

Prevalence of Oral Mucosal and Dental Abnormalities in Patients with Cirrhosis of Liver

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Abstract:

Background: Cirrhosis of the liver is a chronic progressive disease associated with significant systemic manifestations, including alterations in oral health. Oral mucosal lesions and dental abnormalities are commonly observed in patients with cirrhosis due to nutritional deficiencies, impaired immunity, poor oral hygiene, metabolic disturbances, and complications related to liver dysfunction. Early identification of these oral manifestations may contribute to improved patient care and quality of life.

Aim: To determine the prevalence and pattern of oral mucosal and dental abnormalities in patients with liver cirrhosis.

Materials and Methods: This cross-sectional observational study included 100 patients diagnosed with liver cirrhosis attending the Department of Gastroenterology and Hepatology at Kalinga Institute of Medical Sciences, Bhubaneswar KIIT UNIVERSITY. and tertiary care hospital. Detailed demographic and clinical data were collected. Comprehensive oral examinations were performed by a trained dental specialist to identify oral mucosal lesions and dental abnormalities. Oral findings assessed included candidiasis, angular cheilitis, glossitis, xerostomia, oral ulcerations, petechiae, gingivitis, periodontitis, dental caries, tooth loss, and poor oral hygiene. Data were analyzed using descriptive and inferential statistics.

Results: Among the 100 cirrhotic patients studied, oral abnormalities were present in 78% of cases. The most common mucosal abnormalities were xerostomia (35%), coated tongue (28%), angular cheilitis (20%), oral candidiasis (18%), glossitis (15%), and recurrent oral ulcerations (12%). Dental abnormalities were observed in 65% of patients, with dental caries present in 42%, periodontitis in 38%, gingivitis in 34%, and partial tooth loss in 26%. The prevalence of oral lesions was significantly higher among patients with advanced liver disease (Child-Pugh Class B and C) compared with Child-Pugh Class A patients ($p < 0.05$).

Conclusion: Oral mucosal and dental abnormalities are highly prevalent among patients with liver cirrhosis, with xerostomia, candidiasis, dental caries, and periodontal disease being the most frequent findings. The severity of oral manifestations increases with advancing liver dysfunction. Routine oral health assessment should be incorporated into the multidisciplinary management of cirrhotic patients to facilitate early diagnosis and appropriate intervention.

Keywords: Liver cirrhosis, Oral mucosal lesions, Dental abnormalities, Xerostomia, Periodontal disease, Oral health.

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Introduction

Liver cirrhosis is the end stage of chronic liver disease characterized by diffuse hepatic fibrosis and the formation of regenerative nodules, resulting in progressive impairment of liver function. It remains a major cause of morbidity and mortality worldwide, with common etiologies including chronic viral hepatitis, alcohol-related liver disease, non-alcoholic fatty liver disease (NAFLD), autoimmune hepatitis, and metabolic disorders. The systemic

consequences of cirrhosis affect multiple organ systems and significantly impact patients' quality of life. The oral cavity often reflects the general health status of an individual and may exhibit manifestations of underlying systemic diseases. Patients with liver cirrhosis are particularly susceptible to various oral mucosal and dental abnormalities due to factors such as malnutrition, vitamin deficiencies, immune dysfunction, altered

salivary gland function, poor oral hygiene, coagulopathy, and long-term medication use. Common oral manifestations reported in cirrhotic patients include xerostomia, oral candidiasis, glossitis, angular cheilitis, mucosal pallor, petechiae, ecchymosis, oral ulcerations, and alterations in taste sensation.

In addition to mucosal lesions, dental disorders such as dental caries, gingivitis, periodontitis, tooth loss, and poor oral hygiene are frequently encountered in patients with chronic liver disease. These conditions may contribute to pain, difficulty in mastication, nutritional compromise, and increased risk of systemic infections. Furthermore, oral infections may exacerbate systemic inflammation and negatively influence the overall prognosis of patients with advanced liver disease. Despite the recognized association between liver disease and oral health, oral manifestations often remain underdiagnosed and undertreated in routine clinical practice. Early identification and management of oral abnormalities can improve patient comfort, nutritional status, and overall quality of life while reducing potential complications. Therefore, the present study was undertaken to determine the prevalence and spectrum of oral mucosal and dental abnormalities in patients with liver cirrhosis and to assess their association with the severity of liver disease.

