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Timolol

Updated: January 15, 2017.

OVERVIEW

Introduction

Timolol is a nonselective beta-adrenergic receptor blocker that is widely used for the therapy of hypertension, angina pectoris and prevention of vascular headaches. Timolol has yet to be convincingly associated with clinically apparent liver injury and is often used in patients with liver disease and cirrhosis.

Background

Timolol (tim' oh lol) is a nonselective beta-blocker, acting on both beta-1 and beta-2 adrenergic receptors. Beta-1 adrenergic blockade reduces the heart rate and myocardial contractility by slowing the AV conduction and suppressing automaticity. Beta-2 blockade also affects peripheral vascular resistance and can cause bronchospasm and hypoglycemia. Timolol is indicated for the management of hypertension, angina pectoris, cardiac arrhythmias and reduction in the risk of cardiovascular mortality after myocardial infarction. Timolol is also used for the prevention of migraine amd vascular headaches and for lessening the risk of recurrent variceal hemorrhage in patients with cirrhosis and portal hypertension. Timolol was approved for use in the United States in 1995 and is still in wide use. Timolol is available in tablets of 5, 10 and 20 mg in generic forms and formerly under the trade name Blocadren. In addition, timolol is available in an ophthalmic formulation for therapy of ocular hypertension and glaucoma. The typical initial oral dose of timolol in adults is 10 mg twice daily, with subsequent dose modification based upon clinical response and tolerance, the average total daily maintenance dose being 10 to 60 mg. Common side effects of timolol include bradycardia, hypotension, fatigue, dizziness, depression, memory loss, impotence, cold limbs and less commonly severe hypotension, heart failure and bronchospasm. As with all beta-blockers, sudden withdrawal can trigger rebound hypertension. Beta-blockers are contraindicated in patients with asthma, bradycardia and heart failure and should be used cautiously in the elderly and in patients with diabetes.

Hepatotoxicity

Mild-to-moderate elevations in serum aminotransferase levels occur in less than 2% of patients on timolol and are usually transient and asymptomatic, resolving even with continuation of therapy. Despite its wide spread use, timolol has not been convincingly linked to instances of clinically apparent liver injury. Other beta-blockers have been implicated in rare instances of acute liver injury with a latency to onset ranging from 2 to 24 weeks, a hepatocellular pattern of serum enzyme elevations and a mild, self-limiting course without evidence of hypersensitivity or autoimmune reactions.

Likelihood score: E (unlikely cause of clinically apparent acute liver injury).

Mechanism of Injury

Timolol undergoes extensive metabolism by the liver and is excreted in the urine as inactive metabolites. The reason why timolol rarely causes liver injury is unknown; other beta-blockers with similar chemical structures have been linked to cases of clinically apparent, idiosyncratic liver injury.

References to the safety and potential hepatotoxicity of timolol are provided in the overview on Beta-Adrenergic Receptor Antagonists, last updated in June 2019.

Drug Class: Beta-Adrenergic Receptor Antagonists

PRODUCT INFORMATION

REPRESENTATIVE TRADE NAMES

Timolol – Generic, Blocadren®

DRUG CLASS

Beta-Adrenergic Receptor Antagonists

COMPLETE LABELING

Product labeling at DailyMed, National Library of Medicine, NIH

CHEMICAL FORMULA AND STRUCTURE

DRUG	CAS REGISTRY NUMBER	MOLECULAR FORMULA	STRUCTURE
Timolol	91524-16-2	C13-H24-N4-O3-S.1/2H2-O