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RESEARCH ARTICLE
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AN EVALUATIVE STUDY OF THE COMPARISON OF CA-125 AND SERUM TOTAL PROTEIN IN THE PATIENT POSITIVE FOR HCV AND HBsAg: A CROSS-SECTIONAL STUDY

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Abstract
Background: CA-125 is an essential part of MUC16, a mucin glycoprotein, which is used as a tumor marker for various diseases like ovarian carcinoma, pancreatic malignancy, etc. Its elevated level can also be seen in patients with liver cirrhosis. Elevated CA-125 levels can be associated with decreased synthesis of serum total protein because of impairment of the liver's function.
Aim: The purpose of the study is to find out the level of CA-125 and correlate it with serum total protein in the patients positive for viral hepatitis C and hepatitis B surface antigen.
Method: The study was carried out over a 12-month period at the biochemistry department of HIMS, Dehradun. Patients with complications of liver disease were recruited in this study on the basis of exclusion and inclusion criteria. Serum CA-125, serum total protein, albumin, and globulin were estimated for those patients who had liver problems and were positive for HCV and HBsAg.
Result: This research observed the higher value of CA-125 in HBsAg-positive patients than in HCV-positive patients. And CA-125 has a negative correlation with serum total protein.
Conclusion: Serum CA-125 estimation in patients who are positive for HCV and HBsAg would be of advantage to the clinicians for assessing the severity of the liver disease.

Keywords: CA-125, liver disease, HCV, HBsAg, total protein.

Introduction:

Cancer Antigen 125 (CA-125), also known as Carbohydrate Antigen 125, has been the most important biomarker in the screening, detection, and treatment of ovarian cancer over the last four decades [1]. Ovarian cancer cells surface with CA-125, a mucus-forming glycoprotein with a high molecular weight [2]. Cirrhosis of a liver's cells is one of the most prevalent illnesses linked with elevated CA-125 values. Multiple investigations have shown that the presence of oedema in individuals with cirrhosis seems to have a significant influence in the rise in CA-125 levels [3]. A viral infection (hepatitis C virus, or HCV) causes hepatitis C, a liver disease. Particularly via body fluids and blood, the illness is spread. The illness is asymptomatic for a short time before exhibiting nebulous signs such as mild fever, yellow skin, black urine, etc[4]. Patients with HBsAg infection may be infected by bodily fluids, blood,

or sexual intercourse. Hepatitis B infection may cause no symptoms or emotions of disease for a while. But long-term infection might be reason of liver cirrhosis and carcinoma [5].

Aim of the study: The purpose of the study is to find out the level of CA-125 and correlate it with serum total protein in the patients positive for viral hepatitis C and hepatitis B surface antigen.

Method: The study was carried out over a 12-month period at the biochemistry department of HIMS, Dehradun. Patients with complications of liver disease were recruited in this study on the basis of exclusion (hepatocellular carcinoma or any other malignancy, tuberculosis, cardiac disease, renal failure, peritonitis, or pancreatitis) and inclusion criteria (patients age > 18 years, HCV positive, or HBsAg positive). We have included a total of 60 patients, and out of 60 patients, 12 patients were positive for HCV and 7 patients were positive for HBsAg after the ethics committee approved and all patients gave written informed permission. Serum CA-125, serum total protein, albumin, and globulin were estimated for those patients who had liver problems and were positive for HCV and HBsAg.

Statistical analysis: All the collected data were entered in an MS Excel sheet. And data analyzed with the help of SPSS 30.0 software. The t-test for unequal variance was applied to find out the mean difference in two groups to find out the statistically significant difference (p-value: <0.05), and the Pearson coefficient tool was applied for the r-value.

