Table 1	Manual plan		Autoplan			
	mean [Gy]	std [Gy]	mean [Gy]	std [Gy]	p	diff [Gy]
PTV	77,2	0,4	78,0	0,3	<0.001	0,8
CTV	78,2	0,4	78,6	0,3	<0.001	0,3
Bowel	9,7	11,3	7,2	8,7	<0.001	-2,5
Rectum	42,6	5,7	31,8	6,2	<0.001	-10,8
Bladder	39,9	12,5	33,8	11,6	<0.001	-6,1
C.femur right	22,4	6,4	18,2	5,8	<0.001	-4,2
C.femur left	23,0	7,1	17,7	6,4	<0.001	-5,3
Penile Bulb	21,9	14,3	16,1	11,8	<0.001	-5,8
External	5,2	0,8	4,8	0,8	<0.001	-0,4
Delivery						
3%, 3mm	99,7	0,5	99,1	1,6	<0.001	-0,6
2%, 2mm	96,8	2,1	94,3	4,7	<0.001	-2,5
MU	307,3	27,7	403,2	31,8	<0.001	95,9

For two plans the radiation oncologist evaluated the MA and AP to be of equal quality. For 40 of the 42 patients the oncologist chose the AP plan for treatment. Among the 40 plans, 25 of them were predicted to have a clinical relevant benefit. For the ArcCheck measurements the mean global pass rate (3%, 3mm) was reduced from 99.7% (MA) to 99.1% (AP), both well above the clinical acceptance criteria of 95%. Decreasing the margin of the gamma analysis to 2% and 2mm cut the pass rates to 96.5% and 94.3%, respectively.
The MAs had on average 307 MU and took 90 sec. to deliver, while the APs had on average 403 MU and took 110 sec to deliver. This may be related to an increase in MLC modulation.

Conclusion

Autoplan shows a clear clinical improvement in plan quality for high risk prostate cancer treatment planning, delivering both higher doses to the target while sparing all delineated OARs as well as reducing integral body dose. For these reasons the oncologist prefers the AP.

EP-1526 Analysis of dose deposition in lung lesions: a modified PTV for a more robust optimization

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Purpose or Objective

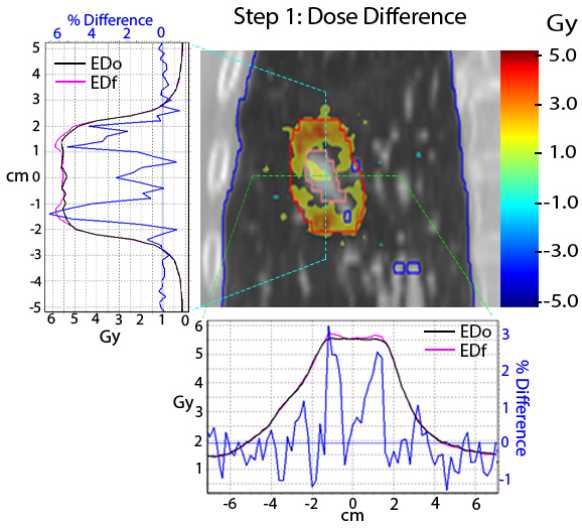
SBRT in lung cancer is often used to deliver high doses to a small dense nodule (GTV) moving into a low density tissue (the margin generating the PTV).
In order to reach an acceptable degree of accuracy, type B or MC-based algorithms should be adopted.
If a modulated technique (IMRT or VMAT) is used to treat such inhomogeneous PTV, an apparently homogeneous dose distribution is delivered, but high photon fluence is generated inside a 3D shell (PTV-GTV) due to its low electron density (ED). This situation gives the paradox that the dose distribution is apparently uniform, but the GTV, which will move into the PTV, will receive a dose that depends on its position.
This work was designed to evaluate this phenomenon and to suggest a more robust dos
e optimization.

Material and Methods

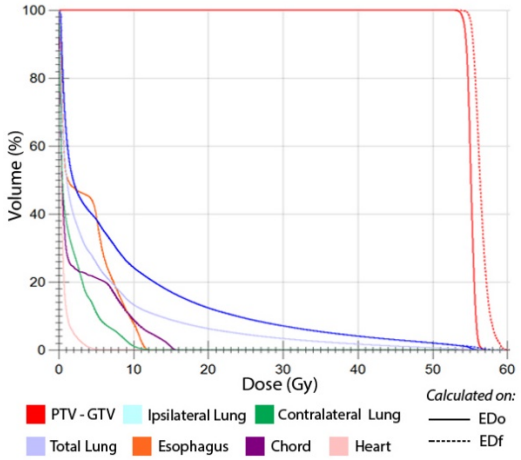
A TPS Monaco 5.11 (Elekta, SWE) with a MC algorithm was used to simulate a SBRT treatment in a dummy patient (55 Gy in 5 fractions). In a first step, in order to evaluate the dose discrepancy on the target when considering the motion of the high ED GTV, the photon fluence was optimized for the original PTV ED (EDo) and thus used to calculate the dose on a "forced" PTV ED (EDf) in which the ED of the PTV was forced to the mean ED of the GTV.
In a second step the photon fluence was optimized for PTV EDf and then used for the dose calculation on PTV EDo in order to evaluate the dose variation on the lower ED region of the PTV and inside the GTV.
Dosimetric comparisons between the original and recalculated dose distribution were made in each step in terms of: dose profiles through PTV, D_{mean}, $D_{98\%}$ and $D_{2\%}$ for PTV-GTV.

Results

In step 1 dose profiles, calculated on EDo and EDf, differ up to 6.6%, 3.4% and 3.8% on longitudinal, sagittal and transversal axes along the plan isocenter (center of GTV). Dose increments of 1.6% for $D_{98\%}$, 2.5% for D_{mean} and 5% for $D_{2\%}$ were obtained for PTV-GTV (see figures 1,2).
In step 2 the maximum difference between dose profiles was -3% for all three axes along the plan isocenter. A reductions of -1.5% for $D_{98\%}$, -1.5% for D_{mean} and -1.4% for $D_{2\%}$ were achieved for PTV-GTV.



Step 1: Photon Fluence Optimized for EDo



Conclusion

If the GTV is static, it should receive a constant dose, but step 1 shows that the dose delivered to GTV, when it reaches a position inside the PTV (where the photon fluence is optimized for low electron densities), is higher than what estimated on the original EDo map. The GTV is thus irradiated in a more homogeneous way in step 2 in which the fluence is optimized for its mean ED everywhere in the PTV. We propose that, in lung small lesions, the PTV is modified in terms of electron density considering the GTV mobility. Optimizing the photon fluence for the "forced" electron density map appears an effective way to evaluate the real dose delivered to the GTV.

EP-1527 Pelvic Intensity-Modulated Radiotherapy in prone and supine position in gynaecological cancer

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