AJPMHS
GLOBAL RESEARCH NETWORK

AMERICAN Journal of Pediatric Medicine and Health Sciences
Volume 02, Issue 02, 2024 ISSN (E): 2993-2149

Damage of Energy Drinks on Morphological Structures of Rat's Pancreas

Oripova Nargiza Ahtamovna
Bukhara State Medical Institute, Bukhara, Republic of Uzbekistan

Abstract: The study aims to assess the impact of various doses of ZIP on pancreas of male albino rats. Sixty male albino rats were assigned to three groups (10 animals/ group). Control group (1) received standard diet and water, group 2 and group 3 received for 30 days

Under light microscope no tissue changes were seen in pancreasof control group. In group 2 ZIP causes pancreas vascular congestion of the islets of Langerhans, increase in the size of the islets, besides, necrosis of Langerhans cells. In group 3 ZI/P leads to pancreatic tissue revealed reduction in the size of the, vacuolation and degeneration of their cells, necrosis of other islets with mononuclear inflammatory cells infiltration and degenerative changes of pancreatic acini. It is concluded that administration of ZIP to rats for 30 days will affect the histological structure of pancreas and this effect is a dose dependent.

Keywords: Energy drink, Pancreas, ZIP, insulin, hyperglycemia, isletsof Langerhans

Introduction

Energy drinks are popular and commonly consumed worldwide particularly by adults aging 15-35 years and less due to their ability to boast mental and physical performance (1). There are many kinds of energy drinks such as gorilla, flash and power adrenalin rush, all these beverages mainly contain caffeine, in addition to water, carbohydrates, vitamins, guarana and taurine (2). Although these ingredients are responsible for the desired effects of energy drinks (like increasing the level of energy, enhancement of physical activity, reduction of mental exhaustion and improvement in the mood), but they can also cause bad effects (3).

Consumption of caffeinated energy drink may induce nephrotoxicity (4), hematological disorders (5), hepatitis.

Materials and methodsChemicals

The energy drink used in this work was the ZIP. form of 490 ml cans. Sixty rats weighing 300 ± 20 mg and aging 3-6 months were obtained from laborotory. Rats were kept in the experimental room under suitable circumstances. Acclimatization of rats was for one week before proceeding the experiment and they were on free access to standard diet and water (6). Furthermore, the high sugar content results in obesity and diabetes (7),

whereas the disturbancesin the homeostasis of the non-essential amino acid taurine which is another component of energy drinks may affect brain, heart and even skeletal system of human (8). Recently they found that allergic disorders are associated with energy drink consumption (9). Since the intake ofenergy drinks became a phenomenon throughout the world and because of their risks to human health, there is an increasing interest for conducting experimental studies, as well as, researches in order to evaluate and understand theirimpact on different body organs.

One of these studies is the present study which is aimed to assess the impact of different doses of ZIP on pancreas of rats. Rats were assigned to 3 groups, 20 animals for each andas follows, group one served as control group, on standard diet and water. Group two treated at dose of 10 ml/ kg/ZIP ratof (This volume is equivalent to 4 cans of ZIP consumed by adult human weighing 65-70 kg). Group threetreated at dose of 20 ml/ kg/ rat of ZIP. The beverage was given daily through oral route via intragastric gavage to all animals of group 2 and 3 for 30 days (10). After completing the experimental period each animal was sacrificed by decapitation. Pancreas was excised and the specimens were fixed in the buffered neutral formalin (10%) for more than 24 hours. Tissue processing were accomplished using standard methods and the tissue sections were stained using hematoxylin and eosin and were observed by light microscope.

Results. Normal pancreatic tissue sections were seen in rats of control group. The pancreatic tissue of group 2 showed vascular congestion of the islets of Langerhans, an increase in the size of the islets and necrosis of Langerhans cells . In rats of group 3, the pathological changes which recognized were, reduction in the size of the islets of Langerhans, vacuolation and degeneration of their cells, in addition to necrosis of other islets with mononuclear inflammatory cells infiltration. The pancreatic acini were seen to have degenerative changes.

Discussion.In concurrence with the increasing ingestion of energy drinks in the last years, several researches were accomplished showing, as well as, explaining their toxic effects on different organs of the body

Although many case reports of acute pancreatitis have been recorded in association with energy drinks consumption, it is not 100% confirmed that these beverages are the reason of pancreatitis (6). Therefore, till now experimental studies are carried out to observe and clarify the impact of various energy drinks ingestion on the pancreas (8) In the present study vascular congestion of the islets of Langerhans, an increase in the size of the islets and necrosisof Langerhans cells were associated with the administrationof 10 ml/ kg of ZIP to rats of group 2 for 30 days. The changes in the pancreatic sections were more remarkable when the dose of red bull increased to 20 ml/ kg, there will be degeneration of the cells of pancreatic acini and those of islets of Langerhans, in addition to reduction in the size, as well as, necrosis of other islets with mononuclear inflammatory cells infiltration. These findings in thepancreatic tissue were also noticed by other investigators following treatment of rats with different doses of energy drinks for 4 weeks (10). On the basis of this work with the mentioned literature, it can be stated that energy drinks when consumed for prolonged time can cause damage to the pancreas, and this damage is increased with increasing the dose of consumption. Thismay explain the reason of the enlarged size of islets following consumption of low dose of red bull as a compensatory mechanism to reduce the high level of blood sugar by secreting more insulin. Increasing the dose and period of ingestion of energy drink will cause a further elevation in blood glucose

