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THE INFLUENCE OF COMBINED APPLICATION OF EXTRACTS OF HYPERICUM PERFORATUM AND GLYCYRRHIZA GLABRA ON THE DEVELOPMENT OF GASTROPATHY IN RATS

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Abstract:
The experiments were conducted on 24 male white rats weighing 180–200 g, in accordance with the requirements of the ethical committee. Two variants of gastropathy were modeled: stress-induced gastric ulcers caused by immobilization and ulcer formation induced by the administration of indomethacin. Rats in the experimental groups were orally administered Lesbokhol in the form of a dry extract intragastrically at a dose of 50 mg/kg one hour prior to the modeling of experimental ulcers.
The results showed that under conditions of immobilization stress and indomethacin administration, multiple hemorrhages with pinpoint and linear ulcerations were observed in all test rats. However, with the administration of a combination of extracts from medicinal plants (Hypericum perforatum and Glycyrrhiza glabra), there was a significant reduction in both the number of rats with ulcers and the number of ulcers per rat.

Keywords: Hypericum perforatum, Glycyrrhiza glabra, gastropathy, gastric ulcers, stress-induced ulcers, indomethacin-induced ulcers, anti-ulcer effects, Helicobacter pylori (H. pylori).

Introduction

Inflammatory diseases of the stomach have been a recognized problem for millennia. Evidence of gastric ulcers from the ancient world, discovered in Egypt and Greece, dates back to the 5th–2nd centuries BCE. However, historical records are limited, partly due to diagnostic challenges and the relatively low mortality associated with this pathology. Notably, the first description of a gastric resection operation for an ulcer, dated to the 4th century BCE, was inscribed on the pillars of the Temple of Asclepius in Epidaurus [16].
Since the identification of Helicobacter pylori (H. pylori), the role of psychosocial factors in the development of peptic ulcers has been largely overshadowed [1, 2]. Modern research identifies H. pylori infection [3, 4], non-steroidal anti-inflammatory drug (NSAID) use [5, 6], and smoking as the primary causes of peptic ulcers [2, 7, 8]. Consequently, alternative

contributing factors have received minimal attention. Yet, not all peptic ulcers can be attributed to these causes [5, 6, 9, 10]. Approximately 5–20% of peptic ulcers are classified as idiopathic [2, 11], and the global prevalence of non-H. pylori and non-NSAID ulcers is rising [12].

Recent studies suggest exploring a broader range of factors to gain deeper insights into ulcer pathogenesis [4, 7, 13]. Psychosocial factors such as stress, depression, and anxiety have been linked to impaired healing of duodenal ulcers, emphasizing the need for a multidimensional approach to treatment [14, 15].

Materials and Methods

The experiments were conducted on 24 male white rats weighing 180–200 g. After a 14-day quarantine period, the animals were housed under standard conditions with access to a standard diet. Ethical committee guidelines were strictly followed during all experiments.

Two gastropathy models were used:

1. Stress-induced ulcers: Rats were subjected to immobilization stress after 24 hours of fasting with access to water only. Forced immobilization was achieved by tying the rats' paws to a board for 24 hours.
2. Indomethacin-induced ulcers: Rats were administered an ulcerogenic dose of indomethacin (60 mg/kg) intragastrically using a metallic probe.

The experimental group received a combination of dry plant extracts (H. perforatum and G. glabra) at a dose of 50 mg/kg orally, one hour before ulcer induction. The control group received an equivalent volume of water.

After the procedures, animals were euthanized, and their stomachs were examined for ulcers. Data were statistically analyzed using the Student’s t-test.

Results

The obtained data indicate that immobilization is characterized by dystrophic changes in the stomach wall, which occur in almost all experimental animals. Multiple hemorrhages with punctate and linear ulcers are also observed. Upon examination of the control group animals, ulcerative lesions were found in 100% of the rats (6 out of 6). In the experimental groups with the prior administration of the combination of medicinal plant extracts at a dose of 50 mg/kg, ulcers were also found in 100% of the animals (6 out of 6). However, the destructive changes slightly differed in terms of the number of ulcers. The main indicator of the anti-ulcer effect of the drug was the change in the average number of ulcers per rat. For instance, the number of small punctate ulcers in the rats of the control group was 35.0±2.9, while in the rats with the prior oral administration of the test drug, it decreased by almost three times to 12.3±1.02 (Table). Similarly, the number of large ulcers in the rats of the control group was 13.3±1.6, whereas in the rats treated with the test drug it decreased by almost two times to 6.0±0.97. The number of linear ulcers in the rats of the control group was 13.5±1.3, whereas in the rats with the application of the test drug, it decreased by almost three times to 5.2±1.08. Thus, the total

number of ulcers in the rats of the control group was 61.8±4.14, while in the rats treated with the test drug, it decreased by almost three times to 23.5±1.8.

Table The effect of extracts from plants hypericum perforatum and glycyrrhiza glabra of medicinal plants on experimental gastric ulcers, caused by immobilization stress and indomethacin

Experiments	Small pinpoint ulcers	Large ulcers	Band-shaped ulcers	Total number of ulcers
Stress-induced ulcers	35,0±2,9	13,3±1,6	13,5±1,3	61,8±4,14
Test drug group	12,3±1,02	6,0±0,97	5,2±1,08	23,5±1,8
Indomethacin-induced ulcers	11,7±0,84	9,3±0,61	10,2±0,7	29,5±1,18
Test drug group	6,5±0,43	6,7±0,429	4,4±0,5	17,5±0,5

Discussion

In experiments with the administration of indomethacin, the test drug also showed a clear preventive effect on the occurrence of stomach ulcers. Upon examination of the stomachs of the control animals, ulcers were found in all rats. Moreover, the ulcers were located in the pre-stomach and had varying sizes and hemorrhagic edges, with some rats showing hemorrhages on the stomach mucosa. In the experimental groups with the prior administration of the test drug at a dose of 50 mg/kg, ulcers were also found in 100% of the animals (6 out of 6). Furthermore, the destructive changes here also differed somewhat in terms of the quantity of ulcers. The main indicator of the anti-ulcer action of the drug, as noted above, was the change in the average number of ulcers per rat. For instance, if the number of small pinpoint ulcers in rats in the control group was 11.7±0.84, it decreased by almost two times in rats that received prior oral administration of the test drug, to 6.5±0.43. Similarly, the number of large ulcers in rats in the control group was 9.3±0.61, and in rats treated with the test drug, it decreased by almost one and a half times to 6.7±0.429. The number of streaked ulcers in rats in the control group was 10.2±0.7, and in rats treated with the test drug, it decreased by almost two and a half times to 4.4±1.08. Thus, the total number of ulcers in rats in the control group was 29.5±1.18, and in rats treated with the test drug, it decreased by almost one and a half times to 17.5±0.5.

Conclusion

The data in the table provide robust evidence that the combination of Hypericum perforatum and Glycyrrhiza glabra extracts offers significant protection against gastric ulcers. This protective effect is observed consistently across different types of ulcers (small, large, and band-shaped) and models (stress- and indomethacin-induced), suggesting their potential utility as a complementary therapy for ulcer prevention and treatment.

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