

Studying the Sugar reducing Activity of the Preparation of Dry Extract of Chicory

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Abstract: Introduction. In modern pharmacotherapy of diabetes mellitus, insulin and oral hypoglycemic agents, sulfonylurea derivatives, biguanides, α -glucosidase inhibitors, etc. are used. Most of these drugs are imported, expensive, and they have various side effects. Based on this search and pharmacological study of new hypoglycemic agents based on local natural raw materials of the republic is an extremely urgent task.

Materials and research methods. The experiments were carried out on 40 rats of both sexes, weighing 153-185 g, according to the generally accepted methodology. To determine the optimal dose of dry extract of Chicory, it was administered orally at 25.50 mg/kg 30 minutes before the administration of glucose. After 30, 60, 90 and 120 minutes, the level of glucose in the blood was determined by the enzymatic method.

Results. The results of comparative experiments showed that after the administration of the study drug at a dose of 25 mg/kg against the background of hyperglycemia for 60 minutes, the blood glucose level decreases from 5.95 ± 0.84 mmol/l to 5.12 ± 0.4 mmol/l, 90 minutes by 5.45 ± 0.28 , and after 120 minutes by 5.83 ± 0.25 mmol / l (Table 3.2). That is, after the introduction of the studied drug at a dose of 25 mg/kg against the background of hyperglycemia for 60, 90, 120 minutes of the experiment, the level of glucose in the blood decreases by 42.3%; 35.4% and 12.3% compared to control data. **Conclusion.** The study drug clearly reduces blood sugar levels, especially at a dose of 50 mg/kg, and is not inferior in its activity to the compared drugs-Glucare.

Key words: Diabetes mellitus, experimental hyperglycemia, natural raw materials, Chicory, Glucar

Introduction. Diabetes mellitus is a chronic disease characterized by hyperglycemia due to a defect in insulin secretion, impaired insulin activity, or a combination of both causes, leading to metabolic pathology, damage to the vessels of the nervous system, and pathological changes in various organs and tissues. In the structure of mortality among chronic non-communicable diseases, diabetes mellitus ranks third after cardiovascular and oncological diseases.

In industrialized countries, this disease affects 6-10% of the population, which can be assessed as a "pandemic" [1,2,3]. The prevalence of diabetes mellitus has a clear upward trend, primarily in the age groups over 40 years [4,5,6]. Every 15 years, the number of people with diabetes doubles. This is mainly due to the increase in the number of patients with type 2 diabetes mellitus. According to WHO, in 2003 there were about 80 million patients in the world, in 2005 - about 200 million, by 2011 more than 230 million are expected in the world. patients [7].

In modern pharmacotherapy of diabetes mellitus, insulin and oral hypoglycemic agents, sulfonylurea derivatives, biguanides, α -glucosidase inhibitors, etc. are used. Most of these drugs are imported, expensive, and they have various side effects [6,8,9].

Based on this, the search and pharmacological study of new hypoglycemic agents based on local natural raw materials of the republic is an extremely urgent task.

Materials and methods of research. The experiments were carried out on 40 rats of both sexes, weighing 153-185 g, according to the generally accepted methodology. In the first series of experiments, we studied the effect of the sugar-reducing activity of the preparation of dry extract of Chicory on experimental hyperglycemia in rats caused by a single intraperitoneal injection of hypertonic glucose solution at a dose of 4.5 g/kg. To determine the optimal dose of dry extract of Chicory, it was administered orally at 25.50 mg/kg 30 minutes before the administration of glucose. After 30, 60, 90 and 120 minutes, the level of glucose in the blood was determined by the enzymatic method. In the next series of experiments, the activity of the dry extract of Chicory was compared with other sugar reducing drugs Glucare in experimental hyperglycemia.

Results. When studying the effect of the study drug on blood sugar levels in acute hyperglycemia in rats at doses of 25, 50 mg/kg, it was found that the drug at the above doses clearly reduces blood sugar levels. The results of comparative experiments showed that after the administration of the study drug at a dose of 25 mg/kg against the background of hyperglycemia for 60 minutes, the blood glucose level decreases from 5.95 ± 0.84 mmol/l to 5.12 ± 0.4 mmol/l, 90 minutes to 5.45 ± 0.28 , and after 120 minutes by 5.83 ± 0.25 mmol/l (Table 3.2).