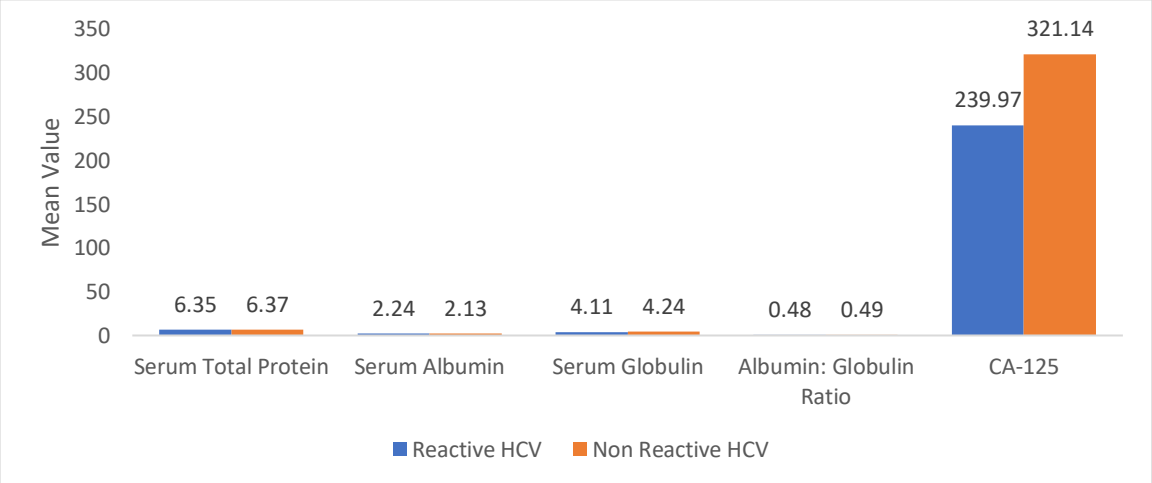
Results:

First, all data was categorized into two groups: patients with non-reactive HCV and HBsAg and patients with reactive HCV and HBsAg.

Table 1 and graph chart 1 are showing the comparison of CA-125 and serum total protein in the patient with positive and negative HCV. Serum albumin level is decreased in both groups, and the t-test value is 0.51, and the p-value is 0.30, which is more than 0.05 and found to be statistically not significant. Serum CA-125 level is higher in range in both groups; the t-test value is 1.06 and the p-value is 0.14, which is found to be statistically insignificant.

Biochemical marker	Patient with Reactive HCV		Patient with Non-Reactive HCV		t-test	p-value	Significance
	Mean	±SD	Mean	±SD			
Serum Total Protein	6.35	0.86	6.37	0.81	0.09	0.46	NS
Serum Albumin	2.24	0.59	2.13	0.41	0.51	0.30	NS
Serum Globulin	4.11	0.48	4.24	0.94	0.49	0.31	NS
Albumin:Globulin Ratio	0.48	0.11	0.49	0.19	0.22	0.41	NS
CA-125	239.97	225.51	321.14	195.98	1.06	0.14	NS

Table 1: Comparison of serum CA-125, serum total protein, albumin, globulin, and albumin-to-globulin ratio in the patient with positive and negative HCV.

