Conclusion
Although both 15Gy-BT and 2x9.5Gy-BT boost schemas achieve excellent long-term biochemical and survival rates in combination with EBRT for high-risk prostate cancer, late grade 3 GU toxicity was statistically unfavorable for 2x9.5Gy-BT boost. No differences in acute GU and GI toxicity were observed between schemas. Late grade 3 or higher GI toxicity was similar in both groups.

PH-0658 Impact of brachytherapy boost on toxicity, functional and cancer outcomes for prostate cancer

Abstract withdrawn

PH-0659 Metastasis-free survival after salvage radiotherapy in post-operative prostate cancer patients in the PSMA PET/CT era - a bi-institutional, retrospective analysis
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Purpose or Objective
Prostate specific membrane antigen positron emission tomography (PSMA PET) has a high detection rate and influences therapeutic decision making in postoperative prostate cancer patients. However, the outcome of PET-based salvage radiotherapy (sRT) in terms of metastasis-free (MFS) survival has not yet been extensively studied. MFS is associated with a significant risk of death from prostate cancer. The purpose of this analysis was to analyse MFS in the era of PSMA PET/CT for sRT guidance and for restaging in terms of biochemical failure after sRT.
Materials and Methods
This bi-institutional, retrospective analysis included patients referred for PSMA PET/CT after radical prostatectomy due to biochemically recurrent or persistent disease. All patients received intensitymodulated RT with a median dose of 70 Gy to the prostatic fossa. In case of PET positive lymph nodes, elective pelvic lymphatics were irradiated with a dose of 45-50 Gy including a boost to the PET positive regions (up to 60 Gy). Androgen deprivation therapy was given in patients with PET positive lymph nodes ot with pre sRT PSA values of >0.7 ng/ml. Patients with follow-up time <12 months, with distant metastases in PSMA PET/CT scans prior to sRT and >3 months' time gap between PSMA PET/CT and beginning of sRT were excluded. MFS (staged by post sRT PSMA PET/CT imaging) was the primary study endpoint. Cox-regression analysis was performed to assess the impact of clinical parameters derived from the MSKCC nomogram as well as of positive findings in PET (positive findings in PET: yes or no / positive lymph nodes in the pelvis: yes or no) on MFS. Finally, the localization of the metastases in PSMA PET/CT images was assessed.
Results
The final analysis included 281 patients with a medium follow-up time of 39 months (IQR: 27-51). The 2- and 4-year MFS rates after sRT were 84% and 69%, respectively. 54% and 66% of the patients with biochemical recurrent disease had also metastatic disease. In multivariate analysis including all parameters from the MSKCC nomogram as well as findings in PET, only PSA before sRT (HR=1.5, p=0.01) and pT stage (HR=1.5, p=0.04) were significantly associated with MFS. The metastases were primarily localized in subdiaphragmal paraaortic lymph nodes (42.9%), non-pelvic bones (28.6%), pelvic bones (14.3%), supradiaphragmal lymph nodes (8.6%) and in visceral organs (5.7%), respectively.
Conclusion
This is one of the first analyses reporting on MFS after sRT in the PSMA PET/CT era showing promising results in terms of tumor control. Additionally, the present analysis confirmed the strong prognostic effect of PSA level prior to sRT. Most of the metastases after sRT were located in abdominal lymph nodes. Future studies with longer follow-up are warranted to confirm the association between MFS and prostate cancer specific survival after sRT in the PSMA PET era.

PH-0660 Independent role of dose-escalation and prophylactic WPRT in salvage RT after radical prostatectomy
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Purpose or Objective
The role of both RT dose-escalation and prophylactic whole-pelvis irradiation (WPRT) in the setting of salvage

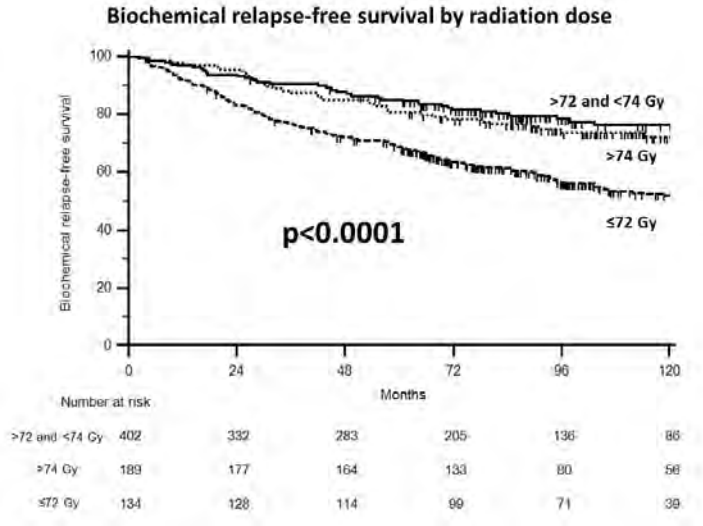
RT (SRT) after radical prostatectomy are still highly debated. Aim of this analysis was to investigate the independent role of both in a large cohort of men treated with high-dose SRT.

