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Ulcerative Colitis and Alcohol: Facts and Myths

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ABSTRACT: Ulcerative colitis (UC) is a chronic inflammatory disease of the colon and rectum, characterized by symptoms such as diarrhea, hematochezia, abdominal pain, and distension. The etiology of UC remains unclear, but it is believed to result from a combination of immune system, environmental, and genetic factors. Among environmental influences, dietary and lifestyle choices, including alcohol consumption, have been scrutinized for their potential impact on UC. Alcohol, a widely consumed beverage, has complex effects on the gastrointestinal system. While moderate alcohol intake is often associated with certain health benefits, its role in inflammatory bowel diseases like UC is contentious. Research indicates that alcohol can exacerbate UC symptoms by altering gut microbiota, increasing intestinal permeability, and enhancing inflammatory responses. This review explores the multifaceted relationship between alcohol consumption and UC, highlighting how alcohol can disrupt the gut barrier, modify microbiota composition, and interact with UC medications, potentially diminishing their efficacy. Despite some studies suggesting that certain types of alcohol, such as red wine, may have anti-inflammatory properties, the consensus is that individuals with UC should approach alcohol consumption with caution. The variability in individual responses to alcohol further complicates this issue. This review underscores the need for more research to fully understand the interplay between alcohol and UC and to provide clear guidelines for patients. Until then, it is advisable for UC patients to consult healthcare professionals to make informed decisions regarding alcohol use.

KEY WORDS: Ulcerative colitis, Inflammatory bowel disease, Alcoholic, Delivery of healthcare, Intestinal barrier function

INTRODUCTION

Ulcerative colitis (UC) is a recurrent, chronic inflammatory gastrointestinal disease that mostly affects the colon and rectum. Diarrhea, hematochezia (blood in the stool), stomach pain, and distension are some of its symptoms (Gajendran et al., 2019). Although its precise cause is still unknown, UC is thought to be caused by a confluence of immune system, environmental, and genetic variables. The possible influence of dietary and lifestyle decisions, including alcohol usage, on the disease has been closely examined among the different environmental factors (Kobayashi et al., 2020a). The symptoms of ulcerative colitis (UC), a chronic inflammatory colon disease, include diarrhea, abdominal pain, and rectal bleeding. Alcohol use and UC have complicated and multidimensional interaction (Porter et al., 2020).

A popular beverage, alcohol has a variety of complex effects on the body, especially on the digestive tract. Although moderate alcohol use is frequently linked to some health advantages, like better cardiovascular health, its effects on inflammatory bowel diseases (IBD), such as ulcerative colitis, are less evident and frequently debatable (Rajendram et al., 2023). Alcohol may worsen UC symptoms and cause flare-ups because it can alter the gut microbiota, increase intestinal permeability, and intensify inflammatory responses, according to research (Varghese & Dakhode, 2022). The impact of alcohol on the protective barrier of the gut is one of the main issues with its use in UC patients. Alcohol can cause intestinal cells' tight connections to break, increasing permeability—a condition known as "leaky gut." This disturbance makes it possible for dangerous materials to enter the circulation, including germs and toxins, which may intensify colon inflammation and set off an immunological reaction (Kuo et al., 2024). Furthermore, alcohol can change the gut microbiota's composition, decreasing the number of good bacteria and encouraging the growth of bad ones, which exacerbates intestinal inflammation (Pohl et al., 2021). Additionally, drinking may reduce the efficacy of drugs that are frequently used to treat ulcerative colitis. Alcohol, for example, might make it harder to control the condition by increasing the negative effects or decreasing the effectiveness of some medications, such as methotrexate, azathioprine, and mesalamine (Mason, 2022). This relationship between alcohol and UC drugs emphasizes how crucial it is to monitor alcohol intake carefully and speak with healthcare professionals about it (Mergenhagen et al., 2020).

Fascinatingly, research has indicated that some alcohols, like red wine, may have anti-inflammatory qualities because of their antioxidant content. But these possible advantages are frequently exceeded by the hazards, and it is generally agreed that people with UC should use alcohol with caution (Chalons et al., 2018). As some UC patients may tolerate moderate alcohol use without

experiencing substantial negative effects, while others may experience severe symptoms and flare-ups, the issue is further complicated by the variety in individual responses to alcohol (Lombardo et al., 2023).

