2017-452 Automated Beam Orientation and Scanning Spot Spacing Optimization for Robust Heavy Ion Radiotherapy

Published date: Sept. 6, 2019

Technology description

Automated Beam Orientation and Scanning Spot Spacing Optimization for Robust Heavy Ion Radiotherapy Therapy

SUMMARY

UCLA researchers in the Department of Radiation Oncology have developed a new method to automate and optimize heavy ion beam radiotherapeutic techniques for the treatment of cancer.

BACKGROUND

Heavy ion radiation therapy is a growing treatment option for a variety of cancers. It has distinct advantages over traditional X-ray radiation based therapies as it is less damaging to healthy tissue adjacent and upstream of the tumor treatment site. Like many other radiotherapeutic procedures treatment planning is required to optimize beam orientation, and scanning spot number and spacing. Additionally, many treatment plans fail to account or optimize beam localization based on dynamic patient positioning, which is critical in maintaining optimal dose distribution. Although there are several commercial software and published methods available for treatment planning they all require: manual beam optimization, increased spot number and therefore reduced efficacy and increased cost/ treatment time, and inability to maintain optimal dose distribution due to patient movement.

INNOVATION

UCLA researchers led by Prof. Ke Sheng have developed a novel method to automate and optimize beam orientation and scanning spot spacing. This has led to a robust increase in efficacy and quality of heavy-ion based treatments. This new method allows for both beam and spot selection to be combined with the plan dose optimization allowing for optimal dose distribution, robustness and delivery efficiency. Automated beam orientation optimization also accounts for probable patient motility. This method also allows for minimization of required spots, and therefore reduced treatment time and cost.

Advantages

- Superior efficacy and quality of heavy-ion based treatment compared to traditional methods
- Reduced spot number, therefore reducing treatment time and cost

- Automated beam orientation allows can account for patient motility during treatment

Institution

University of California, Los Angeles

Inventors

Ke Sheng
Faculty (Health Science Prof In Res)
RAD ONC