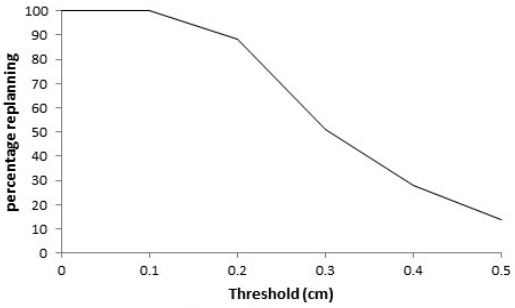

Figure 2: Percentage of patients who need a replanning versus threshold. Correction is applied after 13 fractions.

Conclusion

An adaptive correction strategy was developed based on estimating the mean position of the prostate during the early phase of treatment course. Applying a correction based on the data of the cone beam scan of the first 13 fractions can reduce the systematic error by a factor of 2.

EP-2073 The impact of the electron return effect on radiotherapy plan quality for peripheral sarcomas.

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Purpose or Objective

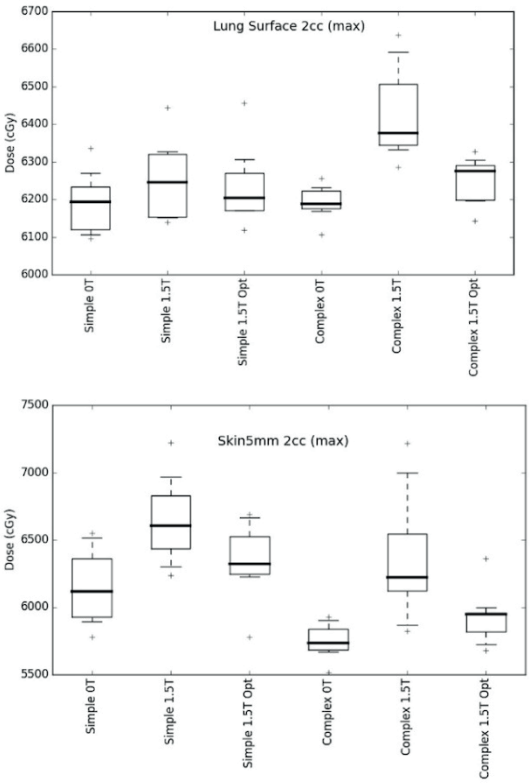
Certain cancer types, such as sarcomas, can benefit from on-line MR imaging and patients with these cancers are ideal candidates for treatment with the MR-linac. However, the electron return effect (ERE) (caused by the presence of a magnetic field with the radiation) can cause an increase in dose at tissue-air interfaces and as well as changes in plan quality. This study aimed to evaluate the impact of the electron return effect on radiotherapy plan quality parameters such as skin dose, dose at other tissue interfaces, and dose to target volumes for peripheral sarcoma plans. Specifically, we aimed to determine the point in the planning process in which it is necessary to consider the impact of the electron return effect and how to adapt the planning process to minimise the effect to achieve a clinically acceptable radiotherapy plan.

Material and Methods

This is a retrospective planning study of ten patients using CT data sets already acquired for their previous radiotherapy treatment. The ten patients were randomly chosen from the database of previously treated peripheral sarcoma patients. Each case was planned with a simple and a complex technique using the Monaco treatment planning system v5.19, 8 MV energy and a dose of 60 Gy in 30 fractions. Each simple and complex technique had a further three plans created using different applications of the magnetic field: firstly, with no magnetic field applied, then with the magnetic field applied at the end of the optimisation process and simply recalculated, and finally with the magnetic field applied from the beginning of the optimisation process. To compare the plan quality, data on the followed parameters were collected: dose cover to the target volumes, maximum dose to the skin surface, and maximum dose to the lung surface (for plans with the lung surface in the treatment volume).

Results

There is some impact on plan quality from the ERE. Although it is possible to achieve similar target volume coverage, the ERE causes higher maximum doses at air-soft tissue interfaces, such as at the skin and the lung surfaces. However, plans in which the magnetic field was applied at the beginning of the optimisation process have lower maximum doses at the air-soft tissue interfaces than plans in which the magnetic field was applied near the end. The ERE on dose at air-soft tissue interfaces can be minimised by considering the magnetic field at the beginning of the planning and optimisation processes.



Conclusion

The effect of the ERE on plan quality can be minimised by considering the magnetic field at the beginning of the planning process. Although plans with the magnetic field have higher maximum doses at air-soft tissue interfaces it is unclear if this results in any negative clinical side effects as this is not often considered in radiotherapy plan dose evaluation and assessment of radiotherapy side effects for peripheral sarcoma patients. It could be useful to determine and further explore the clinical relevance of higher doses at air-soft tissue interfaces.

EP-2074 Acceptability criteria for pre-beam plan adaptations in MR-guided prostate cancer radiotherapy

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Purpose or Objective

The MR-Linac (Elekta Unity, Elekta AB, Stockholm, Sweden) integrates a 7MV linac with a 1.5T MRI scanner. Target misalignment cannot be corrected by a couch shift and therefore daily online plan adaptations are needed to align the dose with the target. The aim of this study was to explore dosimetric acceptability criteria