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Periodontal Status of Patients with Hepatitis B Viruses and B and C Virus (Comparative Study)

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Hepatitis is the inflammation of the liver cause by viral infections which effect cells in the tissue of the liver. Periodontal disease is a bacterial inflammatory disease that affects the gingiva and bone supporting the teeth. This study aimed to evaluate and compare the periodontal clinical parameters of patients with hepatitis B virus and hepatitis B and C super-infection. Sample population consisted of 23 patients had hepatitis B and 20 patients with both hepatitis B and C viruses infection. While the control group consisted of 20 healthy individuals without hepatitis. Males and females were included with age range (40-50) years old. The periodontal clinical parameters were examined and recorded for each group. The results showed highly significant difference between the study and control groups for all the clinical parameters (plaque and gingival index, pocket depth and clinical attachment level. Also high significant differences were reported for all the clinical periodontal parameters when comparing between patients with virus B infection and patients with both virus B and virus C infection. The patients with hepatitis had worse periodontal health than the healthy persons, and in comparison, the patients with hepatitis B and C viruses had worse periodontal health than hepatitis B patients.

Keywords: Periodontal, patients, hepatitis B and C, viruses**.**

Periodontal diseases are one of the most widely spread diseases of humanity , no nation and no country being free from periodontal diseases[1]. These are infectious diseases causing inflammation of the supporting tissues of the teeth[2]. Despite the fact that the bacterial components of dental plaque are the etiological factors, but periodontal diseases have a complex interaction between microbial and host tissues factors modified by many risk factors[3].

Systemic diseases are among the factors that affect periodontal diseases. Hepatitis, which is inflammation of the liver, is important systemic disease because it has the ability to disturb the normal function of the liver[4]. A number of viruses causes most cases of hepatitis but it could be due to other infections or autoimmune disease. Viral hepatitis may include: hepatitis A virus(HAV), hepatitis B virus(HBV), hepatitis C virus (HCV), hepatitis D virus which requires infection with HBV virus at the same time, hepatitis E virus and hepatitis G virus which is a distant relative of HCV[10].

Viral hepatitis mostly present in acute phase, but HBV, HCV, or HDV can progress to the chronic form. The common symptoms include weakness, nausea and vomiting, vague pain or discomfort in upper right abdomen, fever, jaundice, and the chronic signs of viral hepatitis may include fullness of the abdomen, recurrent fatigue and sometimes accumulation of fluid (ascites)[11, 12].

Hepatitis B is a serious infection which can cause a wide range of symptoms. It is caused by hepatitis B virus and may lead to premature death from liver cirrhosis, liver failure or cancer[5].

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Hepatitis C is produced by hepatitis C virus infection, which is an important health problem with public concern because of an estimated 160 million persons infected over the world[6].

HCV represents the causative agent of chronic hepatitis, cirrhosis and hepatic carcinoma. Thus, hepatitis C causes 27% and 25% of all cirrhosis and hepatocellular carcinoma cases respectively[7]. Hepatitis B virus and hepatitis C virus are infections are very serios public health problem which have many consequences concerning psychological problems. HBV and HCV are the most common causes of occupational diseases transmitted from patients to the health care workers and vice versa, also to the workers families[8]. It was estimated that 14.4% and 1.4% of the health workers in hospitals are infected with HBV and HCV respectively. Physicians, dentists, nurses lab staff and dialysis centers workers are at high risk of this infection[9]. Therefore, the present study aspects such common oral manifestations of hepatitis B and C infections to be able to diagnose, prevent and manage appropriately the transmission and progression of this fetal disease.

Hepatitis C virus infection can involve a variety of extra-hepatic conditions including the oral cavity, some oral manifestation are oral diseases like lichen planus and sjogren-like sialoadenitis[19].

Sometimes patients may have two possible patterns of infections with hepatitis viruses, either co-infection, when the viruses infect the patient at the same time, or super-infection, when the infected patient exposed later to a second pattern of hepatitis virus, such as HBC and HDV and HBV and HCV [13].

