

SUMMARY

According to the World Health Organization (WHO), alcohol is a psychoactive substance with reliance delivering properties that have been broadly utilized in numerous societies for a considerable length of time. Consumption of alcohol can also cause many diseases. Many relevant factors which explain the dangers of alcohol can be seen from the level and effectiveness of alcohol policies (WHO, 2019).

Lately many cases have mixed alcohol with ingredients that are not suitable for consumption for example is cukrik from Indonesia. Mixed alcohol is alcohol (ethanol) comes together with various other ingredients such as energy drinks, cola or soft drinks, methylated spirits(spirtus) or other types of alcohol, and drugs (Mulyadi, 2014). Cukrik are mixed with methanol and ethanol, Methanol is a light volatile flammable poisonous liquid alcohol CH_3OH used especially as a solvent, antifreeze, or denaturant for ethanol and in the synthesis of other chemicals, Ethanol is a colorless volatile flammable liquid $\text{C}_2\text{H}_5\text{OH}$ that is the intoxicating agent in liquors and is also used as a solvent and in fuel (BPOM, 2016). In Indonesia on April 11, 2018, cukrik killed 41 people in the regency of Bandung, West Java, the police suspected from the victim's symptoms that mixed drinks contained methanol or usually also called methylated spirits(spirtus) (Mochammad, 2018).

Several studies have shown that alcohol plays a role in renal damage. Until now, there are still few studies examining the effect of giving cukrik on the histopathological image of the renals. So, the authors are motivated to do this research. Based on the background described above, this study aims to

analyze the effect of cukrik on the damage of histopathological image of Wistar rat kidneys.

This research was conducted with the experimental Laboratories method using a post-test only control group design to determine the effect of mixed alcohol on the histopathological image damage of male Wistar rats. The study population was all-male Wistar rats from the Experimental Animal Unit of the pharmacology departement, Faculty of Medicine, Universitas Airlangga. This study uses primary data from observing histopathological images using a light microscope. Data analysis was performed using SPSS version 22 software. The Mann-Whitney test was used to determine significant differences between groups in tubular, glomerular, and interstitial EGTI scoring data. Spearman test to see the correlation of increased damage due to cukrik administration.

Twenty-eight rats were divided into four groups . EGTI scoring values on glomerular cells were found to have significant differences in damage ($p < 0.01$) in the treatment group (G1, G2, and G3) to the control group (C). EGTI scoring values on tubular cells also found significant differences in damage ($p < 0.01$) in the treatment group (G1, G2, and G3) against the control group (C). However, in contrast to the EGTI scoring value on interstitial cells, there was no significant difference in damage ($p < 0.01$) in the treatment group (G1, G2, and G3) to the control group (C).

Conclusions that can be obtained from the results, there is significant damage of tubular and glomerular cell on the kidney caused by cukrik (mixed of ethanol and methanol) poisoning. But there was no significant damage found on interstitial cell of the kidney caused by cukrik (mixed of ethanol and methanol) poisoning. The authors suggest that further research is needed using

more specific staining to evaluate thickening of glomerular wall and different concentrations, and smaller cukrik doses are needed to determine early kidney damage.

ABSTRACT

Background : Cukrik mainly contain ethanol, which are known to be addictive and if consumed excessively may damage the body. Regarding the price of legal alcoholic drinks, which are too expensive for the middle to the lower class, most of them add ethanol alcohol with other substances that are relatively cheaper to increase drunkenness. One of these substances is often encountered are methanol (CH₃OH) due to relatively low price. Cukrik is one of illegal drink in this country, mostly cukrik contain mixed of ethanol and methanol. Misuse of cukrik can lead to intoxication and may lead to death. Several studies have shown its effect on kidney damage.

Objectives : Analyzing the effect of cukrik on the histopathological damage of male Wistar rat kidney.

Method : This was experimental laboratories using a post-test only control group design. A total of 28 rats (200-250 gram) that fit the criteria were divided into four groups, C, G1, G2, and G3, with each group consisting of 7 rats. Group control (C) was given 4 mL of distilled water; groups G1, G2, and G3 were given 1ml, 2 ml, and 4 ml cukrik in orally for 14 days. The composition of cukrik consists of 20% ethanol and 4% methanol. Examination of histopathological features was carried out by identifying glomerular cells, tubular cells, and interstitial cells with HE staining. All samples were evaluated by assessing EGTI scoring of cross-sectional slices of rat kidney tissue under a light microscope with a magnification of 400 x. Statistical analysis used the non-parametric Mann-Whitney test and the Spearman test.

Results : In this study, found in glomerular examination there were significant differences between the control group with the treatment groups G1, G2 and G3 ($p < 0.01$). Tubular examination found that there were significant differences between the control group with treatment groups G2, and G3 ($p < 0.01$). Interstitial examination found that there was a difference but not significant between the control group with the treatment groups G1, G2, and G3 ($p > 0.01$).

Conclusion : Consumption of cukrik produced glomerular and tubular damage on the histopathological image of male Wistar rats' kidneys, but there was no visible damage to the interstitials cell. With higher consumption of cukrik will make tubular and glomerular damage heavier.

Keywords : Cukrik, Kidney, Methanol, Ethanol, Tubular, Glomerular, Interstitial