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Review Article

Blood Cancer- Its Diagnosis and Treatment

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Abstract

Blood cell function and production affected by blood cancer. Cancer arises first from your bone marrow where blood formation occurs. Role of mitochondria in apoptosis and also tumorigenesis have the potential role of Mitochondrial DNA mutation in the development of cancer. Pancreatic cancer is the cause of many cancer-related diseases. Detection of pancreatic cancer, methylation of ADAMS1 and BNC1 in cell-free DNA occurs where there are early stages of tumor and its treatment is possible. Screening of colorectal cancer not only detects early symptoms of cancer but this screening prevents the spreading of the tumor cells forms in colorectal cancer. DNA based tests are used alternations that are genetic that start tumor genesis for early detection of different types of cancer occurs in the fluids of the body including urine. When we normalize the plasma activity of Alanine aminotransferase by IFN treatment less the rate of hepatocellular carcinoma.

Keywords: Mitochondrial DNA, Ergothioneine, Immunotherapy, Hypermethylation, Chemotherapy

INTRODUCTION

Cancer involves lots of nuclear DNA changes. Role of mitochondria in apoptosis and also tumorigenesis have the potential role of Mitochondrial DNA mutation in the development of cancer. Brain cell tumor involves a large number of DNA changes [1-11].

A mitochondrial genome is a biological tool used for the observation of neoplasia and its progression. These characteristics are very vital for research on cancer. Mitochondrial DNA is heteroplasmic, this recognized mutation associated with disease occur in a genome. This heteroplasmy represents disease and it is present in many tumors. Mitochondria has a role in carcinogenic procedure due to a role in apoptosis and their role in tumor biology [12].

Molecular diagnostic evaluates gene, drug metabolism, and disease induction based on DNA, RNA, and proteins. Chromosome analysis involves Fluorescent in situ hybridization is the type of blood cancer diagnostic. It involves the detection of cells with the chromosomal translocation but there is sensitivity occurs while using this method. There is the development of a diagnostic kit available for leukemia, these kits use a unique method of PCR which count the target RNA from the sample [4].

Blood vessels having tumors show permeability larger than normal vessels of normal tissues. Different inflammatory mediators lead to increase permeability and accumulation of fluid that observe in growing tumors [13,14].

Mitochondrial defects have been related to primary human cancers. Hereditary nuclear mutations cause kidney cancers [15-19].

Nuclear techniques of medicine which are non-invasive are important for the treatment of brain tumor. X-ray, magnetic resonance imaging, nuclear techniques of medicine can detect tumors with the help of imaging metabolic tumor changes. Zinc is an essential transition metal for animals and humans. It is necessary for the replication of DNA and the synthesis of protein.

Zinc has a role in the metabolism and interaction of cells that lead to tumors. Zinc metabolism and the role has a function in tumor cells related to the malignancy. Brain tumors were imaged because of the slow activation of zinc in the brain [20-22].

TYPES OF BLOOD CANCER

1) Pancreatic Cancer

Pancreatic cancer is the cause of many cancer-related diseases. It has a survival rate of 7 percent. This cancer often

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spreads and initially does not cause symptoms. Due to late detection of this cancer and lack of diagnosis methods. Diagnosis occurs at stage ¾ of pancreatic cancer of 75 percent cases. Surgical treatment is available for the diagnosis of this cancer. There is an urgent need for a reliable and less expensive method for the treatment of this cancer. There is a method available for early diagnosis of this pancreatic cancer using two biomarkers name ADAMS1 which stands for A disintegrin and metalloproteinase with thrombospondin motif 1 and BNC1 stands for zinc finger protein basonuclin-1. In experimental work using the method of methylation on the beads. Genes ADAMS1 and BNC1 using DNA methylation have a role in the early detection of pancreatic cancer [3].

