compare available evidence of carbon ion therapy prostatic cancer by meta analysis.

Material and Methods: PubMed, Embase, The Cochrane Library, Web of Science, the Chinese Biomedical Literature Database were systematically searched from 1980 to May 2015 by heavy ion, carbon ion, carbon and 12C6+, to collect clinical study of carbon-ion radiotherapy for prostatic cancer. Two reviews independently screened citation extracted basic information of local control rate, overall survival rate and phase of clinical study, the related data were analyzed by stata 12.0.

Results: Three phase II clinical trials, four phase I/II clinical trials and one retrospective study were included, which included 1307 patients. The meta-analysis showed 3-, 4-, 5- and 8-year overall survival rates were 0.934 (95% CI: 0.901, 0.968), 0.909 (95% CI: 0.866, 0.951), 0.872 (95% CI: 0.844, 0.899) and 0.839 (95% CI: 0.793, 0.884) and the 4-, 5-, 6- local control rate were 0.989 (95% CI: 0.973, 1.004) and 0.99 (95% CI: 0.969, 1.001), respectively (Figure 1).

Conclusion: Carbon ion therapy is suitable and tolerable for the treatment of prostate cancer, in the future, more evidence is required before carbon ion therapy can become internationally the standard treatment for prostate cancer patients.

EP-1355
Combined and modulated adjuvant therapy in prostate carcinoma: a phase I-II trial
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Purpose or Objective: EORTC trial 22911 showed 75% 5-year biochemical disease-free survival (BDFS) in patients with prostate carcinoma (PCA) treated with radical prostatectomy (RP) followed by postoperative radiotherapy (RT). Aim of this study was to improve this outcomes by using a combined-intensified-modulated-adjuvant (CIMA) treatment, based on RT and adjuvant hormone therapy (AHT).

Material and Methods: The study hypothesis was that CIMA treatment may improve 5-year BDFS from 75% to 90%. The study was planned based on Simon’s phase II design. We needed to study 100 experimental subjects to be able to reject the null hypothesis that the success rates for standard and experimental treatments are equal with probability (power) 0.8. The Type I error probability associated with this test of this null hypothesis is 0.05. We used an uncorrected chi-squared statistic to evaluate this null hypothesis. Some over-recruitment was planned to allow for a continuous drop-out process of up to 20% during the follow-up period. Enrolled patients were < 80 years old, with histological diagnosis of PCa, without known metastases, stage pt2-4 N0-1, not previously treated and with ECOG performance status of 0-2. All patients had at least one of these pathologic features: capsular perforation, positive surgical margins, seminal vesicle invasion. Standard dose to the tumor bed was 64.8 Gy. According to the pathological stage patients received a higher dose (70.2 Gy; 85.4%) and/or prophylactic irradiation of pelvic lymph nodes (57.7%) and/or adjuvant hormonal therapy (69.1%).

Results: One-hundred-twenty-three patients were enrolled in the study and completed the planned CIMA treatment. Median preoperative and postoperative PSA were 8.8 and 0.06 ng/dL, respectively. Proportion of patients with pathologically involved nodes and positive resection margin was 14.6% and 58.5%, respectively. Median follow-up was 67 months (interquartile range: 48.0 -98.0 months). Actuarial 5-year BDFS was 92.9%. Actuarial 5-year local control and metastasis-free survival were 99% and 96%, respectively. Actuarial 5-year overall survival was 95%.

Conclusion: CIMA therapy, compared to studies based on standard adjuvant radiotherapy, resulted in an improved 5-year BDFS, although patients with nodal metastatic disease and detectable postoperative PSA were enrolled in the study. A prolonged follow-up will be needed to confirm this improvement even in terms of disease-free survival and overall survival.

EP-1356
Postoperative radiotherapy in pT3a R1- resected prostate cancer patients
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Purpose or Objective: Despite 3 large randomized studies on adjuvant radiotherapy (RT) proving a significantly improved biochemical recurrence free survival in patients (pts) with advanced prostate cancer (PCA), there is still an dispute regarding the need for adjuvant RT in those pts. The risk of recurrence in these advanced stages may reach 30% to 60%. Nevertheless many of those pts are not referred to adjuvant RT. We therefore performed a retrospective analysis of 94 pts with pT3a pN0/cN0 R1- resected PCA in order to investigate the natural history of the disease and the benefit of adjuvant or salvage RT.

Material and Methods: We included 94 pts with pT3a pN0/cN0 R1- resected PCA that had undergone prostatectomy no later than 2009. In 91 pts lymphadenectomy was performed with an average of 10 removed lymph nodes. Gleason-Score was mainly 7a in 33, 7b in 24 and 8 in 19 pts. Statistical analysis was performed using a Cox proportional hazard model and Kaplan Meier survival analysis. Median follow-up was 80 months.

