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Prediction of the Survival Outcomes of Patients with Non-Small Cell Cancer Using 18F-Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography and Clinicopathological Factors **Alireza Heidari^{1,2,3,4*}, Elena Locci^{1,2,3} and Silvia Raymond^{1,2,3}**

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Abstract

Despite an overall decrease in the incidence of lung cancer, the incidence of the disease is increasing among young people. According to research, this upward trend is due to reduced consumption of vitamin D in foods such as fish, mushrooms, eggs and milk. There is growing evidence of a link between vitamin D and the risk of death from lung cancer, but there is little research on whether vitamin D intake is associated with a risk of lung cancer (before age 50). Because vitamin D deficiency has been on the rise over the past few years, we looked at whether it could increase the risk of lung cancer in young people. The results of this study show that taking 300 units of vitamin D a day or more, roughly equivalent to three glasses of milk, reduces the risk of lung cancer by about 50%. Previous studies have shown that taking more vitamin D is associated with a reduced risk of developing precancerous lung polyps before the age of 50. The findings are based on data from more than 94,000 women, part of a long-running study that began in 1989. They were 25 to 42 years old at the start of the study. It should be noted that the researchers did not find a significant association between vitamin D intake and the risk of lung cancer after age 50. Researchers say more research is needed to determine whether vitamin D actually provides more protection against lung cancer in young people. The researchers say the findings could lead to recommendations for getting more vitamin D as a low-cost supplement for screening tests to prevent lung cancer in adults under 50.

Keywords: Cancer; Cells; Tissues; Tumors; Prevention; Prognosis; Diagnosis; Imaging; Screening; Treatment; Management



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Introduction

An experimental approach called DELFI (DNA Assessment of Parts for Early Tracking) shows unique patterns in the fragmentation of DNA shed from circulating cancer cells. Using the technology in blood samples from 796 people in Denmark, the Netherlands and the United States, the researchers found that the DELFI approach made a clear distinction between patients with and without lung cancer. Combining this experiment with the analysis of clinical risk factors, biological markers of protein, followed by computed tomography imaging, DELFI identified 94% of cancer patients in different stages and subgroups. This included 91 patients with less invasive stage I / II cancers and 96 patients with more advanced stage III / IV cancers. Lung cancer is the most common cause of cancer death, and approximately 2 million people worldwide die each year. Yet less than 6 percent of Americans at risk for lung cancer are undergoing low-dose computed tomography screening, despite predictions that tens of thousands could die, and even fewer worldwide. This is for a variety of reasons, including concerns about possible harm from reviewing false-positive imaging results, radiation exposure, or concerns about the side effects of invasive procedures. Clearly, there is an urgent and unmet need to develop alternative and non-invasive methods to improve cancer screening for high-risk individuals and, ultimately, the general public. We believe that a blood test or fluid biopsy for lung cancer could be a good way to increase screening efforts, as it is easy, affordable, and

cost-effective. DELFI technology uses blood tests to indirectly measure how DNA is packaged inside the cell nucleus by studying the size and amount of cell-free DNA circulating from different regions throughout the genome. Healthy cells pack DNA like a regular suitcase in which different areas of the genome are carefully placed in different containers. In contrast, the nuclei of cancer cells are like messy suitcases, and items are thrown randomly across the genome. When cancer cells die, they release DNA into the bloodstream in a disordered manner. DELFI detects the presence of cancer using machine learning, a type of artificial intelligence that examines millions of cell-free pieces of DNA for abnormal patterns including the size and amount of DNA in different genomic regions. This approach provides a view of cell-free DNA called a "fragmentome." The researchers say the DELFI approach only requires low-coverage genome sequencing, enabling the technology to be cost-effective in a screening environment. For this study, researchers at Johns Hopkins University, in collaboration with researchers in Denmark and the Netherlands, first performed the genomic sequence of cell-free DNA in the blood samples of 365 people in a seven-year Danish study called LUCAS. Most participants were at high risk for lung cancer and had smoking-related symptoms such as coughing or difficulty breathing. The DELFI approach showed that patients who were later diagnosed with cancer had extensive changes in their fragmentary profiles, while cancer patients had fixed fragment profiles. The researchers then confirmed DELFI technology using a different population of 385 people without cancer and



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46 people with cancer. In total, this method identified more than 90 patients with lung cancer, including patients with early and advanced stages and various subtypes. DNA fragmentation patterns provide a significant fingerprint for early detection of cancer, which we believe could be the basis for the available liquid biopsy test for patients with lung cancer [1-490].

