Serotonin Syndrome: Advice & Guidance

What is Serotonin Syndrome?

Serotonin Syndrome is a potentially life-threatening condition which can be triggered by use of prescribed medication and/or recreational drug use. It is caused by over-stimulation of the central nervous system and peripheral serotonin receptors. Depending on the severity of the illness, symptoms can range from being barely noticeable to potentially fatal.

Serotonin Syndrome is generally associated with (a) either starting or increasing the dose of a serotonergic drug (for example, an antidepressant), or (b) introducing a second serotonergic drug (such as ecstasy/MDMA), leading to a drug interaction.

What are the symptoms?

Symptoms usually start within six hours of taking the provoking drug. In milder cases, they may be difficult to distinguish from the effects of the drug itself. Some symptoms which might be observed by the patient or an onlooker are:

- *Tremor (shakiness)*
- *Akathisia (restlessness/inability to stay still)*
- *Diarrhoa*
- *Anxiety/agitation*
- *Hypervigilance (increased sensitivity to sensory stimulation, e.g. noises and sudden movements, and perpetually scanning the environment for potential threats)*
- *Pressured speech (speaking rapidly, often jumping from topic to topic, difficult to follow or interrupt)*

Some of the physical symptoms of Serotonin Syndrome are:

- *Hypertension (high blood pressure)*
- *Tachycardia (increased heart rate)*
- *Hyperthermia (increased body temperature)*
- *Hyperactive bowel sounds*
- *Mydriasis (dilated pupils)*
- *Excessive sweating*
- *Clonus (involuntary muscle contractions)*
- *Ocular clonus (involuntary movements of the eye)*
- *Muscular hypertonicity (involuntary muscle tension)*
- *Hyperreflexia (overactive reflex responses)*

Muscular hypertonicity, sustained clonus, and hyperthermia (up to 41°C) indicate that the illness is severe and requires emergency medical treatment.

In severe cases, symptoms tend to progress from restlessness/agitation, to excessive sweating, to neuromuscular dysfunction (i.e. shaking, involuntary muscle contractions, involuntary muscle tension), to confusion, to convulsions (seizures), coma, and potentially death.

Who is at risk?

Use of serotonergic drugs is the main risk factor for Serotonin Syndrome. It is most likely to occur if someone has recently started using a medication, recently increased their dose (or overdosed), or recently used another drug which may interact with the one they were already using.

The main groups of medications which have been linked to Serotonin Syndrome are:

- *Antidepressants/mood stabilisers: SSRIs (e.g. fluoxetine, sertraline, citalopram), SNRIs (e.g. duloxetine, venlafaxine), TCAs (e.g. amitryptaline), MAOIs (e.g. phenelzine), St John's Wort, lithium.*
- *Analgesics (painkillers): tramadol, pethidine, fentanyl, dextromethorphan (in some over-the-counter cough remedies).*
- *Antiemetics (anti-nausea): odansetron, metoclopramide.*
- *Others: linezolid, tryptophan, buspirone, methylthioninium chloride (methylene blue).*

If you are using any of these medications, it is best to be aware of the potential risks, especially if you use (or are planning to use) any recreational drugs.

The main drugs which have been linked to Serotonin Syndrome are:

- *Ecstasy/MDMA*
- *Cocaine*
- *LSD/Acid*
- *Amphetamines (speed)*

What is the treatment?

Mild cases (where the only symptoms observed are increased agitation and/or fairly minor shakiness) will usually resolve within 24 hours of discontinuing the drug which triggered the symptoms. If the illness is linked to recreational drug use, the most important thing is to stop using the drug in question and monitor symptoms to make sure they don’t get worse.

Moderate cases (symptoms may include cardiovascular symptoms such as increased heart rate/increased blood pressure, and/or increased body temperature) require immediate medical attention. This will usually involve treating the cardiovascular symptoms and ensuring body temperature goes back down to a normal level.

Severe cases (symptoms may include involuntary muscle contractions/eye movements, body temperature of >40°C, confusion and/or convulsions) will require aggressive treatment and intensive care with early sedation, neuromuscular paralysis and ventilatory support.

When the illness is caught early, the prognosis is generally good. Most deaths from Serotonin Syndrome occur within the first 24 hours, and if adequate treatment is received the majority of patients make a full recovery.

How can I reduce the risk?

- If you take medication, it is always a good idea to research potential interactions before using another drug. This includes over-the-counter medications and herbal remedies.

- If take antidepressant medication, it would be advisable to avoid using recreational drugs as this puts you at the highest risk of developing Serotonin Syndrome.

- If you do decide to use recreational drugs, familiarise yourself with the symptoms of Serotonin Syndrome as this will help you to catch it early.

- If you are using drugs with friends, make sure you are all aware of the symptoms so you know how to help each other if someone becomes ill. Ideally, it is best if at least one person in the group does not use drugs so they are in a better position to react if something goes wrong.

- If you are using drugs with friends and are taking medication, it would be a good idea to tell at least one of the people you are with what medication you are using. They will then be able to pass this on to medical professionals if you become ill.

- If you (or a friend) are showing any of the symptoms described above, it is best to err on the side of caution and seek medical advice. If you are showing symptoms associated with severe illness, please call an ambulance.

- The ambulance service does not routinely involve the police in drug-related call-outs (only when there is reason to believe the paramedics will be at risk). You won't get in trouble for making the call, and early treatment can mean the difference between life and death.