U.S. National Library of Medicine
National Center for Biotechnology Information

NLM Citation: LiverTox: Clinical and Research Information on Drug-Induced Liver Injury [Internet]. Bethesda (MD): National Institute of Diabetes and Digestive and Kidney Diseases; 2012-. Nitroprusside. [Updated 2014 Feb 7].
Bookshelf URL: https://www.ncbi.nlm.nih.gov/books/

Nitroprusside

Updated: February 7, 2014.

OVERVIEW

Introduction

Sodium nitroprusside is a nitrovasodilator that is used intravenously for therapy of severe hypertension, hypertensive emergencies and heart failure. Despite its use for many years, nitroprusside has not been convincingly linked to cases of clinically apparent liver injury.

Background

Sodium nitroprusside (nye" troe prus' ide) is a nonselective vasodilator that acts through release of nitric oxide to cause relaxation of smooth muscle cells of arterioles and venules. Nitroprusside is used predominantly to treat hypertensive emergencies, such as to lower blood pressure during acute aortic dissection or to improve cardiac output in severe congestive heart failure. Nitroprusside is unstable and must be administered intravenously with careful monitoring. It is rarely used for more than a few hours or days. Nitroprusside was approved for use in the United States in 1981 and continues to be used in critical or emergency situations. Sodium nitroprusside is available in solution for injection in 2 or 5 mL vials of 50 mg generically and under the brand name of Nitropress. The usual initial dose is 0.25 to 0.30 mcg/kg/minute by intravenous infusion with subsequent increase based upon clinical effect and blood pressure. The rate of infusion should be carefully managed; the average effective dose in children and adults is 3 mcg/kg/minute and the maximum recommended dose is 10 mcg/kg/minute. Nitroprusside has many side effects including hypotension, dizziness, headache, drowsiness, stupor, bradycardia, palpitations, flushing, nausea, metabolic acidosis and rash.

Hepatotoxicity

Serum aminotransferase elevations during nitroprusside therapy are uncommon and are more likely attributable to hepatic ischemia due to hypotension, heart failure or anoxia. Nitroprusside has not been convincingly linked to cases of clinically apparent acute liver injury.

Mechanism of Injury

Sodium nitroprusside is metabolized in peripheral tissue to a cyanide radical which is converted to thiocyanate in the liver. Nitroprusside helps protect against ischemia reperfusion injury in animal models by improving hepatic microcirculation.

Drug Class: Antihypertensive Agents

PRODUCT INFORMATION

REPRESENTATIVE TRADE NAMES

Nitroprusside – Generic, Nitropress®

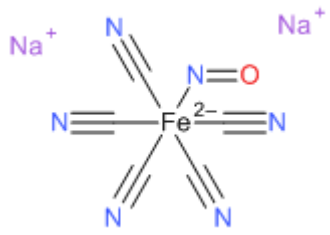
DRUG CLASS

Antihypertensive Agents

COMPLETE LABELING

Product labeling at DailyMed, National Library of Medicine, NIH

CHEMICAL FORMULA AND STRUCTURE

DRUG	CAS REGISTRY NUMBER	MOLECULAR FORMULA	STRUCTURE
Sodium Nitroprusside	13755-38-9	C5-Fe-N6-Na2-O	

ANNOTATED BIBLIOGRAPHY

References updated: 07 February 2014

Zimmerman HJ. Drugs used in cardiovascular disease. In, Zimmerman HJ. Hepatotoxicity: the adverse effects of drugs and other chemicals on the liver. 2nd ed. Philadelphia: Lippincott, 1999, pp. 639-71.

(Expert review of hepatotoxicity published in 1999; nitroprusside is not discussed).

De Marzio DH, Navarro VJ. Antihypertensives. Hepatotoxicity of cardiovascular and antidiabetic drugs: fibrates. In, Kaplowitz N, DeLeve LD, eds. Drug-induced liver disease. 3rd ed. Amsterdam: Elsevier, 2013, pp. 522-6.

(Review of hepatotoxicity of hypertensive agents does not discuss nitroprusside).

Michel T, Hoffman BB. Angiotensin converting enzyme inhibitors. Treatment of myocardial ischemia and hypertension. In, Brunton LL, Chabner BA, Knollman BC, eds. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill, 2011, pp. 745-88.

(Textbook of pharmacology and therapeutics).

Drugs for hypertension. Treat Guidel Med Lett 2009; 7: 1-10. PubMed PMID: 19107095.

(Brief overview of currently available drugs for hypertension, with guidelines on their use and information on prices and toxicities; nitroprusside not discussed).