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Neuro-ophthalmic aspects of drug toxicity

The toxic optic neuropathies are typically characterized by subacute or chronic, bilateral, symmetrical and painless loss of vision. On examination, the optic discs seem initially normal but later atrophic. Treatment is initiated by recognition and drug withdrawal. Historically, methanol (though not a medication), ethambutol and isoniazid were the first to be recognized as neurotoxic. Later on, cyclosporine, a widely used immunosuppressant, and other chemotherapeutic agents, like: cisplatin, carboplatin and vincristine were recognized as having neurotoxic adverse reactions. Amiodarone-associated optic neuropathy has been widely discussed in the ophthalmic literature less than half a century ago. It is still controversial whether sildenafil and other phosphodiesterase-5 inhibitors prescribed for erectile dysfunction can cause visual loss by triggering ischemic optic neuropathy. Vigabatrin, an anti-epileptic drug, was reported to cause irreversible visual field defects. Infliximab, an anti-tissue necrosis-alpha monoclonal antibody currently in use for granulomatous diseases, is also known to cause toxic optic neuritis. New cancer therapies with unique modes of action, that carry the capability to interfere with intracellular signal pathways, modulate and in some cases activate the immune system, can have various neuro-ophthalmic complications. A long list of reported drugs is associated with increased intracranial pressure, though not confirmed by controlled studies. Vitamin A derivatives, corticosteroids, tetracyclines, fluoroquinolones, gonadal hormones, indomethacin, lithium and tamoxifen are just a small part of the list. Abnormalities of eye movements, including nystagmus and inappropriate vestibulo-ocular reflex are reported at toxic levels of neuroactive drugs like: diazepam, methadone, phenytoin, barbiturates and chloral hydrate. Drug-induced disturbances of neuromuscular transmission, occurring at the pre-or-post synaptic levels, include prominent ptosis and ophthalmoparesis along with variable degrees of extremity muscle weakness resembling true myasthenia gravis.

Biography

Shlomo Dotan attended Medical school at the Hebrew University–Hadassah Hospital in Jerusalem, between the years 1968 and 1974. He completed his internship and residency in Ophthalmology and received his license as a specialist in Ophthalmology from the Israeli Ministry of Health in 1986. In 1989 he started a clinical fellowship in Neuro-Ophthalmology at the Kellogg Eye Center in Ann Arbor, MI, USA, under the supervision of Dr. Jonathan Trobe, a world leading Neuro-Ophthalmologist. For the last 27 years, he was the Chief of the Neuro-Ophthalmology Service at the Hadassah-Hebrew University Medical Center in Ein Kerem, Jerusalem. He is the author of almost forty scientific articles and the organizer and speaker in many ophthalmological and neuro-ophthalmological conferences worldwide.

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