Purpose or Objective: The dose coverage in patients diagnosed with high risk prostate adenocarcinoma with seminal vesicles affection don’t suppose any problem in dose escalation with HDR Brachytherapy. But we wonder if the quality prostate implant indicators will show any differences between standard patients (15-Gy HDR) and those with seminal vesicles affection (9-Gy HDR). To evaluate it, a multivariate analysis has been performed in our Radiation Oncology Department

Material and Methods: 120 patients with high risk prostate adenocarcinoma were selected for the study and divided into two groups. The treatment schedule was external beam radiotherapy plus high dose rate brachytherapy as a boost:
- Group A: 9-Gy boost - T3b high grade (seminal vesicles affection) 46-Gy to pelvic areas, up to 60-Gy in prostate and seminal vesicles (2-Gy per fraction) daily and 9-Gy HDR to prostatic gland and 1-2cm. of proximal seminal vesicles.
- Group B: 15-Gy boost - High grade (no seminal vesicles affection) 46-Gy to pelvic areas (2-Gy per fraction) daily treatment and 15-Gy HDR to prostatic gland.

Volumetric Modulated Arc Therapy (VMAT) was the selected technique for external radiotherapy delivered in a Varian DHX Clinac (Varian, Palo Alto, Ca.) with Millennium 120-MLC. Brachytherapy was performed with Varisource IX afterloader (Varian, Palo Alto, Ca.). The aim is to demonstrate whether there are any differences in both groups for dose homogeneity index (DHI) and homogeneity index (HI). A multivariate analysis was developed using as variables; three of prostate (PTV volume, D90 , D100), two of urethra (Dmax, D10) and two of rectum (Dmax, D10).

Results: The multivariate analysis for both groups shows a p-value of 0.452 to obtain the probability for DHI > 0.75 and a p-value of 0.897 to obtain a probability for HI>0.70. In Figure 1, the plots of the results are presented:

Conclusion: According to dose homogeneity, the analysis states that there were no significant differences for both studied groups. These results suggest the possibility of increasing the boost dose in T3b patients

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**EP-2014**

Retrospective analysis of interstitial brachytherapy in gynecological and digestive tumours

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Purpose or Objective: The aim of this study was to evaluate the acute and late toxicities and disease-specific and overall survival after interstitial brachytherapy for the treatment of gynecological and digestive tumors.

Material and Methods: A retrospective study was carried out on a series of 19 patients referred for interstitial brachytherapy in our center between 2008 and 2013 with histologically proved locally advanced or recurrent gynecological malignancies and digestive tumors. Patients with distant metastases were excluded. Treatment consisted of brachytherapy alone (5p) (gynecological recurrence and anal carcinoma), or after surgery (1p) (rectal carcinoma) or after surgery and radiochemotherapy (4p) or after radiochemotherapy (9p). The radiotherapy with cisplatin-based chemotherapy regimens. Previously, recurrent patients (4p) were treated with radiotherapy with or without concurrent chemotherapy. Medium dose of external beam radiotherapy was 51,7 Gy (range 45-70 Gy) followed by interstitial brachytherapy median implant dose 22,3 Gy (range 9-38,5Gy). Inclusion criteria were as follows: Hb minimum 10gm/dl and performance status 70% or more.

Results: Median age was 59 years (range 36-82). With a median follow-up of 14 months, local control was achieved on clinical examination or magnetic resonance imaging 93,8% patients. Among 19 patients studied, 3 lost follow-up and they were excluded from late toxicities and survival analysis. Eleven of the 19 patients (57,9%) experienced Radiation Therapy Oncology Group (RTOG) grade I or II acute toxicities proctitis (36,3%), cystitis (81,8%) and epheilitis (18,2%). Not acute toxicities grades 3 or 4 were reported. Two of the 16 patients (12,5%) experienced RTOG grade I or II late toxicities proctitis (6,25%) and cystitis (6,25%). Two of the 16 patients (12,3%) experienced RTOG grade III or IV late toxicities rectal ulcer (6,25%) and vulvar necrosis (6,25%). Using Kaplan-Meier analysis overall survival after minimum follow-up of 14 months was 93% and disease-free survival was 75% (persistent tumor were included in this group). One patient had a locoregional recurrence and died of tumor.

Conclusion: Interstitial brachytherapy is a good choice to deliver high-dose radiation in gynecological tumor after external beam radiotherapy or as an exclusive treatment in...
recurred and previously radiated tumors. This treatment offers adequate locoregional control with acceptable range of complications.

Electronic Poster: Brachytherapy track: Miscellaneous

EP-2015
Acute toxicity in HDR BT of skin cancer with very high viscosity addition silicone custom made molds C. Sanz Freire1, S. Pérez Echagüen1, G.A. Ossola Lentati2
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Purpose or Objective: To study normal skin acute toxicity in Non-Melanoma Skin Cancer (NMSC) patients treated with High Dose Rate (HDR) Brachytherapy and very high viscosity addition silicone (VHVAS) rubber custom-made molds. VHVAS rubber features excellent mechanical and physical properties which benefit the stability and reproducibility of the implant. On the other hand, the high electron density relative to water of these materials will increase the scatter production, which may be relevant at the mold-skin interface.