Results: 71 pts had a PSA <0.07 ng/ml after surgery. 35 of them experienced a biochemical relapse (Group 1). In 30 pts this occurred within the first 80 months. 28 of the pts with biochemical relapse received early salvage RT. PSA before salvage RT was in median 0.24 ng/ml and after RT in 23 pts <0.04 ng/ml. 36 pts were PSA negative after surgery and did not have any PSA relapse (Group 2). Nevertheless 14 of these pts received an additive RT treatment within the first 15 months after surgery. At the last date of contact all 36 pts were still PSA negative. 23 pts were PSA positive after surgery (Group 3). 18 pts received an early salvage RT with a PSA in median of 0.4 ng/ml (0.12-4.58). After RT PSA was 0.28 ng/ml (0.0-4.58). 5 pts in Group 1, 1 patient in Group 2 and 9 pts in Group 3 received androgen deprivation therapy (ADT) after radiotherapy until the last date of contact.
Conclusion: In total 60 of 94 pts (63.8%) with homogenously pT3a pN0/cN0 R1 resected PCA received radiotherapy highlighting the need of adjuvant/salvage therapy in those pts. The efficacy of radiotherapy is documented by the fact that the median PSA of all irradiated pts at 80 months of follow up was 0.01ng/ml (0.0 – 204.9). This may be blunted by the influence of ADT (15 pts). However, even our small retrospective cohort demonstrates a biochemical recurrence rate of originally postoperatively PSA negative pts of 49.2%. Furthermore, 65.7% of these pts could be rendered at least temporarily PSA-free by postoperative radiation.

EP-1357
Moderately hypofractionated IGRT / IMRT-SIB in prostate carcinoma: toxicity and QoL in 300 patients
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Purpose or Objective: Aim of this study was to evaluate the safety, in terms of acute and late toxicity and QoL in patients (pts) with prostate carcinoma (PCa) treated with moderately hypofractionated IGRT/IMRT-SIB using fiducial markers.

Material and Methods: Three-hundred consecutive PCa pts were treated with daily on-line IGRT based on 2D (6MV) orthogonal images. Low risk pts received 62.1 Gy in 23 fractions to PT1V (prostate). Intermediate risk pts with probability < 15% of lymph nodes involvement (Roach’s equation) received 67.5 Gy and 56.25 Gy in 25 fractions to PT1V and PT2V (semenal vesicles). In high risk patients with probability > 15% of lymph nodes involvement, pelvic lymph nodes (PTV3) received 50 Gy. Acute and late toxicities were prospectively recorded using RTOG-EORTC scale and AUA score. Survival curves were calculated using the Kaplan-Meier method. Androgen suppressive therapy was prescribed based on risk categories.

Results: GI and GU G ≥ 3 acute toxicity were 0.7 % and 2.0 %, respectively. With a median follow-up of 30 months (range: 12-72), late GI and GU toxicity were recorded in 4 and 18 pts, respectively. Based on IPSS score, no pts reported severe urinary symptoms, and 7.7% of pts reported moderate symptoms only. In terms of QoL, 91.3% declared to be “pleased”, 5.7% “mostly satisfied” and 1.3% “mixed” (1.7% not evaluable).

Conclusion: Our experience confirms the safety of moderate hypofractionation delivered with IGRT/IMRT-SIB and a moderate impact on QoL in pts with PCa. Prolonged follow-up is needed to evaluate the results in terms of patient outcome.

EP-1358
Prospective evaluation of PSA kinetics during salvage radiotherapy as a predictor for outcome
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Purpose or Objective: The aims of this prospective observational trial was to study early PSA kinetics by weekly PSA measurements during salvage radiotherapy (RT) for patients with recurrent prostate cancer in order to develop a predictive model for treatment outcome.

Material and Methods: This prospective study included patients with a biochemical recurrence after prostatectomy referred for curative salvage RT. No previous or present anti-hormonal treatment was allowed. All patients were prescribed 70 Gy in 35 fractions to the prostate bed. PSA was measured at baseline and then weekly during RT. A PSA follow-up was scheduled at 3, 6, 12, 18 and 24 months after RT and yearly thereafter. Treatment response was defined as PSA <0.1 ng/ml at these time points (PSA_RESP_3/6/12/18/24). Bivariate analyses of the association between response and clinical factors as well as PSA during RT were performed. Here we report the results for end-point PSA_RESP_6.

Results: Since Sept 2012, 151 patients have reached six months follow-up after RT. PSA_RESP_6 was achieved in 89 (59%) of the cases. Significant predictive clinic factors were proportion of positive biopsies, Gleason score, lymph node extirpation and surgical borders. However PSA during therapy was the single strongest predictive factor for PSA_RESP_6 with a ROC AUC up to 0.92 (95% CI 0.86 - 0.95).

Conclusion: We propose that PSA monitored during salvage RT can be used as a predictive factor for treatment outcome and subsequently for personalized patient management.

EP-1359
A randomized trial comparing bladder volume consistency during EBRT in postoperative prostate cancer patients
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Purpose or Objective: There are different guidelines about delineating the post-operative prostate fossa before EBRT. They all recommend that the patients should have a full half or comfortably filled bladder at the planning CT and at each fraction in order to ensure a consistent bladder volume throughout the whole treatment course. The aim of this study was to compare bladder volume variations between 1) a specific bladder filling protocol and 2) a simple instruction to the patients to keep a comfortably filled bladder before each treatment fraction.

Material and Methods: Twenty-nine patients (median 65 y) with PSA-relapse planned for salvage radiation therapy were randomised in two groups, with different preparation instructions: 1. Drinking 300 ml and emptying the bladder one hour before planning CT and treatment fractions. (13 patients) 2. A comfortably filled bladder before planning CT and treatment fractions. A pre-treatment drinking volume according to patient’s preference. (16 patients)

Treatment was prescribed to 70 Gy/35/2. As a complement to positioning to bony anatomy a CBCT was performed once a week to calculate the bladder volumes.