MATERIALS AND METHODS

Human Samples**:** Sample population consisted of (63) individuals, all with age range 45-55 years old . The test or study group consisted of 43 patients who subdivided into two subgroups , hepatitis B positive 23 patients which is the first subgroup, and hepatitis B and C positive[20] patients

Parameter	Groups	No.	Mean	S.D.	S.E.	Min.	Max.	ANOVA-Testing equality of means Sig. (*)
Plaque Index	Hep. (B)	23	1.49	0.26	0.06	0.95	2.27	0.000 (HS)
	Hep. (B+C)	20	2.08	0.29	0.07	1.41	2.68	
	Control Neg.	20	1.21	0.17	0.04	0.89	1.57	
Gingival Index	Hep. (B)	23	1.51	0.26	0.05	1.10	2.00	0.000 (HS)
	Hep. (B+C)	20	2.01	0.28	0.06	1.50	2.51	
	Control Neg.	20	1.26	0.24	0.05	0.78	1.73	

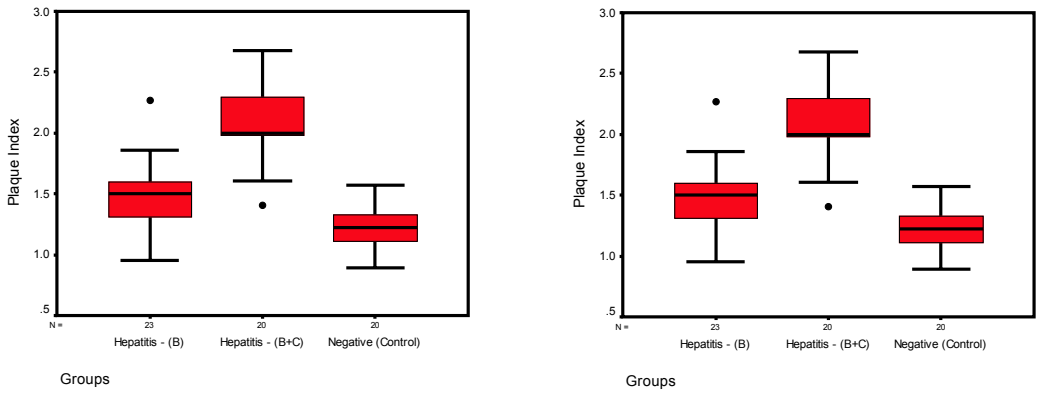

Fig. 1. Stem-Leaf plots for the studied readings of (Plaque & Gingival Index) parameters in different groups

which is the second subgroup. The sample recruited here were patients attending in Al-Kadhemia Teaching Hospital and Al-Yarmook Teaching Hospital. The control group consisted of 20m adults with the same age range and are healthy individuals with no history of any systemic disease or drugs intake for at least one month.

Clinical examination

All the individuals in both study and control groups were carefully examined clinically. For each patient, all the teeth were examined with the exclusion of the third molar. The collected data involved the assessment of plaque index, gingival index, probing pocket depth and the assessment of clinical attachment level . Both probing pocket depth and the clinical attachment level were divided into three categories according to severity (1-2mm), (3-5mm) and (>=6 mm).

Statistical analysis: The data analysis were used in order to determine and analyze the results of the study under application of SPSS (Statistical Process for Social Science) version 14 application

1. Descriptive data analysis : Mean value, standard deviation, standard error, and two extreme values (minimum and maximum) of the calculated men values.
2. Inferential data analysis: These were used to accept or reject the statistical hypothesis, which include the one way ANOVA procedure produce a one way analysis of variance for quantitative dependent variable, and least significant difference (LSD) test.

RESULTS

For plaque index and gingival index, the statistical analysis showed that mean values were higher for study group than control group, with highest responding towards hepatitis (B and C) subgroup. By applying one way ANOVA and LSD tests, highly significant differences were revealed in testing means between the study and control groups, with the high levels at hepatitis (B and C) subgroup then decreased for hepatitis B subgroup

Table 1-3. Multiple Comparison for (Plaque & Gingival) parameters by (LSD) method for all pairs of the studied groups

Parameter	Group (I)	Group (J)	Sig.	C.S. (*)
Plaque Index	Hep. - (B)	Hep. - (B+C)	0.000	HS
		Control	0.000	HS
	Hep. - (B+C)	Control	0.000	HS
Gingival Index	Hep. - (B)	Hep. - (B+C)	0.000	HS
		Control	0.002	HS
	Hep. - (B+C)	Control	0.000	HS

Table 2-1. Summary Statistics of the studied readings of (Pocket Depth) parameter in different groups

