)                                                                                                                                                                                                                                                                           |
| Analgesics                       | Cyclobenzaprine (Flexeril)<br>Fentanyl (Duragesic)<br>Meperidine (Demerol)<br>Tramadol (Ultram)                                                                                                                                                                                                                                                                                                                                   |
| Antidepressants/mood stabilizers | Buspirone (Buspar)<br>Lithium<br>Monoamine oxidase inhibitors (e.g., phenelzine [Nardil])<br>Selective serotonin reuptake inhibitors (e.g., fluoxetine [Prozac])<br>Serotonin-norepinephrine reuptake inhibitors (e.g., venlafaxine [Effexor])<br>Serotonin 2A receptor blockers (e.g., trazodone)<br>St. John's wort ( <i>Hypericum perforatum</i> )<br>Tricyclic antidepressants (e.g., amitriptyline, nortriptyline [Pamelor]) |
| Anti-vomiting                    | Metoclopramide (Reglan)<br>Ondansetron (Zofran)                                                                                                                                                                                                                                                                                                                                                                                   |
| Antimigraine drugs               | Ergot alkaloids<br>Triptans (e.g. sumatriptan, rizatriptan, zolmitriptan)                                                                                                                                                                                                                                                                                                                                                         |
| Anti-seizure drugs               | Carbamazepine (Tegretol)<br>Valproic acid (Depakene)                                                                                                                                                                                                                                                                                                                                                                              |
| Recreational drugs               | Ecstasy (NMDA)<br>Cocaine<br>Amphetamines                                                                                                                                                                                                                                                                                                                                                                                         |

Others

Dextromethorphan (cough suppressant)  
Linezolid (Zyvox) (antibiotic)  
L-tryptophan  
5-hydroxytryptophan

## Conditions that May Resemble Serotonin Syndrome

There are other conditions that may resemble serotonin syndrome, which is why it is always best to see your health care provider.

- Anticholinergic syndrome
- Malignant hyperthermia
- Neuroleptic malignant syndrome (NMS):
- Develops days to weeks after taking a dopamine antagonist (i.e. antipsychotic)
- Tetanus
- Overdose of sympathomimetic drugs
- Meningitis
- Encephalitis
- Thyroid storm
- Heat stroke
- Delirium tremens
- Sepsis

## Seek Immediate Medical Attention

Are you wondering about serotonin syndrome?

Are you having mild symptoms:

- Stop taking your serotonin medications.
- Call your health care provider, a health line.

Are you have severe symptoms? (e.g. fever, muscle rigidity, confusion, hallucinations)

- Stop taking any serotonin medications, and visit an Emergency Department.

Fortunately, most cases symptoms are mild to moderate. Nonetheless, it is still better to be certain.

## How is Serotonin Syndrome Treated?

In mild cases, people can be treated without needing to be admitted to hospital.

- Stop any causative serotonergic drugs.
- Mild cases generally resolve within 24- 72 hours.
- Most patients with mild cases do not require hospital admission.

In moderate to severe cases, people need to be admitted to hospital.

- Symptoms of moderate to severe cases: hypertonicity, hyperthermia, autonomic instability, or progressive cognitive changes).
- Treatment in hospital includes IV fluids, medications for agitation/tremor.

## How to Prevent Serotonin Syndrome?

Avoid using multiple serotonin medications, e.g. do not use more than one SSRI.

Avoid prescribing an SSRI along with a medication that blocks the metabolism of an SSRI.

Use electronic ordering systems and/or electronic medication databases to check for interactions.

## References

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