In conclusion, drinking alcohol can have a big influence on how ulcerative colitis develops and is treated, even though it doesn't cause it. Patients with ulcerative colitis must exercise caution since alcohol can worsen symptoms, cause flare-ups, and interact with medicines (Kobayashi et al., 2020b). To completely comprehend the connection between alcohol and UC and to give patients clear guidance, more research is required. In the interim, people with UC should speak with their medical professionals to make well-informed choices regarding alcohol use and its possible impact on their illness.

MATERIAL AND METHODS

This review is guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses – Scoping Review (PRISMA-ScR) method with document registration using PRISMA 2018, which includes a checklist and flow diagram, this review is led by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses – Scoping Review (PRISMA-ScR) procedure. This article was prepared using the following PICO methodology:

(1) The patient has a positive ulcerative colitis diagnosis, (2) Intervention history of diet alcohol use, (3) Not applicable in comparison, (4) Outcomes are the extent to which ulcerative colitis is affected. The review question was formulated into key and specific questions as follows: (1) Key questions: Do alcohol consumption affect ulcerative colitis? (2) Specific questions: How much of an impact does drinking alcohol have on ulcerative colitis?

Search strategies and eligibility criteria

A search for online articles was conducted using two databases, namely PubMed and Google Scholar. The BOHLEAN strategy is followed by the keywords used for article searches in both databases. Table 1 provided specifics on the search phrases.

Table 1. Keywords for article searching

Database	Searching terms
PubMed	Ulcerative colitis AND alcohol OR alcoholic OR alcohol consumption
Google Scholar	Ulcerative colitis AND alcohol OR alcoholic OR alcohol consumption

This study used the following inclusion criteria: (1) English-language articles; and (3) the availability of full-text articles. Similarly, the exclusion criteria listed below are applicable: (1) The articles were of the meta-analysis and systematic review types. For every included study, a risk of bias assessment was carried out using the Cochrane Collaboration.

Data collection

The identification step is where the database search for articles starts. The search for an article was to be conducted by two investigators. One researcher was tasked with tabulating data based on the review's findings, while another researcher was tasked with evaluating publications for appropriateness based only on their abstract and title. A thorough examination of the included studies was then carried out by two investigators, considering variables including data appropriateness, full-text accessibility, and duplicate articles. All investigators reached a consensus on whether to include research in the final review.

RESULTS

Using preset keywords, the first inspection search yielded 103 articles in total. The next step was screening to make sure the inclusion criteria were met. Of all the items, 30 satisfied the requirements for inclusion, and 73 fulfilled the requirements for exclusion. Of the listed studies, 18 were authored in languages other than English, leaving 12 articles. After 2 publications with inappropriate titles and abstracts were eliminated from the included studies, 10 studies were included overall because of the screening stage. After 4 papers were eliminated for not meeting these requirements, a total of 6 publications were added to this scoping review.

General characteristics of included studies.

The general attributes of the 6 articles that were part of this scoping review are in Table 2.

Table 2. General characteristics of included studies.

Author	Title	DOI / PMID	Findings
(Miyake et al., 2022)	IL12B rs6887695 polymorphism and interaction with alcohol intake in the risk of ulcerative colitis in Japan	https://doi.org/10.1016/j.cyto.2022.155901	- Patients: 384 UC patients and 661 controls, adjusting for various factors like sex, age, smoking, alcohol consumption, and more. - Results: alcohol consumption influence on

