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Perspective

The Dysphagia Dosage Response Model and Selection of Head and Neck Cancer for Proton Treatment

Chen Hong*

Department of Modern Optical Instrumentation, Zhejiang University, Hangzhou, China

DESCRIPTION

The model based approach patients with head and neck cancer are selected for proton therapy using models of normal tissue complications. One of the most common cancers in the world is head and neck cancer (HNC). According to estimates, HNC malignancies result in approximately 400.000 deaths annually. An exact depth in the patient is where protons deliver their highest amount of energy. The use of Intensity Modulated Proton Therapy (IMPT), a type of proton therapy, may therefore be advantageous for HNC patients receiving either curative or palliative care. The fundamental objective of the Model Based Approach" (MBA) was to begin a data-information process of patient qualifying and selection that will result in the greatest Proton Therapy (PT) benefit. Challenging head and neck malignancies can be effectively treated with proton therapy while minimizing radiation exposure to important organs like the brain, eyes, and mouth. When a patient receives proton treatment, vital physical functions like vision, smell, taste, and swallowing are essentially unaffected.

Complicated head and neck malignancies can be effectively treated with proton therapy while exposing the brain, eyes, and mouth to the least amount of radiation possible. When receiving proton treatment, a patient's vital bodily functions like vision, smell, taste, and swallowing are essentially unaffected. However, a uniform recording of high quality patient data was necessary to guarantee proper selection using the (Model Based Approach) MBA was started with the intention of compiling patient data from various tumor types, including demographic information that can support the MBA, in a systematic manner. Additionally, the data were translated into a FAIR (Findable, Accessible, Interoperable, Reusable) data format so that the different NTCP statistical profiles can be validated in a privacy preserving manner using the Personal Health Train (PHT) infrastructure.

The precision of intensity modulated proton therapy, or IMPT, which delivers protons to the most complicated tumors by focusing a narrow proton beam and essentially "painting" the radiation dose onto the tumor layer by layer, can help a lot of patients with head and neck cancer. Due to minimal oral cavity collateral damage, IMPT patients may not require the placement of a feeding tube during head and neck radiation therapy, which can happen in up to 60% of traditional radiation patients. In head and neck cancer, radiation therapy is a common form of treatment. Radiation therapy administered to diseased areas adjacent to critical normal structures, however, has the potential to cause severe toxicity. Although improvements in the therapeutic ratio have been made by to developments in conformal radiation treatments like intensity-modulated radiation therapy (IMRT), significant treatment-related morbidity still occurs. Due to its potential to increase radiation doses safely while improving organ sparing, proton therapy is a new and promising treatment option for head and neck tumors.

More than 80% of patients with head and neck cancer receive some form of external beam radiation therapy (EBRT), making it a well-established therapeutic option for the treatment of this disease. It frequently serves as the main course of treatment for early-stage malignancies, achieving good local control rates with constrained fields. Acute and late toxicity from EBRT to the head and neck are linked. Because it is necessary to irradiate diseased areas that are adjacent to healthy tissues, these tissues are exposed to a high amount of radiation and experience damage early in the therapy process.

Correspondence to: Chen Hong, Department of Modern Optical Instrumentation, Zhejiang University, Hangzhou, China, E-mail: hong.chen.lu.ck@email.com

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