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Original Article

Association Between Alcohol Use Disorder and Ischemic Colitis: A Case-Control Study in Pakistani Patients

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A B S T R A C T

Objective: To investigate how alcohol use disorder relates to ischemic colitis among Pakistani individuals.

Methodology: A case-control hospital-based study was conducted in different hospital settings in Pakistan from Feb to July 2025. The research involved hundred participants diagnosed with IC as well as hundred participants who had similar demographics but lacked ischemic colitis. A standardized set of questionnaires gathered information about demographic characteristics in combination with comorbidities, smoking behavior, alcohol use patterns and diet. The evaluation of AUD used the Alcohol Use Disorders Identification Test (AUDIT). Logistic regression analysis with smoking, body mass index (BMI), diabetes and hypertension as control variables evaluated the associated between IC and AUD.

Results: The prevalence of AUD was 20% in IC case subjects yet 14% in comparison participants though this difference proved statistically insignificant with a p value of 0.12. The analysis revealed that AUD alone showed no correlation with IC since the adjusted odds ratio equaled 1.3 with 95% confidence interval from 0.7 to 2.2 and a p value of 0.24. The analysis revealed smoking as a significant risk element for the development of IC (aOR = 1.9, 95% CI: 1.1–3.1, p = 0.02). BMI and diabetes with hypertension displayed no meaningful relationships with ischemic colitis.

Conclusion: AUD proved not to act as an independent factor for IC when confounders were accounted for throughout the analysis. The study revealed smoking behavior as the primary cause that leads to IC. More extensive prospective research is required to investigate how smoking and alcohol usage jointly create risks for developing IC.

Keywords: Ischemic colitis, alcohol use disorder, case-control study, smoking

Introduction

The medical condition Ischemic colitis results when insufficient blood reaches the colon causing tissue inflammation leading to tissue injury. The disease manifests as abdominal pain together with diarrhea and bleeding in the stool and its severity depends on ischemic damage extent and patient-related other medical conditions.[1] The occurrence of Ischemic Colitis has multiple causes that include vascular diseases along with shock and thrombosis but alcohol use disorder (AUD) shows increasing evidence as a factor in its development.[2] The medical classification of alcohol use disorder describes it as a persistent condition with recurrent patterns that involves losing control over alcohol intake even though it leads to negative physical and social complications.[3] The addictive substance exists globally including in Pakistan so calculating its precise prevalence encounters obstacles due to alcohol use-related cultural stereotypes which make statistics challenging to verify.[4] Persistent alcohol abuse produces detrimental health results throughout various body systems because it causes gastrointestinal disorders such as gastritis, pancreatitis and liver disease.[5,6] The link between persistent alcohol usage leading to ischemic colitis remains poorly understood in Pakistan alongside other developing nations because these countries face healthcare limitations together with social factors preventing proper diagnosis and treatment strategies.[7] Health care professionals need to understand how alcohol damages both systemic and splanchnic blood circulation patterns because this damage can result in reduced gastrointestinal tract blood flow and tissue ischemia according to various medical investigations.[8] According to research the development of vascular diseases such as atherosclerosis and thrombosis along with coagulation abnormalities behaves as risk factors for causing ischemic colitis in people who consume alcohol chronically[9-10]. Patients who have alcohol abuse face worse colonic ischemia because alcohol causes dehydration and disrupts electrolyte levels and creates nutritional deficiencies.[11] Research demonstrates that people with persistent alcohol abuse develop greater susceptibility to ischemic colitis because of their existent risk factors.[12]

Pakistan unfortunately lacks sufficient evidence about ischemic colitis occurring in alcoholic use disorder patients within its borders.[13] This research demands specific exploration in Pakistan to determine the relationship between alcohol use and ischemic colitis based on local healthcare delivery and social customs.[14] The present case-control study examines how alcohol use disorder affects the development of ischemic colitis among Pakistani patients. The research investigation examines two groups including patients who have been diagnosed with ischemic colitis against control subjects who do not have the condition.

This evaluates association of alcohol use disorder with occurrence of ischemic colitis. The research encompasses consumption patterns and duration of alcohol use along with key clinical and demographic features.[15] The research investigates ischemic colitis risk factors along with AUD to help clinical practice while developing future interventions against ischemic colitis. The research is pertinent about any association of individuals with alcohol use disorder[14] with development of ischemic colitis.

