Effects of GUF (Glycyrrhiza uralensis Fischer) Extract in Water Immersion Restrain Stress (WIRS)-Induced Gastric injury in Rats

Jun-Seon Lee, Gil-Hyun Lee, Kyung-Yae Hyun*
Depart. of Clinical Laboratory Science, Dong-Eui University
*corresponding author: kyhyun@deu.ac.kr

Abstract. In this paper purpose is investigate to protective effects of GUF (Glycyrrhiza uralensis Fischer) Extract in Water Immersion Restrain Stress (WIRS) induced Gastric injury rat model. 30 min after GUF orally administered in rat, implemented water immersion during 8 hr. Studying animal groups are as follows; Group I: Control group(n=5), group II: WIRS induced Rat, Group III: WIRS induced + GUF Extract 25mg/kg treated Rat, Group IV: cWIRS induced + GUF Extract 50mg/kg treated Rat, Group V: WIRS induced + GUF Extract 100mg/kg treated Rat. We confirmed gastric injuries through stomachs were opened along the greater curvature and gastric lesion area was quantified by pixel density using digital camera. The researcher result showed that oral administration of GUF Extracts have dose dependent protective effects in gastric injury and suggested having improvement effect of inflammation.

Keywords: Glycyrrhiza uralensis Fischer extract, Water Immersion Restrain Stress, gastric injury

1 Introduction

Glycyrrhiza uralensis Fischer is a perennial plant of legume family and is a herb medicine of which the root and part of stem are used with or without skin. As the idiom of "Glycyrrhiza uralensis Fischer in drug store (referring to an indispensible thing)" suggests, Glycyrrhiza uralensis Fischer frequently used in preparation of herbal medicine with a proportion of about 90% in medicines [1]. Glycyrrhizin, a core ingredient of Glycyrrhiza uralensis Fischer, adds sweetness. Glycyrrhiza uralensis Fischer is effective in liver protection [2], pancreatitis [3], anti-inflammation [4], etc. Water Immersion Restrain Stress (WIRS), a stress-induced animal model using fear of water and behavior restriction, was used in examining the role [5] of gastric acid secretion or cell necrosis in gastric ulcer, which was conducted as a previous study. Based on this animal model, we incised the stomach, looked into the impaired site with the naked eye, took a photograph of the stomach with a digital camera and quantified the pixel density of the impaired site in order to examine the efficacy of the Glycyrrhiza uralensis Fischer on gastric damage.
2 Methods

2.1 Animal

We bought twenty five rats of four-week-old male Sprague-Dawely male rats (110-130g) from Co. Oriental Bio. Breeding condition was maintained at 25℃, 60% humidity and 12-hour-shift of day and night while the same amount of food and drinking water are provided freely. Breeding condition was maintained at 25℃, 60% humidity and 12-hour-shift of day and night while the same amount of food and drinking water are provided freely.

2.2 Animal experimental model

The rat went to 24-hour-long starvation before the experiment, and 30 minutes before sacrifice, Glycyrrhiza uralensis Fischer extract was orally administered by 25mg/kg, 50mg/kg and 100mg/kg according to the concentration. After 30 minutes after oral administration, the rat is immersed in the 22℃ water for 8 hours and a restrain cage is used to restrict the behavior of the rat. After 8 hours, rat is sacrificed to proceed with the experiment. Experiment method is shown in [Fig. 1].

Fig. 1. Water Immersion Restrain Stress (WIRS) Rat model
30 min after GUF (25mg/kg, 50mg/kg, 100mg/kg) orally administered, Rats are immersed in water (22℃) during 8 hr. Rat behaviors are limited by restraint cage.

2.3 Analysis

2.3.1 Measurement of the site of gastric damage

After extracting the stomach of the rat sacrificed after 8 hour-long immersion, 10% Neutral Buffered formalin (NBF) was filled therein for 2 hours. Then, after 10% NBF was removed, the stomach was cleaned with cell line along greater curvature and was cut open and fixed.

2.3.2 Statistic process

The site of impaired stomach was photographed with a digital camera and the largest
diameter of each impaired stomach site was measured. Then, the pixel density of each group was put together to calculate the average, and the result was used in quantification. The quantified value was analyzed in ANOVA by using SPSS Version 18.

3 Result

3.1 Protection Effect of GUF Extract

![Fig. 2. Protective effects of GUF in WIRS induced gastric injury](image)

These pictures showed protective effects of GUF in WIRS induced gastric injury in rat and protective effects are dose dependently increas. G I : Control Group, G II : Vehicle Group, G III : 25mg/kg GUF, G IV : 50mg/kg GUF. G V : 100mg/kg GUF.

3.2 Pixel density quantity of gastric damage region

![Fig. 3. quantification of gastric injury lesion area by pixel density * p<0.05 (compare with vehicle); ** p<0.01 (compare with vehicle).](image)

The gastric injury lesion size was quantified by measuring each lesion along its greatest diameter. Each groups of total pixel density expressed and averaged as the lesion index.

4 Discussion

As we looked into the site of stress-induced gastric damage through water immersion experiment by the naked eye, the group to which 100mg/kg Glycyrrhiza uralensis Fischer extract was orally administered showed clear protection effect, and in the
graph which was quantified through the pixel density of the site of gastric damage, the
group to which 50mg/kg and 100mg/kg of Glycyrrhiza uralensis Fischer were orally
administered showed significant reduction when compared to the group to which
Glycyrrhiza uralensis Fischer was not administered (p<0.05, p<0.01). Such result
indicates that orally administered Glycyrrhiza uralensis Fischer extract has the effects
of protection on stress-induced gastric damage and inflammatory regulation.

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