Materials and Methods

A merged database comprising men treated with SRT in seven Institutes was analyzed. Only pts with a minimum (if alive) follow-up of 5 years and a PSA ≤2 ng/mL at SRT start were considered. This resulted in a cohort of 725 men treated with a median 2-Gy equivalent dose (EQD2) of 72 Gy (IQR 70-72.85). Radiotherapy was delivered to prostatic bed (PB) only in 455 men, to PB+WPRT in 270. Adjuvant androgen deprivation therapy (ADT) was given to 38% for a median of 14 months.

Results

The median follow-up was 102 months (IQR 78-140), median PSA at SRT 0.43 ng/mL (IQR 0.24-0.80). Two Receiver Operating Characteristics (ROC) curve analyses indicated an EQD2 dose ≤72 Gy as the most informative cut-off with respect to the risk of both biochemical and clinical relapse (p≤0.0003). The 8-year biochemical relapse-free (bRFS) and clinical disease-free survival (cDFS) in patients treated at EQD2 doses ≤72, >72 and ≤74 or >74 Gy were 57%, 78% and 75% (p<0.0001, Figure 1) and 81%, 89% and 89% (p=0.002), respectively.



The 8-year bRFS and cDFS in men treated with PB only (median dose to PB 70 Gy, median PSA at SRT 0.42) or PB+WPRT (median dose to PB 72.58 Gy, to WPRT 48.38 Gy, median PSA at SRT 0.43) were 62% *vs* 73% (HR 0.61, p=0.0003) and 87% *vs* 83% (HR 0.70, p=0.054).

The results of Cox's backward multivariable analyses including only variables with a p-value <0.20 at univariable are shown in Table 1. SRT doses >72 Gy, WPRT and adjuvant ADT emerged as independent predictors of improved post-SRT bRFS, while WPRT was the sole treatment-related factor significantly improving cDFS. The overall 8-year risk of Grade ≥3 toxicity was 5% *vs* 14% in men treated at EQD2 doses ≤72 vs >72 Gy (p=0.002), being however almost identical (4.9% *vs* 5.1%) in the cohort receiving conventionally-fractionated RT.

Biochemical and Clinical Relapse-Free Survival Multivariable Analyses

Biochemical Relapse-Free Survival

Variable	Categorization	HR	p.value
Adjuvant ADT	NO YES	Ref. 0.71	- 0.02
Surgical Margins	Positive Negative	Ref. 1.39	- 0.02
ISUP Group	1-2 3-5*	Ref. 2.13	- <0.0001
Pathologic stage	pT2 pT3a pT3b	Ref. 1.42 2.60	- 0.03 <0.0001
PSA@RT	Continous	1.70	0.0005
EQD2	≤72 Gy >72 Gy	Ref. 0.61	- 0.003
RT Volume	PB only PB+WPRT	Ref. 0.61	- 0.04

*Best categorization with respect to the risk of post-SRT BCR

Clinical Disease-Free Survival

Variable	Categorization	HR	p.value
ISUP Group	1-3 4-5**	Ref. 2.17	- 0.003
PSA Doubling Time	Continous	0.95	0.002
PSA@RT	Continous	1.68	0.02
RT Volume	PB only PB+WPRT	Ref. 0.58	- 0.02

**Best categorization with respect to the risk of post-SRT clinical recurrence

Conclusion
Both EQD2 doses >72 (but not >74 Gy) and WPRT, as well as ADT, significantly improved bRFS, while only WPRT, but not the sole dose-escalation, significantly reduced the risk of clinical recurrence. Further analyses will address which pts subsets can safely be spared such treatment intensification.

