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Praziquantel

Updated: January 22, 2014.

OVERVIEW

Introduction

Praziquantel is an antihelmintic agent with activity against a broad spectrum of trematodes and cestodes that is used predominantly in the therapy of schistosomiasis, liver flukes, and cysticercosis. Praziquantel therapy has been reported to cause serum aminotransferase elevations during therapy, but clinically apparent liver injury after its use is rare if it occurs at all.

Background

Praziquantel (praz" i kown' tel) is a heterocyclic prazino-isoquinoline derivative with a broad spectrum of activity against several trematodes (Fasciola, Schistosoma) and cestodes (Taenia). Praziquantel is believed to act by interference with tegument calcium transport, resulting in paralysis of the parasitic worms with subsequent loss of adherence to tissue, degradation and expulsion. Praziquantel was approved for use in the United States in 1982 for schistosomiasis. Praziquantel is also commonly used in veterinary medicine. Praziquantel is available for human use in tablets of 600 mg generically and under the brand name Biltricide. The typical dose for treating schistosomiasis in adults is 20 mg/kg (depending upon the species) three times over one day. Side effects are common but transient, and include abdominal discomfort, nausea, vomiting, vertigo, muscle aches, drowsiness, headaches and fatigue, some of the symptoms being due to its effects on the parasites.

Hepatotoxicity

Praziquantel therapy has been associated with elevations in serum aminotransferase levels in up to 27% of patients, but these abnormalities were self-limiting. Praziquantel has not been associated with clinically apparent liver injury. In a large retrospective survey from China, 2 of 25,000 treated patients were reported to have developed jaundice, but no specific information about the two cases was provided. There have been few studies of long term therapy with praziquantel, and most controlled trials of this agent have used one day courses without serum aminotransferase monitoring. However, millions of people have been treated with praziquantel as a part of large scale control stategies in China where schistosomiasis Japonica is endemic. The combination of praziquantel preventive therapy and snail control has resulted in marked decreases in the prevalence of infection in the population with no evidence of significant toxicity.

Mechanism of Injury

Praziquantel is extensively metabolized by the liver via the cytochrome P450 system and might cause hepatic injury as a result of a toxic intermediate of its metabolism. Plasma levels of praziquantel are affected by inducers

(rifampin decreases drug levels) and inhibitors of P450 activity (cimetidine, ketaconazole and erythromycin can reduce drug levels).

Outcome and Management

Praziquantel is usually well tolerated and clinically apparent liver injury due to its use must be very rare if it occurs at all.

Drug Class: Antihelmintic Agents

PRODUCT INFORMATION

REPRESENTATIVE TRADE NAMES

Praziquantel – Biltricide®

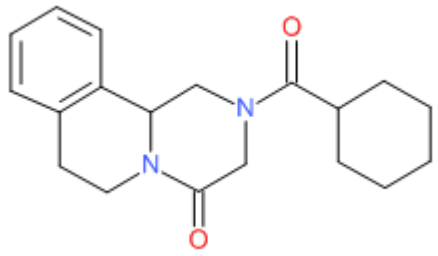
DRUG CLASS

Antihelmintic Agents

COMPLETE LABELING

Product labeling at DailyMed, National Library of Medicine, NIH

CHEMICAL FORMULA AND STRUCTURE

DRUG	CAS REGISTRY NUMBER	MOLECULAR FORMULA	STRUCTURE
Praziquantel	55268-74-1	C19-H24-N2-O2	

ANNOTATED BIBLIOGRAPHY

References updated: 22 January 2014

Zimmerman HJ. Antihelminthics. Hepatic injury from antimicrobial agents. In, Zimmerman HJ. Hepatotoxicity: the adverse effects of drugs and other chemicals on the liver. 2nd ed. Philadelphia: Lippincott, 1999, pp. 626-8.

(Expert review of hepatotoxicity of antihelmintics written in 1999; praziquantel has been reported to cause serum aminotransferase elevations).

McCarthy J, Loukas A, Hotez PJ. Chemotherapy of helminth infections. In, Brunton LL, Chabner BA, Knollman BC, eds. Goodman & Gilman's the pharmacological basis of therapeutics. 12th ed. New York: McGraw-Hill, 2011, pp. 1443-61.

(Textbook of pharmacology and therapeutics).

