**Treating Lung Cancer**

Author:
Major: Biology
Department of Microbiology and Molecular Genetics, Oklahoma State University, Stillwater, OK 74078, USA

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**Abstract:**

Lung cancer was first discovered about half way through the 1800’s. Since then, the incidence and death rates have had many peaks and valleys but overall, cases of lung cancer have grown exponentially. One of the bigger factors contributing to the rapid increase in incidence and mortality rates is the development and use tobacco inhalation products such as cigarettes. However, other factors like air pollution have played a role in the increasing rates. Lung cancer is, and has been, one of the main cancers being diagnosed. Currently, lung cancer is the second most common cancer behind skin cancer. So, despite the advancement of technology and medical procedures, lung cancer is still a major problem in today’s society. Nonetheless, these advancements have provided medical professionals with ways of addressing and attacking the lung cancer cells. The most common way of combating is chemotherapy. Research, which has been collected over time for the past several years, has shown additional treatments administered with chemotherapy generate efficient results in concerns to dealing with lung cancer. Two of these combination therapies include chemotherapy with a drug called Pembrolizumab and chemotherapy with early palliative care. These methods have yielded lower death rates and/or greater quality of life among people who have been diagnosed with lung cancer.

**Introduction:**

Even though lung cancer was first identified around the mid-19th century, the condition has most likely been around significantly longer. The amount of people developing and dying from lung cancer has increased at an alarming rate since being discovered. At first, the rising incidence and mortality rate was most likely due to the correcting of the wrong diagnosis patients received when lung cancer was unknown. Since then, the increase has been caused by lifestyle, environment, and other factors which relate to the jobs in which people choose. Lifestyle, smoking tobacco products in particular, has been the hallmark and focal point of potential causes of lung cancer. Because of our increased knowledge about the dangers of smoking, there has been less smokers proportional to the different population sizes of the past and present. One article says, “Since the Surgeon General’s report on smoking and health in 1964, at which time 52% of American men and 35% of American women were active smokers, the prevalence of cigarette smoking in US and consequently lung cancer has markedly decreased.” (Barta et al, 2019). A big contributing factor to smoking leading to lung cancer is the frequency in which a person smokes or is around someone who smokes as well as the fifty plus chemical cancer causing agents (chemical carcinogens).

Chemotherapy itself has become instrumental when it comes to treating most cancers. It is one of the most used strategies to fight cancer and reduce further growth and metastasis of cancer cells. However, there are more effective strategies than simply administering chemotherapy by itself. Combination therapy is the addition of other therapeutic strategies on top of what is already being performed. Using multiple tactics to fight any disease, let alone cancer, is a more effective strategy because you are addressing the problem in more than one area. A relatively new practice is the addition of the drug Pembrolizumab into a patient’s body as well as the other therapeutic agents which are found in chemotherapy treatments.

Early palliative care is another method which can benefit cancer patients. The best time to use this strategy would be almost immediately after being diagnosed with lung cancer or even most cancers. The early palliative care practice is mostly focused on the person as a whole instead of only focusing on the disease itself. Because this method focuses on the entire person, the side effects are not as severe and in some cases are completely absent (Greer et al, 2010).

The importance of research such as this can’t be understated. Lung and bronchus cancer is the leading cause of cancer related deaths and thus is a major problem. Any and all studies being conducted to help combat this cancer is helpful. The hope is that this type of cancer will be less of a problem in the future because of the hard work of scientists, epidemiologists, and others.

**Recent Progress:**

According to the Center for Disease Control and Prevention’s website, even though the number of new lung cancer rates is increasing, the rate of new lung cancer cases has been on a steady decline for a long time now. (<https://gis.cdc.gov/Cancer/USCS/DataViz.html>) This is due to the partially better understanding of lung cancer and how the cells form and develop as well as the advancements in genetic/medical technology. A decrease in the proportion of people smoking has also contributed to the decline in lung cancer incidence rate. An article called *Global Epidemiology of Lung* Cancer said, “Since the Surgeon General’s report on smoking and health in 1964, at which time 52% of American men and 35% of American women were active smokers, the prevalence of cigarette smoking in US and consequently lung cancer has markedly decreased.” (Barta et al, 2019). The reason in which overall new lung cancer cases is increasing is because the ever-expanding population around the globe. Even though the rate of new people being diagnosed with cancer is slowly declining, the severity and mortality risk is still incredibly high.

Chemotherapy was first used early in the 1900’s and has since become one of the signature cancer treatments. This method of cancer treatment has been very effective on stabilizing cancer development and even curing certain cancers. Since chemotherapy has been shown to combat cancer efficiently, researchers have studied the practice in great depth and this has led to even more cancer fighting strategies being discovered. The addition of multiple therapeutic strategies has also lead to greater advancement in treating cancer. One article says, “The ability of combination chemotherapy to cure acute childhood leukemia and advanced Hodgkin's disease in the 1960s and early 1970s overcame the prevailing pessimism about the ability of drugs to cure advanced cancers, facilitated the study of adjuvant chemotherapy, and helped foster the national cancer program.” (DeVita jr., Chu, 2008). The different types of combination chemotherapies implemented have resulted in new drugs being added to certain cancer treatments. One drug in particular, called Pembrolizumab, has been shown to have beneficial effects on the patients who are taking this in addition to regular chemotherapy.

