Conclusions: Our data, though in a limited series, strongly support the conclusion that concomitant chemoradiotherapy of rectal SCC can achieve a complete response in a relevant proportion of patients, avoiding demolitive surgery.

6022 POSTER

Chemoradiation with capecitabine and mitomycin C in preoperative treatment of locally advanced rectal cancer

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Background: Administration of 5 Fluorouracil during preoperative radiotherapy in locally advanced rectal cancer (LARC) is standard treatment. All other new drugs or their combinations have been compared with this therapy in order to reach better results and lower toxicity.
The purpose of our study was to evaluate tolerance and efficacy of preoperative radiotherapy combined with capecitabine plus mitomycin C in patients (pts) with LARC.
Materials and Methods: From October 2006 to April 2008, a prospective study was performed on 46 pts at the Institute for Oncology and Radiology of Serbia. Preoperative radiotherapy was conducted on linear accelerators with tumor dose of 45 Gy in 25 fractions, combined with concomitant chemotherapy Mitomycin C 7 mg/m^2 at 1, 29 day, Capecitabine 825 mg/m^2 bid continuous from 1−37 day. T3 stage was diagnosed in 32 pts and T4 in 14 pts. Positive lymph nodes were noted in 25 pts.
Four to six weeks after radiochemotherapy clinical response rate (cRR) was evaluated by control examinations, rectoscopy and abdominal and pelvic CT and pts were undergone to surgery. NCI-CTC criteria were used for toxicity grading. Regression status was evaluated after operation according to Dworak Tumor Regression Grade (TRG).
Results: Acute complications one or more were diagnosed in 34 pts. The most frequent complication was dermatitis in 26 pts (grade II and III in 21 pts). Skin-foot syndrome was registered in only 3 patients (grade I and II). Diarrhea was reported in 15 pts (grade II and III in 9 pts). Hematological toxicity was noticed in 13 pts (leucopenia grade I and II in **6** pts, anemia grade I in 4 pts and thrombocytopenia grade I in 3 pts).
Clinical complete response was noticed in 10 pts, partial response in 30 and stabile disease in 6 pts. No patient showed disease progression. All patients undergone surgery with R0 resection.
At patohistological findings, the stage distribution was as follows: pT0 (p CR) in 8 pts, pT2 in 9 pts, and pT3 in 25 pts and pT4 in 4 pts. 21 pts had positive lymph nodes. TRG regression rate was: grade IV in 6 pts, grade III in 5 pts, grade II in 19 pts, grade I in 13 pts and grade 0 in 3 pts
The mean follow-up time was 15 months. Out of 46 pts, 5 pts relapsed.
Conclusions: Combined chemotherapy Capecitabine and MMC given concurrently with radiotherapy in preoperative setting is safe and well tolerated with good treatment results and quality of life of treated patients.

6023 POSTER

The value of PET-CT during radiochemotherapy in the tumour response prediction for rectal cancer