level that may increase the production of reactive oxygen species precipitating oxidative stress and pancreatic tissue damage (13). Also oxidative stress may occur owing tohyperglycemia (14). Hyperglycemia results from caffeine intake, the caffeine reduces the sensitivity of tissues toward insulin, impairs metabolism of glucose, and stimulates stress hormones release (as adrenaline) (15,16). Oxidative stress in turn will cause insulin resistance, dysfunction and destruction of βeta cells of pancreas (17).

Conclusion

It is concluded that administration of ZIP to rats for 30 days will affect the morphological structure of pancreas and this effect is a dose dependent. So attention and alertness is very important when this beverage is consumed for prolonged periods. Further researches are recommended in order to evaluate the effects of prolonged use of energy drinks on other body organs and to discover the exact mechanism of their effect in order to find the preventive measures in future.

References

1.Саркисова, Л. В., Каюмова, Г. М., & Умидова, Н. Н. (2018). Морфологические изменения фетоплацентарного комплекса при герпетической инфекции. *Тиббиётда янги кун*, 188-191.

2.Каюмова, Г. М., Саркисова, Л. В., & Умидова, Н. Н. (2018). Современные взгляды на проблему преждевременных родов. *Тиббиётда янги кун*, 183-185.

3.Саркисова, Л. В., & Умидова, Н. Н. (2018). Premature birth in the modern aspect. *Новый день в медицине*, *3*, 23.

4. Toyqulovna, K. M. T. K. M., & Nabievna, U. N. (2023). THE ROLE OF GENETIC DETERMINANTS IN THE OCCURRENCE OF HYPERPLASTIC PROCESSES OF THE REPRODUCTIVE SYSTEM OF WOMEN'S MENOPAUSAL AGE. *Journal of Advanced Zoology*, *44*(S2), 3724-3730.

5.Саркисова, Л. В., Умидова, Н. Н., Муаззамов, Б. Б., Муаззамов, Б. Р., & Ахророва, Л. Б. (2019). Пути улучшения способов профилактики и лечения анемии беременных. *Новый день в медицине*, (2), 275-279.

6.Baxtiyorovna, N. N. (2023). Modern Aspects of Early Diagnosis and Effectiveness of Treatment of Endometriosis. *American Journal of Pediatric Medicine and Health Sciences (2993-2149)*, *1*(9), 23-28.

7.Baxtiyorovna, N. N. (2023). Modern View on the Diagnosis and Treatment of Endometriosis. *American Journal of Pediatric Medicine and Health Sciences (2993-2149)*, *1*(9), 20-22.

8.Hamdamova, M. T., & Umidova, N. N. (2023, September). THE ROLE OF APOPTOSIS MARKERS AND ANGIOGENESIS REGULATORS IN THE PATHOGENESIS OF

GENITAL ENDOMETRIOSIS. In *International Conference on Medicine and Life Sciences* (pp. 47-48).

9. Khamdamova, M. T., & Umidova, N. N. (2023, September). MEDICAL AND SOCIAL ASPECTS OF GENITAL, ENDOMETRIOSIS. In *International Conference on Medicine and Life Sciences* (pp. 49-50).

10.Умидова, Н. Н. (2023). Медицинские И Социальные Аспекты Генитального, Эндометриоза. *AMALIY VA TIBBIYOT FANLARI ILMIY JURNALI*, *2*(5), 416-418.

11. Samandarovna, S. Z., & Hikmatovna, A. M. (2023). Treatment Efficiency Analysis Pregnant, With Anemia of Varying Severity. *Scholastic: Journal of Natural and Medical Education*, *2*(2), 214-218.

12. Uchqunovna, N. M., & Ixtiyarovna, N. O. (2022). Treatment of Pregnant People with Various Animia Disease at Random in Humans. *Central Asian Journal of Literature, Philosophy and Culture*, *3*(12), 153-159.

13.Саркисова, Л., & Умидова, Н. (2019). Анализ эффективности лечения беременных, с анемией различной степени тяжести. *Журнал вестник врача*, *1*(4), 115-118.

14.Umidova, N. N. (2019). THE ROLE OF INDICATORS OF FERROKINETICS AND ENDOGENOUS ERYTHROPOIETIN IN ANEMIA OF PREGNANT WOMEN. *Journal of Asian Medical Student Association*, *7*(2), 48-50.

15.Sarkisova, L. V., Umidova, N. N., & Ro‘ziyeva, D. U. (2019). Treatment efficiency analysis pregnant, with anemia of varying severity. *Новый день в медицине*, (4), 290-294.