Pocket Depth Parameter	Groups	No.	Mean	S.D.	S.E.	Min.	Max.	ANOVA-Testing equality of means Sig. (*)
(0 - 2)	Hep. (B)	23	40.22	17.16	3.58	6	84	0.000 (HS)
	Hep. (B+C)	20	32.90	17.72	3.96	5	88	
	Control Neg.	20	70.45	10.61	2.37	45	90	
(3 - 5)	Hep. (B)	23	40.61	12.68	2.64	6	69	0.001 (HS)
	Hep. (B+C)	20	43.15	16.63	3.72	0	73	
	Control Neg.	20	27.50	7.92	1.77	17	48	
≥ 6	Hep. (B)	23	3.96	2.31	0.48	0	8	0.000 (HS)
	Hep. (B+C)	20	9.45	5.64	1.26	0	24	
	Control Neg.	20	1.25	1.80	0.40	0	6	

and finally the lowest readings levels for control group.

For probing pocket depth for (0-2),(3-5), (>=6) categories the mean of number of surfaces that had deeper pocket depth was higher for the study group than the control group, and higher for hepatitis B and C subgroup than hepatitis B subgroup. By applying ANOVA test highly significant differences were revealed between the control group and hepatitis B and hepatitis B and C subgroups. When using LSD test, except for comparison between hepatitis B and B and

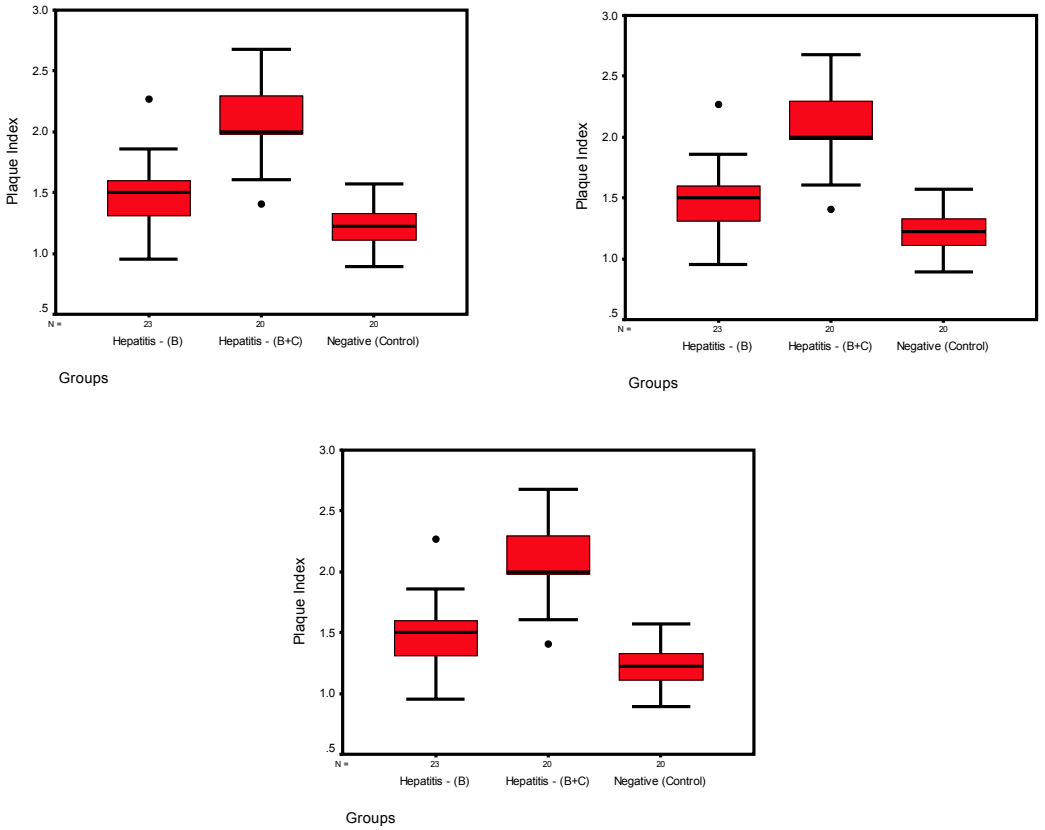

Fig. 2. Stem-Leaf plots for the studied readings of (Plaque & Gingival Index) parameters in different groups

Table 2-3. Multiple Comparison for (Pocket Depth) parameter in each class among all pairs of the studied groups

Parameter	Group (I)	Group (J)	Sig.	C.S. (*)
(0 - 2)	Hep. - (B)	Hep. - (B+C)	0.130	NS
		Control	0.000	HS
	Hep. - (B+C)	Control	0.000	HS
(3 - 5)	Hep. - (B)	Hep. - (B+C)	0.366	NS
		Control	0.000	HS
	Hep. - (B+C)	Control	0.000	HS
(e" 6)	Hep. - (B)	Hep. - (B+C)	0.000	HS
		Control	0.017	S
	Hep. - (B+C)	Control	0.000	HS

C subgroups for (0-2) and (3-5) categories non-significant differences were observed, however, the hepatitis B and C subgroup had higher number of surfaces having (>=6) category of pocket depth than the control and hepatitis B groups.

