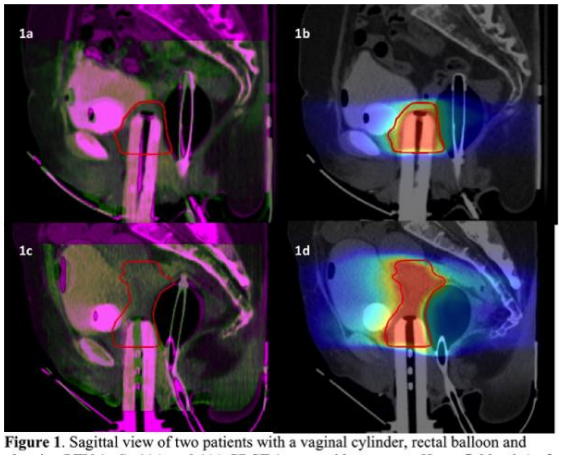

Figure 1. Sagittal view of two patients with a vaginal cylinder, rectal balloon and planning PTV (red). **1(a) and 1(c)** CBCT (green, without proper Hounsfield units) of one fraction overlaid on planning CT (purple), in treatment position. **(1b) and (1d)** Measured dose map non-rigidly deformed overlaid on planning CT. **Upper images**: Patient 1 with CBCT-planning CT match leading to a CTV coverage difference between planned and measured of 0,5%; **Lower images**: Patient 2 with difficult patient set-up leading to a CTV coverage difference between planned and measured of 13.4%.

Table1. Average dose planned and delivered for 23 patients. Delivered doses derived from CBCT anatomy for all fractions. Dose constraints as indicated in our clinical protocol. Data for the 3 and 5 fractions scheme is shown.

3 Fractions	Mean treatment	Mean planned	Dose-volume constraints
D2cc Bladder wall (Gy)	15.7 ± 3.0	15.9 ± 3.0	V(21.6 Gy)<2cc
Dmax Small bowel (Gy)	5.5 ± 7.2	7.0 ± 10.0	Dmax = 8Gy (7.5Gy/fraction) Dmax= 24.3 Gy (10.5Gy/fraction)
V PTV1 (%)	86.0 ± 6.3	99.8 ± 0.3	V(15 or 21 Gy) ≥ 99%
V CTV1 (%)	96.8 ± 2.8	99.4 ± 2.2	V(15 or 21 Gy) ≥ 99%
V CTV2 (%)	89.4 ± 10.8	99.6 ± 0.4	V(22.5 or 31.5 Gy) ≥ 99%
D2cc Rectal wall (Gy)	16.2 ± 2.4	16.2 ± 2.6	V(16.8 Gy) < 2cc
5 Fractions	**Mean treatment**	**Mean planned**	**Dose-volume constraints**
D2cc Bladder wall (Gy)	24.7 ± 1.6	24.9 ± 1.7	V(25 Gy)<2cc
Dmax Small bowel (Gy)	15.0 ± 6.5	7.5 ± 3.7	Dmax = 9Gy
V PTV (%)	58.8 ± 11.9	72.9 ± 11.0	V(15 Gy) ≥ 99%
V CTV (%)	71.9 ± 14.2	82.0 ± 13.2	V(15 Gy) ≥ 99%
D2cc Rectal wall (Gy)	19.6 ± 2.7	19.3 ± 1.2	V(20.5Gy) < 2cc

Conclusion

Image-guided VMAT boost for gynecological cancer pts has been implemented. Patient set-up and CBCT image quality is a challenge for the low prognostic pts (5 fraction scheme). PTV margins used are adequate but evaluation of the added PTV margin to the 3 fraction scheme is needed.

EP-2019 Does the use of an endorectal balloon improve seminal vesicle stability for prostate radiotherapy?

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Purpose or Objective

Endorectal balloons have been used for prostate immobilisation and rectal wall sparing during radiotherapy for prostate cancer. However, inter-fraction motion of the seminal vesicles (SVs) is larger than for the prostate, and reducing their motion may lead to improved target volume coverage and/or decreased rectal dose when SVs are included in the clinical target volume. In this study, we assessed whether the use of an endorectal balloon (ERB) improved stability of the SVs.

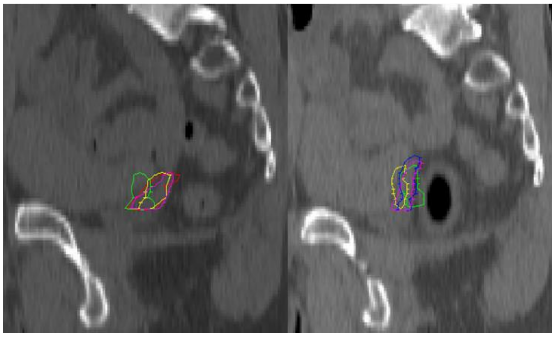
Material and Methods

Ten patients undergoing radiotherapy for prostate cancer participated in a feasibility study of a RectalPro ERB filled with 100cc of air inserted at radiotherapy planning and 4 subsequent visits during treatment. SVs were contoured on the radiotherapy planning CT and subsequent cone beam CTs (CBCT) with and without an ERB. SV stability was assessed by comparison of their displacement on CBCT compared to the radiotherapy planning CT by centre of mass, keeping the prostate aligned using soft tissue registration. Comparison of means and standard deviations were assessed using two-tailed unpaired t-tests and f-tests respectively.

Results

34 and 37 CBCTs with and without ERB were assessed. Four patients were not able to complete all four pairs of cone beam CBCTs. Mean SV displacement without and with ERB for left-right direction was -0.6mm vs 0.6mm (p=0.070), superior-inferior -0.1mm vs -0.1mm (p=0.987) and anterior-posterior 0.7mm vs -0.3mm (p=0.476). Corresponding standard deviations of SV displacement without and with ERB were left-right 3.6mm vs 2.0mm (p=0.001), superior-inferior 2.8mm vs 2.0mm (p=0.132) and anterior-posterior 6.7mm vs 5.0mm (p=0.101). Seminal vesicles were more difficult to visualise on CBCT than radiotherapy planning CTs, especially with ERB in situ, and variation in ERB insertion angle affected positioning of pelvic soft tissue organs.

Seminal vesicle displacement	Endorectal balloon	Left-right	Superior-inferior	Anterior-posterior
Mean	Without	-0.6mm	-0.1mm	0.7mm
	With	0.6mm	-0.1mm	-0.3mm
Standard deviation	Without	3.6mm	2.8mm	6.7mm
	With	2.0mm	2.2mm	5.0mm



Left: Seminal vesicle positioning without endorectal balloon. Right: Seminal vesicle positioning with endorectal balloon.

Conclusion

The insertion of an endorectal balloon for prostate radiotherapy improves stability of the seminal vesicles relative to the prostate. The largest seminal vesicle displacement is seen in the anterior-posterior direction. However, ERBs may impair soft tissue visualisation and alter soft tissue anatomy, so utilisation of daily image guided radiation therapy is recommended when ERBs are used.

EP-2020 Assessment of treatment margins for breast radiotherapy evaluated using CBCT

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Purpose or Objective

In the clinical routine patients are often positioned based on planar x-ray images prior to irradiation in external beam breast radiotherapy. The objective of the present study was to find the treatment margins from a setup