EP-2148 Brachytherapy on anal canal tumors

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Purpose or Objective
Technological advancements in radiotherapy (RT) with improved volumetric conformation and accuracy of dose administration have resulted in better locoregional control (LCR) and lower toxicity. Brachytherapy (BT) is a technique that allows a greater dose escalation and can be used in combination with external RT to increase dosage in tumors of the anal canal, enabling the preservation of sphincter function and reducing the total treatment time. With this study, we intend to analyse the therapeutic approach and response to treatment of patients undergoing endoretal brachytherapy.
Material and Methods
Retrospective study of patients with anal canal tumors treated at our institution with endorectal high dose rate BT (HDR BT) with endocavitary applicator and Iridium-192 radioactive source, between 2008 and 2016. The toxicity evaluation was carried out according to the CTCAE4 and RTOG/EORTC scales. The response to therapy was assessed by clinical observation, imaging and histologically. Primary Endpoints: locoregional control (LCR), progression-free survival (PFS). Secondary Endpoint: overall survival (OS). Statistical analysis was performed using SPSS v20.
Results
We included 12 patients, all were female, with a median age of 67.5 (41-81) years; Histologically: 2 adenocarcinomas, 8 squamous carcinomas; As for the location of lesion and stage: 2 low rectal carcinomas, 1 stage I and 1 stage III; 10 anal canal carcinomas, 5 in stage I, 2 stage II, and 3 stage III; All patients had disease confined to ≤ 50% of the anal circumference, with 7 ≤ 25%; All tumors extension ≤ 50 mm, 9 with ≤ 30 mm and 1 with 50 mm; According to purpose of treatment, 9 patients under intensive, 2 patients in neoadjuvant and 1 in adjuvant intent; The main chosen chemotherapy regimen was MMC and 5-FU, concomitantly with external radiotherapy. 11 patients were subjected to external radiation, with the most frequent fractionation scheme 50.4Gy/28Fr/5.5weeks and dose increment by BT HDR endoretal, between 4.5 and 5Gy in a single fraction, on tumor volume; Concomitant treatment was well tolerated, with two major complications with need for treatment interruption: febrile neutropenia and herpetic lesions associated with G3 radiodermatitis;10 patients obtained complete response and 2 partial response; The median follow-up time was 5.25 (1-9) years; 2 cases of disease progression have been reported, one in the liver, with a PFS of 47 months and 1 in a locoregional area with a PFS of 31 months. 3 colostomies were performed, 2 with abdominal-perineal amputation as treatment of rectal carcinoma and 1 in a palliative context due to locoregional recurrence. The median survival time was 8.7 years, with an overall survival of 77% at 5 years.
Conclusion
This type of malignant tumors with low incidence should be treated in centers with an experienced and differentiated team, allowing better results and control of the correlated morbidity. These results are in agreement with published literature. BT in association with external RT provides better LCR, allowing the preservation of sphincter function and better quality of life.

Electronic Poster: Brachytherapy: Prostate

EP-2149 HDR brachytherapy as monotherapy for low and intermediate risk prostate cancer

