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Olanzapine and its Working Mechanism

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Description

Olanzapine is a second-generation (a typical) antipsychotic drug. The FDA has approved this drug for schizophrenia, if the patient is over 13 years old and has bipolar disorder, including mixed or manic episodes. Olanzapine is also approved for use with fluoxetine, a Selective Serotonin Reuptake Inhibitor (SSRI), in patients with depression associated with bipolar disorder type 1 and treatment-resistant depression. It is important to note that; olanzapine is not approved by the FDA for patients younger than 13 years of age. In addition, the combination of olanzapine and fluoxetine is not approved for patients younger than ten years of age. This activity states olanzapine, including its mechanism of action, pharmacology, adverse event profile, eligible patient populations, contraindications, and follow-up, and highlights the role of expertise in the management of olanzapine therapy.

Working mechanism of olanzapine

Olanzapine acts on dopamine D2 receptors in the mesolimbic pathway as an antagonist, blocking the potential action of dopamine on postsynaptic receptors. Olanzapine binds loosely to the receptor and dissociates readily, allowing normal dopamine neurotransmission.

Acting on D2 receptors reduces positive symptoms in patients, including hallucinations, delusions, and disorganized speech, thinking, and behavior. Olanzapine acts similarly on serotonin 5HT2A receptors in the prefrontal cortex as an antagonist. The effect of olanzapine on serotonin resulted in a reduction in negative symptoms, including dystonia, flatulence, analogy, fascination and inattention.

Olanzapine has a half-life of 21 to 54 hours, with a median of 30 hours. Daily administration of olanzapine results in steady-state plasma concentrations in approximately one week. Consequently, olanzapine has linear pharmacokinetics when used within the FDA-approved range. The volume of distribution is nearly 1000 liters. The drug is dispersed throughout the body. It is 93% bound to plasma proteins, mainly albumin and alpha-1-acid glycoprotein.

Olanzapine is widely absorbed by the liver *via* direct glucuronidation and the cytochrome P450 system. The enzymes in this system that metabolize olanzapine are primarily 1A2 and slightly 2D6. The CYP1A2 gene is polymorphic, but one study did not show any reported association between different polymorphisms and drug pharmacokinetics. Patients with hepatic impairment do not require dose adjustment. Child-Pugh Class A and B cirrhotic patients do not affect the metabolism of this drug. Because of this extensive metabolism of olanzapine, only 7% of the drug is unchanged in excretion. Olanzapine is eliminated mainly in the urine (53%) and feces (30%). Patients with renal impairment do not require a specific dose of this drug because of its metabolism.

It is available in tablet form, which is beneficial for the patients who can take oral medication. Tablets are available in 2.5 mg, 5 mg, 7.5 mg, 10 mg, 15 mg and 20 mg doses. Alternatively, olanzapine is also available as a disintegrating tablet. This form is especially beneficial for patients who cannot swallow tablets but want to take them orally, for patients who do not like to take medication by not swallowing pills, or for agitated patients. Olanzapine is also available as an injection, at a dosage of 5 mg/mL.

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