Regarding the clinical attachment level, the mean of number of surfaces for (0-2) category was higher for the control group than the study groups.

While for (3-5) and (>=6) categories the study groups had higher number of surfaces than the control group. By applying ANOVA test, highly significant difference were revealed between the groups for (0-2) and (>=6) categories and significant difference the groups for the (3-5) category. When using LSD tests, significant and highly significant differences were obtained for all comparisons between the control and hepatitis B and hepatitis B and C subgroups except when comparing between hepatitis B and hepatitis B and C subgroups for (3-5) category and hepatitis B and control group for (>=6) category were non-significant differences .

DISCUSSION

There was a highly significant difference between the study and control groups regarding the plaque index results, this could be related to the psychological and physiological condition of the hepatitis patients[14,15], when the super infection with either hepatitis B on hepatitis C viruses or vice versa, this super infection could be fetal and life threatening , so the patient had less interest about oral hygiene. This agreed with Grossmann et al 2009 who found many patients with hepatitis C infection present with poor dental health which contributed to worsen their quality of life[16].

Table 3-1. Summary Statistics of the studied readings of (Attachment) parameter in different groups

Clinical attachment Parameter	Groups	No.	Mean	S.D.	S.E.	Min.	Max.	ANOVA-Testing equality of means Sig. (*)
(0 - 2)	Hep. (B)	23	39.04	15.48	3.23	0	78	0.000 (HS)
	Hep. (B+C)	20	30.30	10.20	2.28	9	54	
	Control Neg.	20	64.70	10.04	2.24	50	90	
(3 - 5)	Hep. (B)	23	43.13	16.96	3.54	16	82	0.012 (S)
	Hep. (B+C)	20	44.00	9.29	2.08	27	63	
	Control Neg.	20	33.30	7.33	1.64	14	44	
≥ 6	Hep. (B)	23	2.61	2.57	0.54	0	6	0.000 (HS)
	Hep. (B+C)	20	10.25	4.51	1.01	0	18	
	Control Neg.	20	1.20	1.74	0.39	0	5	

Table 3-3. Multiple Comparison for (Attachment) parameter in each class among all pairs of the studied groups

Parameter	Group (I)	Group (J)	Sig.	C.S. (*)
(0 - 2)	Hep. - (B)	Hep. - (B+C)	0.024	S
		Control	0.000	HS
	Hep. - (B+C)	Control	0.000	HS
(3 - 5)	Hep. - (B)	Hep. - (B+C)	0.976	NS
		Control	0.001	HS
	Hep. - (B+C)	Control	0.001	HS
(≥ 6)	Hep. - (B)	Hep. - (B+C)	0.000	HS
		Control	0.146	NS
	Hep. - (B+C)	Control	0.000	HS

For the gingival index , there was a highly significant difference between the study and control groups. Also, highly significant difference was revealed when comparing between hepatitis B and hepatitis B and C subgroups. This because of the fact that liver dysfunction can be presented by many oral manifestations like mucosal membrane jaundice, bleeding disorder, petechiae, bruising, gingivitis, gingival bleeding (even in response to minimal trauma), chelitis, xerostomia and oral soreness[17]. On the other hand, the severity of bleeding tendency, periodontal disease and bad oral hygiene were associated with the risk of hepatitis infection and the discovery of hepatitis markers in the whole saliva[18,19]. Many oral side effects after interferon and ribavirin (hepatitis C virus infection treatment) were reported. These involve bleeding and swelling of gingiva , toothache , gingivitis, periodontitis, dental caries, taste disorders , mucosal damage, oral lichen planus, oral haemorrhage and dry lips[20].

