

Tytuł pracy: Impact of segmentation methods on absorbed dose in ^{131}I -MIBG and $^{99\text{mTc}}$ -HYNIC-TOC dosimetry workflow- a preliminary report

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Afiliacja: The study compared whole organ segmentation with a simplified 4-mL sphere method for absorbed dose (AD) calculation in patients undergoing ^{131}I -MIBG and $^{99\text{mTc}}$ -HYNIC-TOC imaging.

Methods: Data from 10 patients per tracer were analyzed, with three Whole Body scans (^{131}I -MIBG: 1, 24, 48 hours; $^{99\text{mTc}}$ -HYNIC-TOC: 1, 4, 24 hours post-injection) used for biokinetics determination. A quantitative SPECT scan (^{131}I -MIBG: 24 hours; $^{99\text{mTc}}$ -HYNIC-TOC: 4 hours post-injection) scaled counts into activity. The SPECT segmentation was performed using Hermes with two different methods: whole organ segmentation and by placing a small 4-mL sphere within an organ in a region of uniform radiopharmaceutical distribution. Curve fitting was carried out using the SciPy library, followed by calculating and normalizing the integral to injected activity. ADs were calculated using OLINDA/EXM ver. 2.2.3. For whole organ segmentation, the AD results were scaled to organ mass (CT-segmented volume multiplied by unit density). For 4ml sphere segmentation, the ICRP phantom masses were used. Paired t-tests compared different segmentation methods on ADs per unit of activity for each tracer and organ.

Results: In $^{99\text{mTc}}$ -HYNIC-TOC studies, significant differences ($p < 0.05$) were found in kidneys, liver, and spleen, with the sphere method yielding higher mean values: kidneys 29.7%, liver 31.25%, spleen 18.6%. No significant difference was observed in bone marrow. In ^{131}I -MIBG studies, a significant difference ($p < 0.05$) in liver was found, with the sphere method yielding 61.1% higher mean values. Bone marrow AD was significantly lower with the sphere method, resulting in a 6.3% lower mean.

Conclusion: The study revealed significant differences in ADs between whole organ segmentation and the 4-mL sphere method for both $^{99\text{mTc}}$ -HYNIC-TOC and ^{131}I -MIBG studies.

Obraz uzupełniający: [Przesłany plik](#)