Software System for Analyzing Three-Dimensional Image Data of a Target Region - Application in Early Prediction of Tumour Recurrence after Stereotactic Ablative Radiotherapy for Lung Cancer

Published date: April 10, 2019

Technology description

Background

Stereotactic ablative therapy (SABR) is a standard treatment for individuals with early stage non-small lung cancer who are medically inoperable or refuse surgery. This highly conformal, high-dose radiation therapy alters the radiographic appearance of the lung during follow-up computer tomography (CT) imaging assessment in ways that are not seen in conventional treatment. A key clinical decision during the follow-up assessment is whether to provide further, possibly more invasive interventions, such as surgery or chemotherapy, to treat or remove recurrent/residual disease. This clinical decision relies on the ability to assess the success of the SABR treatment, that is, to determine whether the subject’s cancer will recur. Delayed detection of recurrence may reduce the options for salvage therapies. This clinical decision is complicated by the fact that radiation-induced lung injury (RILI) may occur as radiation pneumonitis and radiation fibrosis which appear to have a similar size and morphology as a recurrent tumour. Generic image appearance assessment tools or tools designed for follow-up assessment of lung radiotherapy in the non-SABR context will not provide accurate and useful results in the lung SABR context.

Technology Overview

The invention provides computational decision support to physicians when interpreting a patient’s post-SABR follow-up CT scan, including quantification of CT imaging texture, to aid in the prediction of eventual cancer recurrence. It takes the form of a software plug-in that can be used in conjunction with a physician’s current image processing workstation for analyzing 3D image data or as a stand-alone software through a standard DICOM send/retrieve interface. It targets surrounding regions of a tumour that contains ground-glass opacity (GGO), which is characterized by increased parenchymal density compared to surrounding areas and is important in predicting the eventual recurrence of cancer from radiation-induced lung injury. A 3D region of interest (ROI) is identified by determining one or more regions within the 3D image data that contain GGO followed by the calculation of at least two radiomic features associated with 3D ROI. A trained classifier is then used to classify the 3D ROI as “recurrent cancer” or “radiation induced lung injury”.

Keywords
Stereotactic ablative therapy, SABR, computed tomography, CT, image processing, ground-glass opacity, CGO, tumour recurrence, lung cancer, radiation-induced lung injury

Advantages

- Predicts cancer recurrence based on the imaging texture of the GGO region.
- Method and apparatus covered by US patent
- Other target regions maybe classified, e.g. liver, brain, prostate, kidney, heard or neck

Institution

WORLDiscoveries

联系我们

叶先生

电 话：021-65679356
手 机：13414935137
邮 箱：yeyingsheng@zf-ym.com