postoperative outcome for patients. This project evaluates the use of software packages to produce volumetric estimates of these TL structures. These estimates were obtained for patients whose radiological reports indicate the presence and/or suspicion of mTS and a normal cohort. A comparison between Freesurfer and more specific hippocampal volumetric software packages was made. A database of normal MRI scans was compiled, this is age and gender matched for robust comparison and to reduce systematic error associated with comparing volumetric data. It was found that the software packages showed good agreement with radiological reports by indicating a reduced hippocampal volume. It is hoped that this work and further validation of volumetric approaches will be integrated into the presurgical workup with the aim of improving postoperative prognosis.

https://doi.org/10.1016/j.ejmp.2019.09.217

Poster Session : P20

Dose equilibrium and CTDI quality assurance in CT and the implications for the effective dose estimation in patients

Ahmad Albngali [a], Andy Shearer [a], Margaret Moore [b], Joshua Deslongchamps [a], Brendan Tuohy [b], Niall Colgan [a]

[a] *National University of Ireland, Galway NUIG, Ireland*
[b] *Galway University Hospitals, Ireland*

Effective dose is a single parameter meant to reflect the relative risk from exposure to ionizing radiation. It reflects the risk of detrimental biologic effects from a non- uniform, partial-body exposure in terms of a whole-body exposure1. In this study we applied the American Association of Physicists in Medicine (AAPM)2 dose equilibrium (DEq) method and the CTDI method to estimate organ dose and effective dose values and retrospectively correct the annual effective patient dose for a random sample of twenty patients. The results showed that the effective dose summed across the affected organs was underestimated by CTDI between 26 % and 31% when compared to the DEq estimate. This updated data set reflected that the effective dose to patients was up to 6 mSv greater than previously estimated through CTDI. 1. Rodrigo Canellas, Subba Digumarthy, Azadeh Tabari, Alexi Otrakji, Shaunagh McDermott, Efren J. Flores, Mannudeep Kalra. 2018. Radiation dose reduction in chest dual-energy computed tomography: effect on image quality and diagnostic information. Radiologia Brasileira 51:6, 377-384 2. AAPM. Report of AAPM Task Group 111: The Future of CT Dosimetry: Comprehensive Methodology for the Evaluation of Radiation Dose in X-Ray Computed Tomography. AAPM Report No. 111. City Park: American Association of Physicist in Medicine; 2010.

https://doi.org/10.1016/j.ejmp.2019.09.218

Poster Session : P21

Retrospective Shielding Measurements in a Radiographic X-ray Department

Claire Mc Cabe, Clare Corbally

Tallaght University Hospital, Ireland

Retrospective Shielding Measurements in a Radiographic X-ray Department Undertaking a series of Barrier Measurements for Lead Shielding Verification purposes using a Mobile X-ray tube/Ionisation chamber brought to light many practical issues. As a result of these practical issues, it became evident that a protocol would need to be drafted to better suit our positioning difficulties and logistical issues. Whilst positioning of X-ray tube in line with ionisation chamber via the medium of lead glass was relatively straightforward, positioning of X-ray tube and Ionisation Chamber through other barriers proved more difficult in relation to vertical and horizontal positioning whereby no visual cues were available to confirm that the X-ray beam and ionisation chamber were correctly aligned. Also, the distance between the X-ray tube and the Ionisation Chamber would have a knock-on effect on certain parameters. Situations resulted with no output recorded on the measurement device, which may have been either as a result of barrier thickness or positioning accuracy. Whichever was the case, either of these situations may have been attempted to be rectified by reducing the X-ray tube/Ionisation chamber distances, making the collimation bigger or a combination of both. Trade off in collimation size needed to be considered, whereby although broad beam is desirable for the above reasons, it is also necessary to ensure that the collimation is coned to the barrier of interest only and not including other barriers.

https://doi.org/10.1016/j.ejmp.2019.09.219

Poster Session : P22

Global head SAR assessment of MRI-induced temperature change

James Blackwell [a], Gideon Oluniran [a], Marcin Krasny [a], Brendan Tuohy [b], Niall Colgan [a]

[a] *National University of Ireland Galway, Ireland*
[b] *Galway University Hospital, Ireland*

Purpose: Underestimation of SAR (Specific Absorption Rate) in MRI poses potential risks to patients and in particular individuals with compromised thermoregulation. EU standards imposes a head SAR limit of 3.2 W/kg as SAR effects are negligible at up to 3 W/kg. We developed a phantom and protocol where heating due the RF pulse is measured and verified against scanner displayed SAR.

Methods and materials: The spherical 3-Litre phantom comprised of agar (60 g/L), NaCl (10 g/L) and $CuSO_4$ (1 g/L) dissolved in distilled hot water. T1 properties of the phantom were determined at room temperature using a STIR sequence. The phantom was manufactured to achieve thermal equilibrium. A baseline image is acquired using a 2D fast gradient echo. SAR loading is generated with a clinical 3D FLAIR sequence followed by a repeat 2D fast gradient echo. Our phantom is nonperfused, and the period of heating is relatively short. Thus, physiological and conduction effects are ignored. Temperature maps were generated using Proton Resonance Frequency Shift (PRF) thermometry. Global SAR was estimated by averaging temperature changes over the whole phantom and compared to the scanner's SAR display. The procedure was repeated for five independent scanners.

Results: In the format scanner model/scanner readout [W/Kg]/ our calculation [W/Kg]/ error [%]: GE 1.5T Signa Explorer/0.42/0.41/2.3, Siemens 1.5T Symphony/1.88/1.90/1.0, Philips 3T Achieva/1.52/1.52/0, GE 1.5T Signa Explorer /0.56/0.55/1, Siemens 1.5T Magnetom 1.5/1.49/1.2 We have found that our SAR estimates are in good agreement with the MRI scanner displayed data.

Conclusion: We have developed a phantom that can independently verify MRI SAR.

https://doi.org/10.1016/j.ejmp.2019.09.220