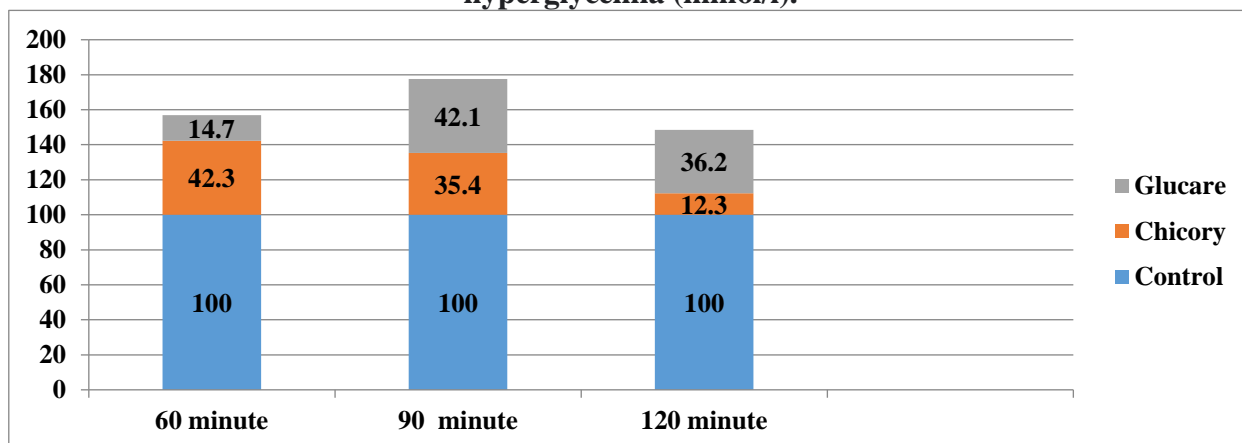
Table 3.2
The influence of various substances on the level of glucose in the blood during experimental hyperglycemia (mmol/l) (M±m; n=6)

| Substances under studying | Dose mg/kg | Time after administration | | |
|--|------------|---------------------------|-----------|----------|
| | | 30 min | 60min | 120 min |
| Saline | 1 MJI | 6,9±0,48 | 7,8±0,95 | 4,9±0,5 |
| Powder of Garlic | 50 | 5,07±0,7 | 5,7±0,4 | 4,17±0,8 |
| Nowbakhtite | 50 | 5,7±0,2* | 5,4±0,2* | 4,37±0,6 |
| Topinambure+dry extract of Chicory (1:1) | 50 | 5,68±0,3 | 5,78±0,3 | 4,42±0,7 |
| Powder of Topinambure | 50 | 5,74±0,23 | 4,85±0,6* | 3,9±0,28 |
| Nowbakhtite+dry extract of Chicory (1:1) | 50 | 5,79±0,4 | 5,29±0,6* | 4,26±0,8 |
| Dry extract of Chicory | 50 | 5,6±0,4 | 5,75±0,5 | 4,6±0,3 |

Note: * - differences relative to the data of the control group are significant (* - P<0.05)

That is, after the introduction of the studied drug at a dose of 25 mg/kg against the background of hyperglycemia for 60, 90, 120 minutes of the experiment, the level of glucose in the blood decreases by 42.3%; 35.4% and 12.3% compared to control data (Figure 1). The most pronounced effect of the drug was noted with the introduction of 50 mg/kg.

Fig.1
Effect of dry extract of chicory at a dose of 25 mg/kg on blood glucose levels in experimental hyperglycemia (mmol/l).



During these study periods, against the background of hyperglycemia under the influence of the studied drug at a dose of 50 mg/kg, the blood glucose level decreases from 5.95 ± 0.84 mmol/l, respectively, to 4.49 ± 0.2 mmol/l, to 5.1 ± 0.36 (90 minutes), and after 120 minutes by 5.83 ± 0.25 mmol / l (Table 3.3). Therefore, the study drug at a dose of 50 mg/kg has the most pronounced hypoglycemic effect, that after the administration of glucose, after 60 minutes, the blood glucose level decreases by 47.7%, respectively, after 90 minutes - by 40.8%, and after 120 minutes by 19. 1% compared to the control data (Fig. 2).

The results of comparative experiments showed that after the administration of Glucare at a dose of 100 mg/kg against the background of hyperglycemia at this time, the sugar level decreases from 5.95 ± 0.84 mmol/l, respectively, by 5.46 ± 0.5 , 4.94 ± 0.5 , 5 and 5.14 ± 0.54 in relation to the control. It is maximum effect on the level of glucose in the blood during experimental hyperglycemia is observed after 90 minutes of the experiment (Table 3.3).