			UC risk may depend on this genetic variation.
(Tanaka et al., 2024)	Coffee and caffeine intake reduces risk of ulcerative colitis: a case–control study in Japan	https://doi.org/10.1111/jgh.16439	- Patients: 384 UC cases and 665 controls, with adjustments for various factors like sex, age, smoking, alcohol consumption, and more. - Results: coffee and caffeine consumption may reduce the risk of UC in Japan.
(Boyko et al., 1989)	Coffee and alcohol use and the risk of ulcerative colitis	2719009	- Patients: 304,000 members of a prepaid health plan compared the coffee and alcohol use histories of 209 UC cases and an equal number of age- and sex-matched controls. - Results: alcohol consumption may lower the incidence of UC.
(Bergmann et al., 2017)	No association of alcohol use and the risk of ulcerative colitis or Crohn's disease: data from a European Prospective cohort study (EPIC)	https://doi.org/10.1038/ejcn.2016.271	- Patients: 262,451 participants from the European Prospective Investigation into Cancer and Nutrition (EPIC-IBD) study, including 198 UC cases and 84 CD cases, along with matched controls. - Results: The results showed no associations between any categories of alcohol consumption and the risk of developing UC or CD.
(Nakarnura & Labarthe, 1994)	A Case-Control Study of Ulcerative Colitis with Relation to Smoking Habits and Alcohol Consumption in Japan	https://doi.org/10.1093/oxfordjournals.aje.a117178	- Patients: 384 UC patients and age- and sex-matched controls. - Results: regular alcohol consumption was associated with a reduced risk of UC compared to less frequent use.
(Wu et al., 2020)	Patchouli Alcohol: a Natural Sesquiterpene Against Both Inflammation and Intestinal Barrier Damage of Ulcerative Colitis	https://doi.org/10.1007/s10753-020-01219-8	- Patients: PA was tested on two animal models: TNBS-induced UC and DSS-induced UC. - Results showed that PA reduced levels of pro-inflammatory cytokines (TNF-α, IFN-γ, IL-1β, IL-6, IL-17) and decreased

			mRNA expression of other pro-inflammatory markers (iNOS, COX-2, TNF-α, IL-1β, IL-6). Additionally, PA upregulated the expression of tight junction proteins (ZO-1, ZO-2, claudin-1, occludin) and mucin proteins (mucin-1, mucin-2), which are crucial for maintaining the integrity of the intestinal barrier. PA also improved histological damage and clinical parameters in both colitis models, suggesting its potential as a treatment for UC by reducing inflammation and protecting the intestinal barrier.

Genetic Factors and Ulcerative Colitis Risk

The important function of the SNP rs6887695 in the IL12B gene in UC is highlighted by the study of Miyake et al. (2022). Comparing the GG and CC genotypes, the former was linked to a greater risk of UC. This points to a genetic propensity that might be exploited for early detection and focused treatments. It is noteworthy that alcohol use seemed to lower the risk of UC in those with the CC genotype, but not in people who had at least one G allele. This suggests a complicated interplay between lifestyle variables and genetics in UC risk (Miyake et al., 2022).

Dietary Influences

In Japan, Tanaka et al. (2024) investigated the relationship between UC risk and diet, namely coffee and caffeine intake. According to their findings, eating more coffee and carbonated soft drinks may lower your risk of developing UC, but eating chocolate treats may make it more likely. This might be because coffee contains substances like caffeine that have anti-inflammatory effects. Nevertheless, no noteworthy correlations were discovered with decaffeinated coffee or different types of tea, suggesting that caffeine may be an important factor (Tanaka et al., 2024).

Alcohol Consumption

Numerous investigations have investigated the connection between alcohol use and UC. According to Boyko et al. (1989), non-smokers who drank alcohol before the commencement of the disease had a lower risk of developing UC. When daily alcohol use grew, so did this protective effect. Similar findings were made by Nakarnura & Labarthe (1994), who found that regular alcohol use decreased the risk of UC in Japanese people. In contrast, Bergmann et al. (2017) did not discover any noteworthy correlations between alcohol intake and the likelihood of acquiring Crohn's disease (CD) or ulcerative colitis (UC) in a sizable European population. According to these contradictory findings, lifestyle, environmental, and genetic factors may all influence how protective alcohol is (Boyko et al., 1989).

Smoking and UC

The study by Nakarnura & Labarthe (1994) also highlighted the complex relationship between smoking and UC. Former smokers had an increased risk of UC compared to nonsmokers, while current smokers had a decreased risk. This paradoxical effect has been observed in other studies and suggests that nicotine might have a protective effect against UC, although the exact mechanisms remain unclear (Nakarnura & Labarthe, 1994).

Potential Treatments

Wu et al. (2020) investigated how Patchouli alcohol (PA) affected UC in animal models. Tight junction and mucin proteins, which are critical for preserving the intestinal barrier, were increased while pro-inflammatory cytokine levels were decreased by PA. According to these results, PA may be a promising treatment for UC because it lowers inflammation and preserves the intestinal

barrier (Wu et al., 2020). Overall, these studies underscore the multifactorial nature of UC, involving genetic predispositions, dietary habits, and lifestyle factors like smoking and alcohol consumption. Understanding these interactions can help in developing personalized prevention and treatment strategies for UC. The potential of dietary components and natural compounds like Patchouli alcohol in managing UC also opens new avenues for research and therapy (Bergmann et al., 2017).

