

Use of pyridoxine to prevent neuropathy in patients receiving isoniazid for the treatment of latent tuberculosis infection

Isoniazid-induced neuropathy

The drug isoniazid can cause peripheral neuropathy in patients undergoing treatment for tuberculosis infection. Symptoms of peripheral neuropathy include numbness, pain, and tingling in the extremities (hands and feet). If untreated, more severe symptoms can develop. The risk of neuropathy increases with the dose of isoniazid, and is not common when isoniazid is given at a standard 5 mg/kg dose. However, certain risk factors such as diabetes, alcohol use, and malnutrition increase the risk of peripheral neuropathy.

Pyridoxine and its function

Isoniazid causes peripheral neuropathy through interference with the metabolism of pyridoxine, also known as vitamin B₆. Pyridoxine is critical for central nervous system function as it is used in the production of neurotransmitters. When pyridoxine enters the body, it is activated by a certain set of enzymes. Isoniazid competes for these same enzymes, which reduces the amount of the activated form of pyridoxine in the body. Isoniazid metabolites also react with pyridoxine to deactivate it. Taking isoniazid thus reduces the amount of pyridoxine that the body effectively has, and this deficiency causes neuropathy. Taking supplemental pyridoxine concurrently with isoniazid can prevent pyridoxine deficiency and therefore prevent isoniazid-induced neuropathy.

Recommendations for using pyridoxine

The US CDC recommends that 10-50 mg of pyridoxine be given daily to anyone who is taking isoniazid and who develops symptoms of peripheral neuropathy. The US CDC also recommends that 10-50 mg of pyridoxine be given daily to all people who are taking isoniazid and who have risk factors for neuropathy, including diabetes, uremia, alcoholism, malnutrition, HIV infection, pregnancy, and seizure disorders.

Scientific Evidence

In the 1960's, two randomized controlled trials performed by the Tuberculosis Chemotherapy Center in Madras, India showed that pyridoxine, but not other B vitamins, was effective for treating and preventing isoniazid-induced peripheral neuropathy. In the first trial, patients receiving isoniazid did not receive pyridoxine; if they developed symptoms of neuropathy, they were given either pyridoxine or other B vitamins. The study found that only pyridoxine was effective for treating neuropathy. The second trial randomized patients receiving isoniazid to either receive 6 mg of pyridoxine alone, 6 mg of pyridoxine as part of a vitamin B complex supplement, 48 mg of pyridoxine alone, or a vitamin B complex supplement that did not include pyridoxine. Subjects developed neuropathy only in the group that did not receive pyridoxine.

Bibliography:

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