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An Experimental Study on the Healing Effect of Water to Traditional Sudanese Liquor (Aragi)-induced Stomach Peptic Ulcers

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Background: Peptic ulcer is one of the most common gastrointestinal tract diseases which affect the stomach. This study aimed to determine the effect of aragi on the adult rats' stomach and investigate the effect of water as a therapeutic agent on aragi-induced ulcerations.

Materials and methods: Thirty-five adult Wistar albino rats were used in this experimental study. Five rats were sacrificed on day 0 to represent normal stomach histology, 5 rats were used as a control group, and 25 rats were treated with aragi. On day 15, all rats in the control group and five aragi-treated rats were sacrificed for histological examination of the stomachs. The remaining 20 rats were stopped from aragi intake and 10 of them were treated with water for 15 days. After 15 day, all rats were sacrificed for histopathological examination of their stomachs. Stomach tissues were stained using hematoxylin and eosin (H&E) and documented under a microscope.

Results: Our research showed that aragi-treated rats had different severity of peptic ulcers after 15 days of continuous aragi intake, while the control group showed normal stomach histology. Nine out of 10 rats treated by water after aragi treatment also showed normal stomach histology.

Conclusion: Aragi is a causative agent for peptic ulcer and water can be used as potential natural therapy for treating ulcerative stomach.

Keywords: aragi, water, stomach, peptic ulcer

Introduction

Alcoholism includes attitudes manifested by craving¹, which is widely influenced by the frequency, quantity and regularity of alcohol consumption. Some risk factors,

including social environment, and stress play a great role in this issue.²

At biochemical level, alcohol affects a number of systems and organs in the body. Ethanol increases cell

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membrane fluidity. It also increases heart rate and causes peripheral vasodilation. Alcohol intake leads to severe biochemical and histological damage in the liver, including elevation of hepatic enzymes, fatty infiltration, focal necrosis and liver cirrhosis.³ The most common effect of alcohol on the stomach is peptic ulcers with different grades of severity, depending on the amount of alcohol. It can cause serious damage to the stomach, most of them are irreversible. Alcohol affects the mucosal barrier and increases gastric acid secretion.⁴

Synthetic drugs that are used for treatment of peptic ulcers have many side effects including diarrhea, dyspepsia (indigestion), headache, nausea, vomiting, rash, and itching. The cost of peptic ulcers medication is also high.⁵⁻⁷ Water is the cheapest and most valuable biological molecule. It is recently used as a traditional therapeutic agent for many diseases, including peptic ulcers.

Hydrotherapy is the internal or external use of water in the form of liquid, steam or ice with different duration, temperatures, pressure, and site to improve health or treat various diseases. It is widely used in ancient China, Egypt, India, etc.⁸ This method is usually used as local heat or cold therapy and its ability to relieve symptoms of musculoskeletal injuries and stimulate post-traumatic recovery has been proven.^{9,10} This research aimed to investigate the therapeutic use of water for treating peptic ulcers induced by excessive aragi intake.

Materials and methods

Samples Collection

The alcoholic drink used in this study was aragi, a traditional Sudanese liquor prepared from dates fermented by yeast, which converts the sugar found in dates into alcohol. A small amount of yeast was added to boiled water and then poured into washed dates in a clean pot. The pot was covered and left for 3 days. The fermented aragi was then distilled and collected in a clean bottle. The stock solution of aragi was checked using an ignition test^{3,5} and diluted to 50% of its original concentration.

Study Design and Animal Treatment

Thirty-five adult Wistar albino rats were used in this experimental study. All rats were purchased from the Faculty of Veterinary Medicine-University of Khartoum. The samples were taken under anesthesia, animals were kept in a well-ventilated area and fed properly. All animals received

humane care according to the guidelines outlined by the Committee for the Purpose of Control and Supervision on Experiments on Animals (CPCSEA).¹¹

Five rats were sacrificed at day 0 to represent normal stomach histology. The other 5 rats were used as a control group, while the other 25 rats were treated with a dose of aragi equivalent to 2 cups taken by an adult human for 15 days. On day 15, all rats in the control group and five aragi-treated rats were sacrificed for histological examination of the stomachs. The remaining 20 rats were stopped from aragi intake and 10 of them were given a dose of water equivalent to 4 cups taken by an adult for 15 days. Water was given one hour before food intake. After 15 day, all rats were sacrificed for histopathological examination of their stomachs.