Materials and Methods

This was a hospital-based cross-sectional observational study conducted in the Department of Gastroenterology and Hepatology, Kalinga Institute of Medical Sciences, Bhubaneswar KIIT UNIVERSITY, in collaboration with the Department of Dentistry at a tertiary care teaching hospital over a period of 12 months.

Study Population: A total of 100 consecutive patients diagnosed with liver cirrhosis were enrolled in the study. The diagnosis of cirrhosis was established on the basis of clinical features, biochemical investigations, radiological findings, and/or histopathological evidence when available.

Inclusion Criteria

- Patients aged 18 years and above.
- Patients with confirmed liver cirrhosis of any etiology.
- Patients willing to provide informed written consent for participation.

Exclusion Criteria

- Patients with hepatocellular carcinoma or other malignancies.
- Patients who had undergone liver transplantation.
- Patients receiving chemotherapy or radiotherapy.

- Patients with known autoimmune oral diseases unrelated to liver disease.
- Patients who were unable to undergo oral examination or refused consent.

Data Collection: Demographic and clinical data including age, sex, etiology of cirrhosis, duration of liver disease, alcohol consumption, smoking status, comorbidities, and current medications were recorded using a structured proforma. The severity of liver disease was assessed using the Child–Pugh classification and Model for End-Stage Liver Disease (MELD) score.

Oral Examination: All participants underwent a comprehensive oral examination performed by a qualified dental surgeon under adequate illumination using sterile mouth mirrors and periodontal probes. Oral mucosal abnormalities assessed included:

- Xerostomia
- Oral candidiasis
- Angular cheilitis
- Glossitis
- Recurrent aphthous ulcers
- Petechiae and ecchymosis
- Coated tongue
- Mucosal pallor
- Dental abnormalities evaluated included:
 - Dental caries
 - Gingivitis
 - Periodontitis
 - Tooth loss
 - Dental plaque accumulation
 - Poor oral hygiene status

Outcome Measures: The primary outcome was the prevalence of oral mucosal and dental abnormalities among patients with liver cirrhosis. Secondary outcomes included the association between oral manifestations and severity of liver disease.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) version 25.0. Continuous variables were expressed as mean $\pm$ standard deviation (SD), while categorical variables were presented as frequencies and percentages. Associations between oral manifestations and severity of cirrhosis were assessed using the Chi-square test or Fisher's exact test as appropriate. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations: The study protocol was reviewed and approved by the Institutional Ethics Committee prior to commencement of the study. Written informed consent was obtained from all participants, and confidentiality of patient information was maintained throughout the study.

Results

A total of 100 patients with confirmed liver cirrhosis were included in the study. The mean age of the participants was 52.8 ± 11.6 years (range: 24–78 years). The majority were males (72%), while females constituted 28% of the study population. The most common etiology of cirrhosis was alcohol-related liver disease (45%), followed by non-

alcoholic fatty liver disease (25%), chronic hepatitis B (15%), chronic hepatitis C (8%), and other causes (7%). According to Child–Pugh classification, 25% of patients belonged to Class A, 40% to Class B, and 35% to Class C.

Prevalence of Oral Mucosal Abnormalities: Oral mucosal abnormalities were observed in 78 (78%) patients.

Oral Mucosal Abnormality	Number (n)	Percentage (%)
Xerostomia	35	35.0
Coated tongue	28	28.0
Angular cheilitis	20	20.0
Oral candidiasis	18	18.0
Glossitis	15	15.0
Oral ulcerations	12	12.0
Mucosal pallor	10	10.0
Petechiae/Ecchymosis	8	8.0

Xerostomia was the most common oral mucosal abnormality, followed by coated tongue and angular cheilitis.

