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Original Research Article.

Value of Serum AFP for Differential Diagnosis of Digestive System Malignancies

Abu Hena Md. Shohel Rana[1*], Md. Lutful kabir[2], Mst. Jannatul Ferdausi[3], Mostafa Kabir Ahamed[4], Md. Mahfuj-Ul-Anwar[5], Md. Al Fatah Al Adiluzzaman[5], Jobaida Jannat[6]

[1]Assistant Professor, Dept. of Gastroenterology, Pabna Medical College, Pabna, Bangladesh.
[2]Assistant Professor, Dept. of Endocrinology, Rangpur Medical College, Rangpur, Bangladesh.
[3]Lecturer, Dept. of Forensic Medicine, Rangpur Medical College, Rangpur, Bangladesh.
[4]Assistant Professor, Dept. of Dermatology and Venereology, Rangpur Medical College, Rangpur, Bangladesh.
[5]Assistant Professor, Dept. of Medicine, Rangpur Medical College, Rangpur, Bangladesh.
[6]Assistant Professor, Dept. of Transfusion Medicine, Rangpur Medical College, Rangpur, Bangladesh.

ABSTRACT

Background: Now a days, Cancer is a major health problem worldwide. Common malignant disease of digestive system includes carcinoma oesophagus, carcinoma stomach, carcinoma colon, hepatocellular carcinoma, carcinoma biliary tree, and pancreatic carcinoma. In Bangladesh, there are a few studies to evaluate diagnostic value of serum AFP as tumour marker for GIT malignancies.

Aim of the Study: To evaluate the diagnostic value (sensitivity, specificity, positive and negative predictive values as well as accuracy) of serum AFP in different malignancies of digestive system.

Methods: This cross-sectional study was carried out at the department of Gastroenterology of Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh from October 2012 to June 2014. A total of 200 patients with primary digestive system malignancies in the age group of 22 to 76 years were included in this study. Malignancy of the included patients were histologically proven and serum AFP level was measured by immunoassay method. Serum AFP level >15 ng/ml was considered as positive. Data was collected using questionnaire and clinical information data sheet. Sensitivity, specificity, positive and negative predictive values as well as accuracy of serum AFP have shown.

Results: Mean elevation of Serum AFP found to be much higher in advanced case than localized malignancy. Sensitivity, specificity, positive and negative predictive values as well as accuracy of serum AFP for carcinoma stomach was 5%, 73.75%, 4.55%, 75.64% and 60% respectively. Sensitivity, specificity, positive and negative predictive values as well as accuracy of serum AFP for carcinoma colon was 0%, 72.15%, 0%, 73.08% and 57% respectively. Sensitivity, specificity, positive and negative predictive values as well as accuracy of serum AFP for hepatocellular carcinoma was 87.5%, 98.68%, 95.45%, 96.15% and 96% respectively. Sensitivity, specificity, positive and negative predictive values as well as accuracy of serum AFP for carcinoma Pancreas was 0%, 74.12%, 0%, 80.77% and 63% respectively. Sensitivity, specificity, positive and negative predictive values as well as accuracy of serum AFP for carcinoma gallbladder was 0%, 72.5%, 0%, 74.36% and 58% respectively.

Conclusion: Serum AFP level has important role for diagnosis of hepatocellular carcinoma. But has no significant role for the carcinoma of stomach, carcinoma colon, carcinoma pancreas and carcinoma gallbladder. This study stresses the need of broad-based work to detect the actual value of serum AFP for differential diagnosis of digestive system malignancies.

Keywords: Serum AFP, Digestive System, Malignancies.

***Correspondence to:**

Dr. Abu Hena Md. Shohel Rana,
Assistant Professor,
Department of Gastroenterology,
Pabna Medical College, Pabna, Bangladesh.

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INTRODUCTION

Digestive system malignancies are of major concern in the biomedical community due to their high mortality rates and lagging ability for early diagnosis.[1] The use of tumor markers has become a very attractive technique for early detection of gastrointestinal neoplastic disease.[2]

Among digestive system malignancies gastric cancer remains the second leading cause of cancer mortality in the world.[3] Up to now few effective biomarkers for gastric cancer have been applied. Study of serum AFP level for diagnosis of gastric cancer inconsistent result have been obtained.[4]

Globally colorectal cancer is the fourth most common carcinoma for men and third most common for women. Hepatocellular carcinoma is the fifth most common cancer in men and eighth most common in women.[5,6] Role of tumour markers for gallbladder cancer documented in very few case studies.[7] It is hoped that by combined testing a panel of biological markers,a more effective and efficient means might be discovered to improve the diagnostic accuracy for pancreatic cancer.[8] Tumour markers are measurable biochemical substances that are associated with malignancy.They are either produced by tumour cells or by the body in response to tumour cell. They are typical substances that are released into circulation and could be measured in blood. Though tumour markers are rarely specific enough to be used to diagnose different cancers, they can be used to assess prognosis, to monitor treatment response or to follow up for any cancer recurrence.