That is, after the introduction of a comparative drug against the background of hyperglycemia, at 60-, 90-, 120-minutes of the experiment, the blood glucose level decreases by 14.7%, 42.1% and 36.2%, respectively, compared with the control data (Fig. 1,2)

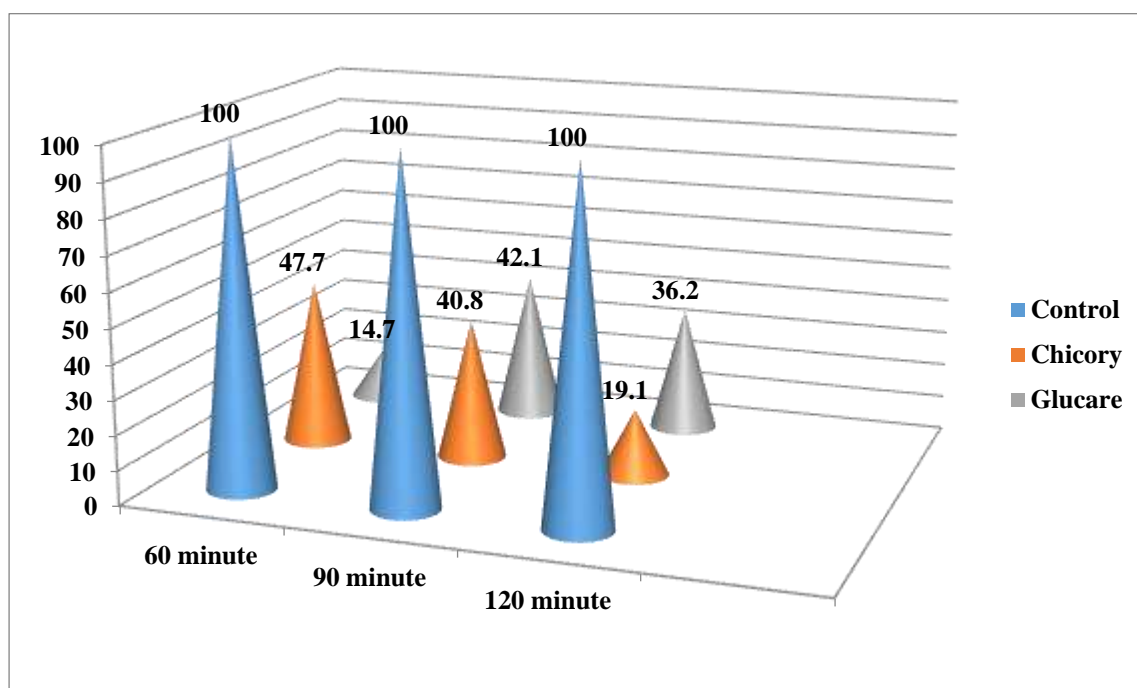
Table 3.3.

Effect of dry extract of chicory on blood glucose levels in experimental hyperglycemia (mmol/l).n=6

Note * - Reliability $P < 0.05$ in relation to control

Fig. 2
Effect of dry extract of chicory at a dose of 50 mg/kg on blood glucose levels in experimental hyperglycemia (mmol/l).

| Groups | Дозы, мг/кг. | Intact group of animals before administration of Glucose | Results after administration of Glucose | | | | | |
|------------------------|--------------|--|---|------|------------|------|-------------|------|
| | | | In 60 min. | | In 90 min. | | In 120 min. | |
| | | | Results | % | Results | % | Results | % |
| Control | Dis. water | 5,95±0,84 | 8,57±0,57 | 100 | 8,61±0,58 | 100 | 7,2±0,64 | 100 |
| Dry extract of Chicory | 25 | | 5,12±0,4* | 42,4 | 5,45±0,28* | 35,2 | 5,83±0,25 | 12,6 |
| Glucare | 50 | | 4,49±0,29* | 47,7 | 5,1±0,36* | 40,8 | 5,83±0,25 | 19,1 |
| Glucare | 100 | | 5,46±0,5* | 36,2 | 4,94±0,56* | 42,1 | 5,14±0,54 | 14,7 |



Conclusion. The dry extract of Chicory clearly reduces blood sugar levels, especially at a dose of 50 mg/kg, and is not inferior in its activity to the compared preparations - Glucare. The basis of the hypoglycemic action of the studied drug is an increase in insulin secretion, deposition of glycogen and slowing down glycogenolysis. Harmlessness, absence of side effects, effectiveness of hypoglycemic action, sufficiency of material resources for raw materials opens up wide opportunities for the use of these drugs in the treatment of type 2 diabetes mellitus.

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