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Thyroid remnants therapeutic dose determination using a small field of view gammacamera; pilot study

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The aim of this pilot study was to investigate and verify the possibilities of dosimetry for patients undergoing first Radioiodine therapy (RAIT) using a small single head mobile gamma camera.

Methods: Camera Solo mobile was used for the measurement of ^{131}I accumulation in remnants of patients' thyroids and ^{131}I accumulating nodes (neck region). Vials with a known activity of ^{131}I were used to calibrate the system. The patient-volunteers were around 3 months after thyreoablation due to thyroid carcinoma. The weight of the accumulating remnants or nodes was established using ultrasound or roughly estimated using phantom measurements. Two types of collimators - MEGP (medium energy general purpose) and HEGP (high energy general purpose) were tested. Seven patients were examined using the MEGP collimator; HEGP was used for the five patients.

Results: The absorbed doses within remnants or nodes vary from 40 Gy up to 800 Gy with an uncertainty from 25% up to 50% depending mainly on the mass of the remnants estimation. Based on the measurements the administered therapeutic activity is considered to be sufficient for most of the patients, a consequent follow-up is done. So far 10 patients were examined again. Three of them were treated again and seven of them are in remission.

Conclusions: The dose assessment uncertainty could be significantly reduced by processes optimization. Based on the results appropriate grant for further investigation will be sought out.

Biography

Pavel Solný has completed his Master degree studies (Ing.) at the age of 25 years at FNSPE CTU and now is studying for PhD degree. He is also working as a Medical physicist at DNME. He is interested in problematics dealing with Targeted Radionuclide Therapy Dosimetry in clinic conditions.

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