Pembrolizumab is one of the many which has been discovered in the scientific fight against cancer. It is a relatively newer drug which has yet to be allowed for therapeutic use in many areas around the world. The use of Pembrolizumab is not yet allowed everywhere because the drug is fairly potent and highly selective. Despite the intensity of the drug, research has already shown the positive outcomes on lung cancer patients when used in combination therapy treatments with chemotherapy (Gandhi et al, 2018). If more positive results are yielded from continued research than more medical practitioners can begin using Pembrolizumab to treat lung cancer. An article dedicated to studying this drugs effect on lung cancer when combined with chemotherapy stated, “the addition of pembrolizumab to standard chemotherapy of pemetrexed and a platinum-based drug resulted in significantly longer overall survival and progression-free survival than chemotherapy alone.” (Gandhi et al, 2018). The reduced development of the malignant lung carcinoma tumor is very beneficial news to the medical community. Having more ways in which doctors can combat lung cancer is important. Chemotherapy itself, if performed on a patient a sufficient amount of time, can lead to the patients developing a resistance to the method. The key to defending against resistance is to mix up the therapeutic strategies when needed. Since Pembrolizumab is a relatively recent discovery and rarely used across the globe, implementing this drug in combination therapy with chemotherapy is most likely to be effective in the human body and not resisted.

Early palliative care is another strategy which addresses cancer. Unlike most methods, early palliative care focuses on the patient’s quality of life and not specifically on cancer like most methods. Users of this strategy go about improving patient’s quality of life by trying to reduce the severity of the symptoms or make the symptoms less intense. Early palliative care is not used very often even though it’s a patient centered approach. There are survival benefits associated with this treatment method, but many results have been indecisive.

Many recent studies have shifted their attention to the potential benefits of early palliative care on patients with advanced lung cancer since the treatment strategy focuses on patient’s quality of life and advanced cancers often come with more severe symptoms. Earl palliative care can be an effective strategy to extend the life span or increase survival of people who have been diagnosed with advanced lung cancers but the timing of treatment is important as well. Research has shown that treatments not performed at the right time can have virtually no effect or actually inverse effects on a patient’s life. An article dedicated to the topic stated, “palliative care received 31 to 365 days after diagnosis was associated with increases in survival.” (Sullivan et al, 2019). The study also mentioned that if treatments were performed early the patient’s chance of survival could increase. If performed later, then the treatment could have little to no effect. The location in which the patient received treatment was another factor considered in the previously mentioned article. The study said, “Receipt of palliative care was associated with a reduced risk of dying in an acute care setting compared with nonreceipt of palliative care.” (Sullivan et al, 2019). Early palliative care is also another treatment method which, if performed on a patient, is usually combined with chemotherapy or another hallmark cancer treatment. As stated before, using multiple and different combinations of therapies to treat cancer can be critical to survival so that the cancer is being attacked from more than one area and therefore the body will have less of a chance to become acclimated to the treatment and develop some degree of resistance. It’s important to note that early palliative care can be the lone method used in treating cancer but the potential benefits are more likely to occur when combined with other treatment techniques.

**Discussion:**

With any study or research, there is always more work to be done. Until there is an outright cure for lung cancer, more research and experiments need to be conducted because even though lung cancer incidence rates have gradually declined in the past few decades (<https://gis.cdc.gov/Cancer/USCS/DataViz.html>), the intensity of the disease and mortality risk is still incredibly high. The future studies which are to be performed should not only focus on how to treat lung cancer but also the infinite number of contributing factors which cause lung cancer so that we can be more effective in preventing the disease. All of this could be applied to the research being done on the other cancers and diseases as well.

In the case of the drug Pembrolizumab, the direct and indirect effects need to be evaluated thoroughly to ensure the costs to benefits ratio is favoring the benefits side. If the drug has a positive effect on the cancer itself but harms the individual, then the drug should be scrapped from the treatments until the patient’s health outcomes are more positive. All of the potential side effects need to be harmless or insignificant enough so as the patient receiving Pembrolizumab is not worse off after the treatment is administered. The studies which have already been done should make sure their results can be generalized so the treatments can benefit anyone who chose to take it. If the positive health outcomes which have been shown by Pembrolizumab can’t be generalized, then there could possibly be an unknown number of biological and genetic factors which allowed a certain set of people to experience prolonged survival or slowed/halted cancer progression.

Concerning the use of early palliative care methods, the importance of timing needs to analyzed more. More research needs to be done to understand why this treatment method has only yielded positive results when administered in certain time frames after a patient has been diagnosed with lung cancer. If at all possible, researchers need to discover if there is a chance to make the early palliative care treatment method effective across any amount of time after diagnosis. This type of treatment should also be studied in direct comparison to patients who have declined the treatment or those who are simply not being administered this type of care. Observing the results of a direct comparison will allow us to see the exact benefits and downfalls of receiving early palliative care.

Both of the treatments which have been discussed have shown to be effective against lung cancer in some degree. The drug Pembrolizumab attacks cancer directly and the early palliative care treatment focuses on limiting the intensity or the presence of symptoms which are accompanied with lung cancer. The intended consequences of receiving these treatments are to improve a patient’s overall life span and/or quality of life. Addressing lung cancer from each of the goals in mind are equally important. Overall, when attacking diseases or cancers, the combination of multiple therapies to attack a person’s cancer can lead to better health results than just simply using one treatment method.

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