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**Research Article**

# Biochemical Investigation of Gastrointestinal Cancer Patients in North Costal Andhra Pradesh

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**Abstract:** Gastrointestinal (GI) cancer, which includes a group of tumors, is the most common human cancer. The GI cancers are specifically characterized by high invasive and metastatic potential as well as poor outcome. Both genetic and environmental factors are involved in GC development. Recent epidemiological and clinical investigations have evidenced the relationship between inflammation and development of gastrointestinal cancers. *Helicobacter pylori* infection is considered to be the leading cause of gastric mucosa inflammation. Present study explored and analyzed the clinical value of combined detection in the blood biochemical investigations in screening of gastric cancer patients in North costal Andhra Pradesh. The conclusions of the present study were significant p-values were obtained for Total protein, creatinine, Blood Urea, CEA, Blood sugar, ALP, SGPT, Albumin, A/G ratio, Globulin, Na and K and insignificant p-value was observed for Bilirubin, SGOT and Cl in study population.
**Keywords:** Inflammation, Gastrointestinal (GI) cancer, creatinine.

## Introduction

Gastrointestinal (GI) cancer, which includes a group of tumors, is the most common human cancer. The GI cancers are specifically characterized by high invasive and metastatic potential as well as poor outcome. Both genetic and environmental factors are involved in GC development. Recent epidemiological and clinical investigations have evidenced the relationship between inflammation and development of gastrointestinal cancers. *Helicobacter pylori* infection is considered to be the leading cause of gastric mucosa inflammation [1]. According to GLOBOCAN 2018 data, gastric cancer is the third leading cause of cancer deaths worldwide, following only lung and colorectal cancer in overall mortality. About 1 in 12 of all oncological deaths are attributable to gastric cancer. Gastric cancer has the fifth highest incidence among cancers, with 5.7% of all new cases attributable to the disease. Over a million new cases of gastric cancer are diagnosed, worldwide, each year. Gastric cancer is also one of the most behaviorally influenced, and thus preventable, of major cancers. Gastric cancer is more prevalent in males. In developed countries, gastric cancer is 2.2 times more likely to be diagnosed in males than females. In developing countries, this ratio is 1.83. In 5 countries worldwide, gastric cancer has the highest incidence among all cancers for males. There is no country where it is the most diagnosed cancer in females [2]. Present study explored and analyzed the clinical value of combined detection in the blood biochemical investigations in screening of gastric cancer patients so as to provide strong support for accurate identification of gastric cancer prevalent population. So we designed the study aim is to detection of Biochemical investigations in the serum.

## Materials and Methods

The present study includes 200 gastro intestinal cancer patients (146 males and 54 females) from care hospital, Visakhapatnam and 200 age and sex matched controls (146 males and 54 females)

above 20 years during the period 2015-2017. The study was approved by the institutional ethical committee for blood sample collection. The informed consent was obtained from each and every participant for taking blood sample.

**Collection of blood samples**

About 6 ml of blood was drawn intravenously using the disposable sterilized syringes and collected in test tubes. Blood samples were centrifuged for 10 minutes at 1000 rpm to collect serum and stored at -20$^0$C until further use.

**Estimation of Biochemical parameters**

Biochemical parameters including Blood sugar, Total protein, Albumin, Globulin, A:G ratio, Bilirubin, Creatinine, blood urea, SGOT, SGPT, Alkaline phosphatase, Sodium, Potassium and Chloride. All the biochemical parameters were analyzed by using ERBA diagnostic kit.

**Statistical Analysis**

Data analysis was conducted using SPSS, version 14.0. Descriptive statistics were presented as mean and standard deviation for quantitative data. Analysis of variance (t-test) was used to test the significance differences between means.

**Results**

The serum Biochemical parameters in gastro intestinal cancer patients and controls were presented in table-1. High Blood sugar (118.73) and ALP (117.43) mean values were observed for gastro intestinal cancer patients than the controls Blood sugar (109.67) and ALP (90.33) mean values. Low Blood Urea (12.86), SGPT (29.95) and Na (120.35) mean values were observed for gastro intestinal cancer patients than the controls Blood Urea (27.98), SGPT (42.12) and Na (139.46) mean values. Significant p-values were obtained for Total protein, Creatinine, Blood Urea, CEA, Blood sugar, ALP, SGPT, Albumin, A/G ratio, Globulin, Na and K and insignificant p-value was observed for Bilirubin, SGOT and Cl in study population.

