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MORPHOFUNCTIONAL CHANGES OF THE STOMACH WALL UNDER THE INFLUENCE OF ENERGY DRINKS

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Abstract: Changes in the function of laboratory markers in the blood serum of the stomach were determined during the consumption of energy drinks at different periods of time.

This experimental study examines morphofunctional changes in the stomach wall.

The experiment was performed on 30 three-month-old white male rats weighing 130 ± 20 g. To obtain the experimental model, the energy drink (ED) "Gorilla" was administered intragastrically for 4, 8, 12 weeks through a plastic tube in the vivary department in Bukhara, during the period February 2022 - June2022.

The level of the tumor marker CA 74-2 varied from 0.2 to 4.02 U/ml in rats that received EN for 4 weeks. In blood samples from rats that consumed EN for 8 weeks, the tumor marker level varied from 1.36 to 5.38 U/ml, and when exposed to EN for 12 weeks, the tumor marker level varied from 2.1 to 24.15 U/ml. Only in 1 case (9%), in rats administered EN for 12 weeks, the tumor marker concentration increased to 24.15 U/ml.

When assessing the studied parameters that determine the functional state of the stomach in the blood serum, it was revealed that as a result of long-term action of EN, the secretory function of the stomach decreases and the risk of gastrointestinal diseases increases.

Keywords: Stomach, White rat; Atrophic gastritis; Pepsinogen I,II; CA 74-2; Immunological laboratory test.

I. INTRODUCTION

In recent years, energy drinks have begun to progressively conquer not only the market of European and Western countries, but they have also conquered the market of Asian countries. Therefore, WHO believes that the risk of such mass consumption of energy drinks among adolescents and young people can lead to serious health problems and negative complications in health care in the future. Moreover, this condition remains largely unattended among scientists and the public***[1, 4, 6].*** Analysis of literary data with a high degree of persuasiveness indicates that excessive consumption of energy drinks can have an extremely adverse effect on human health and can lead to the development of multiple organ failure, with damage, first of all, to the cardiovascular, central nervous, endocrine systems, as well as the digestive and excretory systems. To substantiate the indications and contraindications, recommendations for the use of energy drinks, it is necessary to obtain a clear evidence base based on complex clinical, laboratory, instrumental and experimental morphological studies ***[1, 8].***

In recent years, in a number of countries, when screening various stomach diseases, including gastric ulcer and duodenal ulcer, gastroesophageal reflux, atrophic gastritis and other stomach diseases, the invasive endoscopy method is being replaced by more effective and easier non-invasive methods. Therefore, a number of studies have been conducted ***[2, 3, 4].*** As a result of these studies, it was found that changes in the amount of pepsinogen I (PGI), pepsinogen II (PGII) in the blood serum can be used as a biological marker of these diseases, and their concentration in the blood serum determines the morphofunctional state of the stomach wall, and subsequently, if changes are detected, the diagnosis is confirmed by histological examination ***[1].***

Pepsinogens are inactive pepsin precursor proteins, which are converted into catalytically active pepsin in the presence of hydrochloric acid in the stomach. In healthy people, PGI is normally produced three times higher than PGII. It is known that the gastric mucosa, regardless of the mechanism of its damage, is capable of regenerating and restoring its original structure. At the same time, with progressive inflammation of the gastric mucosa, damaged glands lose their ability to regenerate, and instead of the mucosa, metaplastic epithelial cells appear, which leads to atrophic gastritis ***[5].***

II. METHODOLOGY

The experiment was performed on 30 three-month-old white male rats weighing 130 ± 20 g. To obtain the experimental model, the energy drink (ED) "Gorilla" was administered intragastrically for 4, 8, 12 weeks through a plastic tube. After extraction, serum samples were stored in a refrigerator at -20 ° C until ELISA analysis was performed. Laboratory testing of serum pepsenogens of type I and II, tumor marker CA74-2 was performed using special kits for enzyme-linked immunosorbent assay (ELISA) of Russian manufacture.

III. RESULTS

In acute poisoning, the average concentration of PGI in the blood serum of rats in the group consuming EN for 4 weeks was 4.96 μg/l (ta). During this period, the average concentration of PGII in rats consuming EN was 2.18 μg/l, and the average PGI/PGII ratio was 2.69. At the same time, we see that these three indicators were sharply reduced in rats with chronic EN consumption: in the group receiving EN for 8 weeks, the level of PGI in the serum decreased to 4.19 μg/l, PGII by 1.76 μg/l , and the PGI/PGII ratio was 2.41. When EN was used for 12 weeks, the content of pepsinogen I in the blood serum of rats decreased to 2.78 μg/l, pepsinogen II to 1.22 μg/l, and the PGI/PGII ratio by 2.2.