PH-0661 survival analysis of brachytherapy alone vs. EBRT in unfavorable intermediate-risk prostate cancer

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Purpose or Objective
The NCCN currently recommends several definitive radiotherapy options for men with unfavorable intermediate-risk prostate cancer (UIR-PCa) including external beam radiotherapy (EBRT) ± brachytherapy boost ± androgen deprivation therapy (ADT). However, brachytherapy alone (BT) ± ADT is not currently recommended by the NCCN for UIR-PCa. Given that BT allows for significant dose-escalation relative to EBRT, we hypothesized that men treated with BT±ADT have comparable survival to men treated with EBRT±ADT.
Materials and Methods
A total 32,246 men diagnosed between 2004-2015 with UIR-PCa treated with EBRT±ADT (≥ 72 Gy in 1.8-2.0 Gy per fraction) or BT±ADT (HDR-BT or LDR-BT) were identified in the National Cancer Database (NCDB). Patients with a Charlson-Deyo comorbidity index (CDCI) score > 1, who received systemic therapy other than ADT, or missing key information were excluded. Inverse propensity of treatment weighting (IPTW) was used to adjust for covariable imbalances and weight-adjusted multivariable analysis (MVA) using Cox regression modeling was used to compare overall survival (OS) hazard ratios. Covariables included age, race, ethnicity, year of diagnosis, CDCI score, insurance status, educational and socioeconomic metrics, treatment at an academic center, PSA as diagnosis, Gleason score, clinical T-stage, and receipt of ADT.
Results
Patients were stratified into four groups: (*i*) EBRT (n=12,985), (*ii*) EBRT+ADT (n=12,960), (*iii*) BT (n=4,535), or (*iv*) BT+ADT (n=1,303). Relative to EBRT alone, the following treatments were associated with improved OS: EBRT+ADT (Hazard Ratio (HR): 0.92 [95% Confidence Interval (95% CI): 0.87-0.97], *P*=.002), BT alone (HR: 0.90 [0.83-0.98], *P*=.01), and BT+ADT (HR: 0.78 [0.69-0.88], *P*=.00006). In men receiving ADT, brachytherapy correlated with improved OS relative to EBRT (HR: 0.84 [0.75-0.95]. *P*=.004) (Figure 1A). In men who were not treated with ADT, brachytherapy correlated with improved OS relative to EBRT (HR: 0.92 [0.84-0.99]. *P*=.03) (Figure 1B). At 10 years follow-up, 56% and 63% of men receiving EBRT and brachytherapy were alive, respectively (*P*<.0001). IPTW was used to determine the average treatment effect of definitive brachytherapy. Relative to EBRT, definitive brachytherapy was associated with improved OS (HR: 0.90 [0.84-0.97, *P*=.009) on weight-adjusted MVA. The addition of ADT was associated with a similar improvement in OS (HR: 0.90 [0.83-0.97], *P*=.004).

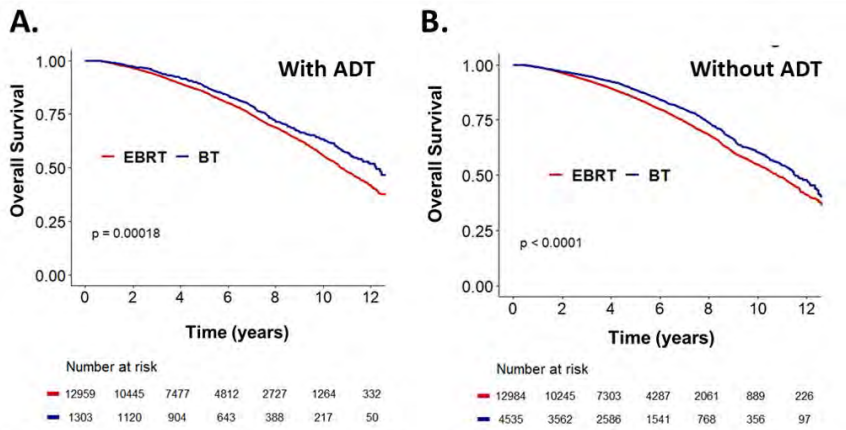

Figure 1. Kaplan-Meier curves showing overall survival stratified by treatment with either definitive brachytherapy (BT) or external beam radiotherapy (EBRT) for men treated (**A**) with ADT and (**B**) without ADT.

Conclusion
Definitive brachytherapy was associated with improved OS compared to EBRT for UR-PCa. The addition of ADT was associated with improved OS for patients treated with EBRT and those treated with BT. BT+ADT was associated with improved OS vs. EBRT+ADT, an NCCN standard-of-care treatment. This study provides additional evidence to support incorporating BT+ADT into the NCCN guidelines for UIR-PCa.

PH-0662 Clinical parameters and nomograms for predicting lymphnode metastasis detected with 68Ga-PSMA-PET/CT