

Impact of SpaceOAR on Prostate Cancer Patients Treated with Stereotactic Body Radiation Therapy

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INTRODUCTION

Stereotactic Body Radiation Therapy (SBRT) treatment to localized prostate cancer produces favourable tumour control as well as grade 2 rectal toxicity^{1,2} due to the high doses received by the proximal rectal wall.

Transperineal injection of SpaceOAR hydrogel can create approximately 8-10mm of buffer between the PTV and rectum which allows for better rectal dose sparing without sacrificing PTV coverage.

PURPOSE

To study the impact of SpaceOAR on PTV coverage and rectum sparing in treating prostate cancer using stereotactic body radiation therapy (SBRT) doses.

METHOD

- 20 prostate cancer patients were prescribed with a SBRT dose of 4250cGy in 5 fractions.
 - 10 of the patients underwent rectal SpaceOAR insertion. Both CT Simulation and MR imaging took place around a week after insertion.
 - The comparison group consisted of 10 patients without SpaceOAR insertion.
- All treatments were planned with 2 full arcs using the 6MV FFF beam.
- All plans met dose constraints for PTV coverage and OAR sparing as per our department prostate SBRT treatment directive.
- The D95 to PTV and rectum dose to 0.01 cc, 1 cc and 3.5 cc were analyzed and compared between those two groups of patients.

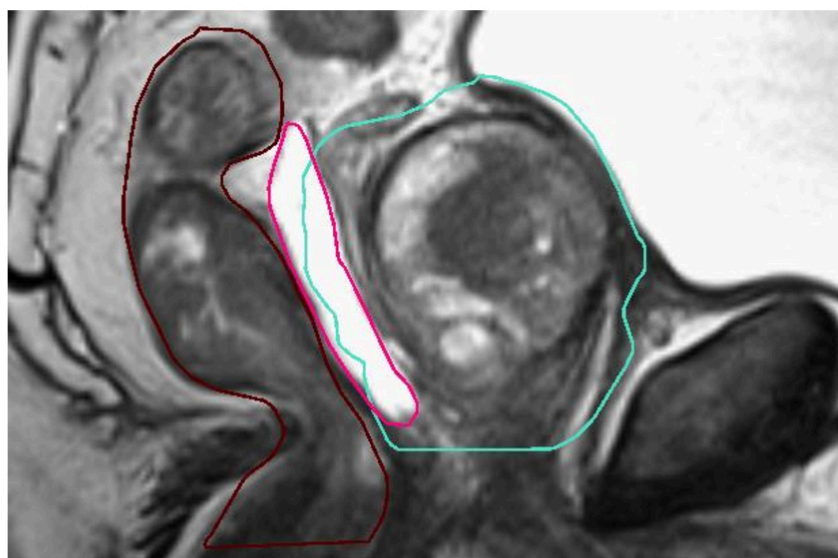


Figure 1. T2 Sagittal MR of SpaceOAR (pink) inserted between rectum (brown) and PTV (cyan)

RESULTS

The average D95 to the PTV in SpaceOAR patients was 96.0% which is 2.2% higher than that to the patients without SpaceOAR. The mean values of rectum dose to 0.01 cc, 1 cc and 3.5 cc were 83.4%, 65.6% and 53.5% of the prescribed dose, respectively, for SpaceOAR patients. In comparison, the mean values were 99.1%, 92.0% and 79.5%, respectively, for patients without SpaceOAR insertion.