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Background: To study the role of sequential FDG-PET-CT (PET-CT) imaging during and after pre-operative radiochemotherapy (RCT) as a predictive tool for the treatment response in locally-advanced-rectal-cancer (LARC).
Patients and Methods: Thirty patients diagnosed with LARC, referred for pre-operative RCT, were included in this prospective study. All patients underwent sequential PET-CT imaging at 4 different time points: prior to therapy, at day 8 and 15 during RCT and shortly before surgery. The metabolic response of the tumour, as assessed from the PET-CT data, was correlated with the pathological response based on the tumour-regression-grade (TRG) and the ypT-stage.
Results: Overall, the FDG uptake significantly decreased during pre-operative RCT ($P < 0.001$). Four patients were characterized with an increased FDG uptake peri-tumoural, indicating an inflammatory reaction. Based on the TRG, 13 patients were classified as pathological responders (TRG 1, 2), whereas 17 patients were classified as pathological non-responders (TRG 3−5). The pathological responders showed higher FDG-uptake response-indices (RIs) compared to pathological non-responders. Using ROC-curve analysis, the time-trend of the maximum standardized-uptake-value (SUVmax) provided the best predictor of pathological treatment response. The RI of SUVmax on day 15 of RCT (AUC of 0.87) was found to be superior to the RI on day 8 (AUC of 0.78) or the RI calculated from the pre-surgical PET-CT scan (AUC of 0.66). A cut-off value of 43% for the reduction of SUVmax resulted in a sensitivity of 77% and a specificity of 93%. Excluding the patients presenting with a peritumoral inflammatory response further improved the accuracy of the prediction model to an AUC of 0.97, a sensitivity of 91% and a specificity of 93%.
Conclusion: The SUVmax reduction after the first 2 weeks of RCT provided the best prediction of the pathological treatment response with an AUC of 0.87, suggesting that an accurate prediction of the pathological response is feasible already early during RCT. However, for a few patients an increased FDG uptake due to peritumoral inflammatory reactions was observed, which led to false negative predictions. Nevertheless, the PET-CT scan performed after the first 2 weeks of RCT provides very useful as response predictor and should be further evaluated in future trials aimed at individualizing the treatment of rectal cancer.

6024 POSTER

Does chemotherapy intensity in pre-operative chemoradiation for rectal cancer affect pathologic response?

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Background: To examine the relationship between chemotherapy intensity and outcome and factors affecting tumor response in patients who underwent preoperative chemoradiotherapy for rectal cancer.
Materials and Methods: Medical records of 172 patients who received preoperative chemoradiotherapy followed by radical surgery for clinically staged T3 or 4 rectal cancer from July 2003 to November 2008 were retrospectively reviewed. Radiation dose ranged from 50.4 to 54 Gy. Thirty-four patients were treated with one cycle of bolus 5-FU (group A), 112 with two cycles of bolus 5-FU (group B) and 26 with oral capecitabine (group C). Interval from radiotherapy to surgery was 37 to 92 days (median 58). One hundred fifty eight patients underwent low anterior resection, while 3 patients underwent Hartmann's operation and another 11 underwent abdominoperineal resection.

	No. of pts (%)			
	Group A	Group B	Group C	P value
Pathologic response				
Grade 5	5 (14.7)	22 (19.6)	4 (15.4)	0.750
⩾Grade 4	8 (23.5)	51 (45.5)	11 (42.3)	0.072
⩾Grade 3	20 (58.8)	90 (42.3)	23 (88.5)	0.011
Downstaging				
Yes	23 (67.6)	85 (75.9)	17 (65.4)	0.425
No	11 (32.4)	27 (24.1)	9 (34.6)	
RRM				
⩾2 mm	27 (79.4)	98 (87.5)	20 (76.9)	0.279
<2 mm	7 (20.6)	14 (12.5)	6 (23.1)	
Sphincter saving				
Yes	20 (76.9)	75 (96.2)	22 (91.7)	0.010
No	6 (23.1)	3 (3.8)	2 (8.3)	

Results: The complete pathologic response and overall downstaging rate were 18% and 72.1%, respectively. The pathologic response rate of grade 3 to 5 for group A, group B, and group C were 58.8%, 80.4% and 88.5% (group A vs. group B, $p = 0.011$, group A vs. group C, $p = 0.012$) The rate of sphincter saving surgery was higher in group B compared to group A in tumors located below 5 cm from anal verge (96.2% vs. 76%, $p = 0.003$). Pathologic response rate was correlated with overall downstaging. There was no statistically significant difference in overall downstaging and radial resection margin same or more than 2 mm between three groups. There was no grade 3 to 4 gastrointestinal or hematologic toxicity during treatment in all patients.
Conclusions: Insufficient chemotherapy regimen showed inferior pathologic outcome and lower sphincter salvage rate in low lying tumor without

difference in grade 3 or higher toxicity. Based on this result, patient should undergo sufficient chemotherapy in combination with radiotherapy to improve pathologic outcome and maximize the chance of sphincter preservation.