Chen MG, Fu S, Hua XJ, Wu HM. A retrospective survey on side effects of praziquantel among 25,693 cases of schistosomiasis Japonica. Southeast Asian J Trop Med Public Health 1983; 14: 495-500. PubMed PMID: 6673126.

(Retrospective survey of side effects after a 1-2 day course of praziquantel for Schistosomiasis in 25,693 patients from China; 2 patients developed jaundice 1-5 days after treatment, both resolving within 2 weeks; 2 other patients with advanced liver disease had acute decompensation shortly after therapy; no details given).

Matthaiou DK, Panos G, Adamidi ES, Falagas ME. Albendazole versus praziquantel in the treatment of neurocysticercosis: a meta-analysis of comparative trials. PLoS Negl Trop Dis 2008; 2: e194. PubMed PMID: 18335068.

(Systematic review of efficacy of albendazole versus praziquantel; mentions that there were no differences in rates of adverse events, but no details given).

Yangco BG, De Lerma C, Lyman GH, Price DL. Clinical study evaluating efficacy of praziquantel in clonorchiasis. Antimicrob Agents Chemother 1987; 31: 135-8. PubMed PMID: 3551827.

(Controlled trial of praziquantel vs placebo in 42 patients wtih clonorhiasis treated for one day twice 30 days apart; side effects included nausea, vomiting and dizzness, but there were no increases in ALT levels).

Seo BS, Lee SH, Chai JY, Hong ST. Praziquantel(Distocide(R)) In treatment of Clonorchis Sinensis infection. Kisaengchunghak Chapchi 1983; 21: 241-5. PubMed PMID: 12902655.

(Among 55 Korean patients with liver flukes treated with praziquantel [75 mg/kg over one day], none developed clinical liver injury and average serum AST levels did not change).

Ross AG, Sleigh AC, Li Y, Davis GM, Williams GM, Jiang Z, Feng Z, McManus DP. Schistosomiasis in the People's Republic of China: prospects and challenges for the 21st century. Clin Microbiol Rev 2001; 14: 270-95. PubMed PMID: 11292639.

(Review of the burden of schistosomiasis japonica infections in China and approaches to treatment and prevention including use of praziquantel in the general population).

Chalasani N, Fontana RJ, Bonkovsky HL, Watkins PB, Davern T, Serrano J, Yang H, Rochon J; Drug Induced Liver Injury Network (DILIN). Causes, clinical features, and outcomes from a prospective study of drug-induced liver injury in the United States. Gastroenterology 2008; 135: 1924-34. PubMed PMID: 18955056.

(Among 300 cases of drug induced liver disease collected in the US between 2003 and 2008, none of which were attributed to an antihelmintic agent).

Devarbhavi H, Dierkhising R, Kremers WK, Sandeep MS, Karanth D, Adarsh CK. Single-center experience with drug-induced liver injury from India: causes, outcome, prognosis, and predictors of mortality. Am J Gastroenterol 2010; 105: 2396-404. PubMed PMID: 20648003.

(313 cases of drug induced liver injury were seen over a 12 year period at a large hospital in Bangalore, India; none were attributed to antihelmintic agents).

Ferrajolo C, Capuano A, Verhamme KM, Schuemie M, Rossi F, Stricker BH, Sturkenboom MC. Drug-induced hepatic injury in children: a case/non-case study of suspected adverse drug reactions in VigiBase. Br J Clin Pharmacol 2010; 70: 721-8. PubMed PMID: 21039766.

(World wide pharmacovigilance database contained 9036 hepatic adverse drug reactions in children, there were no antihelmintic agents listed among the top 40 implicated medications).

Drugs for parasitic infections. Treat Guidelines Med Ltr 2010; 8: 31-20. Not in PubMed.

(Brief description of drugs for parasitic infections in adults and children as well as a table of their major side effects; praziquantel is the drug of choice for schistosomiasis, liver flukes [Clonorchis sinesis and others], and intestinal tapeworm; side effects can include abdominal pain, diarrhea, fatigue, nausea, drowsiness, fever and rash).

Wu W, Huang Y. Application of praziquantel in schistosomiasis japonica control strategies in China. Parasitol Res 2013; 112: 909-15. PubMed PMID: 23358736.

(Summary of results of approaches to decreasing schistosomiasis japonica infection in China with discussion of success and safety of praziquantel prophylaxis in the general population; no mention of hepatotoxicity).