AFP is an α_1-globulin normally present in high concentrations in fetal serum but in only minute amounts thereafter. Reappearance of high serum levels of AFP strongly suggests the presence of hepatocellular carcinoma esp. in populations at risk for hepatocellular carcinoma.[9] Clearly, markedly elevated AFP levels (>10,000 ng/mL to 1,00,000 ng/mL) can be considered diagnostic for hepatocellular carcinoma in an appropriate clinical context. Although there is no specific diagnostic cut off, values above 400 ng/mL in association with liver mass can be considered diagnostic in most cases.[10]

METHODS

This was a cross sectional study done at department of Gastroenterology, Bangabandhu Sheikh Mujib Medical University, Shahbagh, Dhaka, Bangladesh from October 2012 to June 2014. In total 200 patients of both sex in the age group of 22 to 76 years with histologically proven primary digestive system malignancy including carcinoma Stomach (n=40), carcinoma Colon (n=42) Hepatocellular carcinoma (n=48), carcinoma Pancreas (n= 30), Gallbladder carcinoma (n=40) were included in this study. Patients were excluded having metastases of digestive system. S. AFP level was measured by immunoassay method. The cut off values of AFP was 15 ng/ml. Levels more than this value was considered as positive. Data was collected using questionnaire and clinical information data sheet. Sensitivity, specificity, positive and negative predictive values as well as accuracy of serum AFP have shown.

RESULTS

Table IV showing sensitivity, specificity, PPV, NPV, and accuracy of serum AFP for carcinoma stomach is 5%, 73.75%, 4.55%, 75.64% and 60% respectively.

Table V showing the sensitivity, specificity, PPV, NPV, and accuracy of serum AFP for carcinoma colon is 0%, 72.15%, 0%, 73.08% and 57%, respectively.

Table VI showing the sensitivity, specificity, PPV, NPV, and accuracy of serum AFP for hepatocelluler carcinoma is 87.5%, 98.68%, 95.45%, 96.15% and 96% respectively.

Table VII showing the sensitivity, specificity, PPV, NPV, and accuracy of serum AFP for carcinoma Pancreas is 0%, 74.12%, 0%, 80.77% and 63%, respectively.

Table VIII showing the sensitivity, specificity, PPV, NPV, and accuracy of serum AFP for carcinoma Gallbladder is 0%, 72.5%, 0%, 74.36% and 58% respectively.

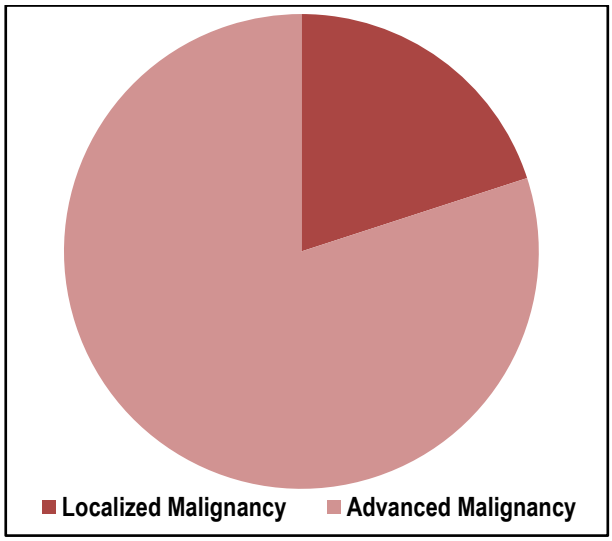

Fig 1: Stage of Malignancy of the study patients

Table I: Age of the study patients according to site of malignancy

Site of Carcinoma	Age (years)		
	≤40 (n=36) No (%)	41-60 (n=114) No (%)	> 60 (n=50) No (%)
Ca-Stomach	8 (22.22)	18 (15.8)	14 (28)
Ca-Colon	16 (44.4)	24 (21.1)	2 (4.6)
Hepatocellular carcinoma	10 (27.8)	28 (24.6)	10 (20.20)
Ca-Pancreas	2 (5.6)	18 (15.8)	10 (20.0)
Ca- Gallbladder	0	26 (22.8)	14 (28.0)

Table II: Sex distribution of the patients according to site of Carcinoma

Site of Carcinoma	Male (n=128) No (%)	Female (n=72) No (%)
Ca-Stomach	28 (21.9)	12 (16.7)
Ca-colon	30 (23.4)	12 (16.7)
Hepatocellular Carcinoma	34 (26.6)	14 (19.4)
Carcinoma Pancreas	14 (10.9)	16 (22.2)
Carcinoma Gallbladder	22 (17.2)	18 (25.0)

Table III: Mean Relation of S. AFP at different stages in patients with digestive system malignancy.

