



Research Week 2020

Clinical Dosimetry Tool Implementation of I-131 MIBG Therapy for Pheochromocytoma and Paraganglioma

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Keywords

MIBG, Iodine-131, theragnostic, dosimetry

Abstract

Purpose

To calculate a therapeutic activity that assures the limit doses are not exceeded for critical organs in patients undergoing the I-131 MIBG / AZEDRA (Progenics Pharmaceuticals, Tarrytown, NY) therapy for pheochromocytoma and paraganglioma.

Methods

A dosimetry calculation tool was developed based on the guidelines provided by the AZEDRA dosimetry protocol. The tool is designed to process the count data obtained from regions of interests drawn in scintigraphs of patients injected with 5 mCi of MIBG labeled with Iodine-131 and imaged three times over a period of 72 hours. The count data for the organs of interest was fitted with a mono-exponential curve. The estimates of radiation dose to each of the relevant organs at risk (kidneys, liver, lungs) are evaluated using a MIRD-equivalent formalism. More specifically, the dose factors (S values equivalent) were obtained from OLINDA/EXM software (Hermes Medical, Sweden) and imported into the tool. To account for each patient's unique anatomy, the organ masses were obtained from CT. The nominal therapeutic activity of 1000 mCi (injected in two sessions) was scaled down as necessary to ensure that the dose to the organs at risk is not exceeding the limits.

Results

The doses to the OARs obtained from the tool were compared and ultimately validated with the OLINDA software calculations. The calculated therapeutic activity varied between patients due to the difference in the clearance rate and tumor burden.

Conclusion

The implementation of the dosimetry protocol within a single tool allows for streamlined performance of patient-specific data analysis, organ dose estimation, and therapeutic

activity calculation. The tool has proven to be clinically useful in determining dose estimates to the OARs of two patients who have already been successfully treated.