



## IMPACT OF ORAL HYGIENE AND PERIODONTAL DISEASE ON DECOMPENSATED LIVER DISEASE WITH OR WITHOUT SPONTANEOUS BACTERIAL PERITONITIS

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### ABSTRACT

**Introduction:** In patients with decompensated liver disease, spontaneous bacterial peritonitis (SBP) is a frequent complication of cirrhosis resulting from factors like prolonged bacteraemia secondary to compromised host defences, intrahepatic shunting of colonic blood, and defective ascitic fluid bactericidal activity. Studies have shown that bacteraemia is more common in patients with poor oral hygiene. This study was conducted to assess whether Spontaneous Bacterial Peritonitis (SBP) is more common in cirrhotic patients with ascites, having poor oral hygiene

**Aim:** This study was conducted to determine the impact of oral hygiene and periodontal disease on decompensated cirrhotic patients with or without SBP

**Material and Method:** This is observational, cross sectional study conducted in department of Medical Gastroenterology, Government Stanley Medical College, Chennai, Tamil Nadu, India from September 2019 to January 2020

Sample size consists of 50 SBP cases and 50 non SBP as control in our study. Determination of oral hygiene in all patients using simplified oral hygiene index (SOHI) [1]

**Data collection and statistics:** History, clinical examination, baseline investigations, ascitic fluid analysis including cytology and cultures, estimation of SOHI was done in all patients. SOHI was estimated by adding debris score and calculus score. SOHI ranges from 0 to 6, which is then categorised into 3 groups, Good oral hygiene (SOHI 0-1.2), fair oral hygiene (SOHI 1.3-3), poor oral hygiene (SOHI 3-6). Data was entered in pre structured proforma. Statistical analysis was done using SPSS software. Chi square test, Anova test were applied

**Results:** All baseline characteristics like age, gender, etiology of cirrhosis, were similar in both groups. Male preponderance was seen in both groups and Poor oral hygiene was more prevalent in males.

SBP patients had significant poor oral hygiene (68%) compared to control group (32%) (significant p value <0.05). Patients with higher MELD and child status had poorly maintained oral hygiene but not statistically significant (p>0.05).

**Conclusion:** Poorly maintained oral hygiene can be independent risk factor for higher development of SBP in decompensated cirrhotic patients and tendency is towards poor dental hygiene with higher MELD score/CTP score. Our study emphasises on maintaining oral hygiene to prevent SBP in cirrhotic patients to prevent mortality.

### KEYWORDS :

#### INTRODUCTION

There are many studies which show impact of gut microbiome on natural history of cirrhosis, but data are limited on role of oral cavity microbiome on complications of cirrhosis especially SBP, however role of oral cavity cannot be ignored. In 2014 Qin et al [1] analysed data of the gut microbiome of cirrhotic patients and reported two important findings; patients with cirrhosis had altered gut microbiomes compared to healthy controls, and most (54%) of the patient-enriched species were of buccal origin, suggesting a massive invasion of the gut by oral bacterial species from the mouth, responsible for this change of the gut microbiota seen in cirrhosis. These findings have thrown new light over the role of oral-gut-liver axis in patients with cirrhosis. Accordingly, a further evaluation of the salivary and stool microbiome in decompensated cirrhotic patients showed dysbiosis represented by reduction in autochthonous bacteria, both in saliva and stool samples [2]. discriminative taxa between cirrhosis and controls. Dysbiosis of the oral microbiota was present in patients with chronic liver disease, i.e., chronic hepatitis B and hepatitis B related cirrhosis. One correspondent study supported that the higher proportion of Firmicutes than of Bacteroidetes organisms is responsible for the weak oral defences that contributes to the breakdown of oral defences and invasion of the gut. So, dysbiosis was introduced as inversion of the Firmicutes/Bacteroidetes ratio [3]. In patients with decompensated liver disease, the frequency of SBP may be as high as 18%. This study was conducted to assess whether SBP is more common in decompensated cirrhotic patients, having poorly maintained oral hygiene.

#### AIMS AND OBJECTIVES

- 1) To compare oral hygiene in decompensated cirrhotic patients with or without SBP

- 2) To evaluate whether SOHI correlates with SBP, MELD score, CTP score.

#### MATERIALS AND METHOD

This is an observational, cross sectional, study conducted in Department of Medical Gastroenterology, Stanley Medical College, Chennai from September 2019 to January 2020. A sum of 100 decompensated cirrhotic patients were included in study. 50 with cytologically and bacteriologically proven SBP, while rest 50 patients (as control) with no evidence of SBP. All patients were subjected to evaluation by Department of Periodontology. Simplified oral hygiene index was used to assess and grade oral hygiene. SOHI was calculated by adding Debris score and Calculous score, and graded as , Good (SOHI 0 to 1.2), fair (1.3 to 3) poor (3 to 6) [4]

#### EXCLUSION CRITERIA

- 1) Patients having other focus of infection other than SBP
- 2) Any other systemic/local disease affecting oral cavity ex. Systemic sclerosis, Sjogren syndrome, oral submucosal fibrosis, chronic smoker, oropharyngeal cancer, tonsillitis.

#### DATA COLLECTION AND STATISTICS

History, clinical examination, baseline investigations, ascitic fluid analysis including routine, cytology, blood and ascitic fluid cultures reports was recorded in pre structured proforma. Calculation of SOHI and grading of oral hygiene was done in all patients. Statistical analysis was done using SPSS software. Chi square test and Anova test were applied.