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Purpose or Objective
To determine biochemical disease-free survival, late toxicity and effect on health-related quality of life of a 2-fraction regimen of high dose-rate (HDR) brachytherapy for the treatment of prostate cancer.
Material and Methods
Patients with low or intermediate risk prostate cancer eligible for prostate brachytherapy were treated with HDR brachytherapy as monotherapy in 2 separate implants of 13.5 Gy spaced 7-14 days apart in a prospective REB-approved phase II clinical trial (NCT02077335). HDR brachytherapy was done with a CT-based planning with a template or freehand implant technique based on patient anatomy and prostate volume. Patients had evaluation with International Prostate Symptom Score (IPSS) and Expanded Prostate Index Composite (EPIC) questionnaires and serum PSA at 1,3,6, 9, 12, 16, 20, 24, 30, 36, 48 and 60 months post brachytherapy. Proportion of patients in each IPSS category (Mild=0-7, Moderate=8-18, Severe=19+) were evaluated at each of the intervals above. Paired t-tests with baseline values were done for IPSS and EPIC urinary, sexual, intestinal and hormonal domains. Biochemical disease-free survival was determined according to Phoenix criteria (Nadir + 2.0 ng/ml) and Kaplan-Meier method.
Results
30 patients were accrued to the study between June 2014 and February 2016. Median age was 66 (Range 54-82). Median PSA at diagnosis was 8,7 (Range 4.1-17.5). T stage was T1c=65%, T2a=21%, T2b=14%. 27% had Gleason 6 and 73% Gleason 7. Mean prostate volume at time of first implant was 45cc. IPSS categories at baseline, 6, 12 and 24, 36 and 48 months were respectively Mild(81%, 63%, 76%, 65%, 67%, 50%) Moderate (19%, 29%, 20%, 29%, 22%, 50%) and Severe (0%, 7%, 4%, 6%, 11%, 0%). There was a significant decrease in EPIC Sexual Summary Scores at 6 and 12 months with mean intra-patient differences of -18 points (p=0.02) and -17 points (p=0.01)
respectively. Biochemical disease-free survival at 4 years was 94,7%. Median PSA (ng/ml) at 12, 24, 36 and 48 months were respectively 0.7, 0.3, 0.3 and 0.1. Overall survival at 4 years was 100%
Conclusion
This is the first report of biochemical disease-free survival in this cohort of patients treated with 2 fraction HDR monotherapy. This regimen shows rates of toxicity and health related quality of life that appear acceptable as compared to other treatment modalities. These results are also comparable with other reports with similar treatment regimens. Further study will be required to determine longer-term results of this cohort which can help guide determination of the optimal dose and fractionation for HDR prostate monotherapy.

EP-2150 Re-salvage treatment for locally recurrent prostate cancer by HDR brachytherapy guided by MRI and US

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Purpose or Objective
Salvage IMRT is well established for recurrence of prostate cancer after radical prostatectomy. With the improvement in early diagnostics and the increase in survival it is possible to observe second local or distant recurrences, and hormonal therapy is the most common treatment in these cases. One challenge in patients with local recurrence is to delay the hormonal treatment and it can be achieved by re-salvage brachytherapy. In 2016 we started focal re-salvage high-dose-rate brachytherapy (HDR-BT) guided by MRI, registered with US [1,2], that is a novel treatment that minimizes side-effects. We describe the procedure carried out to our patients, evolution of the prostate specific antigen (PSA), and related toxicity.

Material and Methods
Ten patients were treated by focal HDR-BT because of a second local recurrence after undergoing radical prostatectomy and IMRT for primary recurrent prostate cancer. The mean age of the patients was 66,9 years (52-77). Dose prescription was 17 Gy for 6 patients and 20 Gy for 3 patients, given in two fractions. Delineation was performed using 1,5T MRI (T2-weighted) registered with US obtained by a transrectal probe. In order to reduce dose to rectum, hyaluronic acid was injected between rectum and target volume. Optimization (Figure 1) of the plan was performed by Oncentra Prostate® (Elekta) and based on the following constraints: CTV V_{100}: 95%, D_{90}: 100%, D_{min}: 80%; Urethra V_{120}: 0 cm^3. Treatment was delivered by MicroSelectron HDR (Elekta). PSA was evaluated before and after treatment, and periodically every three months, and a follow-up consultation was carried out after each PSA evaluation.

