

Cardiovascular adverse effects of phenytoin

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Abstract Phenytoin is an established drug in the treatment of acute repetitive seizures and status epilepticus. One of its main advantages over benzodiazepines is the less sedative effect. However, the possibility of cardiovascular adverse effects with the intravenous use of phenytoin cause a reluctance to its usage, and this has lead to a search for safer anticonvulsant drugs. In this study, we aimed to review the studies which evaluated the safety of phenytoin with respect to cardiovascular adverse effects. The original clinical trials and case reports listed in PUBMED in English language between the years of 1946–2014 were evaluated. As the key words, “phenytoin, diphenylhydantoin, epilepsy, seizure, cardiac toxicity, asystole, arrhythmia, respiratory arrest, hypotension, death” were used. Thirty-two clinical trials and ten case reports were identified. In the case reports, a rapid infusion rate (>50 mg/min) of phenytoin appeared as the major cause of increased mortality. In contrast, no serious cardiovascular adverse effects leading to death were met in the clinical trials which applied the recommended infusion rate and dosages. An infusion rate of 50 mg/min was reported to be safe for young patients. For old patients and patients with a cardiovascular co-morbidity, a slower infusion rate was recommended with a careful follow-up of heart rhythm and blood pressure. No cardiovascular adverse effect was reported in oral phenytoin overdoses except one case with a very high serum phenytoin level and hypoalbuminemia.

Phenytoin is an effective and well tolerated drug in the treatment of epilepsy. Intravenous phenytoin is safe when given at recommended infusion rates and doses.

Keywords Epilepsy · Phenytoin · Cardiovascular adverse effects · Arrhythmia · Death

Background and aim

Phenytoin was introduced as an epileptic drug in 1938 and later was also used as an antiarrhythmic drug in cardiology. Currently, its usage as antiarrhythmic purpose is abandoned, but its oral and intravenous (IV) forms still reserves their importance in the treatment of epilepsy. Phenytoin is one of the four drugs which are declared by ILAE to have a level A efficacy in the treatment of focal epilepsy [1]. Moreover, the use of IV phenytoin just after diazepam administration is also recommended as a level A drug as an alternative to IV lorazepam in the treatment of status epilepticus (SE) [2]. Some serious adverse effects of IV phenytoin such as cardiac arrhythmias, hypotension, respiratory arrest and related deaths were historically reported particularly in the field of cardiology [3–7]. These unfavorable reports cause a hesitation in the usage of IV phenytoin. The recommended slowed infusion rates and cardiac monitoring during the infusion as precaution have also made the IV phenytoin administration difficult. Meanwhile, the new antiepileptic drugs with less (cardiac) adverse effects try to replace phenytoin in the epilepsy treatment although they are not more effective than phenytoin [2, 8–19].

Here, we review the safety of IV phenytoin administration in the epilepsy treatment by evaluating the available studies and case reports containing data about the cardiovascular adverse effects of phenytoin.

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Phenytoin Dilantin Diphenylhydantoin And Its Adverse Effects In The Human Body

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treatment of epilepsy and other related problems Hospital Formulary and Compendium of Useful Information University of California (1868-1952), **The Failed Back Syndrome** Harold A. Wilkinson, 2012-12-06 In the eight years since the first edition of this book several marvelous technical advances have become available clinically for the care of patients with failed back syndromes High resolution MRI scans three dimensional CT scans and percutaneous discectomy are notable technological advances Overall however the problem of the failed back remains as complex and poorly understood as ever A discouraging amount of what we claim to be our knowledge of the pathophysiology and appropriate therapy for the complex of disorders that constitute the failed back syndrome remains unvalidated by careful scientific study 1 The discussions of pathophysiology diagnosis and therapy put forth in the first edition for the most part remain equally as valid or as controversial as they were eight years ago The first edition was well received by numerous physicians and other health care givers from a variety of disciplines and through them the book seems to have contributed usefully to many of those who suffer the unpleasant maladies of the failed back I hope this second edition will likewise prove to be a positive contribution The timing of the publication of this second edition is significant in several ways in the context of the current medicolegal climate in the United States Small Animal Clinical Pharmacology Jill E. Maddison, Stephen W. Page, David B. Church, 2008 Small Animal Clinical Pharmacology is a practical clinically oriented pharmacology text designed to provide the veterinary student and practitioner with all the relevant information needed when designing drug treatment regimens for pets in small animal veterinary practice Comprehensively updated and revised the second edition of this core text covers essential new information on drugs used in the management of a range of presenting conditions including heart disease and cardiac arrhythmias For the second edition new authors superb new illustrations and a second colour have all been introduced With its unique approach combining a thorough understanding of the pharmacological action of drugs with a basic understanding of the relevant physiology and pathophysiology of systems and tissues affected Small Animal Clinical Pharmacology continues to be an indispensable book for all veterinary students and practitioners Organised by drug class in a uniform and detailed structure which means it is easy to locate key information on dose rates routes of administration drug interactions and special considerations at a glance Key chapters based around treatment of disorders of particular body systems eg cardiovascular and thyroid disorders Essential introductory chapters covering pharmacokinetics general pharmacological principles and adverse reactions for a thorough basic grounding in the subject All authors are experienced clinicians and recognised experts in their field who bring a down to earth and practical approach to the text Cerebrovascular Bibliography, 1968 Clinical Pharmacology in Dental Practice Richard L. Wynn, Barbara Requa-Clark, 1983 Psychopharmacology Bulletin, 1991 **Report on Carcinogens**, 2011 Talking Back To Ritalin Peter Breggin, 2007-10-10 Millions of children take Ritalin for Attention Deficit Hyperactivity Disorder The drug's manufacturer Novartis claims that Ritalin is the solution to this widespread problem But hidden behind the well oiled public relations

machine is a potentially devastating reality children are being given a drug that can cause the same bad effects as amphetamine and cocaine including behavioral disorders growth suppression neurological tics agitation addiction and psychosis Talking Back to Ritalin uncovers these and other startling facts and translates the research findings for parents and doctors alike An advocate for education not medication Dr Breggin empowers parents to channel distracted disenchanted and energetic children into powerful confident and brilliant members of the family and society *Report on Carcinogens (12th Ed.)* Nat. Toxicology Program (NTP) (NIH),2011-10-08 The Report on Carcinogens RoC is a congressionally mandated science based public health document that identifies and discusses agents substances mixtures or exposure circumstances hereinafter referred to as substances that may pose a hazard to human health by virtue of their carcinogenicity For each listed substance the report contains a substance profile which provides information on 1 the listing status 2 cancer studies in humans and animals 3 studies of genotoxicity ability to damage genes and biologic mechanisms 4 the potential for human exposure to these substances and 5 Federal regulations to limit exposures Eight substances have been added to this 12th ed of the report which now includes 240 listings The industrial chemical formaldehyde and a botanical known as aristolochic acids are listed as known human carcinogens Six other substances captafol cobalt tungsten carbide in powder or hard metal form certain inhalable glass wool fibers o nitrotoluene riddelliine and styrene are added as substances that are reasonably anticipated to be human carcinogens Figures This is a print on demand report

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