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Research Article

The Action of Cardiac Glycosides in Cardiac Insufficiency

Healthcare

Keywords: cardiac Glycosides, pharmacodinamics, Effects of cardiovascular disease on pharmacokinetics, cardiac insufficiency.

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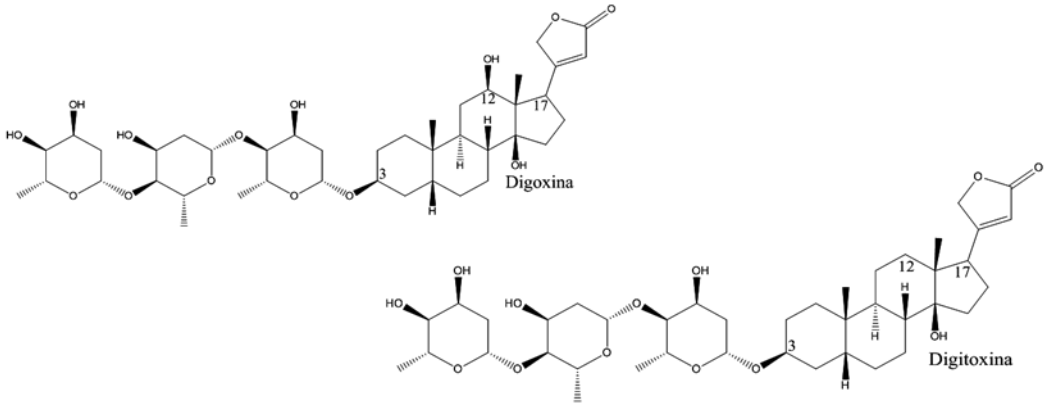
Abstract

Active cardiac glucosides are plant-origin cardiac glycosides consisting of digitalis lanata, Strophantus gratus seeds that contain Ouabain, Scilla marittima (Urginea maritima), Adonis vernalis, known variously as pheasant's eye and Convallaria majalis known as lily-of-the-valley. All active cardiac glucosides in therapeutic doses are ptent inhibitors of active transport of Na+ and K+, through the cell membrane. The increased accumulation of Na+ inside the cell increases the possibility of its exchange with Ca++ outside cell. Accumulation of Ca2 + inside the cell activates phosphorylases which through the phosphorylation supplies the necessary energy for the contraction of the heart muscle. Actions: positively inotropic agents, negative chronotropes, a negative dromotrope (atrio-ventricular conduction), negative batmotrop and positive tonotrop. Pharmacodynamics of drugs, biochemical and physiological effects of drugs in the body or in microorganisms or parasites within or in the body and the acting mechanism of the drug and the relationships between drug concentration as well as its effects. Pharmacokinetics regulates the intestinal absorption of drugs and regulates their action. Mechanism of action: glycosides from digitals grandiflora seeds exercise its inotrop action through inhibition of the pump of Na/ K ATP in the cell membrane. Drugs used for the treatment and prevention of cardiovascular diseases are drugs with anti-Hyperlipoproteinemia action.

Introduction

Pharmacodynamics of drugs and its biochemical and physiological effects relate to the drug in the body or in microorganisms and parasites and the acting mechanism of the drug as well as the relationship between drug concentration and its effects. Pharmacokinetics is the study of what the body does to foreign substances, absorption or propulsion of the drug in the presence of food or other drugs. Glycosides induce an increase in myocardial contractile force and exercise their inotrop action throught inhibition of the pump of Na/ K ATP in the cell membrane. Drugs used to treat coronary artery diseases have inotropic effects and they are antiarrhythmic, antihypertensive and antihiperlipoproteinic.



1. Chemical structure of Cardiac Glycosides Digitoxin

Photo 1. Digitalis Lanata

Photo 2. Digitalis Purpurea

Study Aim

The aim of this research is based on the influence of the body when drug is injected according to the drug release system from its pharmaceutical forms, absorption, distribution, metabolism, biotransformation, elimination of drug and the way of its action, response action of the body, its biochemical and physiological effects and drug mechanism of action and relationship between drug concentration and its effects.

Materials and Methods

The material is taken from the clinical hospital of the city of Tetova in a period of four (4) years (2010-2014). The data were drawn from the the protocol of the patients from internistic service of Cardiology. The survey was conducted based on anamnestic data, such as: age, gender, indications and contraindications, statistical parameters, the index structure, the arithmetic mean and standard deviation. Statistical tests: X2-test and T-test. Verification of tests is done to the level of reliability from 95% to 99% respectively p<0:01 and p<0:05.

Results

In the clinical hospital of Tetova in the Cardiology department in the years 2011-2014 were treated 2756 patients with heart failure and that in 2010, 592 cases or 21.48%, in 2011, 680 cases or 24.67%, in 2012, 734 cases or 26,64%, in 2013, 750 cases or 27,21%. The largest number of patients with heart failure in 2010 was 592 cases or 21.48%, in 2011, 680 cases or 24.67%, in 2012, in 2013, 734 cases or 26.64%, in 2014, 759 cases or 27.21%. Tetovo is located in the northwestern part of Macedonia. In the surroundings of Tetova live 250.000 residents and according to our research by the total number of the population during this time period from 2011-2014 by the cardiac insufficiency were affected only about 1.10% of them.

