Radiotherapy – one world essay

Health & Medicine

What are the Benefits and Drawbacks of Radiotherapy? Cancer is one of our planets most concerning illnesses at this time. It is the uncontrollable growth and forming of malignant tumours. In 2007, it was said to cause about 13% of all human deaths worldwide (Kleinsmith, Lewis J. M. D). Some cancers may be cured and this depends on certain variables such as the type of cancer, where the cancer is, and how early it has been detected. One method of treatment for cancer is Radiation therapy (Radiotherapy). This is the medical use of ionizing radiation to control or kill these malignant cells.

However, there is doubt among society about the use of radiotherapy. This is mainly because some long-term side effects include the growth of scar tissue, infertility and damage to other areas of the body, depending on the location of the radiation treatment. Another major reason for doubting this treatment is because in some cases, people may also develop a secondary cancer as a result of exposure to radiation. Therefore this is a global issue and in the following essay, the social and economic factors involved in this topic will be discussed. Radiation therapy is commonly applied to the cancerous tumor because of its ability to control cell growth. Ionizing radiation works by damaging the DNA of exposed tissue leading to cellular death. To spare normal tissues (such as skin or organs which radiation must pass through to treat the tumor), shaped radiation beams are aimed from several angles of exposure to intersect at the tumor, providing a much larger absorbed dose there than in the surrounding, healthy tissue. ” (Cancer Research U. K.). There are two main types of radiotherapy, internal and external.

The one being discussed in this topic will be external radiotherapy because it is most related to the electromagnetic spectrum, while the other is based more on placing radioactive material inside patients. External radiotherapy uses radiation aimed at a cancer from a machine to destroy the cancer cells. The types of radiation used include high energy X-ray beams, cobalt irradiation or particle beams, such as protons or electrons. The most common types of external radiotherapy, use photon beams (either as x-rays or gamma rays).

A machine called a linear accelerator focuses high-energy X-rays or other high-energy beams (gamma rays) at the cancer. It is concentrated so that the radiation destroys the cancer cells and not the healthy cells around them. Although, healthy cells may be damaged, the cancer cells will take most of the damage and the healthy cells should be strong enough to repair themselves afterwards. “ The linear accelerator uses microwavetechnology(similar to that used for radar) to accelerate electrons in a part of the accelerator called the " wave guide," then allows these electrons to collide with a heavy metal target.

As a result of the collisions, high-energy x-rays are produced from the target. These high energy x-rays are shaped as they exit the machine to conform to the shape of the patient's tumor and the customized beam is directed to the patient's tumor. The beam may be shaped either by blocks that are placed in the head of the machine or by a multi-leaf collimator that is incorporated into the head of the machine. The patient lies on a moveable treatment couch and lasers are used to make sure the patient is in the proper position.

The treatment couch can move in many directions including up, down, right, left, in and out. The beam comes out of a part of the accelerator called a gantry, which can be rotated around the patient. Radiation can be delivered to the tumor from any angle by rotating the gantry and moving the treatment couch. ” (Radiological Society of North America, Inc.) There are numerous advantages to having radiotherapy in comparison to other treatments to cancer. Using linear accelerators is more efficient than using ring-type accelerators. This is because; linear accelerators can generate and maintain stronger light rays.

This is crucial so that the cancer can be completely destroyed and so that the blasts are concentrated enough to not overly damage the healthy cells surrounding the cancerous ones. The other main advantage of using radiotherapy over other cancer treatments is because it is a focused treatment. Other treatments such as chemotherapy affect the entire body. Therefore, radiotherapy has fewer adverse effects on the rest of the body compared to other treatments. Radiotherapy also has several disadvantages and limitations. Firstly, this treatment can only be used if the cancer has been diagnosed at an early stage.

Once the cancer has spread over several areas, this treatment cannot be used. Also, the linear accelerators require large power supplies, increasing the construction and maintenance expense of the machines. Radiation therapy delivers cancer-killing doses of radiation at the tumor site, the National Cancer Institute explains, but doesn't travel throughout the body to destroy cancer cells that have spread as chemotherapy treatment can do. Therefore, radiotherapy cannot be used after the cancer has spread to a

certain degree. As mentioned, some people may also develop a secondary cancer as a result of exposure to radiation.

There are numerous social factors that question the use of radiotherapy to treat cancer. A major social concern is developing secondary cancer as a result to the treatment. Though possible, this is a very rare situation. Developing a secondary cancer is more likely when being treated with chemotherapy or sometimes internal radiotherapy. Unfortunately, many are unaware of these facts and therefore they refuse to take these treatments. However, this therapy (along with chemotherapy) has been a revolutionary breakthrough in medicine.

Radiotherapy, as mentioned before, would act as an alternative to chemotherapy for patients who have been diagnosed with a cancer in its early stages. Referring to one of the main advantages, this is a very beneficial treatment as it limits exposure to radioactivity, and out of the different treatments, it has the least probability of causing a secondary cancer. Also, because of its accuracy, we have been able to completely irradiate cancerous cells while barley harming the surrounding ones. There are also several economic factors that account to us using radiotherapy.

Firstly, there are major costs for the maintenance of machines such as the linear accelerator, which is crucial for radiotherapy. Because of these expenses, not all hospitals have these equipment and also not many patients can afford to get this treatment. This too is a major limitation of using radiotherapy. However, these machines also benefit the economy as it provides better healthcare (In those hospitals and for patients who can afford it), it also creates more jobs. This is because there must be technicians to fix

these machines whenever they are broken, and as said before, they are very high maintenance.

For that reason, there must be regular check-ups on how the systems are running. Especially when considering these machines if run improperly, and at an overdose, can cause cancer. Therefore, this opens more job opportunities. Referring back to the availability of resources such as radiotherapy much depend on location. Unfortunately, people in Ghana do not have the same access to treatments such as radiotherapy to those in the Netherlands. This is mainly to do with the two countries different economical stand points. Most resident of MEDC's have the chance of receiving such treatments, while many others do not.

Also, seeing as how cancer is a growing problem which caused 13% deaths worldwide in 2007, it is clear that radiotherapy is a viable treatment which should be considered over the globe, so that other people have accessibility to these treatments. This will not only save more lives in the future, but also increase economy due to the reasons stated previously. Throughout this essay, radiotherapy has been discussed. Radiotherapy is a treatment for cancer, by which powerful x-rays are blasted into cancerous tumors, to destroy them, eliminating the cancer.

Though presented with possible side-effects, as well as being expensive, radiotherapy is a viable choice for a treatment to an early caught cancer. This is an example of howscience(using x-rays) and technology (creating equipment such as linear accelerators) can work together to create a possible solution for globe issues such as cancer. Two factors affecting the use of radiotherapy has also been discussed, and in conclusion, one can say

that radiotherapy is not without limitation; however it can be considered one of the best treatments for early caught cancer.

Bibliography * " About External Radiotherapy. " : Cancer Research UK : CancerHelp UK. Cancer Research UK, n. d. Web. 12 Nov. 2012. ; http://www. cancerresearchuk. org/cancer-help/about-cancer/treatment/radiotherapy/external/about-external-radiotherapy;. * " Advantages & Disadvantages of Radiation Therapy. " LIVESTRONG. COM. LIVESTRONG, n. d. Web. 12 Nov. 2012. ; http://www. livestrong. com/article/513783-advantages-disadvantages-of-