

# THE USE OF CARCINOEMBRYONIC ANTIGEN IN THE CLINICAL MANAGEMENT OF COLORECTAL CANCER

Pages with reference to book, From 54 To 55

Carcinoembryonic antigen (CEA) is a mixture of related glycoproteins with molecular weight ranging from 150,000 to 250,000 (Alpert, 1978) and they differ primarily in their carbohydrate component composition.

CEA has been found in tissues other than gastrointestinal tract and embryonic digestive organs (Gold et al., 1978), hence the level of CEA may be raised in numerous pathological states. Hepato-cellular disease, biliary obstruction, inflammatory bowel disease, pancreatitis, heavy smoking and old age have all been associated with increased plasma level of CEA (Low-en-stein et al., 1978). CEA from different organ sources both benign and malignant had different antigen specificity and it may differ in the primary tumour compared with metastatic lesion in the same patient (Vrba et al., 1975).

Most commonly used procedure for measurement of plasma levels of CEA is a commercially available radioimmunoassay CEA Roche (Roche Carcino-embryonic antigen assay; Nutley, New Jersey, Hoffman-La Roche, Inc. 1974). As a rule values of 2.5 ng/ml or less are considered as normal, and levels of 2.5 ng/ml-5 ng/ml are suspicious (Taylor et al., 1977). Persistent elevation above 5 ng/ml is abnormal. Variation in result may occur in different laboratories. Thus in following an individual patient, serial assessment should be done in the same laboratory. Sudden change in the level of CEA may suggest recurrent or metastatic cancer.

Potential Clinical Uses of CEA

Screening of colorectal cancer;

Screening of colonic secretions for levels of CEA may facilitate early detection (Molnar et al., 1976).

Assessment of Prognosis:

Pre-operative determination of CEA level is helpful in assessing the prognosis. Failure of post-operative level of CEA to fall into normal range is associated with bad prognosis. Patients with CEA levels more than 5 ng/ml are associated with increased recurrence rate and recurrences appeared earlier with increasing levels (Oh and MacLean, 1977). Significant bowel obstruction appears to be a cause of increased plasma levels of CEA, and its relief is associated with decrease in CEA levels without tumour resection (Sugarbaker, 1976). In such cases higher plasma levels will not be considered as prognostic factor.

Detection of recurrence :

Serial post-operative assessment of CEA for the early detection of recurrence is one of the most important uses of this investigation (Evans et al., 1978). For serial post-operative follow up few factors have to be kept in mind. At least 2-3 successive elevations of CEA level over a period of 2-3 months are required to be significant (Rittgers et al., 1978). A few patients may have recurrence without increase in CEA level (Jubert et al., 1978). Follow up of a patient should be done in the same laboratory to avoid errors.

Monitoring therapy :

Studies have shown that radiotherapy or chemotherapy in the treatment of recurrence are associated with decreased level of CEA and shrinkage of tumour, if the patient responds. In unresponsive cases CEA level goes up (Vider et al., 1975) Moreover it detects the tumour 5-20 weeks before it could be detected clinically. In general this assessment correlates with the amount of tumour mass present. This is particularly useful during radiation therapy to assure that the bulk of the tumour producing CEA is in the treatment field (Sugarbaker, 1976).

Detection of site specific metastatic disease:

In practice patients are seen with a prior history of colorectal cancer and findings highly suggestive of liver involvement. Often liver scan is described as abnormal or suggestive. In such cases a plasma level of CEA greater than 9 ng/ml has been reported to be diagnostic of liver metastasis (McCartney and Hoffer, 1976). Though any benign lesion or hepato-biliary obstruction can also lead to increased CEA, but not to this magnitude. Measurements of CEA in ascitic or pleural fluid may confirm metastatic colorectal cancer in patients with past history of disease and no other accessible metastases. CEA may be elevated even when cytology is negative (Lowenstein et al., 1978).

Screening of high risk patients:

Patients with familial polyposis, sporadic adenomatous or villous polyps, inflammatory bowel disease such as ulcerative colitis are all at high risk for neoplastic change. Patients with familial polyposis and their primary relative show a 20 percent increased incidence of increased CEA, but this increase is very small and does not correlate with malignant disease (Alm and Wahren, 1975). High levels suggest high risk category (Doos et al., 1975) and may correlate with disease activity but development of cancer is often not associated with it. Thus screening for cancer with plasma levels of CEA cannot be recommended even in high risk patients.

Anis A. Rashid

Department of Surgery, K.V. SITE Hospital, Karachi.

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