treatment acceleration, as measured by weekly dose-volume/surface parameters.

PD-0133

Can we use a sentinel node procedure to select patients for whole-pelvis radiotherapy in prostate cancer?

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Purpose/Objective: Although there are data suggesting that whole-pelvic radiotherapy (WPRT) might improve cancer-specific survival in selected patients, a clear benefit has not been demonstrated yet. Randomized controlled trials designed to solve this question are urgently warranted. One of the obstacles in the treatment decision making process is the lack of accurate staging modalities to diagnose lymph node (LN) involvement so that until now, only an extended LN dissection ensures a full nodal staging. The objective of this study was to investigate the feasibility and efficacy of a sentinel node (SN) procedure in patients at high risk for LN involvement and to illustrate the impact of using this procedure in the design of a WPRT trial.
Materials and Methods: A total of 74 patients with a risk ≥10% but <35% for LN metastases (Partin tables) who were node-negative (N0) at contrast-enhanced CT, were prospectively enrolled. Three transrectal ^{99m}Tc-nanocolloid injections were performed per prostate lobe under ultrasound guidance. Two hours later, patients underwent planar and SPECT imaging to facilitate localisation of the SN during surgery. Intraoperatively, a gamma probe was used to detect the LN that had taken up the radionuclide. SN were removed separately. After SN dissection, all patients underwent a super-extended LN dissection (internal, external and common iliac, obturator fossa and presacral regions), followed by radical prostatectomy. All retrieved LN were histopathologically examined.
Results: In total, 470 SN were scintigraphically detected (patient median, IQR 3-9) of which 371 (patient median 4, IQR 2.25-6) were located and removed. In 1 patient, no SN were detected on the SPECT images nor intraoperatively and in 2 patients, the SN that were found on the SPECT images could not be retrieved during surgery.
Histopathology confirmed LN metastases in 34 patients (46%) with a total of 91 affected LN (median number per patient 2, IQR 1-3) of which 46 LN were SN (51%). Twenty-seven of these node positive (N+) patients had at least 1 N+ region containing a SN, which was affected in 96% of the cases (26/27). However, the 6 additional N+ patients in whom no SN were detected in the affected region had to be taken into account as false negatives (FN). Therefore, sensitivity of the procedure decreased to 79% (26/33). If this procedure would be applied to select patients for a WPRT trial, no less than 21% of the N+ patients would not be randomized. Moreover, since SN procedure alone removed all affected LN in 14/33 (42%) patients, these 'new N0' patients should be taken into account for sample size calculation.
Conclusions: Although the SN procedure was technically feasible, its sensitivity was too low to offer a valuable alternative to the standard extended LN dissection for nodal staging in these high-risk PCa. If this procedure would be applied to select patients for a WPRT trial, FN rate and the number of N0-patients *due to* the SN procedure should be taken into account.

PD-0134

No increased risk of local failure for patients with a distended rectum: the geometrical miss concept unraveled.

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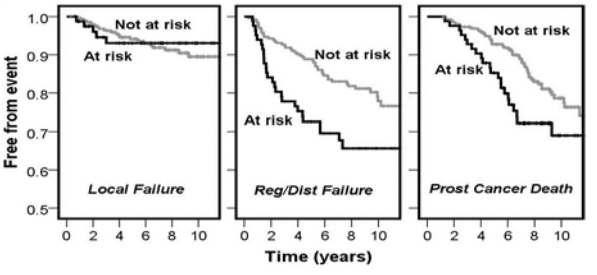
Purpose/Objective: For prostate cancer patients with a large rectum at planning a risk of geometric miss has been suggested in recent literature. We also previously reported a significant decrease in tumor control in case of a large rectum at planning for intermediate- to high-risk prostate cancer patients. Now we investigated in the same patient group with a prolonged median follow-up of 110 months, whether a large rectum at planning was associated with local failure, regional/distant failure, and/or prostate cancer related death (PCRD), and to what extent this affected overall survival.

Materials and Methods: Patients from a multicenter trial (randomized between 78 Gy and 68 Gy) with data on acute diarrhea and with an estimated seminal vesicle involvement of >25 % were included (n=349). Planning target volume was the prostate and seminal vesicles with a margin of 1 cm for the first 68 Gy and a margin of 5 mm for the 10 Gy boost when applicable with 0 mm margin towards the rectum. Investigated risk factors for geometric miss were (similar to our previous study): rectal volume ≥90 cm^3 and diarrhea reported during at least 25% of treatment (RF1, n=87/349), and cross-sectional area (CSA) of the rectum >8 cm (RF2, n=83/349) regardless reported diarrhea. CSA was calculated by dividing the rectal volume by the rectal length in cranial-caudal direction. We calculated Hazard Ratios (HR) and Kaplan Meier curves for each outcome, stratifying for the dose arms.
Results: There were 68 cases of PRCD, 26 cases of local failure as first event, and 73 cases of regional/distant failure as first event. Surprisingly, there was no increased risk for local failure (Figure) for both risk factors (HRs≈1) while they were associated with a higher risk of regional/distant failure (Figure): HR=1.6 (p=0.06) for RF1 and HR=2.0 for RF2 (p=0.007), and with increased rates of PCRD: HR=1.9 (p=0.01) and HR=1.7 (p=0.04), respectively. The estimated difference in disease specific survival was 14% at 10 years (Figure) for RF1 (68 % versus 82 %). The corresponding overall survival curve showed a difference of only 6 % at 10 years (60 % versus 66 %).

Figure. Kaplan Meier curves for RF2: at risk (n=83) vs not at risk (n=266).



Conclusions: Patients with a large rectum at planning had no increased risk for local failure, which considerably weakens the hypothesis of 'geometric miss'. Apparently the local tumor was not missed during treatment. An alternative hypothesis for the observed increase in regional/distant failure could be that a large rectum at planning is associated with geometrical miss outside the prostate, i.e. extraprostatic disease in -for instance- lymph node areas receiving less (unintended) dose due to a ventral shift of the dose distributions.

PD-0135

The impact of radiation therapy technology and treatment protocol on high-risk prostate cancer outcome

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Purpose/Objective: Several reports have suggested an impact of treatment parameters such as radiation dose, treatment margin and image guidance (IG) of radiotherapy (RT) delivery on Prostate Cancer (PCa) treatment outcomes. The purpose of this work is to review published actuarial estimates of Prostate Specific Antigen Relapse Free Survival (PRFS) for high-risk disease treated by 3DCRT, IMRT or IG-IMRT with or without Androgen Depravation Therapy (ADT), and establish the dose-response relationship.
Materials and Methods: PubMed searches were performed on PCa outcomes following external beam RT. Data on treatment margin, use and duration of ADT, prescribed radiation dose, treatment technique(IMRT/IGRT), randomized trial, PRFS (Phoenix definition) at 3, 4, 5 and 7-years for high risk PCa were collected. Dose per fraction was corrected to 2 Gy-equivalent doses using an α/ß of 1.4. In order to limit the uncertainty of the procedure, only trials with moderate fractionation were included (3.1Gy/fr. or less). A funnel plot was used to investigate publication bias. A multivariate analysis of the parameters were performed to clarify if data from all studies could be pooled (p-values <0.05 were considered significant). A logistic regression curve was fitted to the PRFS and dose data at each time point. The gradient (γ_{50}) and the dose required to obtain 50% PRFS