Remote dose monitoring – Early phase study

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Individual organ dosimetry is critical for predicting absorbed doses to normal organs and target tissue in terms of therapeutic efficacy and toxicity reduction with radiopharmaceutical therapy. We designed and developed a micro dosimetry system utilizing a CMOS (complementary metal oxide)-based radiation Track Structure Detector (TSD) device to analyze radiation quality and quantity from different forms of radiation and radiopharmaceutical drugs. The TSD system allowed capturing and analyzing heavy ion tracks at cellular dimensions with a 1.67 microns per pixel resolution and more than 10 M pixels on a 0.6 cm x 0.4 cm sensor. For individualized radiopharmaceutical patients, the proposed Integrated Wearable Micro Dosimetry for Remote Monitoring-VASTRA is delineated. Here, we demonstrate the capability to objectively detect, measure, and spatially resolve the imaging radiation activity of radiopharmaceutical therapeutic radionuclides including 18F-FDG, TC99m and validates the VASTRA in a smart phantom. Consequently, the approach is capable to measure patient-specific temporal activity data in radiopharmaceutical therapy. As an integrated ergonomical wearable dosimetry, VASTRA in Post cancer treatment, has unique opportunities and a profound impact on the quality assurance in the cancer treatment.