In silico clinical trial in Lung, Prostate, Neuro and Head & Neck cancer, comparing photon, proton and C-ion radiotherapy treatment

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NEWSFLASH

We are happy to announce that the three ROCOCO abstracts have been selected for presentation at the PTCOG in San Diego:

- ***Photons, protons or carbon ions for stage I NSCLC - results of the multicentric ROCOCO in silico study***
- ***Results of a ROCOCO in silico Trial: Photons, Protons or Carbon-ions for Re-irradiation of Head and Neck Cancer***
- ***Development and Validation of an Online, Three-Level***
- ***Photon vs Proton Therapy Decision Support System***

Thanks for your contribution!

OVERVIEW OF CURRENT ACTIVE ROCOCO STUDIES:

LUNG

- **Re-irradiation of NSCLC**
  In the previous ROCOCO study on lung cancer (stage I-IIIB), patients with primary lung tumors were assessed for conventionally fractionated radiotherapy (RT) or stereotactic ablative body radiotherapy (SABR). In this study patients **with recurrent thoracic disease or a second primary tumor in the lung** have been included. Consensus about the planning protocol has been achieved. OARs have been renamed according to international standards. DVHs of the OARs of the initial plan have been calculated to define the OAR dose restrictions for the recurrent part. Treatment planning will start in the second part of 2015.

- **Stage 1 NSCLC**
  In this study we compare **state-of-the-art photon therapy with proton and carbon-ion therapy for patients having stage I NSCLC**. A lot of planning work has been done. Photon therapy planning has been performed by our partners from the Catharina Hospital Eindhoven (IMRT), the Liege University hospital (Cyberknife) and MAASTRO (VMAT). Proton therapy planning (PSPT) was performed in the University Hospital Pennsylvania. Carbon-ion treatment planning (IMIT) has been performed in the University Hospital Marburg. Data analysis has been performed in MAASTRO. A draft manuscript will be send to the participating centres before summer.

HEAD AND NECK

- **Recurrent Head & Neck cancer**
  This study included Head and neck (H&N) cancer patients who have been treated with curative intent at one of the participating centers who underwent **re-irradiation on overlapping**

target volume. Photons plans VMAT) were performed by Maastro Clinic, protons (IMIT) by the University of Pennsylvania and Carbon-ions (IMIT)by the University of Marburg. A simulated interval of ≥1 year was used for the whole group when defining constrains for treatment planning. Individual constrains per patient were defined for dose limiting OARs based on the accumulated dose of the initial treatment plan and the simulated time interval. Data-analysis has been performed. A meeting will be planned to discuss about the clinical impact.

- **Adaptive head and neck treatment**
  For this study a data set with **repeated head and neck CT data** is used. With this dataset we are able to investigate the effect of weight loss and tumor respons on the dose distribution and compare this effect for the three modalities. A dataset from Upenn including 10 patients with weekly CT scans during treatment has been selected. For the initial plan the best possible dose distribution will be determined using the planning-CT (reference scan). For every time point (CT-scan) the reference treatment plan will be projected on the actual CT scan and the dose will be recalculated without changing the treatment parameters. Dose differences in the target volume (CTV-GTV and PTV) and the OAR, as a result of tumor shrinkage during treatment will be evaluated for each time point and each treatment modality.

PROSTATE

- **Prostate spacer**
  This in silico trial compares tumor dose, rectal wall dose and volume and dose of other irradiated normal tissues in prostate cancer patients having a hydrogel injected between the prostate and the rectum. The goal is to establish whether these patients will benefit from proton therapy compared to a modern IMRT treatment. A dataset from Aachen is used for this planning comparison. IMRT treatment planning has been performed in the University Hospital Aachen. Proton planning will be performed in Pennsylvania.

ROCOCO OVERVIEW: