at a dose of 300 mg/body once per week, with an occasional rest week during EBRT, and at a dose of 1000 mg/m^2 every 3 weeks after EBRT was completed. For evaluation of efficacy and safety, all patients were examined at regularly scheduled follow-up visits. Medical examinations were performed every month. Contrast-enhanced computed tomography was also performed at pre-treatment, and at 1 month and 6 months after KORTUC-IORT.
Results: All treatments, including KORTUC-IORT, were well tolerated in all patients, with few adverse effects. No severe complications were experienced. The follow-up period for all patients ranged from 5 to 29 months; the 1-year survival rate of them was 67%, and the median survival period was 15 months.
Conclusions: We performed this study based on our experimental data indicating that hydrogen peroxide is a potent radiation sensitizer, and showed that the present formulation can be delivered safely and effectively under the conditions used.

6541 POSTER

Gradient-based Delineation of the Primary GTV on FLT-PET in Esophageal Cancer and the Influence on Radiotherapy Planning

G. Zhang[1], Y. Yin[1], D.L. Han[2], J. Lu[1]. [1]*Shandong Cancer Hospital and Institute, Radiation Oncology Physics, Jinan, China;* [2]*Shandong Cancer Hospital and Institute, Radiation Oncology, Jinan, China*

Background: The aim of this study was to validate a gradient-based segmentation method for GTV delineation on FLT-PET in EC through surgical specimen, in comparison with threshold-based approaches and CT. Discuss the influences of gradient-based methods delineate the primary GTV to radiotherapy planning.
Materials and Methods: Ten patients with esophageal carcinoma treated with radical surgery were enrolled and detected by ^{18}F-FLT PET/CT before operation transferred the images to MIM software. For each patient, four GTVs were defined. GTV-ct was based on CT data alone. GTV-$_{GRAD}$, GTV-$_{1.4}$, GTV-$_{30\%max}$ were automatically segmented on PET images using the gradient-based method, fixed threshold values at 1.4 and 30% of SUV_{max}, respectively. The GTV-$_{GRAD}$, GTV-$_{1.4}$, GTV-$_{30\%max}$ were compared with GTV-$_{CT}$ by overlap index. Lengths of GTVs were recorded as L_{CT}, L_{GRAD}, $L_{1.4}$, $L_{30\%max}$, respectively. The length of surgical specimen was recorded as $L_{Path,}$ and compared with L_{CT}, L_{GRAD}, $L_{1.4}$, $L_{30\%max}$. Next, two radiotherapy plans were designed for each patient based on GTV-$_{GRAD}$ (plan-$_{GRAD}$) and GTV-$_{CT}$ (plan-$_{CT}$). The radiation dose was prescribed as 60 Gy in 30 fractions. The dose-volume parameters of target volume and normal tissues, CI and HI of plan-$_{GRAD}$ and plan-$_{CT}$ were compared.
Results: The mean L_{Path} was 6.47±2.7. The mean L_{ct}, L_{GRAD}, $L_{1.4}$ and $L_{30\%max}$ were 7.17±2.28, 6.22±2.61, 6.23±2.80, 5.95±2.5. The correlation coefficients were 0.862, 0.989, 0.920 and 0.920 when compared with L_{Path}, respectively. The overlap index of GTV-$_{GRAD}$, GTV-$_{1.4}$, GTV-$_{30\%max}$ when compared with GTV-$_{CT}$ were 0.75±0.12, 0.71±0.12, 0.57±0.10. The values for mean lung dose, total-lung volume receiving more than 5, 10, 20, and 30 Gy, mean heart dose and heart volume receiving more than 30 Gy of plan-$_{GRAD}$ were significant lower than plan-$_{CT.}$
Conclusions: The gradient-based method provided the closest estimation of GTV length. The gradient-based method radiotherapy planning reduced the irradiated volume in the lung, heart and other normal tissues.

6542 POSTER

Phase I/II Study of Scheduled Interval Transarterial Chemoembolization Followed by Radiation Therapy for the Patients With Hepatocellular Carcinoma

J.I. Yu[1], H.C. Park[1], D.H. Lim[1]. [1]*Samsung Medical Center, Radiation Oncology, Seoul, Korea*

Background: We designed this phase I/II study to evaluate the safety and efficacy of the scheduled interval transarterial chemoembolization (TACE) followed by radiation therapy (RT) in the patients with unresectable hepatocellular carcinoma (HCC).
Materials and Methods: Patients with HCC, not suitable for standard therapies, were enrolled for scheduled interval TACE followed by RT (START). Between February 2008 and December 2009, 84 patients were enrolled. The patients who were enrolled in this study, received TACE on the first day of treatment, and then 3-dimensional conformal RT was delivered after 14 days. If the results of liver function test at simulation day (7th day after TACE) were not good enough, one week delayed RT was planned. The overall time of this whole treatment was taken almost in 4 to 5 weeks. Total RT dose and fractionation size were decided by the irradiated normal liver volume.
Results: In 81 patients (96.4%) were completed the START in planned treatment period. Delayed RT was administered to the other 3 patients because of decreased liver function or performance status after TACE. Of the 81 patients, complete response (CR) was appeared in 7 patients (8.6%), and 50 patients (61.7%) had a partial response (PR). Although one unexpected death was observed after START because of icteric hepatic failure, the other toxicity was quite tolerable. The median survival was 14.7 months. According to the response of START, there was a significant difference in overall survival rate ($p < 0.0001$).
Conclusions: START showed comparable response and survival. And the toxicity was quite tolerable.

