"Population-based recurrence probability map for salvage radiotherapy after prostatectomy"

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Abstract

Following radical prostatectomy to treat prostate cancer, a significant portion of patients will experience elevated and rising levels of PSA, indicating chemical recurrence of the disease. Both adjuvant and salvage radiation therapy have been shown to reduce incidences of recurrence, but in most patients the site where cancer cells are active is unknown immediately following chemical recurrence. A new PET imaging technique known as PSMA PET is able to detect the location of recurrence with higher sensitivity than conventional tests after prostatectomy. Using a large dataset of PSMA-PET/CT images containing visible recurrences, we propose to build a population-based probability risk map by automating a pipeline that uses deformable registration to sum all recurrences on a reference patient anatomy. Ultimately we aim to apply machine learning methods to leverage information on individual risk factor profiles and population data, which will allow us to adjust and tailor the risk map to each individual patient. In this way, radiation treatments may be better targeted to the regions at highest risk of bearing microscopic disease.