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MORPHOLOGICAL CHANGES OF HEART IN 6-MONTH-OLD WHITE NONBREED RATS UNDER THE INFLUENCE OF AN ENERGY DRINK

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Summary
In recent years, there has been a growing demand for energy drinks among young people. However, the effect of energy drinks on the cardiovascular system has not yet been fully studied. This article presents an analysis of morphological changes in the heart tissue under the influence of energy drinks in 6-month-old white rats.

Keywords: heart, morphology, energy drink, rat.

МОРФОЛОГИЧЕСКИЕ ИЗМЕНЕНИЯ СЕРДЦА У 6-МЕСЯЧНЫХ БЕЛЫХ БЕСПОРОДНЫХ КРЫС ПОД ВЛИЯНИЕМ ЭНЕРГЕТИЧЕСКОГО НАПИТКА

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Резюме
В последние годы среди молодежи растет спрос на энергетические напитки. Однако до сих пор полностью не изучено влияние энергетических напитков на сердечно-сосудистую систему. В данной статье представлен анализ морфологических изменений в ткани сердца под влиянием энергетических напитков у 6-месячных белых крыс.

Ключевые слова: сердце, морфология, энергетический напиток, крыса.

6 OYLIK OQ ZOTSIZ KALAMUSHLAR YURAGIDA ENERGETİK ICHIMLIK TA'SIRIDA YUZAGA KELADIGAN MORFOLOGIK O'ZGARISHLAR

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Buxoro davlat tibbiyot instituti

Annotatsiya
So‘nggi yillarda yoshlar o‘rtasida energetik ichimliklarga talab ortib bormoqda. Ammo energetik ichimliklarning yurak-qon tomir tizimiga ta'siri hali to'liq

o'rganilmagan.Ushbu maqolada 6 oylik oq kalamushlarda energetik ichimliklar ta'sirida yurak to'qimalarida sodir bo'ladigan morfologik o'zgarishlar tahlili keltirilgan.

Kalit so'zlar: yurak, morfologiya, energetik ichimlik, kalamush.

Relevance

Energy drinks (energy tonics, energy drinks) are a new brand in a number of bad habits, along with alcohol, tobacco and drugs. It was in this historical sequence that these phenomena appeared in the life of mankind. Unlike the first three, energy drinks and the mechanism of their effect on the human body have not been studied enough. The psychological connection “energy - evil” has not yet been entrenched in the minds of society, this relationship is not obvious and is not as pronounced as in the case of alcohol. The idea of creating an invigorating drink came to the mind of an Austrian entrepreneur after a trip to Asia. The world-famous Red Bull was the first to go on sale, which is still as popular as Coca-Cola and Pepsi. Since then, the choice of drinks has increased significantly and a person can choose any type of drink depending on preferences. A wide range allows people to purchase energy drinks of different categories. All drinks are divided by composition into alcohol-containing energy drinks (Ten Strike - 8%, Red Devil - up to 20%, Jaguar - up to 9%); non-alcoholic (Burn, Red Bull, Adrenaline Rush, Dynamite); sports, improving the performance of the body by filling the working muscles with energy and compensating for fluid loss during physical exertion; caffeinated, containing stimulants (namely caffeine), which energize and give a boost of energy and fortified drinks, including vitamins and minerals [A.N. Krivykh, 2019].

According to American scientists, energy drinks contain enough stimulants to cause anxiety, insomnia, dehydration, irritation of the digestive system, irritability, nervousness, redness of the skin, increased urination, and palpitations. The use of energy drinks has also been associated with seizures, manic seizures, and bleeding. The content of guarana, taurine and ginseng in popular energy drinks is too low to have any therapeutic effect or vice versa - to lead to any negative phenomena. But the amounts of caffeine and sugar contained in energy drinks can have a harmful effect on the body. Cardiovascular conditions that can manifest with energy drink abuse include palpitations, chest pain, rapid heart rate, heart rhythm disturbances, and hypertension. Energy drinks are high in caffeine, which can alter the elasticity of blood vessels and thus contribute to cardiovascular disease. The risk is increased if energy drinks are consumed with alcohol.

Purpose of the Study

The aim of this study is to study morphologically the heart tissue of three-month-old outbred rats under the influence of energy drinks.

Research Methods

The study of the micromorphology of the cardiac tissue was carried out on 35 white rats without pedigree at the age of 6 months, which are under normal vivarium conditions. At the beginning of the experiment, all sexually mature rats were quarantined for a week, and after the exclusion of somatic or infectious diseases, they were transferred to the usual vivarium mode with food given 3 times a day. For 30 days, from the 181st day of development to the 210th day, the rats were injected with a metal probe inside the stomach with an energy drink in a volume of 10 ml. The studies were carried out in compliance with the rules of humane treatment of animals, which are regulated by the "Rules for carrying out work using experimental animals", approved by the ethical committee of the Bukhara State Medical Institute named after A.I. Abu Ali ibn Sino (No. 18 of 01/16/2018).