6543 POSTER

Radiotherapy Prolongs Survival in Locally Advanced, Inoperable Gastric Cancer

M. Valkov[1], S. Asakhin[1], M. Levit[1], O. Vtoraya[1], A. Ruzhnikova[2], S. Litinskiy[3]. [1]*Northern State Medical University, Radiology and Oncology, Arkhangelsk, Russian Federation;* [2]*Regional Clinical Oncology Hospital, Chemotherapy, Arkhangelsk, Russian Federation;* [3]*Regional Clinical Oncology Hospital, Radiotherapy, Murmansk, Russian Federation*

Background: Usually, in locally advanced, inoperable gastric cancer (LAIGC) radiotherapy (RT) is only indicated in cases of progressing malignant obstruction. Considering high risk of local/regional progression and poor survival of these patients, we supposed, that addition of RT to the treatment may be beneficial.
Materials and Methods: From November 1998 to August 2007 external beam conventionally fractionated RT was used for patients with LAIGC after explorative surgery or confirmation of medical inoperability. Initially, two parallel-opposed radiation fields covering primary tumour and lymphatics were applied to total 40 Gy, than boost 20 Gy to initial tumour with 3−5 isocentric fields was delivered. In 4−6 weeks after completing RT, patients were assigned to 2−6 courses preferentially platinum-containing chemotherapy (CT). Historical controls consisted of patients with LAIGC undergone CT during the same period. Overall survival calculated using Kaplan–Meier method with log-rank test was established as primary end-point, and multivariate analysis using Cox proportional regression was done to analyze factors influencing survival.
Results: Overall 110 patients were assigned to RT/CT and 32 patients received CT only. Groups were well balanced on gender, age, initial T-stage (92% T3−4), ECOG and Charlson score. Exploratory surgery and N+ stage were more frequent in CT group − 69% vs 33% (Pearson 2-sided chi-square test, $p = 0.001$) and 55% vs 26% ($p = 0.006$) respectively. At least 40 Gy, 50 Gy and 60 Gy total dose was delivered to 100%, 77% and 53% patients of RT/CT group respectively. Median survival was 20 (95% confidence interval (CI), 15−24) months and 10 (95% CI 6−15) months respectively, $p = 0.015$. In multivariate analysis, favorable survival was detected in lower T-stage ($p = 0.019$), Charlson score less than 4 ($p = 0.026$) and location of primary tumour in middle third of stomach ($p = 0.039$).
Conclusion: Addition of radiotherapy to the treatment of locally advanced, inoperable gastric cancer seems to be of survival benefit. Considering probable patient selection biases in present trial, prospective, randomized study is warranted.

6544 POSTER

Chemoradiotherapy for Extrahepatic Bile Duct Cancer With Gross Residual Disease After Surgery

H. Park[1], K. Kim[1], J.Y. Jang[2], S.H. Kim[2], S.W. Han[3], D.Y. Oh[3], S.A. Im[3], Y.J. Bang[3], E. Chie[1], S.W. Ha[1]. [1]*Seoul National University Hospital, Radiaton Oncology, Seoul, Korea;* [2]*Seoul National University Hospital, Surgery, Seoul, Korea;* [3]*Seoul National University Hospital, Internal Medicine, Seoul, Korea*

Background: To analyze the outcome of chemoradiotherapy (CRT) for extrahepatic bile duct cancer patients with gross residual disease after surgery, and to identify prognostic factors for these patients.
Methods and Materials: We retrospectively analyzed the data from 29 patients with extrahepatic bile duct cancer who had undergone CRT after bypass surgery (n = 7) or palliative resection (R2 resection) (n = 22) between January 2000 and April 2009. Most patients (n = 24) underwent CRT concurrently with 5-fluorouracil or capecitabine, and 19 out of them had maintenance chemotherapy. Nineteen and 10 patients were treated with continuous course radiotherapy (RT) and split course RT with a 2-week planned rest after 20 Gy, respectively. Six out of 7 patients who had bypass surgery received high dose RT (>50 Gy) in continuous course. The median radiation dose was 50 Gy (range; 40−60). The median follow-up period was 15.9 months.
Results: The actuarial overall survival rate at 2- and 5-years was 63.9% and 19.2%, respectively. The median survival time was 31.6 months. The 2- and 5-year disease-free survival, loco-regional progression-free survival and distant metastases-free survival rates were 38.3% and 19.2%, 31.5%