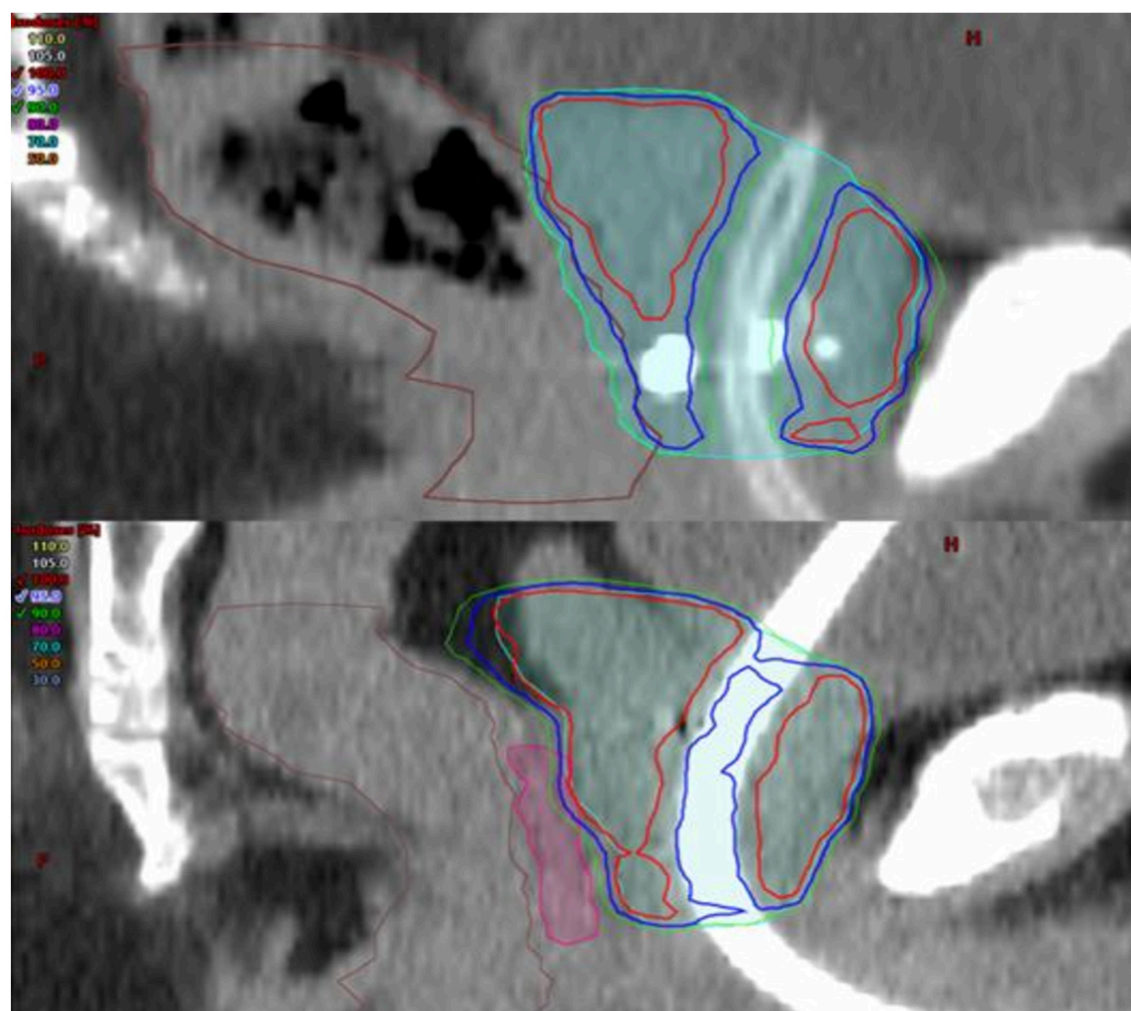


Figure 2. Sagittal view of isodose lines in a non SpaceOAR plan (top) and a SpaceOAR plan (bottom)

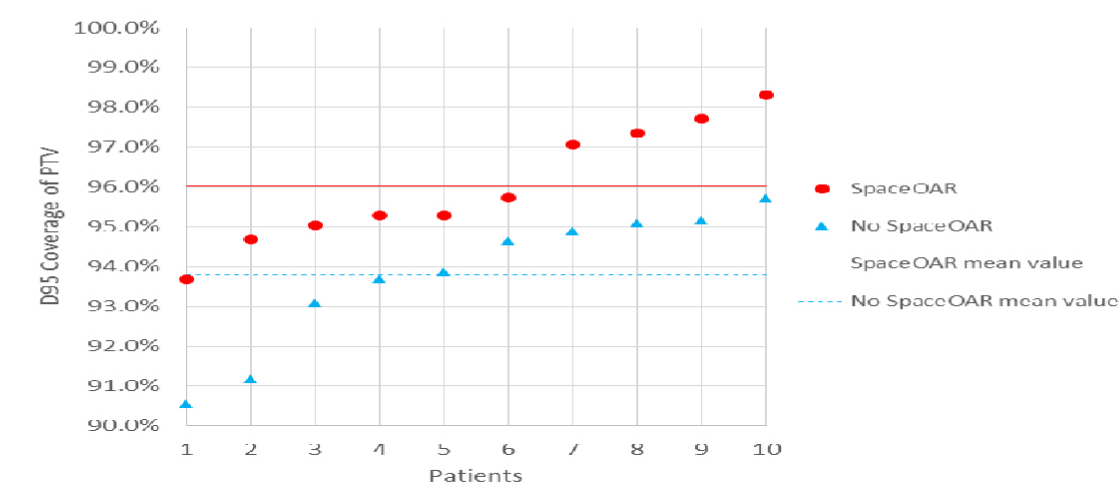


Figure 3. D95 to PTV of patients with and without the insertion of SpaceOAR.

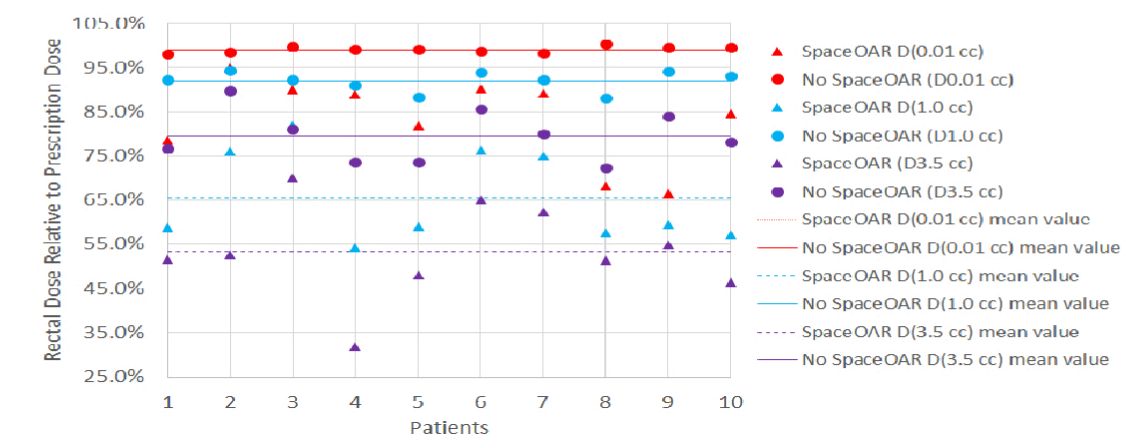


Figure 4. Dose to 0.01 cc, 1.0 cc and 3.5 cc of the rectum for patients with and without the insertion of SpaceOAR.

CONCLUSIONS

SpaceOAR insertion allows for better PTV coverage posteriorly while helping reduce dose to the rectum significantly, therefore lowering patient morbidity and improving the quality of life.

REFERENCES

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