Material and Methods: Our standard applicators are polymerized VHVAS moulds with catheters embedded. This VHVAS model features 99.5% recovery factor after compression and maximum 0.20% linear dimensional variations. Dosimetric properties of this VHVAS have been characterized by our Group elsewhere. Silicone attenuation relative to water is <5% up to 3 mm thickness. Maximum scatter relative to water measured at the mold interface is <14%. Treatment is delivered with a 1-ir 192-based VARIAN MS Gammamed® HDR unit. All treatments are 3D simulated. A sample of 15 Patients with 21 lesions (8 basal cell carcinomas, 13 squamous cell carcinomas) representing all treated locations were considered. Average age is 83.1 years [96-58], 47% without any concomitant diseases and life expectancy >5 years. Median lesion area is 5.4 cm2 [1.0-46.6], treatment depth is 4.0 mm [2-15] and microscopic disease margin is 4 mm [2-5]. Standard fractionation is 5.5 Gy/fr, 10-12 fr, twice a week. Acute toxicity was retrospectively assessed following the RTOG criteria.

Results: DVH analysis showed high dose areas having: D100=8.5 Gy/fr [5.4-14.4], D0.5cc= 9.0 Gy/fr [5.4-16.3], D0.1cc= 10.3 Gy/fr [6.2-22.9]. All patients presented radiodermatitis 1 month after treatment (G2: 89%, G3: 11%). 32% presented radiodermatitis at 3 months (G1: 26%, G2: 6%) and only one patient presented radiodermatitis G1 at 6 months. Toxicity score correlation to CTV volume, treatment depth, BED prescribed dose, D1cc, D0.5cc and D0.1cc had no statistically significant difference (p>0.05). Treated area was found to be predictive of radiodermatitis persistence at 3 months after treatment (p=0.036). Lesions located in the legs showed longer - recovery time from radiodermatitis than other locations (months vs 1.8 months average).

Conclusion: The use of these VHVAS moulds was well-tolerated by all patients. Our treatments yield similar results to other groups with similar treatment schemes in terms of acute toxicity. We can conclude that VHVAS custom made molds have a good safety profile.

EP-2016
A method to transform 2D LDR brachytherapy plans into contemporary 3D PDR dose distributions E. Rodenburg1, J. Wilkes1, J. Wiersma1, R. Ordoñez Marmolejo2, R. Dávila Fajardo1, A. Bel1, B. Pieters1
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Purpose or Objective: Formerly in the 2D Low-Dose Rate (LDR) era no information about Dose-Volume Histogram (DVH) parameters of organs at risk (OARs) was available in brachytherapy plans. To enable research on late dose effects for children treated with Pulsed-Dose Rate (PDR), 3D dose distributions and DVH parameters are required. In this study a method was developed to enable calculation of DVH parameters.

Material and Methods: Before 2001 pediatric head and neck (H&N) patients received LDR brachytherapy as a part of their treatment. Of 16 LDR plans (1989-2001) only hard-copy CT data, orthogonal x-ray images of the implant and documented 2D dose information were available. The documented 2D dose information consisted of source strength, catheter numbering, catheter loading, and treatment time. The hard-copy CT data was digitized, transferred to DICOM format and imported in Oncentra Brachy (Elekta, v4.3). The visible OARs were delineated and used catheters were reconstructed. The Ir192-LDR line sources from the original 2D plans were simulated by loading the reconstructed catheters with Ir192-PDR source tracks of the same length as the LDR sources, with a step size of 2.5mm. Simulation of a line source dosimetry was necessary because the planning system did not support LDR planning. All PDR source dwell times were made equal, but scaled to the documented 2D dose distribution to obtain the 3D dose distribution at time of treatment. Scaling was performed at a 2D LDR isodose level below 30% of the prescribed dose in a plane where the documented 2D dose distribution and transformed 3D dose distribution geometrically match. Scaling below 30% is done to avoid effects due to the non-uniform isodose distribution very close to a stepping PDR source. To check the reliability of the method the Total Reference Air Kerma (TRAK) for both 2D LDR and 3D PDR plans were determined and compared. The difference was tested with the Wilcoxon Signed Rank Test for paired variables. To illustrate the applicability of the method the maximum dose, defined as the D0.1cm3, on e.g. chiasm was determined.

Results: Of 16 LDR plans 2D data were transformed into 3D dose distributions. OARs and DVH parameters of chiasm were determined. The mean 2D TRAK was 0.95CGy/1m (IQR 0.89). The mean 3D TRAK was 0.89CGy/1m (IQR 0.74). The mean difference of 2D TRAK and 3D TRAK was statistically not-significantly different from 0 (P=0.45). For 7 patients the CT data incorporated the chiasm area. The mean chiasm maximum dose was 233.6cGy (range 4.6-399.2) using the described method.

Conclusion: With the described method it was possible to transform 2D LDR brachytherapy plans into a 3D dose distribution. This method shows the possibility to use information from 2D LDR brachytherapy plans in scientific studies in which 3D dose information is needed.

EP-2017
High dose-rate endoluminal brachytherapy as a treatment of primary and recurrent esophageal cancer N.H. Nicola1,2, J. Wagner1, J. Oelmann-Avendano1, J. Debus1,2, E.P. Huber1,2, K. Linden1
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Purpose or Objective: To evaluate outcomes and toxicities after high dose-rate (HDR) endoluminal brachytherapy for the treatment of esophageal cancer patients.

Material and Methods: We analyzed the patient records of 36 patients treated with high dose-rate endoluminal brachytherapy for histologically confirmed esophageal cancer. Brachytherapy was either applied as a boost treatment for definitive radiotherapy and radiochemotherapy regimens or as a salvage treatment for recurrent tumors. Single radiation doses between 4 and 6 Gy were delivered to the endoscopically visible tumor including 2 cm margins in 2 to 4 sessions. Recurrence-free and overall