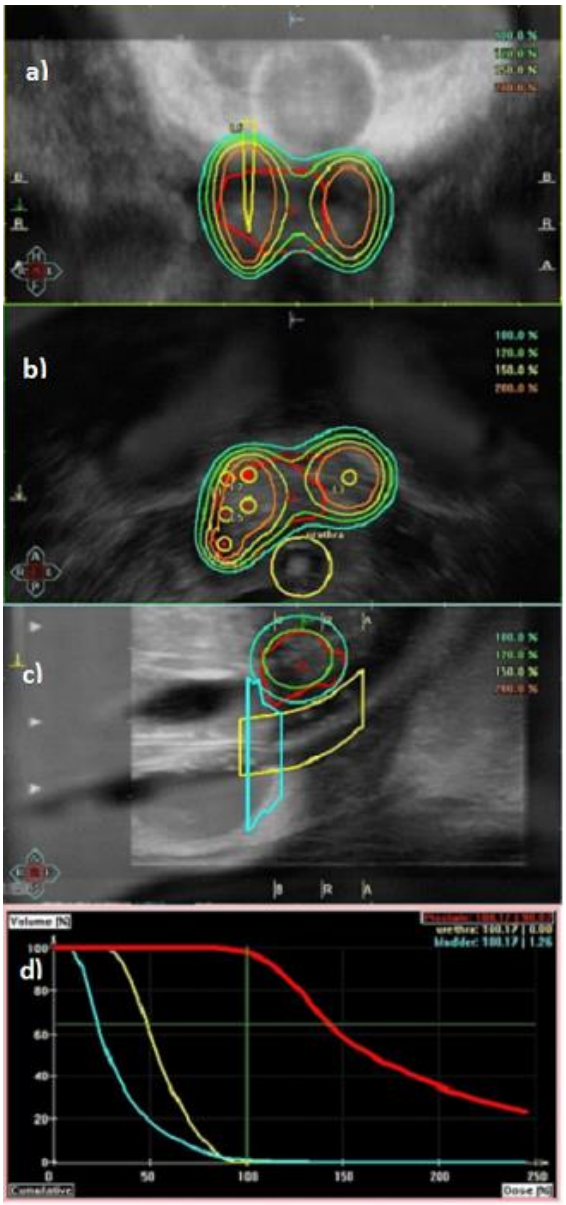

Figure 1. a) Coronal plane, b) transverse plane and c) sagittal plane showing delineations of the PTV, urethra and bladder, the reconstructed catheters and the isodose curves on the MRI-US registered images. d) Cumulative DVH.

Results
Average dosimetric parameters after optimization were: CTV V_{100}: 98,0%, D_{90}: 118,1%, D_{min}: 84,5%; urethra V_{120}: 0 cm^3; V_{100}: 2,53 cm^3. With a follow-up of 12 months, 7 patients do not show any side effects, 2 patients have urethral stricture and one had haematuria. PSA values for all patients are shown in Figure 2. 3 patients had stable values of PSA and 2 patients showed PSA <0,2. PSA after treatment increased in 5 patients because of new local recurrences in other localizations (3 patients), or metastatic nodes (1 patient), or unknown cause (1 patient) and were treated with hormonal therapy (7-17 months delay).

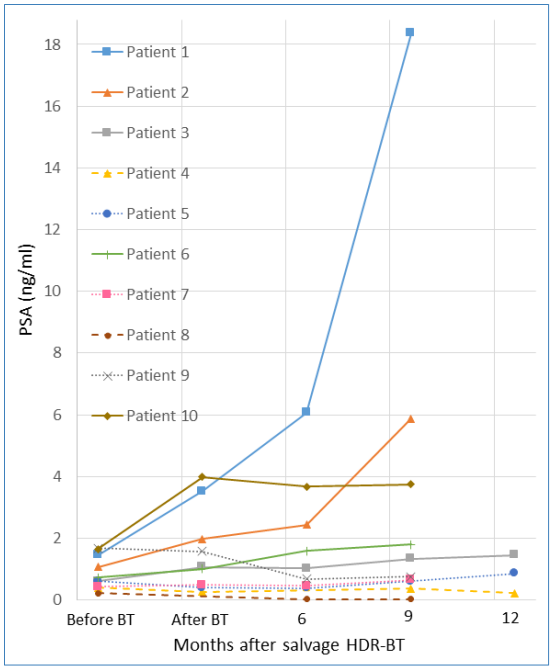

Figure 2. Prostate-specific antigen values of all 10 patients. Solid line: patients with biochemical recurrence. Dotted line: patients with stable values of PSA. Dashed line: patients that show PSA<0,2.

Conclusion

Re-salvage for locally recurrent prostate cancer by focal HDR-BT guided by MRI-US is feasible and can be offered to patients as low-toxicity local treatment. Even in those cases where it does not represent a definitive cure, it can delay hormonal therapy. Therefore, we consider this technique to be recommended especially in patients with a long life expectancy.