6025 POSTER

Lymphatic mapping and lymphatic endothelial cell isolation in colorectal cancer patients

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Background: Sentinel Lymph Node (SLN) biopsy has already been established as a common procedure, and its clinical usefulness has been confirmed in patients with malignant lymphoma and breast cancer. In colorectal cancer, however, the application of the SLN theory remains uncommon and its clinical significance is also unclear. In addition, the characteristics of the lymphatic vessels that connect SLNs or the lymphatic endothelial cells have been unclear until now. Our purpose is to determine the feasibility and accuracy of SLN mapping by intraoperative subserosal dye injection and to develop a novel method for the isolation of anatomically defined lymphatic endothelial cells.
Methods: SLN biopsy by the subserous dye injection method (patent blue) was conducted in 36 patients with colorectal cancer for which curative resection was possible (stage 0: 2 cases, stage I: 18 cases, stage II: 4 cases, stage III: 12 cases), with additional systematic lymph node dissection. Lymphatic endothelial cells were isolated from lymphatic vessels identified at the time of the SLN biopsy by the collagenase II perfusion method, and we tried to transfer them into a culture system with an endothelial cell-specific medium and evaluated the biological properties of the isolated cells using molecular procedures.
Results: SLNs could be identified in 34 cases (94%). The total number of resected lymph nodes was 705, and 72 of those nodes were confirmed as SLNs (10.2%). Ten metastasis-positive nodes were found in SLNs (13.9%), and the mean number of identified SLNs per case was 2.0. The sensitivity to detect metastatic lymph nodes and the specificity of the SLN biopsy for all removed lymph nodes was 86.1% and 99.2%, respectively. No complications or toxicity associated with the dye injection were observed. In addition, cells isolated from removed lymphatic vessels formed colonies with endothelial cell-specific properties, and the expression of lymphatic endothelial cell-specific markers, VEGFR-3, Podplanin and Prox-1 was observed.
Conclusion: The SLN biopsy by the dye method for colorectal cancer is a procedure with high sensitivity, accuracy and safety that is applicable to cases with advanced cancer. In addition, a method was established to isolate only lymphatic endothelial cells from resected lymphatic vessels and to culture them. Our results are expected to be another milestone in the determination of the rational margin of resection in colorectal surgery and the future clarification of the mechanism of lymphatic metastasis.

6026 POSTER

Comparison of CT-guided and PET-CT guided radiotherapy planning in patients with rectum cancer treated preoperatively

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Background: Positron emission tomography (PET) has a potential improvement for staging and radiation treatment planning of various tumor sites. We analyzed the use of 18F-fluorodeoxyglucose (FDG)-PET/computed tomography (CT) images for gross tumor volume delineation of patients with rectum carcinoma candidates for preoperative conformal radiotherapy.
Materials and Methods: Twenty seven patients with rectum cancer for preoperative radiotherapy had both CT and PET images acquired. For each patient Gross Tumor Volume (GTV) was contoured on CT (CT-GTV) and PET/CT images (PET/CT-GTV). The volumes of CT-GTV and PET/CT-GTV were compared, also the intersection volumes, and tumor volumes remained outside PET/CT and CT were compared.
Results: The PET/CT-GTV ($48.5 \pm 8.5\,cm^3$) was significantly greater than the CT-GTV ($30 \pm 5.6\,cm^3$) ($p = 0.002$), respectively. The mean difference between PET/CT-GTV and CT-GTV was 38%. The intersecting tumor volume for both methods was $22 \pm 25\,cm^3$, and tumor volumes remaining outside CT and PET/CT were $24.5 \pm 29\,cm^3$ and $6.5 \pm 5.5\,cm^3$ respectively. PET/CT use causes a 38% increase in GTV, which may prevent unnecessary normal tissue irradiation and may cause geographic miss because of less GTV contoured on CT.
Conclusion: Co-registration of PET and CT information in rectum cancer may improve the delineation of GTV and theoretically reduce the likelihood of geographic misses. Imaging with PET/CT for preoperative radiotherapy of rectal cancer may lead to a change in target volume delineation. The GTV changed significantly, with a mean increase in size of 38%. PET/CT fusion images could have a potential impact on treatment planning.