2) Colorectal Cancer

It is the third common cancer leading among persons in the USA. Screening of colorectal cancer not only detects early symptoms of cancer but this screening prevents the spreading of the tumor cells forms in colorectal cancer. CIPN stands for Chronic chemotherapy-induced peripheral neuropathy is used among colorectal patients. ET stands for Ergothioneine, whole blood ET level is related to peripheral neuropathy among the patients having colorectal cancer with completed chemotherapy. Diagnosis performs, ET concentration of 159 patients having colorectal cancer were checked. After completion of the chemotherapy treatment, patients completed their questionnaires 6 months before on neuropathy **(Figure 1)**. Calculated the prevalence ratios (PR) to reach the relation between ET concentrations and peripheral neuropathy prevalence [6].

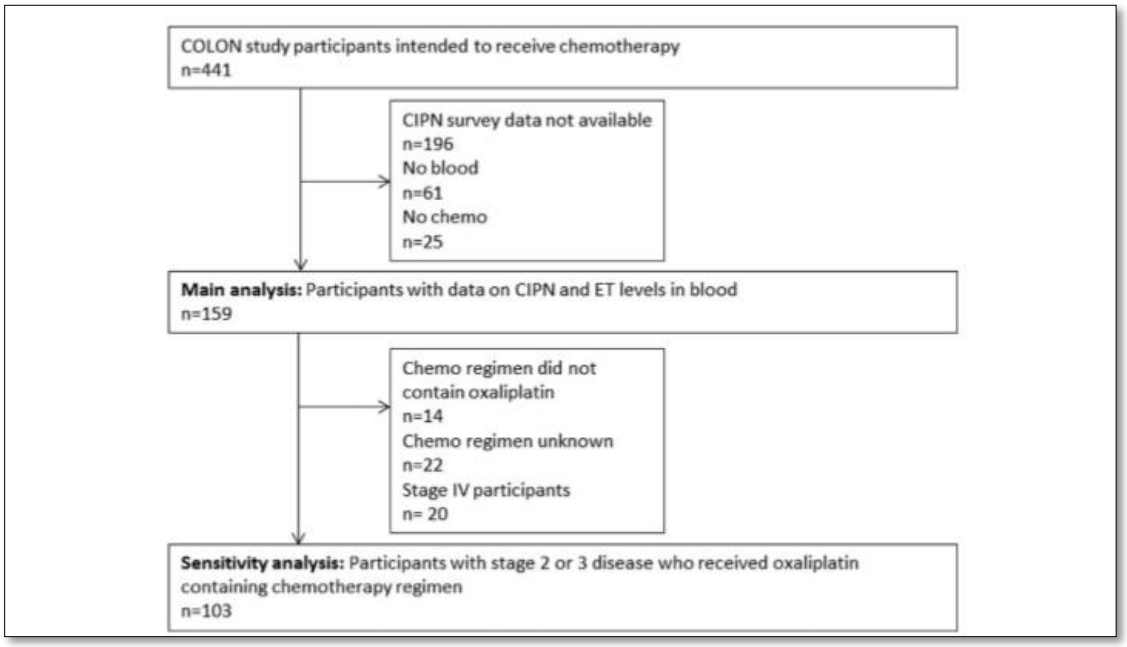

Figure 1. Flow chart of colorectal cancer patients participating in a prospective study on ergothioneine levels in blood and chemotherapy-induced peripheral neuropathy.

3) Lung Cancer

Immunotherapy, despite its success, there is a basic need for assays that are molecular from which more patients show response. Circulating tumor DNA reported different measures and also use an expansion of T-cell to respond to blockade immune in cancer patients of lungs. T-cell expansion and DNA tumor changes are rapidly detected. It is used for guide therapy of immune for lung cancer patients **(Figure 2)** [5].

4) Kidney Cancer

Kidney cancer occurs in the renal capsule and is cured by surgical treatment in many cases. There is a need for early detection strategies. DNA based tests are used alternations that are genetic that start tumor genesis for early detection of different types of cancer occurs in the fluids of the body including urine. By using PCR methylated specific screening Tumor DNA that is matched and sediment DNA from specimens of urine obtained in kidney tumor patients. Hypermethylation of one gene occurs in tumor DNA and the same pattern of hypermethylation of gene found in the DNA urine which is matched. Methylation is used for PCR specific early detection of kidney cancer patients [19].