[1] Van Son, M. J. *et Al* (2018). Re-salvage MRI-guided Focal High-dose-rate Brachytherapy for Locally Recurrent Prostate Cancer. *Cureus* 10(4): e2429. DOI 10.7759/cureus.2429

[2] Maenhout, *et Al* (2017). Second salvage high-dose-rate brachytherapy for radiorecurrent prostate cancer. *J Contemporary Brachytherapy* 9(2), 161-6

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EP-2151 Intermediate-risk prostate cancer with EBRT plus permanent 125-I seeds. Long term results

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Purpose or Objective

To present long-term results in patients with intermediate-risk prostate carcinoma treated with combined treatment with external beam radiotherapy (EBRT) plus low dose brachytherapy with 125-I seeds.

Material and Methods

From April 2008 to December 2010, 51 patients with intermediate risk prostate carcinoma according to EAU guidelines (T2b-c, Prostate Specific Antigen-PSA- between 10 and 20ng/ml or Gleason 7), underwent EBRT on prostate and seminal vesicles to a mean of 46Gy. In the next 3-4 weeks they received the permanent implantation of 125-I seeds, to a median dose of 108Gy, with real-time dosimetry planning and Bard Prolink™ system. Hormonal treatment (HT) was prescribed to 31% during 3-6 months. Biochemical failure (BF) was considered according to Phoenix definition.

Results

Mean age was 67, mean PSA was 9.34ng/ml (4.31-18.3) and Gleason score was 6 in 37.3% patients, 7 (3+4) in 45.1% and 7(4+3) in 17.6%. Clinical tumour stage was T1c in 51%, T2a in 27.5%, T2b in 11.7% and T2c in 9.8%. With a median follow-up of 99 months (range 24-124), 5 cases (9.8%) presented BF. Biochemical relapse free survival (bRFS) at 5 and 8 years was 98% and 89.3%. No differences according to Gleason (G), PSA, clinical T stage or HT. At 8 years, patients with Gleason 6 had bRFS of 94.7%, G7 (3+4) 89.5%, G7 (4+3) 75% (p=0.27). When we classify the risk of patients with Mount Sinai Criteria (intermediate or high), we appreciate differences in PSA control at 8 years, 94.3% vs 75% (p<0.06). Late genitourinary G1-G2 toxicity was observed in 9.8%, G3 in 5.8% (3 patients required Transurethral Resection (TURP). Late gastrointestinal G1-G2 toxicity was observed in 9.8%, G3 0%.

Conclusion

Combined treatment in intermediate-risk prostate carcinoma offers good results on PSA control with low rates of late toxicity. The presence of several intermediate criteria marks a trend to worse results.

EP-2152 Pre-rectal spacing w/. Blood Patch in HDR Prostate Brachytherapy, Feasibility and Dosimetric Analysis

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Purpose or Objective

Our main goal is to describe a useful technique to decrease rectal dose during high dose rate (HDR) prostate brachytherapy given either as boost or monotherapy, Evaluated in a multicentric initial Latin American first experience from Peru, Chile and Colombia using a blood patch as OAR spacer, as an alternative procedure to improve rectal toxicity in developing countries with limited resources.

Material and Methods

60 patients, underwent HDR prostate brachytherapy in multiple institutions. Under spinal anesthesia and sedation, approximately 16 mL of blood was extracted from the patient via antecubital venopuncture and mixed with 4 ml of iodine venous contrast as the technique firstly described in *2008 by Morancy from Boston* For prostate LDR brachytherapy.

The perineum was prepared for a sterile procedure. Under ultrasound guidance, an 18 gauges spinal needle was placed to open the space below the denonvilliers facia for hydro-dissection, after the volume of blood was then instilled within the peri-rectal space on each side, as the needle was withdrawn, using the sagittal ultrasound image for guidance as the technique described by Hatiboglu in 2012 in Heildelberg.

After creation of the blood patch, a standard needle insertion to the prostate is performed under US guidance, followed by CT Simulation and then MR fusion is performed for treatment planning. The prescribed dose to PTV in monotherapy is 20.5 Gy and as Boost to EBRT is 15 Gy.

Results

Patients median age were 71, volume most of them between 20-60 cc, stage II and III intermediate and high risk, Blood Patch was successfully apply in 60 patients, the other 9 are controls without blood patch. It´s remarkable that the use of in vivo dosimetry to compare the dose