Methodology

The research comprised a hospital-based study with cases and controls to evaluate the association between alcohol use disorder (AUD) and ischemic colitis (IC) among Pakistani patients. The research investigated patients diagnosed with ischemic colitis as cases while using patients without this condition as controls to establish whether alcohol use disorder elevated ischemic colitis risk. The six-month research from Feb to July 2025 was carried out at various Pakistani hospitals where gastroenterology departments participated. IRB was obtained from Mohi ud Din Islamic Medical College Mirpur AJK Ref No 1-2/24-MIMC/ERB/A-3336 dated 30-12-2024. The study determined its sample size to detect a minimum odds ratio (OR) of 2.0 assuming that controls have an estimated 10% prevalence of AUD. A 95% confidence interval together with 80% power allowed the researchers to use the case-control study sample size calculation formula. The literature review suggested that ischemic colitis patients contained 20% AUD while control subjects had 10% AUD. The calculated sample requirement reached 200 cases and 200 controls to obtain sufficient power alongside precision using these established assumptions. The arranged 100 cases and 100 controls resulted in reduced power and precision. The research analyzed adult patients from 18 to 65 years old who received either an ischemic colitis diagnosis (cases) or acted healthy patients without gastrointestinal disease (controls). The study selected patients from 18 to 65 years of age who fulfilled the diagnosis criteria through clinical examinations and endoscopic procedures and histological tests. The study employed controls who were aged 18-65 years and had neither inflammatory bowel diseases nor ischemic colitis nor conditions which could imitate ischemic colitis nor previous gastrointestinal conditions.

The study excluded patients who had previous experiences with chronic bowel diseases including Crohn's disease and ulcerative colitis and bowel surgery history in addition to patients with severe comorbidities affecting ischemic conditions, pregnant women and patients with known systemic disorders that affect gastrointestinal blood flow. The study used matching procedures to reduce confounding variables between matched pairs that consisted of age differences within five years and gender along with urban-rural residence and body mass index differences within two kilograms per square meter. The study matched cases one by one with controls through this set of criteria.

Through the matching process the study eliminated any differences that could have distorted the relationship between the cases and controls regarding confounding variables. The research data was obtained by both medical record assessments and interviews with patients while trained staff used structured questionnaires. The primary data collection tool included demographics like age, gender, BMI, occupation, socioeconomic status , medical history: history of ischemic colitis, cardiovascular disease, diabetes, and other relevant medical conditions, alcohol use history: duration of alcohol consumption, frequency, type of alcohol consumed, and any previous interventions for AUD, smoking history: smoking status, duration, and intensity, dietary habits: assessment of dietary patterns that could contribute to ischemic colitis (e.g., high-fat diet) and family history: presence of gastrointestinal disorders or cardiovascular disease. Standard criteria guided the diagnosis of ischemic colitis through clinical presentation together with radiological findings and histopathological examination. The clinical assessment used colonoscopy and CT angiography to show colon ischemic changes. Alcohol Use Disorders Identification Test (AUDIT) for AUD evaluation was used. The AUDIT score at or above 8 points indicated the presence of AUD among patients. The study collected further information regarding how long patients consumed alcohol and their AU severity. Data analysis occurred in SPSS through descriptive statistics which involved summarizing continuous variables such as age and BMI with mean values and standard deviations. Statistical analysis presented categorical variables such as gender and smoking status as data frequencies together with percentages. A univariate analysis determined the prevalence differences

between cases and controls through chi-square tests for categorical variables in addition to t-tests for continuous variables. Logistic regression estimated the odds ratio (OR) of ischemic colitis associated with AUD through multivariate analysis after controlling for smoking, BMI, and comorbidities as potential confounders. The research model included interaction terms to cheque whether smoking behavior and family history could change the link between alcohol use disorder and ischemic colitis.

Results

Two hundred participants entered the research divided into patients with ischemic colitis (100 cases) as well as patients without ischemic colitis (100 controls). The demographic and baseline characteristics of studied subjects display in Table I.

Table I: Baseline demographic and clinical characteristics of study participants with ischemic colitis (cases) and without ischemic colitis (controls) (n = 200).

Variables	Cases n=100	Controls n=100	P-Value
Age (mean ± SD)	52 ± 10	50 ± 9	0.15
Male, n (%)	60 (60%)	57 (57%)	0.72
BMI (mean ± SD)	27.5 ± 2.8	26.8 ± 2.5	0.10
Smoking, n (%)	35 (35%)	25 (25%)	0.04*
AUD, n (%)	20 (20%)	14 (14%)	0.12
Diabetes, n (%)	15 (15%)	12 (12%)	0.60
Hypertension, n (%)	42 (42%)	40 (40%)	0.75

Evaluations show that AUD patients develop ischemic colitis with 1.5 times more probability than patients without AUD. A basic calculation did not consider the effects of smoking combined with BMI or other possible factors' influences. The analysis included controlling for confounding variables through multivariate logistic regression with smoking status and BMI and diabetes and hypertension as included variables. The adjusted odds ratio (aOR) received a new calculation by including these important variables as shown in Table II.

Table II: Multivariate logistic regression analysis showing the association of alcohol use disorder and other risk factors with ischemic colitis.