DISCUSSIONS

The study explores the role of the IL12B gene's SNP rs6887695 in ulcerative colitis (UC). It involved 384 UC patients and 661 controls, adjusting for various factors like sex, age, smoking, alcohol consumption, and more. The results showed that individuals with the GG genotype of IL12B SNP rs6887695 had a significantly higher risk of UC compared to those with the CC genotype (Shi et al., 2019). Additionally, alcohol consumption was inversely related to UC risk in those with the CC genotype, but not in those with at least one G allele. The study concludes that IL12B SNP rs6887695 is significantly associated with UC, and alcohol's influence on UC risk may depend on this genetic variation (Miyake et al., 2022). The study investigates the relationship between diet, specifically the consumption of coffee, other caffeine-containing beverages, and foods, and the risk of ulcerative colitis (UC) in Japan. It involved 384 UC cases and 665 controls, with adjustments for various factors like sex, age, smoking, alcohol consumption, and more. The results showed that higher consumption of coffee and carbonated soft drinks was associated with a reduced risk of UC, while higher consumption of chocolate snacks was linked to an increased risk (Almofarreh et al., 2022). No significant association was found between the consumption of decaffeinated coffee, black tea, green tea, or oolong tea and UC risk. Overall, total caffeine intake was inversely related to UC risk, suggesting that coffee and caffeine consumption may reduce the risk of UC in Japan (Tanaka et al., 2024).

The study examined the risk of ulcerative colitis (UC) associated with coffee and alcohol use among 304,000 members of a prepaid health plan. It compared the coffee and alcohol use histories of 209 UC cases and an equal number of age- and sex-matched controls. The findings revealed that coffee consumption did not alter the risk of developing UC (Georgiou et al., 2021). However, alcohol consumption before disease onset was associated with a decreased risk of UC among never-smokers, with the risk declining as daily alcohol consumption increased. These results suggest that alcohol consumption may lower the incidence of UC (Boyko et al., 1989). The study aimed to assess the role of long-term alcohol consumption in the risk of developing ulcerative colitis (UC) and Crohn's disease (CD). It involved 262,451 participants from the European Prospective Investigation into Cancer and Nutrition (EPIC-IBD) study, including 198 UC cases and 84 CD cases, along with matched controls. Participants completed food frequency and lifestyle questionnaires, and alcohol consumption was categorized into non-use, former, light, below recommended limits (BRL), moderate, and heavy use (Mukamal et al., 2016). The results showed no associations between any categories of alcohol consumption and the risk of developing UC or CD, even after adjusting for smoking and education. The study concluded that there is no evidence to suggest that alcohol use affects the odds of developing UC or CD (Bergmann et al., 2017).

The study investigates the relationship between smoking habits, alcohol consumption, and the risk of ulcerative colitis (UC) among Japanese people. It involved 384 UC patients and age- and sex-matched controls. Information on smoking and alcohol use was collected through self-administered questionnaires. The results showed that former smokers had an increased risk of UC compared to nonsmokers, while current smokers had a decreased risk (Kondo et al., 2023). Additionally, regular alcohol consumption was associated with a reduced risk of UC compared to less frequent use (Jee et al., 2021). These findings suggest that the relationships between smoking, alcohol consumption, and UC in Japanese people are consistent with those reported in Western countries (Nakarnura & Labarthe, 1994). The study investigates the effects of Patchouli alcohol (PA), extracted from Pogostemon cablin Benth., on ulcerative colitis (UC), a chronic inflammatory disorder of the gastrointestinal tract. PA was tested on two animal models: TNBS-induced UC and DSS-induced UC. The results showed that PA reduced levels of pro-inflammatory cytokines (TNF-α, IFN-γ, IL-1β, IL-6, IL-17) and decreased mRNA expression of other pro-inflammatory markers (iNOS, COX-2, TNF-α, IL-1β, IL-6) (Xian et al., 2011). Additionally, PA upregulated the expression of tight junction proteins (ZO-1, ZO-2, claudin-1, occludin) and mucin proteins (mucin-1, mucin-2), which are crucial for maintaining the integrity of the intestinal barrier. PA also improved histological damage and clinical parameters in both colitis models, suggesting its potential as a treatment for UC by reducing inflammation and protecting the intestinal barrier (Wu et al., 2020).

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