All stomach samples were dissected and preserved in 10% formaldehyde. Histopathological examination was performed as previously described.¹² Stomach tissues were stained using hematoxylin and eosin (H&E) and documented under a microscope at 40x magnification. The behaviors of rats were also observed during the experiment. The ethical clearance form was designed and approved by the ethical committee of Ahfad University Research Board, Sudan (No. AH-RES/05-021-07).

Data Analysis

Histology of the rats' stomach were analyzed under a microscope and classified as normal, slight peptic ulcers, moderate peptic ulcers, and severe peptic ulcers.

Results

Rats that were treated with aragi showed many abnormal behaviors, including unstable movement and drowsiness followed by sleep. A lot of rats seemed to be tired and weak, experiencing body weight fluctuations as well as bleeding from eyes and ears. Some rats died before finishing the assigned duration of treatment. Several rats experienced

Table 1. Degree of peptic ulcer severity between control and aragi-treated group on day 0 and 15.

Group	Number of Rats			
	Day 0	Day 15		
	Normal	Slight Peptic Ulcer	Moderate Peptic Ulcer	Severe Peptic Ulcer
Control	5	0	0	0
Aragi-treated	0	1	1	3

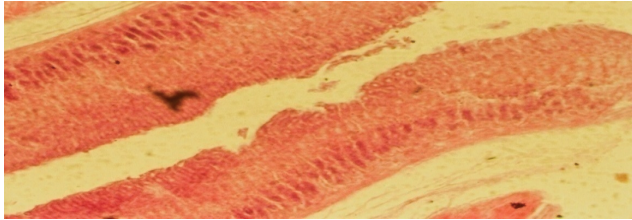


Figure 1. Normal stomach histology of a control rat.

increased appetite, while the others became very aggressive. Inversely, the rats that were treated with water after continuous aragi intake showed improved activity and alertness as well as increased body weight.

All rats showed normal stomach histology on day 0. After 15 days of continuous aragi intake, different degrees of peptic ulcers appeared in the rats' stomach, while the control group showed normal stomach histology (Table 1). Figure 1 showed the stomach histology of control rats. Nine rats with normal stomach histology and one rat with slight peptic ulceration were observed after 15 days of continuous water intake. Two rats with normal stomachs, three rats with slight ulceration, three rats with moderate ulceration and two rats with severe ulceration were observed in the group that was stopped from aragi intake and received no water treatment (Table 2).

Discussion

Numerous studies have shown that various risk factors other than *Helicobacter pylori* infection may be associated with the incidence of peptic ulcers, including socioeconomic, environmental, and psychological factors.¹³ Alcohol intake is one of the factors that is associated with gastric ulceration.¹⁴

Continuous intake of aragi caused moderate and slight ulceration in the epithelia of rats' stomachs. Meanwhile, the control group and the group which received water treatment after abstinence of aragi had normal stomach

histology. Similar results have been documented in previous studies.^{15,16}

Recently, many studies have been conducted on the use of water as a therapy for various diseases.^{17,18} We propose that water heals the aragi-induced peptic ulcers by washing out alcohol from the stomach and neutralizing the acidity of the stomach, hence facilitating the healing of the ulcerative stomach walls.

Conclusion

Our study confirmed the effectiveness of water to alleviate aragi-induced gastric ulcerations, verifying the traditional therapeutic use of water for peptic ulcer treatment. It can be concluded that water can be used as potential natural therapy for treating ulcerative stomach.

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Table 2. Degree of peptic ulcer severity between rats that did not treated and treated with water aragi treatment on day 0 and 15.

Group	Number of Rats			
	Day 0	Day 15		
	Normal	Slight Peptic Ulcer	Moderate Peptic Ulcer	Severe Peptic Ulcer
- Water	2	3	3	2
+ Water	9	1	0	0

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