For pocket depth, it was found that hepatitis B and C subgroup had higher number of tooth surfaces with deeper pocket depths than hepatitis B subgroup which had larger number of surfaces with deeper pocket depths than the control groups. Well, these results agreed with what was stated in a small number of studies had been conducted in Japan. These studies established detection of high level of serum alanine aminotransferase (ALT) and ”- glutamyl transferase (GGT), these are usually used for screening of liver disease in asymptomatic patients[21]. The researcher revealed that the levels of ALT and GGT were increased in patients with periodontal pockets (e”4 mm) as compared to healthy individuals , also, a significant association between periodontal pockets and GGT levels even after adjustment for age, gender , cigarette smoking and alcohol consumption[22].

Lastly, we found the hepatitis B and C subgroup had highest number of surfaces suffering

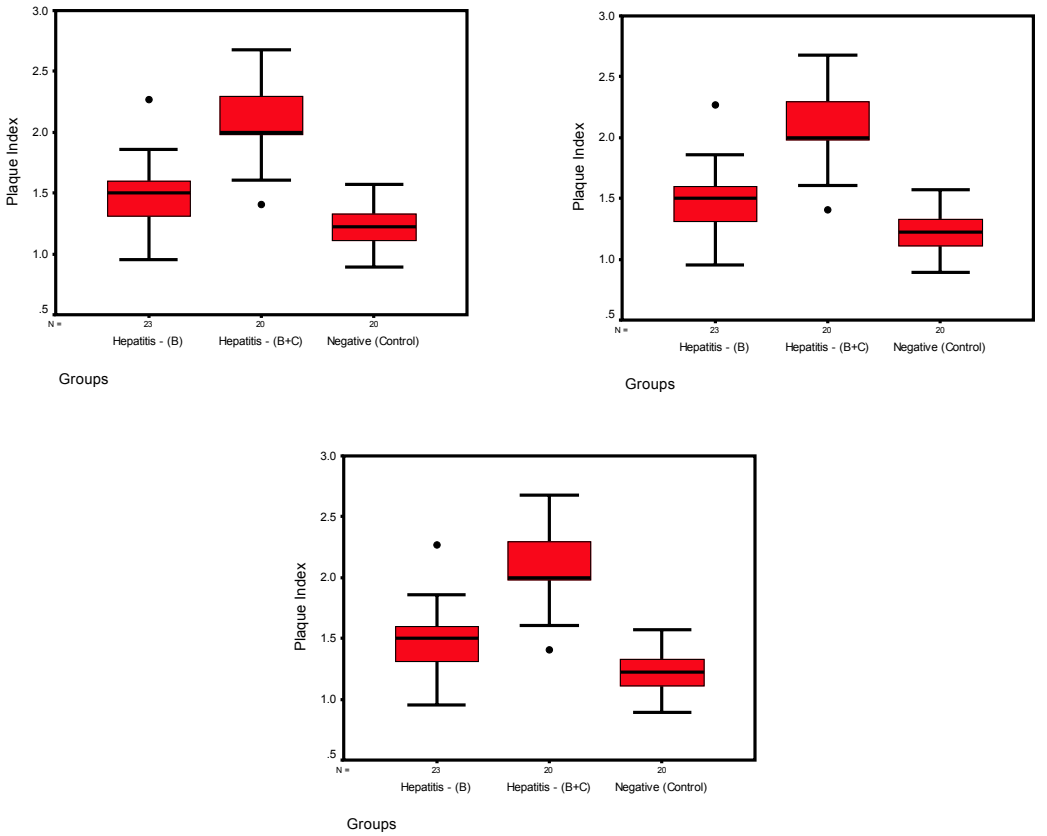

Fig. 3. Stem-Leaf plots for the studied readings of (Attachment) parameters in different groups

from clinical attachment loss than hepatitis B subgroups, and both had larger number of surfaces having clinical attachment loss than the control group. The association between liver cirrhosis and periodontal disease were discussed in many studies. It was determined that the persons with liver cirrhosis showed a tendency to have more clinical attachment loss than the healthy individuals. Notably, significant differences between healthy controls and patients with cirrhosis were found in each age group[23]. It had also been found that cirrhosis patients exhibited a worse periodontal status compared with healthy volunteers[24,25]. Furthermore, it was found that patients with cirrhosis for more than 3 years showed greater clinical attachment loss, dental plaque and calculus when compared with less than 3 years cirrhosis patients [25]. These effects on periodontium by liver diseases and cirrhosis may be due to decreased blood flow of the mucogingival junction and increased level of serum alkaline phosphatase[26].

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