Results and Discussion

Immunotherapy agents that inhibit PD1, PD-L1, or CTLA-4 molecules are widely used in clinical practice to treat small cell lung cancer, or NSCLC. Approximately 20 to 50 percent of advanced NSCLC patients have strong responses to immunotherapy and show long-term survival, but the remaining patients often have poor responses. There is an urgent need to identify biomarkers that can predict which patients are not responding to treatment to avoid unnecessary treatment and instead prescribe potentially beneficial drugs. PD-L1 expression, which is measured in a patient's tumor, is a common biomarker that is often used to identify patients who should be treated with anti-PD1 / PD-L1 therapy; however, several studies have shown that patients may respond to these factors even with low PD-L1 expression. Other tissue-like biomarkers may be costly or require sufficient tissue quality and quantity, which may be limited in supply. In a new paper published in the JNCI Cancer Spectrum, researchers at the Moffit Cancer Center describe their predictive model, which includes information computed from computed tomography images that can calculate patients who may not respond to immunotherapy. Instead of analyzing common tissue biomarkers such as protein expression patterns, Moffit's research team evaluated the potential of using pre-treatment CT scan features along with clinical data to identify markers associated with immunotherapy outcomes. The quantitative image-based or radiographic features reflect the underlying

pathophysiology and heterogeneity of the tumor and have advantages over tissue-based biomarkers because they can be standardized using medical imagery. Extracted speed and extracted data from the entire tumor instead of a small image. The part of the tumor that is sampled and tested. The researchers analyzed the clinical and radiographic features of 180 NSCLC patients treated with anti-PD1 / PD-L1 or without anti-CTLA-4 therapy. "Our goal was to create a savings model that was known as a simple model with the fewest variables and the most predictive power possible," said Bob Gillis, a senior doctor and head of the Department of Cancer Physiology. They found that among the 16 clinically considered characteristics, a patient's serum albumin level and the number of metastatic sites were significantly associated with overall survival. Among the 213 radiographic features, the gray surface synchronization matrix (GLCM) was inversely different from overall survival. Statistical analysis and modeling of the data showed that these characteristics were suitable parameters for inclusion in the model, which led to four groups according to the risk of death due to immunotherapy: low risk, moderate risk, high risk and very high risk. The researchers confirmed their model in the other two patient groups: the high-risk group had very poor overall survival after immunotherapy, while the low-risk group had a three-year overall survival. Approximately 40% of them also found that the inverse property of the inverse GLCM difference with the expression of the CAIX gene, which is involved in tumor hypoxia, regulates tumor growth and metastasis and provides a biological association of the inverse GLCM difference as a potential marker. Due to the lack of oxygen or lack of oxygen in the tissues, there are important consequences for all types of cancer. These results suggest that the inverse difference in GLCM may be a possible predictor of the patient's response to other anticancer drugs. These results suggest that patients at higher risk should either avoid



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immunotherapy altogether or use initial combination therapies, which may provide a better response. We hope that with further study, this model can be used to change clinical practice and allow patients to avoid medications that may not respond well.

Conclusion

Smoking is the most common cause of lung cancer, but those who have not smoked to date can also develop the disease. A family history of lung cancer or treatment for certain diseases can cause a variety of cancers, such as lung cancer. Researchers believe; In the early stages of lung cancer, there are no symptoms, but after the involvement of people, the main symptoms of lung cancer, which include: • Cough that does not go away after two or three weeks • Prolonged cough that is constantly intensifying • Recurrent chest infections • Coughing with blood Pain when breathing or coughing Persistent shortness of breath Persistent fatigue or lack of energy Decreased appetite or weight loss for no reason. Lung cancer usually does not cause significant symptoms in humans until it spreads to the lungs or other parts of the body. In general, one in three people survives at least one year after diagnosis, and one in 20 Lives at least 10 years. Of course, the only way to treat these cancers is chemotherapy, radiotherapy or surgery.

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IJHO: October-2021: Page No: 548-593

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IJHO: October-2021: Page No: 548-593

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Prediction of the Survival Outcomes of Patients with Non-Small Cell Cancer Using 18F-Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography and Clinicopathological Factors

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IJHO: October-2021: Page No: 548-593

Japan, Singapore, Malaysia, Indonesia, Thailand, Taiwan, Hong Kong, Philippines, South Korea, China, India, Kingdom of Saudi Arabia, Jordan, Qatar, United Arab Emirates, etc. as research fellow, sabbatical and volunteer researcher or visitor and so on heretofore. He has a history of several years of teaching for college students and various disciplines and trends in different universities. Moreover, he has been a senior advisor in various industry and factories. He is expert in many computer programs and programming languages. Hitherto, he has authored more than twenty books and book chapters in different fields of Chemistry. Syne, he has been awarded more than one thousand reputed international awards, prizes, scholarships and honors. Heretofore, he has multiple editorial duties in many reputed international and peer-reviewed journals, books and publishers. Hitherward, he is a member of more than five hundred reputed international academic-scientific-research institutes around the world. It should be noted that he is currently the President of the American International Standards Institute (AISI), Irvine, California, USA and also Head of Cancer Research Institute (CRI) and Director of the BioSpectroscopy Core Research Laboratory at California South University (CSU), Irvine, California, USA.



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