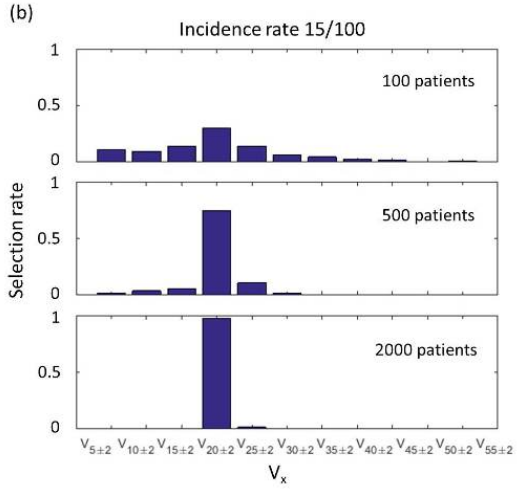
(a)

Nr of patients \ Incidence rate	7/100	15/100	30/100
100	20%	31%	36%
500	56%	75%	81%
2000	92%	98%	99%

(b)



Conclusion

For realistic dose distributions and cohort sizes, a state-of-the-art analysis failed to identify the postulated dose-response in about 2-in-3 cases for the low incidence of the large-volume effect complication radiation pneumonitis. Very large patient cohorts were required to ensure recognition rates above 90%. This fundamentally low success rate could explain the persistent difficulties to derive dose constraints from clinical data for complications in large-volume effect, "parallel" organs.

EP-1615 Second cancer risk after radiation of localized prostate cancer with and without flattening filter

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Purpose or Objective

Radiotherapy is a standard treatment modality with curative intent for localized prostate cancer. Prostate cancer is a disease of elderly men. Nevertheless these patients have a remaining life span of ten years or more. Radiotherapy compared to surgery may increase the risk for second cancer. Minimizing this risk can be one criterion in deciding for a specific technique. Therefore we compared the organ equivalent dose (OED) and excess absolute risk (EAR) for second cancer for different treatment techniques.

Material and Methods

For ten patients four different plans were calculated, using a seven field intensity modulated radiotherapy (IMRT) and a single arc volumetric modulated arc therapy (VMAT) with and without flattening filter. The optimization was performed as simultaneous integrated boost in 33 fractions, aiming for 59.4 Gy minimum dose to the PTV and 71.0 Gy minimum dose and 74.2 Gy maximum dose to the CTV. The OED was computed for the urinary bladder and the rectum from dose volume histograms for the linear-exponential (LEM) and the plateau dose-response model (PM). The EAR can be derived from the OED, taking age modifying parameters into account. The statistical analysis was performed using the Wilcoxon test in IBM® SPSS® Statistics 23 (IBM Corporation).

Results

Within one technique (IMRT or VMAT) the average value of the OED is lower for the flattening filter free (FFF) mode compared to flat beams (FB) in both organs and for both dose-response models with one exception: In the urinary bladder it is the other way round for IMRT and the LEM These results are statistically significant (level of significance 5%). The results for VMAT are statistically significant for the rectum only in both models.

Comparing IMRT and VMAT the results are ambiguous: For the LEM the OED is lower with IMRT for both FB and FFF, for the PM lower OEDs are achieved with VMAT. All results are significant, except of one (LEM, FFF, urinary bladder, p = 7.4%).

The average values for the EAR for patients of 71 years at exposure and an attained age of 84 years are given in table 1.

	Urinary Bladder		Rectum	
	$EAR_{lin\text{-}exp.}$	$EAR_{plateau}$	$EAR_{lin\text{-}exp.}$	$EAR_{plateau}$
IMRT FB	41.66 ± 4.12	49.35 ± 6.04	8.94 ± 0.08	10.64 ± 0.11
IMRT FFF	43.53 ± 5.23	48.93 ± 6.42	9.10 ± 0.09	10.57 ± 0.12
VMAT FB	45.23 ± 5.49	48.33 ± 6.38	9.50 ± 0.09	10.54 ± 0.11
VMAT FFF	44.68 ± 6.17	47.98 ± 6.92	9.36 ± 0.09	10.49 ± 0.12

Table 1. Excess average risk in 10,000 person years Gy

Conclusion

Some statistically significant differences have been found for the different treatment techniques and modes. However, they depend on the dose-response model. For the PM the lowest EAR is found for VMAT FFF in both organs at risk, for the LEM IMRT FB shows the minimum values. Plan quality and efficiency should additionally be regarded before the decision for a specific technique and mode.

Electronic Poster: Physics track: Intra-fraction motion management

EP-1616 Phase II trial of a novel device for DIBH in left-sided breast cancer: preliminary results

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Purpose or Objective

To present the preliminary results of the prospective phase II trial of a novel device, called DIFGI, for deep inspiration breathhold (DIBH) in left-sided breast cancer. We will focus on the performance of the device as well as on the dosimetrical benefits of the technique.

Material and Methods

DIFGI is a simple, friendly, low-priced external respiration-monitoring device developed in our institution that has obtained a utility model protection (Fig.1). The patients hold her breath in supine position until contacting an horizontal bar, which activates an acoustic and a visual signal that offers feedback to the patient and the RTTs,