6027 POSTER

Helical tomotherapy or intensity-modulated radiation therapy in the treatment of anal cancer: experience of Geneva and Lausanne

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Background: To assess the early clinical outcomes and toxicities in patients treated with high precision radiation therapy (RT) consisting of helical tomotherapy (HT) or intensity-modulated radiation therapy (IMRT) for anal cancer.
Materials and Methods: Since March 2006, 30 patients with stage I-IIIB anal squamous-cell carcinoma were treated curatively by IMRT or HT alone ($n = 2$) or by concomitant chemotherapy and IMRT or HT ($n = 28$). Median age was 59 years (range, 36–83 years) and the female/male ratio was 2.3 (21/9). Primary tumor site was anal canal, anal margin, or both in 26, 1, and 3 patients, respectively. Anal tumor, pelvic and inguinal nodes were irradiated with a median dose of 36 Gy using HT, or 5- or 7-field IMRT in 18 and 12 patients, respectively; After a planned gap of 1–2 weeks (median 1 week), a median boost dose of 23.4 Gwas delivered to the tumor and/or involved nodes using 3DRT ($n = 24$) or HT/IMRT ($n = 6$). The total delivered dose ranged between 59.4 and 64.8 Gy (median, 59.4 Gy). Concomitant chemotherapy consisted of mitomycin C alone ($n = 1$), mitomycin C and 5-fluorouracil ($n = 17$) or capecitabin ($n = 10$) in 28 patients. Common Terminology Criteria for Adverse Events v3.0 scale was used to score acute and late toxicities.
Results: All but one patient, who developed progressive local and distant disease at the end of RT, achieved a complete response. Twelve months following RT, one patient had a recurrence at the primary tumor site, salvaged with brachytherapy. After a median follow-up of 7.5 months (range, 1–35 months), no deaths were observed. The 2-year actuarial locoregional control and probability of disease control without colostomy rates were 82% and 79%, respectively. RT was well tolerated without any unplanned treatment interruptions. Grade 1 or 2 acute adverse events consisted of skin toxicity in 8 and 22 patients, diarrhea in 18 and 3 patients, and cystitis in 9 and 2 patients; respectively. Only one patient developed grade 3 mucosal necrosis at the end of the treatment, requiring diverting colostomy. No difference in terms of acute toxicity was observed between patients treated with HT or IMRT. None of the 22 patients with a follow-up of more than 3 months developed grade 3 or more late toxicity.
Conclusions: Our preliminary results suggest that HT or IMRT combined with concomitant chemotherapy for anal cancer is effective, and associated with favorable rates of toxicity compared with historical series. Further follow-up is warranted to assess late toxicity.

6028 POSTER

Prognostic value of pathological complete response after neoadjuvant therapy for locally advanced rectal cancer – a monoinstitutional experience

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Background: In the European randomized trials of neoadjuvant CRT the rate of complete response (CR) ranged from 11–16%. A favorable prognosis was observed for CRT after preoperative therapy in patients with locally advanced rectal cancer. The aim of our analysis was verify whether yCR predicts a favorable outcome.
Methods: 234 pts with locally advanced low and mid rectal cancer underwent neoadjuvant CRT in our academic institution from January 1998 to December 2007. Eligibility criteria included locally advanced rectal cancer with no distant metastases and evidence of ypCR after CRT. All patients received the same neoadjuvant treatment with 5-FU and Oxaliplatin. After a median interval of 8 weeks after complatation of CRTpatients underwent a radical resection according to the principles of TME. Standard pathological tumour staging of resected specimen was