#### RESULTS

**In SBP group:** In this decompensated liver diseased group, with

proven SBP, 36(72%) were male and 14(28%) were female. Age distribution ranged from 26 to 72 years, mean age 48±5.2 years. Most common etiology was alcohol observed in 36 patients (72%), followed by hepatitis B 8(16%). 4(08%) patients were in CTP-A, 20(40%) in CTP-B and 26(52%) patients with CTP-C. 5(10%) patients were having MELD score < 10, 18(36%) patients with MELD 10-20, 27(54%) patients were having MELD>20. Patients with OHI<1.2 were 6(12%), 1.3-3 were 10(20%) while 34(68%) were having OHI>3-6 MELD vs SOHI: Patients with MELD more than 20, had OHI>3 in 20 patients (74%), OHI 1.3-3, in 7 patients (26%). Mean MELD was higher (23) for patients with poor oral hygiene (p >0.05, not significant).

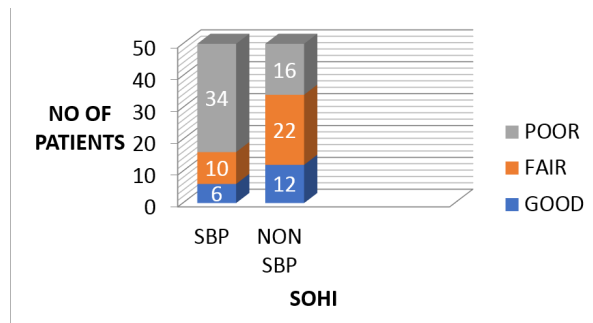
**CTP vs SOHI:** 24(92.3%) patients in CTP-C were having OHI>3 while 2 were in OHI with 1.3-3. Mean Child score was higher (13) for patients with poor oral hygiene (p >0.05, not significant).

**NON-SBP group:**

42(84%) were male and 8(16%) were female, age distribution from 45 to 68 years with mean age 53±6.9 years. Most common etiology was alcohol 32(64%) followed by hepatitis B 5(10%), 3(6%) were in CTP-A, 12(24%) in CTP-B while 35(70%) in CTP-C. 7(14%) were in MELD <10 group, 5(10%) in MELD 10-20 group and 38(76%) in MELD >20 group. 35(100%) patients with CTP-C were having SOHI>3. Results are shown in Table 1

**Table 1. Baseline characteristics and results in Decompensated liver disease patients in SBP and Non SBP group (control)**

Parameter	SBP GROUP	NON SBP GROUP	p VALUE
Age (mean) years	48+5.2	52+6.5	>0.05
Gender (male/female) %	72/28	84/16	>0.05
Etiology (%)	72	64	>0.05
Alcohol	16	10	
HBV	8	10	
HCV	4	16	
Cryptogenic			
Number of patients according to SOHI grades	6	12	<b>&lt;0.05 (significant)</b>
Good (SOHI 0-1.2)	10	22	
Fair (SOHI 1.3-3)	34	16	
Poor (SOHI 3-6)			
Mean MELD score in oral hygiene index	14	12	>0.05
Good (SOHI 0-1.2)	18	14	
Fair (SOHI 1.3-3)	23	17	
Poor (SOHI 3-6)			
Mean child score in oral hygiene index	9	8	>0.05
Good (SOHI 0-1.2)	12	10	
Fair (SOHI 1.3-3)	13	11	
Poor (SOHI 3-6)			



**Figure 1: Comparison of oral hygiene index in SBP and non SBP group**

**DISCUSSION**

As we know SBP is common complication of cirrhosis and considered as marker of end stage liver disease. In India prevalence of SBP varies from 20 to 30 % [5]. It is one of the most important cause of mortality in cirrhotic patients. Some studies have correlated High MELD score with SBP risk in cirrhotic patients [6]. Although SA Borowsky et al [7] showed in their study that teeth can be focus of infection in alcohol

related cirrhotic patients, there is no published data or study correlating impact of oral hygiene on development of SBP in cirrhotic patients. As this study was conducted first of its kind trying to illustrate the correlation between oral hygiene with risk of SBP in decompensated liver disease using simplified oral hygiene index. This study was done in cross sectional manner. SBP and non SBP groups were taken based on cytological and culture criteria. SOHI was calculated in all patients and was designated as good, fair, or bad. Culture was positive in only 24 % of patients in SBP group. E coli was most common organism grown. Results showed that risk of SBP increased proportionately in patients with SOHI>3 (poor oral hygiene) as compared to patients with OHI<1.2(fair oral hygiene) Similarly, patients with CTP-C (92.3%) and MELD >20 (77.7%) has high OHI>3. An inference can be drawn that poor oral hygiene predispose to increased growth of pathogenic microbiota which leads to systemic bacteraemia when it is surmounted by decreased overall immune defence mechanism causing various decompensation as exemplified by SBP, high CTP score and MELD score. However, we could not prove whether SBP is caused by oral cavity microbes as limited positive culture in ascitic fluid. There is need of further studies correlating with microbiological evaluation to establish specific etiology as growth shown in culture from oral cavity and ascitic fluid.

**CONCLUSION:**

Poorly maintained oral hygiene can be independent risk factor for development of SBP in cirrhotic patients. Poor dental hygiene is associated with higher meld score/CTP score. Our study emphasises on maintaining proper oral hygiene to prevent SBP in cirrhotic patients. This study highlights the need for maintaining good hygiene and periodic dental check up in patients with cirrhosis.

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