The amount of PGI in animals of the experimental group

Table 1

(PGII) mkg/l			
№	**Influence energy drinks over 4 weeks**	**Influence energy drinks over 8 weeks**	**Influence energy drinks over 12 weeks**
1	1,93	1,76	1,47
2	1,49	1,52	1,31
3	1,32	1,92	0,88
4	2,7	1,85	0,79
5	1,64	1,32	0,835
6	2,16	1,8	0,81
7	1,86	2,15	1,76
8	2,42		1,08
9			1,35
M	**1,94**	**1,76**	**1,22**

The amount of PGI in animals of the experimental group

Table 2

(PGI) mkg/l			
№	**Influence energy drinks over 4 weeks**	**Influence energy drinks over 8 weeks**	**Influence energy drinks over 12 weeks**
1	4,81	3,6	4,6
2	3,27	3,53	3,79
3	3,31	4,37	1,84
4	4	5,3	2,79
5	5,3	4,06	2,31
6	6,31	4,15	2,82
7	4,88	4,32	2,64
8	7,83		1,96
9			2,315
M	**4.96**	**4.19**	**2.78**

The level of the tumor marker CA 74-2 varied from 0.2 to 4.02 U/ml in rats that received EN for 4 weeks. In blood samples from rats that consumed EN for 8 weeks, the tumor marker level varied from 1.36 to 5.38 U/ml, and when exposed to EN for 12 weeks, the tumor marker level varied from 2.1 to 24.15 U/ml. Only in 1 case (9%), in rats administered EN for 12 weeks, the tumor marker concentration increased to 24.15 U/ml (Table 3).

The amount of CA 74-2 in animals of the experimental group

Table 3

(CA74-2) ng/l			
№	**Influence energy drinks over 4 weeks**	**Influence energy drinks over 8 weeks**	**Influence energy drinks over 12 weeks**
1	6,04	2,36	38,15
2	2,26	0,8	6,13
3	0,2	3,4	3,73
4	3,18	1,6	4,93
5	2	2,56	4,33
6	4,02	1,6	4,8
7	3,15	2,2	3,8
8	0,02		2,1
9			3,15
M	**2,68**	**2,07**	**7,902**

IV. DISCUSSION

Thus, in general, determining the level of PG is a reliable indicator of the presence of changes in the gastric mucosa in an atrophic or hyperacid state. In recent years, it has also been confirmed that low pepsinogen levels can be a predictor of gastric cancer development. It should be taken into account that the study of the

CA74-2 tumor marker in the blood serum helps to determine the morphofunctional state of the stomach and reflects the precancerous state of this organ***[5].***

Although little research has previously been conducted examining the effects of energy drinks or their components on the gastric mucosa. It is worth noting that in the five years from February 2005 to December 2009, 20 of 82 calls to the New Zealand National Poison Control Centre were related to nausea, vomiting and diarrhoea associated with energy drinks. Caffeine can cause symptoms affecting the gastrointestinal tract such as upset stomach and diarrhoea. Because caffeine stimulates the secretion of gastric acid. Increased acidity triggers a negative feedback mechanism, that is, it suppresses the release of gastrin. The inhibitory effect of caffeine on gastric mucosal secretion may be one of the main factors in the damage to the gastric mucosa. Studies have shown that rats consuming an energy drink (POWER HORS) had a significant biochemical and immunohistochemical decrease in the hormone gastrin ***[6].*** In addition to the above, caffeine increases the production of gastric juice, which relaxes the muscles of the upper stomach and esophagus, which leads to mechanical damage to the stomach wall as a result of prolonged retention of food in the stomach, and a decrease in muscle tone leads to gastroesophageal reflux***[7].***

V. CONCLUSIONS

When assessing the studied parameters that determine the functional state of the stomach in the blood serum, it was revealed that as a result of long-term action of EN, the secretory function of the stomach decreases and the risk of gastrointestinal diseases increases.

This indicates that organic changes may occur in the epithelium of the gastric mucosa due to the chronic action of energy drinks.

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