clinical tests. One of the tests involved is Glomerular Filtration Rate (GFR), GFR describes the flow rate of filtered fluid through the kidney. Currently the GFR procedure is calculated using the plasma sampling method. This is done with Cr51 EDTA or Tc99m DTPA using a NaI Gamma Counter. GFR measurements are typically used to determine the kidney function of patients who have End-Stage Kidney disease or those undergoing Cancer treatments. The living donor programme contains individuals who are assumed to have normal healthy kidney function and have GFRs within age appropriate ranges. In order to calculate GFR there are numerous combinations of complex equations and corrections to be applies to determine a normalised GFR. Our aim is to develop a user friendly method of calculating the GFR for the Living Donor Programme. This will involve analysing the current calculation method, which uses the slope intercept method and its corresponding corrections. This in-house solution will offer a more transparent and intuitive solution to the clinicians.

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Poster Session : P27

Use of Megavoltage (MV) Computed Tomography (CT) to account for anatomical variations during radiotherapy treatment

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In radiotherapy (RT) CT scans are used a) to outline tumour targets to ensure the prescribed radiotherapy dose is delivered correctly, b) to identify critical structures where the radiation dose needs to be restricted and c) in dose calculations to account for the anatomical variations (inhomogeneities) in the patient – for example lung, bone and tissue. At this clinic, kilovoltage CT (kV) scans are used for radiotherapy dose calculations in routine treatment planning (TP). Though the initial kVCT is useful for TP, patients undergoing RT sometimes lose weight which leads to changes in anatomical details with respect to the initial CT scan. As a result, the original dose calculation performed for the patient has been compromised. To account for the changed anatomy during treatment, a kVCT rescan can be ordered by the doctor. The aim of this project is to commission radiotherapy dose calculations using Megavoltage (MV) Cone Beam CT as part of routine treatment planning. In this project, a CIRS Rando head & neck phantom was used to directly calibrate the MV cone beam CT system. The Rando phantom was scanned with both kVCT and MVCT for the purpose of comparing dose calculations from the two systems. The Hounsfield Units to Relative Electron Density obtained from the MV scan was entered in the planning system. From the initial work, the kVCT and the MVCT calculations performed for simple photon fields match closely. The results obtained for a range of clinical plans will be presented.

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Poster Session : P28

New BNMS guidelines for measurement of glomerular filtration rate: To adopt or not?

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The British Nuclear Medicine Society (BNMS) has recently published new guidelines for the measurement of glomerular filtration rate (GFR). The new guidelines recommend replacing the "slope-intercept" (SI) method, which involves taking multiple blood samples, with a "single sample" (SS) method. The time that the single blood sample is withdrawn from the patient is chosen based on estimates of the patient's GFR, or the most recent GFR measurement where one is available. Whilst the single sample method would be less invasive for patients and entail less work for staff (sampling, counting etc.) there is a perception that single sample methods are generally less accurate and precise compared to multiple sample methods. By applying the new method to historical data from our facility we hope to verify that measurement of a single sample withdrawn at a carefully chosen time can yield results that are as valid as those obtained using the SI method. A retrospective study is carried out by applying the new method proposed by BNMS to data obtained from approximately 100 GFR studies undertaken at our facility over the past two years. The optimum sampling time is determined for each patient and a GFR based on the single sample method is calculated and compared to the value originally calculated based on the SI method.

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Poster Session : P29

Dosimetric effect of a change in breathing patterns between simulation and delivery on VMAT lung stereotactic body radiation therapy (SBRT)

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In radiotherapy planning, it is vital that the breathing patterns at simulation scan mimic treatment scenario as accurately as possible. A number of previous studies assumed that a patient has the same breathing trace shape at both simulation and treatment delivery. This is not always the case and this work was to evaluate the dosimetric effect of a change in breathing patterns between planning and delivery in lung volumetric modulated arc therapy (VMAT) stereotactic body radiation therapy (SBRT). A TrueBeam LINAC with 6MV flattened filter free (FFF) beams was used. A dynamic motion phantom with sinusoidal (reference) motion (20 mm diameter 'tumour'; period = 3 s; amplitude = 30 mm) underwent a 4D-CT scan. A treatment plan was created using Eclipse version 15.1 and optimised according to St Luke's protocol. The delivered plan was evaluated in five situations: using the same trace as simulation, using a modified trace which contained variabilities in amplitude (VA), using a modified trace which contained variabilities in period (VP), using a highly regular trace (RT), and finally using a highly irregular trace (IRT). Measurements were made with EBT-XD films and evaluated against convolved dose distribution using a gamma analysis of 3% dose difference and 2 mm distance to agreement. Results indicate that both sinusoidal and RT traces showed a high passing rate of more than 98%. However, there was more variability in passing rates for the irregular motion. Results and dosimetric analysis will be presented.

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