Dosimetry in Thyroid Cancer (Survey): Radioiodine Dosimetry Practices for Differentiated Thyroid Cancer

This initiation is supported by the Society of Nuclear Medicine and Molecular Imaging (SNMMI) Quality and Safety Committee, Health Policy and Quality and the Value Initiatives of the SNMMI and conducted by the Division of Nuclear Medicine Research Team at MedStar Washington Hospital Center (MWHC) directed by Dr. Douglas Van Nostrand. Its objective is to identify the facilities in the United States (US) as well as foreign countries that perform dosimetry to help guide the amount of I-131 activity to be administered for the treatment of differentiated thyroid cancer (DTC). Different dosimetry approaches for the determination of the amount of I-131 activity in DTC patients exist and to date, there is no publicly available database that provides information on facilities and practitioners performing dosimetry to help select the activity of I-131 therapy for DTC. This study reports the list of facilities that responded to the survey and that perform any type of dosimetry (i.e. utilizing any dosimetry method). Specific objectives of the survey are: (1) To establish a database of facilities and individuals in the US and outside US that perform dosimetry to help guide the selection of activity for I-131 therapy for DTC; (2) To determine the practice patterns of indications and various methods for performing dosimetry and/or reasons for not performing dosimetry; (3) To make this data available to physicians and patients who may be interested in using dosimetrically guided activities for I-131 therapy; (4) To assess the facilities quality assurance and performance improvement programs and to promote quality of care by the appropriate use of dosimetry methods for optimizing I-131 therapy; (5) To promote standardization of dosimetry, increase collaboration and to promote further initiatives as part of the Domain of Quality Improvement of the SNMMI Value Initiatives for other Theranostics by the Therapy Center of Excellence.

To date, the first two phases of the survey (Phase I and Phase II) have been developed and conducted. Phase I provided a database of facilities and individuals who perform some form of dosimetry to help select activity for I-131 therapy for DTC. Phase II further questioned the various practice patterns for dosimetry (such as indications, methods for performing dosimetry and factors that may modify dosimetrically determined activities of I-131). Attached you will find a list of US and international facilities grouped by country and state that responded to Survey I and II and that reported to be performing dosimetry. Phase I and II results were presented at the 2019 SNMMI Annual Meeting in Anaheim, CA. A Newsline report about this joint effort with SNMMI was published in the Journal of Nuclear Medicine in May 2019. Please note that the list of facilities reported here is a more recent list of sites that responded to the survey than the table included in the Newsline. An abstract has been submitted for poster presentation to the upcoming SNMMI Annual Meeting in New Orleans, Louisiana. Survey I and II results have been compiled and used to generate database files that are being utilized as reference for the development of Phase III and Phase IV of this survey, as well as can be used by referring physicians that may be interested to directing patients to facilities that perform and use dosimetrically guided activities of I-131 for the therapy of DTC. In addition, the database is providing data for developing grant proposals, specifically to help inquiry and selection of sites that may participate in clinical trials for future research in this area.
A total of 201 responses were received for Phase I, of which 49 facilities in the US and 27 facilities outside the US confirmed performing some form of radioiodine dosimetry. Only 28 responses were received for Survey II, of which 24 were facilities in the US and 4 were international facilities. In the US, 63% (15/24) perform full whole-body (WB) dosimetry and 38% (9/24) facilities perform simplified dosimetry. Of these, 5 facilities perform both full WB and simplified dosimetry. The most common protocol of full WB dosimetry used both in the US and outside the US used the Marinelli et al. approach, also known as the Benua-Leeper and the Memorial Sloan Kettering approach. For simplified dosimetry, the %48hr WB retention was the most common approach reported, 38% (5/13). Survey responses indicate that dosimetry is most commonly (94%) performed based on selected indications and the most common practice/indication is I-131 treatment of known distant metastatic DTC.

Survey III, which is under development, aims to explore the specifics and modifications to the dosimetry methods used by each facility and/or practitioner, any simplifications or additions made to the dosimetry methods, any adaptations made to the imaging protocols and/or patient preparations for these particular procedure(s) on each site and any additional factors used, tested and/or validated by the on-site physicist (if applicable) that may affect the calculation of the I-131 therapy administered activity. A final objective of this initiative is to develop a process for creating similar databases for other nuclear medicine therapies.