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Novel Techniques for Cancer Treatment

Radiation therapy seminars in Tampere Finland 22.–23.3.2018

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Radiation therapy seminars 2018 uncovered fresh methods and brought new data and knowledge for the interested audience. Some presentations reminded of the basics of radiation therapy and medicine, others presented new researches, technology and changes in Radiation Act.

One of the novel modalities presented was high intensity focused ultrasound, HIFU. In HIFU, several piezoelectric elements in concave ultrasound probe emit ultrasound from wider than normal area, but the effect focuses on small volume due to wave interference. HIFU is guided via normal ultrasound probe or Magnetic Resonance Imaging, MRI. With MRI, the thermal impact for the treated tissue is possible to observe in real time. The achieved thermal dose is not cumulative, so the treatment for e.g. prostate, bone metastasis or myoma in the uterus can be repeated for best results. (Sainio 2018.)

One subject appeared in multiple presentations: Optical Surface Monitoring System, OSMS. There were basics of the technique and uses of Varian Medical Instruments' system AlignRT and C-RAD Catalyst's Sentinel. User experiences in Finland mainly include head and neck area tumors in Oulu and thoracic area and Deep Inspiration Breath Hold (DIBH) breast treatments in other cities. (Luukkanen & Remes 2018.)

The OSMS can be used to help position the patients, observe movement during radiation therapy and achieve breath holding techniques such as DIBH. OSMS also has the possibility to accelerate the

treatment. (Hietala 2018, Luukkanen & Remes 2018.) At least breast treatments may be done without any tattoos, or only with one center mark which may even be a mole in the future (Laaksomaa 2018).

The OSMS system tracks patient's skin surface safely and non-invasively with optical infra-red cameras. The AlignRT tracks the region of interest on the surface and the Catalyst estimates the place and movement of the isocentre. The reference surface is computed from CT scan or directly with the cameras. (Luukkanen & Remes 2018.) The AlignRT OSMS also proposes movements for the 6 Degrees-of-Freedom treatment table to place the patient compared to the reference. The system can pause the treatment if patient movement is seen outside the set operational limits in millimeters. On one hand, a main con for the system may be constant pausing due to lack of the field of view of the cameras as the gantry is moving and the patient breathing. (Hietala 2018.)

Uses of HIFU and OSMS are still developing further. Therefore, the utilization of the techniques are evolving and user experiences are still being compared. HIFU and OSMS might be the future in cancer treatment so keep a close eye for new developments!

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