**Table 1. Levels of serum biochemical parameters in gastro intestinal cancer patients and controls**

| Variables | Patients (N=200) | Control (N=200) | p-Value |
|---|---|---|---|
| **1. Serum proteins** | | | |
| Total protein | 5.42± 0.77 | 7.198±0.65 | 0.00* |
| Albumin | 3.276±0.688 | 4.00±0.413 | 0.00* |
| Globulin | 2.87±0.70 | 2.77±0.477 | 0.04* |
| A/G ratio | 1.33±0.472 | 1.22±0.239 | 0.00* |
| **2. Biochemical enzymes** | | | |
| SGOT | 40.66±25.572 | 38.240±10.01 | 0.11 |
| SGPT | 29.95±17.28 | 42.12±13.38 | 0.00* |
| ALP | 117.43±90.34 | 90.33±23.45 | 0.00* |
| **3. Serum profile** | | | |
| Creatinine | 0.750±0.365 | 1.038±0.245 | 0.00* |
| Blood Urea | 12.868±38.37 | 27.98±11.47 | 0.00* |
| Blood sugar | 118.73±65.77 | 109.67±10.79 | 0.03* |
| Bilirubin | 0.874±2.02 | 0.815±1.023 | 0.36 |
| **4. Serum minerals** | | | |
| Na | 120.35±22.41 | 139.46±3.64 | 0.00* |
| K | 3.58±0.74 | 4.31±0.52 | 0.00* |
| Cl | 105.54±71.66 | 99.34±10.06 | 0.11 |
| **5. GI cancer marker** | | | |
| CEA | 5.211±2.028 | 3.008±11.72 | 0.01* |

The total mean values of serum levels in males and females of gastro intestinal cancer patients were presented in table-2. The mean values of ALP in males (124.93) and females (110.56), SGOT males (41.60) and females (33.35) were showing higher mean values than the females. From above variables, SGOT shows only significant p-value and remaining all variables were showing insignificant p-values in gastro intestinal cancer patients.

**Table 2. Male and female mean values of Serum Biochemical Investigations gastro intestinal cancer patients**

| Parameter | Male (N=146) | Female (N=54) | P value |
|---|---|---|---|
| Total protein | 5.40 ± 0.89 | 5.35 ±0.91 | 0.3504 |
| Creatinine | 0.7695±0.38 | 0.766±0.41 | 0.4785 |
| Blood Urea | 14.535±45.09 | 16.898±52.97 | 0.3876 |
| CEA | 5.1088±2.05 | 5.3508±2.02 | 0.2332 |
| Blood sugar | 118.24±66.41 | 115.27±69.84 | 0.3925 |
| Bilirubin | 0.8181±1.80 | 0.9252±2.48 | 0.3706 |
| ALP | 124.93±103.96 | 110.56±54.00 | 0.1714 |
| SGOT | 41.608±24.52 | 33.356±19.8 | 0.0151* |
| SGPT | 28.83±21.64 | 28.442±14.77 | 0.4525 |
| Albumin | 3.2806.±0.71 | 3.2808±0.61 | 0.4992 |
| A/G ratio | 1.2806±0.45 | 1.2038±0.41 | 0.1423 |
| Globulin | 2.8521±0.73 | 2.8404±0.76 | 0.4611 |
| Na | 119.78±22.26 | 118.96±22.97 | 0.4109 |
| K | 3.4327±0.75 | 3.5283±0.74 | 0.2156 |
| Cl | 106.79±84.35 | 101.19±7.12 | 0.3167 |

## Discussion

Gastric cancer is the second most common cancer worldwide and almost two-thirds of all cases occur in developing countries. Although the incidence of gastric cancer is declining, it still remains a major health problem and a common cause of cancer mortality worldwide. Gastric cancer carcinogenesis refers to accumulation of genetic alteration of multiple genes such as oncogenes, tumour suppressor and mismatch repair genes.

