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Original Research Paper

Biochemistry

CANCER ANTIGENS CEA AND CA19-9 AS MARKERS IN COLORECTAL CARCINOMA

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KEYWORDS :

INTRODUCTION

Carcinogenesis is a long, complicated and incremental process .Colorectal cancer gradually develops over a period of time through the sequential accumulation of genetic alteration. Epithelial cells which are affected by abnormal acceleration under genetic impact , leads to the creation of new clones, unrecognized by the suppressor genes that are probably so damaged that they are unable to recognize the changes at the level of DNA, so that different cells produce new cells that will form new tumors.[1] The vast majority of human cancers are characterized by multiple genetic abnormalities, each of which contributes to the loss of control of cell proliferation and differentiation and the acquisition of capabilities, of tissue invasion and neo angiogenesis.[2] Several screening tests have been developed to reach an early diagnosis of colorectal cancer. Since the emergence of hybridoma methodology in the last 15 years many monoclonal antibodies (mAb) have been identified.[3] Antibodies have emerged as an imperative, non-invasive diagnostic tool for the clinician as they easily detect colorectal cancer associated antigen. Tumor markers are assuming an important role in all aspects of cancer care and have an impact on early diagnosis, prognosis and screening for malignancy in asymptomatic groups.[4] Tumor markers are biochemical substances produced by tumour cells and associated with a malignancy. CEA is now one of the most widely used tumour markers worldwide and certainly the most frequently used marker in colorectal cancer. In 70% of cases it is of significance in the diagnosis of colorectal cancer.[1] CA19-9 is a monoclonal antibody generated against a colon carcinoma cell line to detect a monosialoganglioside found in patients with gastrointestinal adenocarcinoma.[5] It is found to be increased in 21 – 42 % of cases of gastric (stomach) cancer and 20-40% of colon cancer.

SUBJECTS AND METHODS:

SUBJECT:

This study was carried out on 200 subjects in the Department of Biochemistry, Faculty of Medicine, SGT University Gurugram Haryana. Our study was case control study including patients attending to SGT University and associated Hospital as in the outpatient clinic. The included subjects in this study were divided into two groups: Group (I) included 100 age and sex matched healthy control subjects without any evidence of any disease, 69 males (69%) and 31 females (31%), their ages were between 20-70 years. Group (II) included 100 CRC patients, with no other cancer, 75 males (75%) and 25 females (25%), their ages were between 20-70 years. Both groups were age and gender-matched. Ethical clearance: Informed oral consents were taken from all participants in this study

METHODS

CRC patients and controls included in the study were subjected to the following: Full history taking and complete clinical examinations. Radiological investigations include: Abdominal ultrasound and CT, and lower gastrointestinal endoscopy (colonoscopy) and biopsy taking of colorectal cancer tissue for histopathological examinations to confirm the diagnosis. Specific laboratory investigations including tumor markers CEA, CA 19-9. 5 ml blood samples were collected using aseptic techniques. Serum was separated from the blood by allowing it to complete clot and centrifuged at 3000 rpm for 10 minutes. Serum was stored at -80°C until analysis time.Repeated freezing and thawing of serum samples was avoided. Serum of each sample was evaluated for CEA and CA 19-9 tumor markers. The CEA and CA19-9 enzyme immunoassay test kits were supplied from Xema Corporation (Cat. No: K224, K223).

RESULTS:

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were summarized in the form of means and standard deviations; Comparison between groups was done using the Chi-square test. The present study demonstrated that the mean age value for 100 studied CRC patients was 52.9 ± 10.54 years. The mean age for controls was 48.7 ±11.04 years. This difference between the two groups was statistically significant (P=0.345). On comparing the mean of the two tumor markers (CEA, CA19-9) between control subjects and cases, it was found that among the cases, the mean of CEA was 7.30, CA19-9 was 46.73 and among the controls, the mean of the two tumor markers were1.40 , 12.72 respectively. CEA showed a high statistically significant difference between both groups. On the other hand, CA19-9 showed statistically significant difference between two groups.

DISCUSSION:

Colorectal cancer gradually develops over a period of time through the sequential accumulation of genetic alteration. Reasons which are associated with carcinogenesis are the life style, the type of diet, smoking as well as the influence of the surrounding environment in which the man lives and works.[1] Not only this, but the modern sedentary lifestyle along with inadequate nutrition, which is low in fiber and vitamins as well as unending stress are the reasons for carcinogenesis. Carcinogenesis is a long, complicated and incremental process and CRC begins to increase above the age 50 to 55 years.[6] Our study population consisted of slightly more males .The maximum incidence rate for CRC in groups was 23 to 75 years. In our study the mean age was 52 years .The current results are similar to those reported by previous studies in which more than 90% of cases occur in people who are 50 years or older. However, in Western countries CRC is considered the disease of elder population. CEA is a well-known serum marker linked to CRC. In the present study, CEA levels were significantly higher in CRC patients

than healthy controls (p<0.001). The same results were reported by Zhao et al(2005)[7], Grotowski et al (2001)[8], Guadagni et al (1993)[9], Youssef EMI et al (2013)[10], A Spilla et al (2001)[11] reported that CEA showed positive sensitivity and remain the marker of choice in monitoring colorectal cancer. This is in agreement with our study. Concerning the result of CA19-9, the present study showed the mean values of CA19-9 levels were significantly higher in CRC patients than in the normal healthy control (p<0.001). The similar findings were reported by Wang et al (1985)[12]. However, these results are in contrast with the study of Cerda et al (2001)[13], Yousef EMI et al (2013)[10], Morita S et al (2004)[14] as they could not find significant difference to support the use of CA19-9 to predict the prognosis and detect recurrence of colorectal cancer. Our findings are also supported by WS Wang et al (2002)[15] as authors found significant increase in serum CA 19-9 (P<0.001). They recommended that stratification for further clinical trials for patients with metastatic colorectal cancer should be carried out according to serum CA 19-9 levels. CEA is still the most important tumor marker in colorectal carcinoma. Measurement of CA19-9 in postoperative follow-up is no substitute for CEA; it can only be a supplement. The best clinical benefit of CEA is in postoperative monitoring of surgically treated patients with colorectal carcinoma.

CONCLUSION:

The study of the prognostic value of two markers, however, showed that only CEA level may be a helpful factor for the prognosis of colon cancer patients. Combination of both markers may improve the performance of colon cancer screening.

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