Variables	Adjusted Odds Ratio	95% Confidence Interval	P-Value
AUD	1.3	0.7 - 2.2	0.24
Smoking	1.9	1.1 - 3.1	0.02*
BMI	1.1	0.8 - 1.5	0.38
Diabetes	1.2	0.6 - 2.0	0.45
Hypertension	1.1	0.7 - 1.7	0.58

The results indicated no significant link between alcohol use disorder and ischemic colitis after statistical control of confounders with a adjusted odds ratio of 1.3 (95% CI: 0.7–2.2) (p = 0.24). The analysis determined smoking to be statistically associated with ischemic colitis through an aOR of 1.9 while maintaining a 95% confidence interval between 1.1 and 3.1 (p = 0.02).

Discussion

The research conducted an assessment of alcohol use disorder (AUD) relationships with ischemic colitis (IC) in Pakistani patients through a case-control methodology. Regardless of controlling for confounding variables, the adjusted odds ratio between AUD and ischemic colitis equaled 1.3 with a p-value at 0.22, which implied no significant connection. Smoking functioned as a major risk element leading to the development of ischemic colitis as indicated by an aOR of 1.8 (p = 0.01). AUD contributes to slightly increasing the development of ischemic colitis, yet smoking proves to be a major contributing factor to this condition. The widespread medical literature shows that alcohol use is connected to multiple gastrointestinal diseases like gastritis, pancreatitis, and colorectal cancer. Medical professionals remain uncertain about the connection between alcohol use and ischemic colitis development. Continuous alcohol intake damages vascular endothelial function and elevates oxidative stress markers and inflammatory response markers that might produce intestinal ischemic conditions.[16-17]

Former research has produced inconsistent findings when examining the connection between Alcohol Use Disorder and Ischemic Colitis. According to Yuan S, people who use alcohol chronically showed elevated IC rates, but these results disappeared when controlling for risk factors.[18] Research into a population-based cohort observed that although heavy alcohol use can affect gastrointestinal tract ischemic damage, the primary agents appear to be smoking alongside metabolic disorders.[19] According to our research results, AUD functions independently as a weak risk factor for the development of IC. Cigarette smoking emerged as a statistically proven IC risk element based on a research-derived aOR measurement of 1.9, with 95% CI ranging from 1.1 to 3.1 and a statistical significance level of p = 0.02. The established risk factor for vascular diseases and atherosclerosis is cigarette smoking because it increases the risk for compromised blood supply to the colon and subsequent development of ischemic

colitis.[20] Scientific evidence demonstrates smoking causes endothelial dysfunction, elevates platelet clumping, and decreases nitric oxide levels, generating ischemia in the stomach tract.[21] Hung A et al. conducted a meta-analysis showing that smoking directly caused ischemic colitis conditions, especially in patients who had cardiovascular risk elements.[22]

Our research discovery agrees with these findings because smoking cessation emerges as the principal preventive approach to avoid IC onset. The research controlled multiple confounding variables, including BMI, diabetes, and hypertension. Medical studies have established these risk factors as influential for vascular health, which leads to ischemic colitis development.[23] Our research found no statistical evidence linking diabetes to ischemic colitis development, even though the condition increases the risk of microvascular and macrovascular complications that could lead to ischemic events (aOR: 1.2, p = 0.45).[24] The relationship between hypertension and ischemic colitis remained statistically insignificant according to this study (aOR: 1.1, p = 0.58). The analysis limitations might have stemmed from restricted sample size and unidentified confounding factors within the study population. Even though our study presented strengths, there were boundary conditions that need consideration. The small number of participants (100 cases and 100 controls) might reduce statistical power, which hinders identification of weak connections between alcohol use disorder and intracerebral hemorrhage. The evaluation of alcohol consumption through self-report methods could have produced incorrect results since participants might lower their alcohol consumption reports due to social desirability bias. Prospective upscaled studies are required to explore any probable association of AUD and ischemic colitis.[25] The results of our research fail to link alcohol misuse independently to the occurrence of IC but highlight the value of continued study in this area. More extensive prospectively designed research with controlled randomization and large participant sample sizes should investigate alcohol's effect on ischemic colitis among people with variable alcohol utilization and medical complications. Several studies must investigate the combined influence of alcohol usage with smoking behaviors and hereditary risk factors toward vascular diseases to better understand IC pathophysiology[26,27] Research on the effects of gut microbiota and inflammation on alcohol-induced ischemic damage would provide novel prevention strategies[28].

Conclusion

This research shows no statistical association between alcohol use disorder and ischemic colitis following the control of confounding variables. Research indicated that smoking functioned as a chief factor that resulted in ischemic colitis. The field needs additional research about alcohol and smoking effects in ischemic colitis through larger sample sizes coupled with prospective research methods.

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