Serum electrolyte abnormalities in cancer patients are highly prevalent, including hyponatremia, hypokalemia, hyperkalemia, hypophosphatemia, and hypercalcemia. Many of these electrolyte abnormalities are caused by common etiologies that are not specific to the underlying disease[3]. The present study estimated serum electrolytes such as Na, K and Cl in gastric cancer patients. Serum Na and K levels in gastric cancer patients were significantly lower than in controls, although Cl levels did not significant between cases and controls. Electrolyte imbalances were common in cancer patients. Electrolyte abnormalities in cancer patients were predicted by age, BMI, dietary status, concomitant disease, and prescription medicines. The findings recommend systematic screening for electrolyte problems in cancer patients, as well as a focus on regulating and managing risk factors [4] Biomarkers for liver disease include alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP) levels in the blood. The links between increased activity of these enzymes and the risk of cancer (particularly liver and colon cancer) could be used as tumour biomarkers in cancer prognosis, diagnosis, and treatment [5]. Serum SGPT and ALP levels were considerably greater than in the control groups, whereas SGOT levels were not. This study revealed no evidence of an elevated levels in liver marker enzymes.

Albumin and globulin, that are closely linked to nutrition and immune system function, have a significant impact on cancer prognosis. The albumin-to-globulin ratio (AGR), which is calculated using the equation albumin/(total proteins-albumin), has been proposed as a useful combination of

two powerful prognostic factors. It had been shown in the hematologic tumour that lower AGR predicted poorer survival results in lymphoma patients[6]. Serum proteins such as total proteins, albumin, globulin, and A/G ratio varied significantly between gastric cancer patients and controls. The profile of serum proteins has strong diagnostic significance for distinguishing between cancer patients and healthy individuals, and it can be used as a supplementary diagnosis for cancer detection [7].

Serum bilirubin levels have been linked to survival in patients with metastatic gastric cancer. Patients with non-metastatic gastric cancer who had higher total bilirubin levels showed better overall survival than those who have lower bilirubin levels. Serum bilirubin levels were not significantly differentiates between cases and controls. This could be related to differences in the patient population. Serum bilirubin levels may have a significant prognostic effect in people with metastatic versus non-metastatic gastric cancer.

The level of glucose is critical in cancer therapy. Many studies have been conducted to investigate the influence of hyperglycemia on the biological behaviour of tumour cells as well as its therapy. According to certain research, hyperglycemia during chemotherapy for hematologic and solid malignancies is related to increased toxicity. The blood glucose levels were significantly increased in gastric cancer patients than the controls. These results suggested that slightly increased blood glucose was observed in gastric cancer. Blood urea nitrogen (BUN) levels are a sensitive indicator of renal dysfunction. Creatinine in serum is considered to become a more sensitive kidney function test than BUN. Because renal disease is the only cause of elevated creatinine. Blood urea and serum creatinine levels were significantly lower in gastric cancer patients. These findings revealed that urea and creatinine levels in gastric cancer were significantly higher than control individuals.

Carcinoembryonic antigen (CEA) is a blood tumour marker that has long been useful in the diagnosis and monitoring of gastrointestinal malignancies, and its effectiveness as a prognostic predictor has been well established [8]. The significant CEA levels were observed in gastrointestinal patients than controls. This finding indicated that CEA has prognostic role in the gastrointestinal cancer. Evaluation of CEA has significant role in identification gastric cancers.

## Conclusions

The conclusions of the present study were significant p-values were obtained for Total protein, creatinine, Blood Urea, CEA, Blood sugar, ALP, SGPT, Albumin, A/G ratio, Globulin, Na and K and insignificant p-value was observed for Bilirubin, SGOT and Cl in study population. The combined detection in the blood biochemical investigations is of important reference value for screening of patients with gastric cancer and can provide the basis for early treatment of the disease. With a larger trial, we would be able to make more definitive statements regarding the importance of these biochemical parameters and the proper timing for measurement.

**Conflicts of interest:** There is no conflict of interest of any kind.

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