

## Peptide Receptor Radionuclide Therapy of Neuroendocrine Tumors: how important is internal dosimetry?

The South African Association of Physicists in Medicine and Biology (SAAPMB) and the associated South African Medical Physics Society (SAMPS) would like to congratulate the College of Nuclear Physicians on the publication of the practice guidelines on Peptide Receptor Radionuclide Therapy (PRRT) in Neuroendocrine Tumours.<sup>1</sup> Unfortunately these guidelines might create the impression that the associated internal dosimetry assessment is just an optional extra, with only a single short paragraph on post-therapy images that are obtained to confirm uptake of therapy agents in the tumour and for dosimetry assessment. This is in stark contrast to the joint IAEA, EANM and SNMMI guidance document,<sup>2</sup> which has a whole section on dosimetry. Radiation dosimetry of normal organs and malignant lesions allows the dose to the tumour to be maximised, while keeping the dose to normal tissues low enough to reduce the risk of delayed organ toxicity.

Prescriptions in radionuclide therapy are mostly based on a fixed amount of activity for all patients, sometimes tailored to patient weight or body surface area.<sup>3</sup> There have been no randomised controlled trials to evaluate the merits of dosimetry-based versus fixed-activity-based approaches in PRRT,<sup>3</sup> but there is increasing evidence that treatment outcome correlates with the absorbed doses delivered to tumours and healthy organs.<sup>4</sup>

The International Atomic Energy Agency (IAEA) published basic safety standards,<sup>5</sup> in which it is clearly stated that “licensees shall ensure that dosimetry of patients is performed and documented by or under the supervision of a medical physicist...” and that medical exposures from therapeutic radiological procedures must be optimised, which also includes PRRT. Internal dosimetry offers one such optimisation avenue. Additionally, quality assurance, including the acceptance testing and commissioning of medical radiological equipment, must be done by or under supervision of the medical physicist.

In fact, an activity-based approach may lead to potential legal issues under South African regulations. The regulations relating to Group IV hazardous substances<sup>6</sup> (i.e. radioactive substances) clearly state that an authority holder who applies for a Group IV hazardous substance for medical purposes must ensure that “a record is kept of the radio-therapeutic treatment given to patients, in which record is indicated of the parts of the body irradiated, the Group IV hazardous substance used for the treatment, the tumour dose and all relevant data on which the calculation of such dose is based.”

We realise that doing internal dosimetry well can be quite challenging, but guidelines have been published on how to do this.<sup>7,8</sup> The European Association of Nuclear Medicine (EANM) also published a guidance document on good

practice of clinical dosimetry reporting.<sup>9</sup> We realise that the Medical Physics community is under-represented in most Nuclear Medicine practices in South Africa, but we maintain that internal radiation dosimetry should form part of any PRRT as part of good practice, and is mandatory under South African law.

Yours sincerely,

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Both authors have no conflict of interest.

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