In total, 35 rats were used in the experiments, the slaughter of animals was carried out at the appropriate time in the morning, on an empty stomach by instantaneous decapitation under ether anesthesia. After opening the chest cavity, the heart was removed. The isolated cardiac tissue was pathologically examined. Stained with hematoxylin and eosin for general histopathology. For general histopathology, 1 piece was cut from the heart tissue measuring 1.5 × 1.5 cm and solidified in 10% neutralized formalin. After washing in running water for 2–4 h, it was dehydrated in concentrated alcohols and chloroform, then filled with paraffin, and bricks were prepared. Incisions 5–8 μm in size were made from paraffin blocks and stained with hematoxylin and eosin. Histological preparations were studied under a 20 lens of a light microscope and the necessary areas were photographed.

Research Results

The results of this study showed that under the influence of an energy drink the following morphological changes were observed in the heart muscle: multiple hemorrhages, as well as mild and moderate cardiosclerosis, moderate leukocyte infiltration in the myocardium (Figure 1), thickening and destruction of the wall of the intermuscular artery with desquamation of the endothelium into the lumen vessel, in the edematous perivascular space accumulation of leukocytes (Figure 2).

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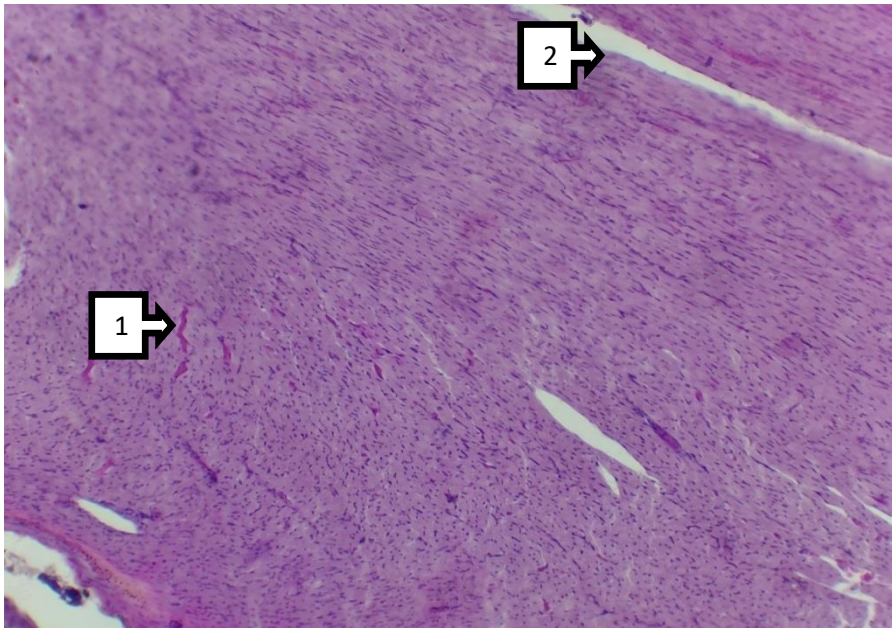

Photo 1. Thickening and destruction of the wall of the intermuscular artery with desquamation of the endothelium into the lumen of the vessel (1). In edematous accumulation of leukocytes in the perivascular space (2). Hematoxylin-eosin stain. About 10x20.

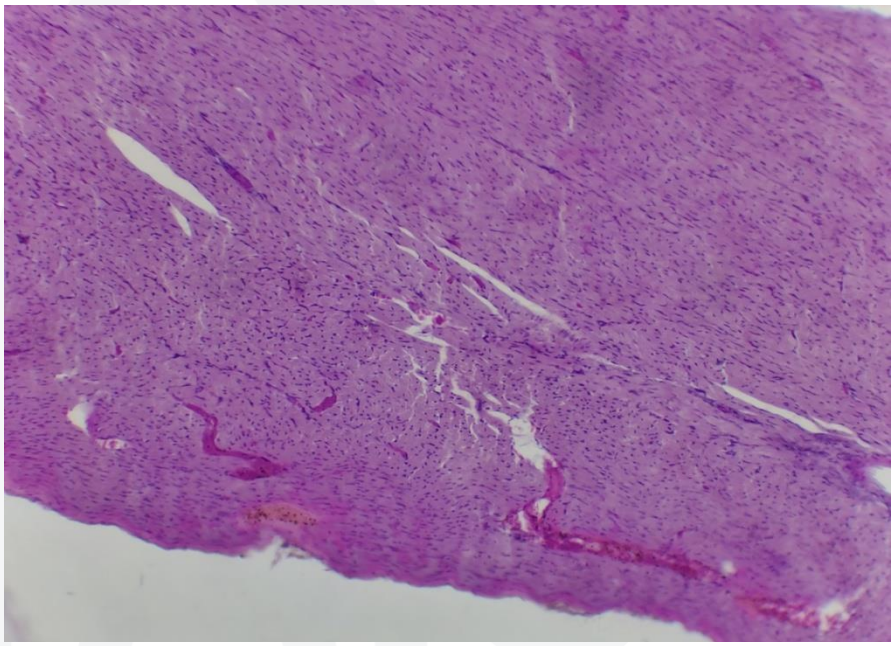

Photo 2. multiple hemorrhages (1), mild cardiosclerosis, leukocyte infiltration in the myocardium is moderately pronounced (2), single macrophages are found (3). Hematoxylin-eosin stain. About 20x20

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