**[New Horizons in the Management and Treatment of Pancreatic Cancer Using Curcumin]**

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**Key Words:**

**Curcumin, Cancer, Pancreas, Pancreatic Cancer**

**Abstract:**

**One of the most difficult types of cancer to treat is cancer of the pancreas. It has a very high mortality rate, with 40,560 of the 48,960 of the patients diagnosed with this type of cancer dying within a year of diagnosis. That is and 83% mortality rate, also only about 7% of the 48,960 people diagnosed with this cancer (around 3,427) survived with it for around five years before succumbing to the disease. There are treatments available for pancreatic cancer. One of which involves surgical removal of part of the pancreas followed by chemotherapy. This has been shown to be the most effective treatment, but there is a problem with this. This treatment plan is only a viable option for patients in the early stages of pancreatic cancer progression. If not detected early the treatments available are ineffective at best, with little chance of cure and little in the way of preservation of quality of life for the patients. However these outlooks can be improved through the use of curcumin, a derivative from the root of turmeric, which when used in conjunction with the current treatments available can help improve patient outcomes and quality of life. While there is a lot of promise with this new treatment option there are some underlying problems with the cellular and molecular interactions that warrant further study into alternate means of utilizing curcumin. There are also some situations where administering curcumin in tandem with some drugs can cause very adverse side effects to late stage patients which unfortunately result in them succumbing to the disease. (1)**

**Introduction**

 “Quality of life” this is a word often used in the medical field and is intimately tied to the outcomes of a patients. The quality of life of a person is directly tied to the disease that brings this term into their life. Pancreatic cancer is a very difficult disease to treat it requires early detection for the most effective treatments and the best quality of life, but due to there not being a precise way to screen for this type of cancer in the early stages people often find themselves relying on a combination of chemotherapy, and radiation treatment. However this has been proven to be an ineffective way of managing the disease as these treatment options. At their most effective, this being the use of Gemcitabine, the treatments provide little to no quality of life improvement and no longevity of life for the afflicted. This makes the time that these people have left be spent receiving drugs and radiation. It slowly eats away the body from the inside, offering little to no help in the slowing and management of the disease. So the question is how can the quality of life, as well as the survival rate of those afflicted with this disease be made better. Well what if the replication of cells infected with cancer could be slowed or even halted. This would lead to the chemotherapy drugs being able to kill the cancer while limiting damage to healthy ones. This reduced amount of damage to the rest of the body would greatly improve the quality of life for those who have this horrible diagnosis.

**Recent Progress**

One of the ways that strides forward are being made for the outcomes of those afflicted by this cancer is through the use of a Curcumin, which is derived from turmeric root. It is observed that countries where this root is a normal part of the diet that there is a lower incidence of cancer. Through the use of Curcumin, which has a low toxicity to normal tissue and has a tendency to inhibit signal pathways crucial to initiation and progression of cancers, such as proliferation, metastasis, angiogenesis, and invasion, along with other cancer drugs it has been shown that the likelihood of an effective treatment can be improved. The curcumin when administered can work in tandem with the chemotherapy drugs and inhibit certain cycles of reproduction in pancreatic cancer cells. This specific targeting of the cancer cells along with the lower toxicity to normal cells ups the chances of survival of the normal cells through the whole treatment battery. The disruption of cancer cell viability makes it easier for the chemotherapy to destroy the cancer cells in a shorter amount of time. The curcumin also has an effect on the inhibitor of apoptosis family (IAP) (1). The IAP keeps balance between cell death and survival, and when pancreatic cancer specifically is in one’s system it can cause and over expression of IAP and this leads to very poor patients outcomes. However with the use of curcumin this can be regulated during periods of cancer exposure and patient outcomes can be significantly improved due to more non cancer cells surviving the treatment. In some of the trials that were run there was a low toxicity rate and a high consumption tolerance for curcumin, up to around 12 grams a day. There were some secondary effects in the preliminary trials but they were limited to diarrhea and nausea. Another phase of testing that was performed on patients with advanced pancreatic cancer. It was shown that some subjects showed stagnation of symptom progression and one even showed signs of tumor regression.

While curcumin has imprecise prospects as a future game changer for cancer treatment there is a problem. Curcumin itself has a poor bioavailability. Meaning there are some problems that occur. This is due to some of the processes that occur when curcumin is in the system actually causing it to have a shorter lifespan than normal and thus decrease the exposure time. This does not lead to the desired results. There is also a tendency for higher concentrations of curcumin in a small sample of test subjects with advanced pancreatic cancer who were receiving chemotherapy (specifically the drug Gemcitabine), did show signs of toxicity and as such these test results were invalidated as sadly this did cause the patients to succumb to their disease (1). As such there are studies being done in order to see if analogs or Nano-particle formulations of curcumin can be used as a viable source of treatment that will not cause toxicity, and will have a better bioavailability.

**Discussion**

So what does all of this mean for people affected by pancreatic cancer? Is curcumin the miracle substance that many who are afflicted by pancreatic cancer have been hoping for? Or is it just the kind of nonsensical pseudo-science one would see touted about on a midafternoon “doctor” television show? Well the answer is not yes nor is it no at this point. It would seem that there is great promise incurcumin, and if thestudies on the analogs or Nano-particle formulations can bring forth viable advancements then it may just be the next big breakthrough in the field of cancer treatment. Using this as a pancreatic cancer treatment has the potential to be a complete game changer for those living with pancreatic cancer. It can lead to unprecedented quality of life improvements for those in all stages of the disease. Also if early detection did not occur it can still improve outcome probabilities for the patients. Those whose only recourse for a late diagnosis would be a rapid decline through as slew of chemotherapy drugs and radiation therapy. Which offered no quality of life benefits and ultimately lead to a sad end. But these late stage outcome improvements will only occur after extensive testing is done to insure that adverse side effects of curcumin are not brought on. While there is great promise for this treatment there still needs to be more testing into making the delivery and viability of curcumin more of a viable treatment**.**

**References**

1.) Osterman, Carlos J. Díaz, and Nathan R. Wall. “Curcumin and Pancreatic Cancer: A Research and Clinical Update.” Journal of Nature and Science, 2015, www.jnsci.org/files/html/e124.htm.