5) Hepatocellular Carcinoma (HCC)

It is caused by inflammation that is due to viral infection. Infection due to Hepatitis B and Hepatitis C result in the development of Hepatocellular carcinoma. The development of HCC is very rapid in people with a viral infection of hepatitis and having a high amount of Alanine Transferase present in plasma. When we normalize the plasma activity of

Alanine aminotransferase by IFN treatment less the rate of hepatocellular carcinoma. When compared with the control liver tissue frequency of mutations in mtDNA was increased in both non-cancerous and cancerous specimens of liver taken from individuals with hepatocellular carcinoma. Accumulation of these mtDNA mutations in Hepatocellular carcinoma reflected the amount of malignancy [20].

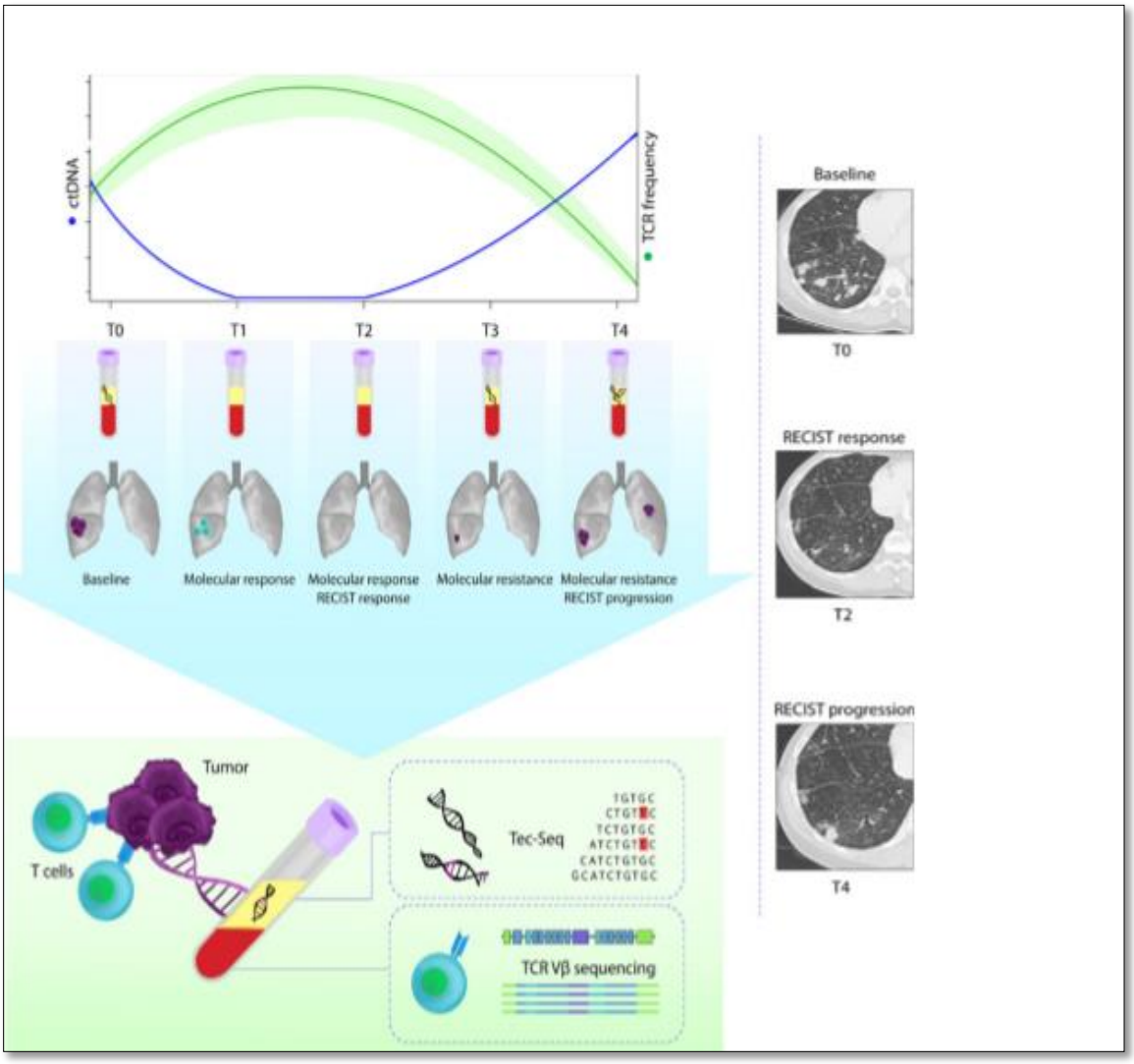

Figure 2. T-cell expansion and tumor changes in lung cancer.

CONCLUSION

- For detection of pancreatic cancer methylation of ADAMS1 and BNC1 in cell-free DNA occurs where there are early stages of tumor and its treatment is possible. This blood-based biomarker is used as a tool for detecting and screening pancreatic cancer in a large population. Cancer early detection is very crucial for this treatment. Early detection meaning risky surgical processes in addition to the survival of patients. Chemotherapy is used for this treatment. The most important part of deciding whether a patient needs surgical treatment in the absence or the presence of metastases [3].
- Colorectal cancer- Total and sensory neuropathy prevalence account for 81 percent. When there is high ET concentration. The prevalence of peripheral neuropathy is very low. Concentrations of ET were not related to the severity of this neuropathy. ET is a potent oxidant. The prevalence of neuropathy is defined as upper tertile scores of total peripheral neuropathy scores having a high amount of blood in the highest tertile of the total ET amount [6].
- Rapid and detection of DNA tumor structure changes and expansion of T-cell are used to guide the therapy of immune for lung cancer patients [5].

LUNG CANCER FIGURE EXPLAINED

