correlations between the slope, D5 v, D2 v, HRCTV D90, HRCTV volume, and the RV point.

Results: Total doses from 3 fractions for the D5 v median 48.7 Gy (range 31.4 - 76.6 Gy), D2 v median 64.0 Gy (range: 43.2 - 112 Gy) and RV median dose 16.3 Gy (range: 11.6 - 25.3 Gy). The RV point exhibited a weak correlation with D2 v (r = 0.56, p = 0.0001) and D5 v (r = 0.35, p = 0.0001) respectively. A moderate correlation was observed between the HRCTV volume and the D2 v (r = 0.69, p = 0.0001), the HRCTV volume and D5 v (r = 0.73, p = 0.0001) and a weak correlation with the HRCTV volume and the RV point (r = 0.57, p = 0.0001). The slope correlated with D2 v (r = 0.96, p = 0.0001) and D5 v (r = 0.87, p = 0.0001) and a weak correlation with the RV point (r = 0.52, p = 0.0002). No correlation was found between the HRCTV D90 and the D2 v (r = 0.20, p = 0.1826), the D5 v (r = 0.24, p = 0.1082), or the RV point (r = 0.02, p = 0.8431).

Conclusion: The expansion volume of the ring applicator can provide a suitable surrogate for determining the vaginal mucosa dose, as this part of the vagina is in close proximity to the ring and tandem contributing to the volume of vaginal mucosa receiving the highest vaginal dose. The RV point does not correlate with the D2 v and D5 v and therefore cannot be used as a suitable surrogate point for the dose to the vaginal mucosa. Additional work is currently ongoing to correlate the D2 v and D5 v with clinically measured vaginal morbidity.

EP-1969

High-dose-rate image-guided interstitial brachytherapy for recurrent cervical adenocarcinoma

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Purpose or Objective: In order to evaluate the usefulness of high-dose-rate image-guided interstitial brachytherapy (HDR-ISBT) for recurrent uterine cervical adenocarcinoma, we analyzed our clinical experience.

Material and Methods: We investigated 28 patients treated with HDR-ISBT at National Hospital Organization Osaka National Hospital between May 2003 and December 2010. All patients received radical surgery and 7 patients also received post-operative radiotherapy as previous treatments. Histologic finding was adenocarcinoma and squamous cell carcinoma for 11 and 17 patients. In 11 adenocarcinoma patients, 6 patients had endometrioid adenocarcinoma and the other 5 patients had mucinous adenocarcinoma. The median tumor size was 23 mm (range: 9 - 79 mm). In 21 patients who had no irradiation history, 9 patients were treated with HDR-ISBT alone and the other 12 patients were treated with HDR-ISBT plus external beam radiotherapy (EBRT). Forty-eight to 54 Gy in 8 to 9 fractions were delivered as monotherapy and 30 to 33 Gy in 5 to 6 fractions as combination of EBRT. In 7 patients who had irradiation history, slight lower doses (42 to 48 Gy in 7 to 8 fractions) were selected. We implanted 7-15 (median, 12) applicators under transrectal ultrasonography guidance. We used free-hand implantation with ambulatory technique for later 25 patients. Magnetic resonance imaging (MRI)-assisted image-based treatment planning was performed for later 17 patients. Clinical target volumes (CTV) were the gross tumor volume with or without 10 mm of vaginal margin for patients with or without non-irradiation history.

Results: The median follow-up time was 43 months (range: 4 - 115 months). The median D90 (CTV) was 120% of prescribed dose (PD), 122%PD and 118%PD for patients who had endometrioid adenocarcinoma, mucinous adenocarcinoma and squamous cell carcinoma. The 3-year local control and overall survival rates were 72% and 73% for adenocarcinoma. The 3-year local control and overall survival rates were 88% and 77% for squamous cell carcinoma. No significant difference was observed. The 3-year local control rates were both 67% for endometrioid adenocarcinoma and mucinous adenocarcinoma. Grade 3-4 late complications occurred by HDR-ISBT in 5 patients (18%).

Conclusion: Our treatment result of image-based HDR-ISBT showed that slight inferior result was observed in cervical adenocarcinoma although there was no significant difference.

EP-1970

Dose to organs at risk on CT versus MRI based brachytherapy for cervix cancer

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Purpose or Objective: Brachytherapy is one of the most important components in the treatment of cervical cancer. Recently 3D planning for brachytherapy has been used which could be done both by CT and MRI imaging based. We compared the high risk clinical target volumes contoured on CT and MRI and dose distribution in the target volumes and organs at risk.

Material and Methods: Twenty three patients with IIA-IIIB stage cervical cancer were planned for HDR brachytherapy with ring-tandem applicators. Treatment consisted of four 7 Gy fractions by two insertion procedures. On MRI and CT sets we contoured HR CTV and organs at risk on 42 plans: for 19 patients two plans and for four patients only one. Medical physicists received task to make planning on CT and MRI images independently at the same day before irradiation. The mean HR CTV volume, dose received by at least 90% of the volume (D90) and the dose to 2 cc for the organs at risk were evaluated.

Results: The mean volume of HR CTV was 77.5 cc on CT based contours and 60.3 cc on MRI imaging. This difference in HR CTV volume reflected on the dose to organs at risk - physicists have to increase it to achieve prescribed dose in target volume. Thus, while assessing mean D2cc for rectum, bladder and sigmoid we find out that it was lower in case of MRI based planning compared to CT based planning - 66.2 Gy and 70.3 Gy, 85.1 Gy and 89.6 Gy, 62.3 Gy and 66.7 Gy respectively. Mean D90 also was significantly higher in MRI compared to CT imaging plans - 94.2% versus 79.4% of prescribed dose.

Conclusion: In spite that superiority of MRI compared to CT imaging based contouring and planning for HR CTV dose distribution has been already showed in previous studies we found that it also allows indirectly significantly decrease the dose to organs at risk during HDR brachytherapy for cervical cancer.

EP-1971

Result of IGBT for cervical cancer using ring applicator with 'Siriraj Ring Cap' extension

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Purpose or Objective: To retrospectively assess treatment outcome of image guided brachytherapy (IGBT) with or without hybrid technique for cervical cancer using VariSourceTM titanium ring applicator with 'Siriraj Ring Cap' extension (as figure 1). In case of narrow vaginal opening, hybrid brachytherapy technique could be performed using this applicator with extension.

Figure 1: VariSourceTM titanium ring applicator with 'Siriraj Ring Cap' extension

Results: The median follow-up time was 43 months (range: 4 - 115 months). The median D90 (CTV) was 120% of prescribed dose (PD), 122%PD and 118%PD for patients who had endometrioid adenocarcinoma, mucinous adenocarcinoma and squamous cell carcinoma. The 3-year local control and overall survival rates were 72% and 73% for adenocarcinoma. The 3-year local control and overall survival rates were 88% and 77% for squamous cell carcinoma. No significant difference was observed. The 3-year local control rates were both 67% for endometrioid adenocarcinoma and mucinous adenocarcinoma. Grade 3-4 late complications occurred by HDR-ISBT in 5 patients (18%).

Conclusion: Our treatment result of image-based HDR-ISBT showed that slight inferior result was observed in cervical adenocarcinoma although there was no significant difference.