Replacement of iBAS by beam angle class solutions will be discussed as well.

Conclusion: Automated plan generation, including iBAS, is a pre-requisite for systematic, unbiased comparison of the impact of beam arrangements in SBRT.

SP-0366
Faster treatments, smaller margins?
W.F.A.R. Verbakel1, M. Dahele1, S. Senan1, B.J. Slotman1, J.P. Cuijpers1
1VU University Medical Center, Radiation Oncology Department, Amsterdam, The Netherlands

Stereotactic Body Radiotherapy (SBRT) involves delivery of a high dose with stereotactic precision in only a few fractions. Usual treatment sites are lung, liver, spine, prostate and often treatment is delivered using a volumetric modulated arc therapy (VMAT) technique. With conventional dose rates, the highest fraction dose treatments can take 7-12 minutes delivery time. This can be reduced to 2-3 minutes by using flattening filter free (FFF) beams with dose rates up to 2400 MU/min. Treatment planning studies have shown similar plan quality using FFF or flattened beams. Faster treatments implies less time for possible intrafraction motion. However, not all measured intrafraction motions could be correlated with treatment time. Conversely, due to the fast delivery, brief intrafraction shifts may lead to larger dosimetric differences than for slower deliveries. In addition, interplay effects of a respiratory moving tumor can be larger for the faster deliveries. Whether or not all this knowledge can lead to margin reduction may also depend on the margins that were used and the frequency and accuracy of the imaging.

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SP-0367
Absorbed dose treatment planning in radionuclide therapy
G. Flux1
1ICR and Royal Marsden NHS Foundation Trust, Department of Nuclear Medicine, Sutton, United Kingdom

The treatment of cancer with radiopharmaceuticals is expanding rapidly in terms of the numbers and range of procedures performed. The majority of treatments are currently performed with fixed activity administrations, sometimes modified according to patient weight or body surface area, as is common practice for chemotherapy procedures. Personalised dosimetry-based treatment planning, as is routine for external beam radiotherapy (EBRT), is now mandated by a new European directive (EU directive 2013/59) and presents a number of unique challenges. There is increasing evidence for strong correlations between the absorbed doses delivered to tumours and to organs-at-risk and response and toxicity (Strigari et al Eur J Nucl Med Mol Imaging 2014). While it is not possible to determine an absorbed dose that will be delivered to a tumour or organ prior to administration, due to inter-patient variations in biokinetics, it is usually found that intra-patient variations are much reduced, so that uptake and retention may be accurately predicted from a previous therapy study or from a tracer study.

Dosimetry for treatment planning of Molecular Radiotherapy (MRT) can be performed with quantitative imaging (SPECT, planar or PET) or from external probe measurements. Whole-body retention measurements allow the calculation of whole-body dosimetry which, as a surrogate for bone marrow dosimetry, has been used for several therapy procedures including I-131 mIBG treatment of neuroblastoma in paediatrics, uptake measurements for the treatment of benign thyroid disease with radioidine and radiolabeled microspheres for Y-90 and Ho-166 resin and glass microspheres. Initial treatment protocols were based on body surface area, although have become increasingly sophisticated. Two industry sponsored multi-centre international studies are currently in preparation to ascertain the correlation of the absorbed doses with response on which future treatments would be based. Conversely, Ra-223 has recently been at the forefront of a new wave of alpha based therapies, although is currently administered as a chemotherapeutic with a series of weight-based administrations at 4 week intervals.

A number of challenges are to be addressed as prospective treatment planning is introduced. Tracer administrations I-131 Nal are considered to cause a ‘stunning’ effect whereby further uptake of a therapeutic administration is mitigated, although as yet there are no systematic studies to demonstrate this effect or its severity. Further, the %ID of uptake from a tracer administration will not necessarily predict the uptake of a therapeutic administration that may be two orders of magnitude higher. This may entail the application of correction factors. Further issues to be resolved are that patient-specific factors, that may include considerations of previous treatments or the time to recovery of marrow depression, preclude rigid protocols that will necessarily be targeted to the most vulnerable of patients and will therefore be sub-optimal for the majority.

In conclusion, as outstanding challenges are addressed and resolved, the ability to directly image the uptake and retention of a radiotherapeutic in vivo and the adoption of treatment schedules that allow time between sequential administrations to calculate the absorbed doses delivered and to modify further treatments accordingly, offer the potential for highly personalised treatment planning for MRT that can only lead to improved efficacy.

SP-0368
Combined forces: Radium-223 + IMRT in the fight to cure metastatic prostate cancer
J.M. O’Sullivan1
1Queen’s University Belfast, Centre for Cancer Research & Cell Biology, Belfast, United Kingdom

Bone metastases are a frequent consequence from a wide range of malignancies and are associated with a high degree of morbidity. More than 90% of patients with metastatic castrate resistant prostate cancer (mCRPC) have bone metastases, often as the only significant metastatic site [1]. At diagnosis, approximately 10-15% of men presenting with prostate cancer have bone metastases at diagnosis. These