- Use blood sample amount that collects at the base after the initiation of treatment and during immune checkpoints blockade the dynamics of ctDNA and TCR repertoire. Trends of ctDNA were evaluated by a sequence of TEC and TCR repertoire was taken by TCR next-generation sequencing. Dynamic changes in TCR repertoire and ctDNA were used to identify tumors. We developed many assays that identify tumors in the immune system and reach the immune editing of the neoantigens during therapy of the immune system of lung cancer patients [5,22-24].
- Used of DNA based methods for detection of kidney cancer has various advantages. Screening of body fluids such as urine provides a diagnostic and non-invasive modality that is why there is a need to limit current techniques of imaging. Alterations of genes at the level of DNA e.g., promoter hypermethylation can be recognized at many levels which are sensitive by PCR. The majority of kidney cancer is renal cell carcinoma (RCC) originates from renal cells of parenchyma (80-85%) remaining 15-20% are transitional carcinoma (TCC) of the renal pelvis. Promoter hypermethylation is common in renal cancer and can be detected in urine DNA. In addition to early detection and diagnosis of kidney cancer, if the time of hypermethylation of many genes is related to a specific pathological condition the panel could be prolonged in near future to provide the information of molecular imaging and information related to prognostic [19].
- Entire mitochondrial genomes of two HCC specimens which are poorly differentiated, also involve non-cancerous tissue and one control specimen of the liver was applied with the help of PCR and sequenced. The number of mtDNA mutations present in Hepatocellular carcinoma is greater when compared with other types of cancer. Mutations present in mtDNA identified as homoplasmic. Mitochondria present in tumor cells divide rapidly when these cells are fused with the normal cells. D-loop region present in mtDNA is important for both expression and replication of the mitochondrial genome. Inflammatory cells infiltrate HCC tissue/cells the number of such cells is small compared with the cancer cells. Genetic instability results in the high rate of mutations in mtDNA in liver cancerous tissue are related to multicentric hepatocarcinogenesis was detected at the clinical level [20,25].

CONFLICT OF INTEREST

There is no conflict of interest in this paper.

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