Stage		S. AFP (ng/ml)
Localized Malignancy	**Mean ± SD**	3901.20 ± 12048.51
	Range	1.03-54000
Advanced Malignancy	**Mean ± SD**	4471.70 ± 13896.50
	Range	1.69-54000

Table IV: Diagnostic Value of S.AFP for Carcinoma Stomach

AFP	Histopathology		Total	Sensitivity	Specificity	PPV	NPV	Accuracy
	Disease (+Ve) 40	**Disease (-Ve) 160**						
+Ve	2 (TP)	42 (FP)	44	5%	73.75%	4.55%	75.64%	60%
-Ve	38 (FN)	118 (TN)	156					
Total	40	160	200					

Table V: Diagnostic value of S. AFP for carcinoma colon

AFP	Histopathology		Total	Sensitivity	Specificity	PPV	NPV	Accuracy
	Disease (+Ve) 42	**Disease (-Ve) 158**						
+Ve	0 (TP)	44 (FP)	44	0%	72.15%	0%	73.08%	57%
-Ve	42 (FN)	114 (TN)	156					
Total	42	158	200					

Table VI: Diagnostic value of S. AFP for Hepatocellular carcinoma

AFP	Histopathology		Total	Sensitivity	Specificity	PPV	NPV	Accuracy
	Disease (+Ve) 48	**Disease (-Ve) 152**						
+Ve	42 (TP)	2 (FP)	44	87.5%	98.68%	95.45%	96.15%	96%
-Ve	6 (FN)	150 (TN)	156					
Total	48	152	200					

Table VII: Diagnostic value of S. AFP for Carcinoma Pancreas

AFP	Histopathology		Total	Sensitivity	Specificity	PPV	NPV	Accuracy
	Disease (+Ve) 30	**Disease (-Ve) 170**						
+Ve	0 (TP)	44 (FP)	44	0%	74.12%	0%	80.77%	63%
-Ve	30 (FN)	126 (TN)	156					
Total	30	170	200					

Table VIII: Diagnostic value of S. AFP for Carcinoma Gallbladder

AFP	Histopathology		Total	Sensitivity	Specificity	PPV	NPV	Accuracy
	Disease (+Ve) 40	**Disease (-Ve) 160**						
+Ve	0 (TP)	44 (FP)	44	0%	72.5%	0%	74.36%	58%
-Ve	40 (FN)	116 (TN)	156					
Total	40	160	200					

DISCUSSION

Digestive system malignancy is one of the common neoplastic diseases of the body and also leading cause of death. So, use of Tumour marker for early detection of digestive system malignancy has important role.

This study carried out to evaluate the value of tumour marker S. AFP for differential diagnosis of carcinoma stomach, carcinoma colon, hepatocellular carcinoma, carcinoma pancreas and carcinoma gallbladder with sensitivity, specificity, PPV, NPV and accuracy.

One of the challenging problems in the diagnosis of patients with gastric carcinoma is the low sensitivity for tumour markers that are currently being used.[11] Study of Mattar R et al. showed sensitivity of AFP for gastric cancer was zero percent. Our study showed sensitivity of AFP to be 5% for carcinoma stomach. Study of A.M. Attallah also revealed that no significant increase of AFP in case of carcinoma stomach. Study of Fan Feng et. al. showed the positive rate of AFP for early gastric cancer was 2.5-3.3%, which was relatively low.

For hepatocelluler carcinoma AFP is a recognized tumour marker. Our study revealed sensitivity of AFP for hepatocellular carcinoma is 87.75%. The study of A.M. Attallah revealed that sensitivity of AFP for hepatocellular carcinoma was 65%, which was less than that our study result.

The study of A.K. Azad, Bangladesh revealed the sensitivity of AFP for hepatocellular carcinoma was 57.30%, which is also less than our observation. The study of Jawed Altaf Baig, showed the specificity of AFP for hepatocellular carcinoma was 70%-80%. Our result is 98.68%, which match with our result. In some other study of hepatocellular carcinoma for Hep-c virus showed specificity of AFP 70-95% which also supports our result.

AFP sensitivity for carcinoma colon and pancreatic carcinoma in our study is zero persent, which is supported by the study of A.M. Attallah where sensitivity of AFP were 6% and 3.7% respectively.

Our study showed a similar result about the serum AFP in case of carcinoma gallbladder, where the sensitivity is zero percent. The study of Sharada R. also showed similar result for carcinoma gallbladder and serum AFP correlation with zero percent sensitivity. The study of Shukla et al. and Vij et al. observed that serum levels of AFP do not have any diagnostic value in case of carcinoma gallbladder.

CONCLUSION

Digestive system malignancy is a common malignancy and leading causes of death. So, early diagnosis is very important and serum tumour markers have important diagnostic role.

In conclusion, the data obtained from this study suggested that high serum level of AFP has role for diagnosis of hepatocellular carcinoma. But no significant role for diagnosis of carcinoma stomach, carcinoma colon, carcinoma pancreas and carcinoma gallbladder.

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