Clonidine

Clonidine is a sympatholytic medication used for multiple conditions to decrease sympathetic outflow from the central nervous system. Clonidine is an alpha-2 adrenergic receptor agonist. Stimulation of this receptor leads to decreased norepinephrine release systemically and also affects cognitive function via the prefrontal cortex. It is used to decrease the blood pressure of patients with hypertensive urgency. Due to its inhibitory effects on the prefrontal cortex, it can also help manage some patients with attention deficit hyperactivity disorder (ADHD) and Tourette syndrome. Clonidine can also help reduce signs and symptoms of opioid withdrawal like sweating and agitation. Side effects include CNS depression, respiratory depression, as well as hypotension. If discontinued, it should be tapered slowly because rebound hypertension can occur if clonidine is abruptly stopped.

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Mechanism of Action

Alpha-2 Agonist
Afro (2) Tutu Dragonist
Clonidine is an agonist at alpha-2 adrenergic receptors, leading to decreased sympathetic outflow from the CNS. Alpha-2 receptors are typically located on presynaptic neurons in the brain, and activation by clonidine leads to an inhibitory effect resulting in decreased norepinephrine release. This causes decreased sympathetic tone in the vascular system leading to decreased blood pressure. In the prefrontal cortex of the brain, this inhibition alters cognitive functions like working memory and attention, which is thought to contribute to clonidine’s efficacy in treating ADHD and Tourette syndrome.

Indication

Hypertensive Urgency
Hiker-BP and Urgent-alarm
Hypertensive urgency is characterized by severe hypertension >180/>120 mmHg but without signs of acute end-organ damage. For patients with this presentation, clonidine can be used to lower blood pressure.

Attention Deficit Hyperactivity Disorder (ADHD)
AD-HeaD with ADHD
Attention deficit hyperactivity disorder (ADHD) is characterized by deficits in attention and/or an increase in activity and disruptive behaviors, occurring at school, home and other places. Clonidine inhibits norepinephrine release in the prefrontal cortex, altering cognitive functions like working memory and attention. While this can lead to improvement in ADHD symptoms, clonidine is still a second or third-line medication for ADHD behind stimulant medications.

Tourette Syndrome
Torn-rat
Tourette syndrome is characterized by motor and phonic tics. Clonidine decreases norepinephrine release in the prefrontal cortex and elsewhere, leading to a variable improvement in signs and symptoms. Clonidine typically only results in mild improvement when compared to other medications, however.

Opioid Withdrawal
Poppy-droid making a Withdrawal
Opioid withdrawal occurs when a person who has been exposed to opioids (such as heroin or hydrocodone) for a long period of time stops taking opioids, leading to withdrawal. Withdrawal can lead to certain sympathetic symptoms such as restlessness, sweating and agitation. Due to its sympatholytic effect, Clonidine can improve some of these signs and symptoms.

Side Effects

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CNS Depression

Deflated CNS-brain

Clonidine can lead to generalized central nervous system depression due to its reduction in sympathetic outflow. Especially in an overdose setting, clonidine can result in signs and symptoms such as sedation, lethargy, or confusion.

Respiratory Depression

Deflated Lungs

Clonidine can induce respiratory depression due to its generalized inhibitory effects on the central nervous system. Especially in an overdose setting, patients on clonidine should have their respiratory status closely followed including respiratory effort and oxygen saturation levels.

Hypotension

Hippo-BP

Clonidine reduces sympathetic vascular tone, leading to decreases in blood pressure. If this effect is pronounced, it can lead to hypotension. Patients on clonidine should have their blood pressure periodically monitored, and in an overdose setting, followed closely.

Considerations

Rebound Hypertension if Abrupt Cessation

Rebounding Hiker-BP if Stopped Cold Turkey

If clonidine is discontinued abruptly, the patient may experience rebound hypertension in response. Therefore clonidine should be discontinued in a slow gradual manner with attention paid to blood pressure changes.

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