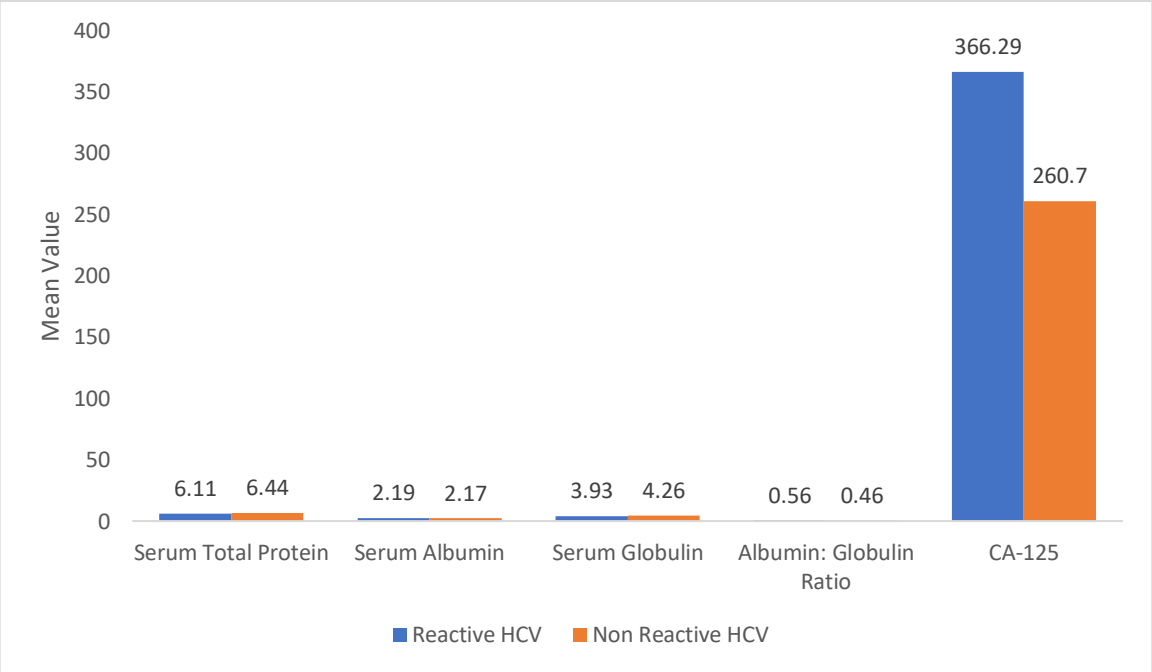


Graph Chart-1: comparison of serum CA-125, serum total protein, albumin, globulin, and albumin-to-globulin ratio in the patient with positive and negative HCV.

Biochemical marker	Patient with reactive HBsAg		Patient with non-reactive HBsAg		t-test	p-value	Significance
	Mean	±SD	Mean	±SD			
Serum Total Protein	6.11	0.95	6.44	0.76	0.77	0.22	NS
Serum Albumin	2.19	0.46	2.17	0.50	0.06	0.47	NS
Serum Globulin	3.93	0.94	4.26	0.72	0.81	0.21	NS
Albumin:Globulin Ratio	0.56	0.20	0.46	0.14	1.10	0.14	NS
CA-125	366.29	204.95	260.70	212.65	1.11	0.13	NS

Table 2: Comparison of serum CA-125, serum total protein, albumin, globulin, and albumin-to-globulin ratio in the patient with positive and negative HBsAg.

In Table 2 and Chart 2, the serum albumin level is decreased in both groups (reactive and non-reactive HBsAg), and the t-test value is 0.77, the p-value is 0.22 (>0.05), and it is found to be statistically not significant. Serum CA-125 level is higher in range in both groups; the t-test value is 1.11 and the p-value is 0.13, which is found statistically not significant.



Graph Chart 2: Comparison of serum CA-125, serum total protein, albumin, globulin, and albumin-to-globulin ratio in the patient with positive and negative HBsAg.

REACTIVE HBsAg Group				
Correlation of CA-125		**R-value**	**r-square**	**p-value**
CA-125	**TP**	-0.0126	0.0002	0.98
REACTIVE HCV Group				
CA-125	**TP**	-0.384	0.148	0.18

Table-3: Correlation of CA-125 with serum total protein in reactive HBsAg and reactive HCV.

Table 3 is showing the correlation of CA-125 with serum total protein in the patients who are positive for HCV and HBsAg. CA-125 has a negative correlation (r-value: -0.384, r-square: 0.148, and p-value: 0.18) with serum total protein in reactive HCV patients and r-value: -0.0126, r-square: 0.0002, and p-value: 0.98 in reactive HBsAg patients. Which is found statistically not significant.

Discussion:
In our study, we have found higher levels of CA-125 in both groups (reactive HCV and reactive HBsAg-positive patients), but CA-125 is more increased in HBsAg-positive patients than in HCV-positive patients. Raised CA-125 levels in liver cirrhosis are not directly related to liver function measures such as serum protein, albumin, bilirubin, AST, or ALT. The rise is more closely related to the degree of ascites[6]. According to the research of Assmar M. et al., elevated blood CA125 levels in certain benign liver disorders may indicate cirrhosis [7]. They have found an increased level of CA-125 in viral hepatitis, which was found statistically significant[8]. Shameem Bhatti et. al; and Raja GR Edula et. al; also observed the higher level of CA-125 in liver dysfunction caused by viral hepatitis [9,10].

Conclusion:
Serum CA-125 estimation in patients who are positive for HCV and HBsAg would be of advantage to the clinicians for assessing the severity of the liver disease.

Conflict of interest: Nill

Limitations of the study: This study was conducted on a small population, which is less effective for finding relevant correlations of CA-125 with total protein in viral hepatitis. We are suggesting to other researchers to kindly take a large sample size to find out the reliable correlation of CA-125 with serum protein in viral hepatitis.

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