Prevalence of Dental Abnormalities: Dental abnormalities were detected in 65 (65%) patients.

Dental Abnormality	Number (n)	Percentage (%)
Dental caries	42	42.0
Periodontitis	38	38.0
Gingivitis	34	34.0
Tooth loss	26	26.0
Poor oral hygiene	30	30.0

Dental caries was the most frequently observed dental abnormality, followed by periodontitis and gingivitis.

Association with Severity of Liver Disease: The prevalence of oral manifestations increased with worsening liver function. Oral mucosal lesions were observed in 52% of Child–Pugh Class A patients, 80% of Class B patients, and 91.4% of Class C patients ($p = 0.002$). Similarly, dental abnormalities were present in 48% of Child–Pugh Class A patients, 65% of Class B patients, and 80% of Class C patients ($p = 0.01$). Patients with advanced

cirrhosis (Child–Pugh Classes B and C) demonstrated significantly higher frequencies of xerostomia, candidiasis, periodontitis, and tooth loss compared with those in Child–Pugh Class A.

Summary of Findings: Overall, oral mucosal abnormalities were present in 78% of cirrhotic patients and dental abnormalities in 65%. Xerostomia, coated tongue, dental caries, and periodontal disease were the most common findings. The prevalence and severity of oral manifestations showed a significant association with advanced liver disease.

Table 1: Demographic and Clinical Characteristics of Study Participants (n = 100)

Variable	Number (n)	Percentage (%)
Age Group (years)		
18–40	20	20.0
41–60	55	55.0
>60	25	25.0
Gender		
Male	72	72.0
Female	28	28.0
Etiology of Cirrhosis		
Alcohol-related liver disease	45	45.0
Non-alcoholic fatty liver disease	25	25.0
Hepatitis B	15	15.0
Hepatitis C	8	8.0
Others	7	7.0

Child–Pugh Class		
Class A	25	25.0
Class B	40	40.0
Class C	35	35.0

Table 2: Prevalence of Oral Mucosal Abnormalities in Cirrhotic Patients (n = 100)

Oral Mucosal Abnormality	Number (n)	Percentage (%)
Xerostomia	35	35.0
Coated tongue	28	28.0
Angular cheilitis	20	20.0
Oral candidiasis	18	18.0
Glossitis	15	15.0
Oral ulcerations	12	12.0
Mucosal pallor	10	10.0
Petechiae/Ecchymosis	8	8.0
Any oral mucosal abnormality	78	78.0

Table 3: Prevalence of Dental Abnormalities in Cirrhotic Patients (n = 100)

Dental Abnormality	Number (n)	Percentage (%)
Dental caries	42	42.0
Periodontitis	38	38.0
Gingivitis	34	34.0
Poor oral hygiene	30	30.0
Tooth loss	26	26.0
Any dental abnormality	65	65.0

Table 4: Association Between Oral Mucosal Abnormalities and Severity of Liver Disease

Child–Pugh Class	Total Patients (n)	Oral Mucosal Abnormalities n (%)
Class A	25	13 (52.0)
Class B	40	32 (80.0)
Class C	35	32 (91.4)
p-value		0.002

Table 5: Association Between Dental Abnormalities and Severity of Liver Disease

Child–Pugh Class	Total Patients (n)	Dental Abnormalities n (%)
Class A	25	12 (48.0)
Class B	40	26 (65.0)
Class C	35	28 (80.0)
p-value		0.010

Table 6. Distribution of Major Oral Findings According to Child–Pugh Class

Oral Finding	Class A (n=25)	Class B (n=40)	Class C (n=35)	p-value
Xerostomia	5 (20.0%)	14 (35.0%)	16 (45.7%)	0.021
Oral candidiasis	2 (8.0%)	7 (17.5%)	9 (25.7%)	0.038
Dental caries	8 (32.0%)	17 (42.5%)	17 (48.6%)	0.045
Periodontitis	6 (24.0%)	15 (37.5%)	17 (48.6%)	0.029
Tooth loss	4 (16.0%)	9 (22.5%)	13 (37.1%)	0.034

