

DID SOMEONE SAY THE “C” WORD?

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How many times have you heard that dreaded C word? **CANCER.** Someone you know, a relative, or even yourself has been diagnosed with Cancer. Advancements in medicine allow us to diagnose disease faster and more accurately than previous generations and we often find ourselves saying “But I have no history of cancer in my family”. Unfortunately, this disease does not distinguish itself only among family members. It can crop up anywhere at any time. We now have another tool to help physicians determine sooner and more accurately if a patient has cancer. Positron Emission Tomography (P.E.T.) is setting new standards in the way a patient is treated by determining earlier in the diagnostic stages how extensive the disease is, what treatment is appropriate, as well as how much. Once treatment has been completed, P.E.T. can then help the physician determine the effectiveness of the treatment and future planning of care for that particular disease.

Cancer is a disease in which healthy cells stop functioning and maturing properly. As the normal cycle of cell creation and death is interrupted, these newly “mutated” cancer cells begin multiplying uncontrollably, no longer operating as an integrated and harmonious part of the body. The process, if unchecked, will eventually lead to the formation of a cancerous tumor. Dr. Otto Warburg (2 time Nobel Prize winner) states that cancerous cells are not only damaged in their chemical makeup, but in their means of utilizing energy. They feed on the fermentation of glucose rather than metabolizing oxygen as normal cells.

According to the American Cancer Society, over a million new cases of cancer are reported in America each year, with over half a million cancer deaths annually. 1 out of 3 Americans can expect to contract cancer in their lifetime. 7.4 million Americans have a history of cancer and 1.3 million new cases will be diagnosed this year. 85% of all cancers occur in persons older than 55.

There are over 100 types of major cancer, and these can be broken down into 5 basic categories: Carcinomas, Sarcomas, Myelomas, Lymphomas and Leukemias. The most common forms of cancer in men are prostate, lung, colon and rectum. In women, the most common types are breast, colon and rectum, lung and uterine cancer. These cancers make up over two thirds of total cancers.

Let’s look at how P.E.T. can play a role in diagnosis and treatment. P.E.T. differentiates itself from MRI and CT by providing the physician with tissue-specific activity. The modality is a non-invasive procedure and is used as a tool to determine the location and extent of disease. Using cancer cell’s own mechanism of survival, a radioactive tracer attached to glucose is injected into the bloodstream. Acting as normal glucose metabolism, the isotope will locate in the body where the utilization of glucose is. Since some tumors are very glucose avid, we are then able to localize and image the disease, sometimes even avoiding the more invasive procedures by staging the disease and tumor response to treatment. After undergoing a P.E.T. scan, between 20—40% of patients treatment plan is changed based on the P.E.T. findings. Using this tool as an adjunct to MRI and CT, we can better assess and plan treatment. The physician

managing the patient will then compile all the information from the various tests to analyze and determine the best treatment plan in this case.

Results are improved prognosis for many patients and, at minimum, better decision-making. Prior to P.E.T. becoming available, a patient having a questionable shadow on a chest x-ray may have been referred for a needle biopsy or have a portion of the lung removed to determine whether the lesion was malignant. A CT cannot determine the cellular activity of the lesion. A P.E.T. can determine not only if the lesion is malignant, but also if the disease has spread beyond that particular area. Hence, this patient may then go for treatment or resection or perhaps nothing at all, depending on the results of the P.E.T.

A P.E.T. scan is a relatively simple procedure. Expect on the average about a 2 hour time frame to complete the study. The first step will be a test to determine your glucose level at the time of arrival. Since glucose is used as a method of tracking the disease, it is important for the levels to be in a normal range. Once this is determined, IV access will be attained and the F18-FDG (fluoro deoxy glucose) will be injected and the IV removed. We need approximately 45 minutes for the circulation of the isotope to complete to an optimal level, and the imaging begins. This can take anywhere from a half hour to an hour based on the client's height and weight. There are no known side effects to the procedure, so one can expect to continue their normal routine once they leave the center.

Currently, Medicare recognizes and reimburses for the following cancers: breast, colorectal, esophageal, head and neck including thyroid, lymphoma, non-small cell lung, solitary pulmonary nodule.

In addition to the current reimbursable indications for P.E.T. imaging, we will soon be able to utilize P.E.T. in early diagnosis of Alzheimers Disease and Parkinson's Disease. Currently, these diseases are diagnosed much later in progression. With the new drugs to treat Alzheimers, the treatment should begin early in the progress of the disease to provide the most effective results. P.E.T. can diagnose, through glucose metabolism to the brain, as much as 10 years earlier in the stages of Alzheimers, giving the patient an opportunity to be proactive in delaying or preventing clinical symptoms much earlier than before. P.E.T. can effectively pinpoint the source of any of the most common cancers, often without multiple diagnostic tests being done, potentially saving the patient money and the physical and emotional stress associated with diagnosing the problem.

As any diagnostic tool, there is a difference in the quality of the P.E.T. you get. Make sure you are asking for the best equipment available, as well as qualified readers of your study. The physician reading your study should be Board Certified in not only Radiology but also in Nuclear Medicine and have had plenty of experience reading P.E.T. If you are scheduled for a P.E.T. scan, call your local center and ask the qualifications of the staff and the camera they will be using for your images. PET Services of Florida would be happy to answer any questions. Call 352 746-6888.

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