Year	N	%
2011	592	21.48
2012	680	24.67
2013	734	26.64
2014	750	27.21
In total	2756	100.00

Table 1. Number of Patients with Cardiac Insufficiency by Years

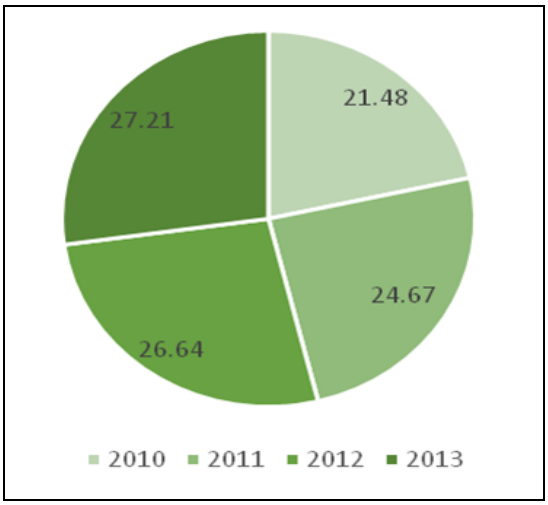


Chart 1. Number of Patients with Heart Failure by Years

Gender	N	%	X^2-test
Female	1125	34.63	X^2=39.4
Male	1631	65.37	P<0.001
In total	2756	100.0	

Table 2. Number of patients with heart failure by gender.

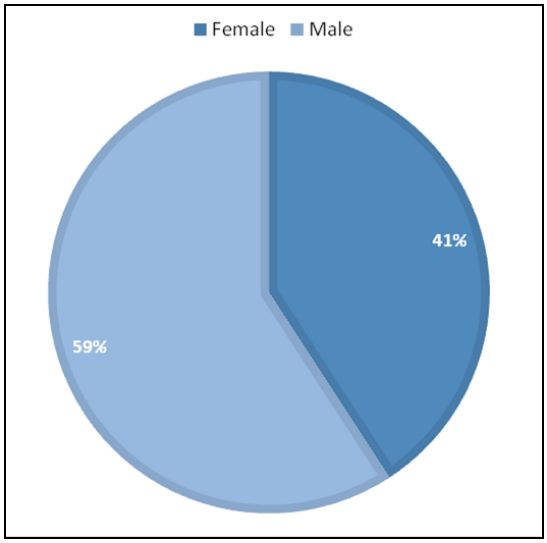


Chart 2. Number of Patients with Heart Failure by Gender

Of the total number of ill patients with cardiac insufficiency have dominated males with 1631 cases or 65.37% and females 34.63% or 1125 cases (X2-test = 39.4, P <0.001). (Table 2.Chart 2). Tetovo is located in the northwestern part of Macedonia. Among 250,000 inhabitants living in Tetova today, 79% of them are Albanians, 21% of them are Macedonians, Turkish and others. As mentioned above, Tetovo surroundings population is affected by cardiac insufficiency around 1.10%. (see Table 3 and Chart 3)

The number of residents of Tetovo and region	Nr. of patientswith CI	%
250.000	2756	1.10

Table 3. Number of residents in Tetova with the surroundings affected by cardiac insufficiency CI for 2011-2014

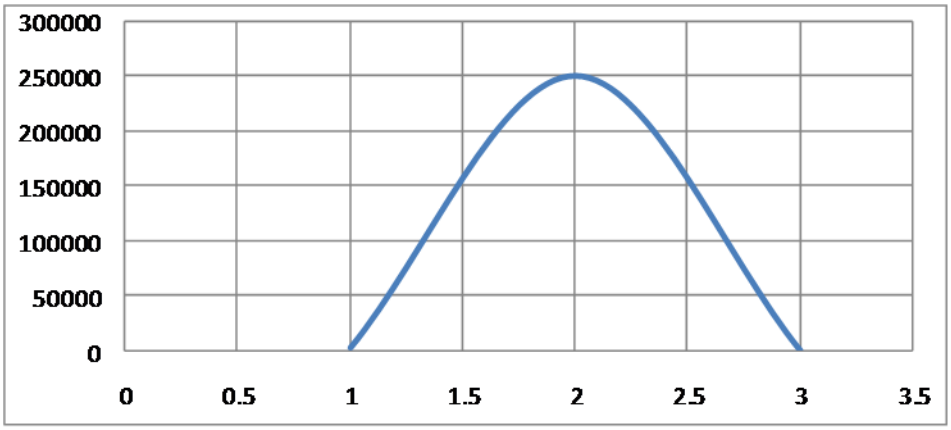


Chart 3. Number of Residents in Tetovo with the Surrounding Affected by Cardiac Insufficiency (CI) for 2011-2014

Patient lying in hospital in Tetova for treatment of heart failure who have used more than 6 types of drugs were a total of 1759 cases or 63.83% to show the adverse effects and the patient who used moreover than 10 types of drugs they were 997 cases or 36.17% (Table 4.) Patients lying in the hospital of Tetova for treatment of heart failure and who have used more than 6 types of drugs were 1759 in total or 63,83% of the cases with side effects and patients who used more than 10 types of drugs were 997 in total or 36.17% (see table 4).

Patients lying in hospital in Tetova with Cardiac Insufficiency (CI)	Number of cases with side effects	%
Patients lying in hospital in Tetova who used more than 6 types of drugs	1759	63.83
Patients lying in hospital in Tetova who used more than 10 types of drugs	997	36.17
In total	2756	100

Table 4. Patients hospitalized with Cardiac Insufficiency (CI) who used more than 6 or 10 kinds of drugs.

Conclusions

In our practice, most decisions involoving dose adjustment in patiens with renal insufficiency is used according to the published recomandation for dosage or dosage intervals based on the severity of renal dysfunction indicated by the creatinine clearance. Such a dose modification should result in plasma concentration data and clinical observation, Glycosides Oubaina is less used because of its cardiac toxicity unlike digoxin which has better parenteral effect and it's less toxic.

Side effects are concentration dependant, and they rarely come from from digoxin plazma concentrations < 0,8 mg. They are more frequent in patients with low levels of potassium (hypocalemia), because usually digoxin competes with K+ ions that bind in places of Na +/K + of the ATP t pump.

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