Discussion

The present study evaluated the prevalence of oral mucosal and dental abnormalities among patients with liver cirrhosis and demonstrated a high burden of oral health problems in this population. Oral mucosal abnormalities were identified in 78% of patients, while dental abnormalities were observed in 65%, indicating that oral manifestations are common among individuals with chronic liver disease. Xerostomia was the most frequent oral

mucosal abnormality observed in the present study, affecting 35% of patients. Reduced salivary flow in cirrhosis may result from dehydration, medication use, autonomic dysfunction, and impaired salivary gland function. Xerostomia predisposes patients to difficulties in swallowing and speaking and increases the risk of dental caries and oral infections. Similar findings have been reported in previous studies, which identified dry mouth as one of the most common oral complaints among cirrhotic

patients. Coated tongue, angular cheilitis, oral candidiasis, and glossitis were also frequently observed. These lesions may be attributed to nutritional deficiencies, impaired immunity, poor oral hygiene, and altered oral microbial flora commonly associated with advanced liver disease. The prevalence of oral candidiasis in our study (18%) is consistent with reports suggesting increased susceptibility to opportunistic fungal infections among immunocompromised cirrhotic patients. Among dental abnormalities, dental caries was the most common finding, followed by periodontitis and gingivitis. Poor oral hygiene, reduced salivary secretion, dietary factors, and impaired host defense mechanisms may contribute to the increased prevalence of dental diseases in cirrhosis. Chronic periodontal infection may serve as a source of systemic inflammation, which can adversely affect liver disease progression and overall health status. The present study also demonstrated a significant association between oral abnormalities and the severity of liver disease. Patients classified as Child–Pugh Class B and C exhibited a significantly higher prevalence of both oral mucosal and dental abnormalities compared with Class A patients. This finding suggests that worsening hepatic dysfunction may contribute to the development and progression of oral lesions through mechanisms such as malnutrition, immune dysregulation, coagulation abnormalities, and metabolic disturbances. Our findings are in agreement with previous studies that have reported increased rates of oral mucosal lesions, periodontal disease, and poor oral hygiene among patients with advanced cirrhosis. The progressive increase in oral abnormalities with worsening Child–Pugh class highlights the importance of routine oral examination as part of the comprehensive assessment of cirrhotic patients. The high prevalence of oral manifestations observed in this study emphasizes the need for multidisciplinary management involving hepatologists, dentists, and oral medicine specialists. Early diagnosis and treatment of oral lesions may improve nutritional intake, reduce infection risk, enhance patient comfort, and contribute to a better quality of life. The present study has certain limitations. It was conducted at a single tertiary care center with a relatively small sample size, which may limit the generalizability of the findings. In addition, the cross-sectional design precludes assessment of causal relationships between liver disease severity and oral abnormalities. Future multicenter studies with larger sample sizes and longitudinal follow-up are warranted to further elucidate these associations. Despite these limitations, the study provides valuable insights into the burden of oral mucosal and dental abnormalities among patients with liver cirrhosis and underscores the importance of

incorporating oral health evaluation into routine clinical care for these patients.

Conclusion

The present study demonstrated that oral mucosal and dental abnormalities are highly prevalent among patients with liver cirrhosis. Xerostomia, coated tongue, angular cheilitis, oral candidiasis, dental caries, periodontitis, and gingivitis were the most commonly observed manifestations. The frequency of these abnormalities increased significantly with advancing severity of liver disease, as evidenced by higher prevalence rates among Child–Pugh Class B and C patients. These findings highlight the close relationship between oral health and chronic liver disease and emphasize the need for routine oral examination in the comprehensive management of cirrhotic patients. Early detection and appropriate treatment of oral lesions and dental disorders may improve nutritional status, reduce the risk of oral and systemic infections, enhance quality of life, and potentially contribute to better overall clinical outcomes.

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