performed according the AJCC Cancer staging Manual. The pCR was defined by no evidence of viable tumour cell on pathologic analysis. Local recurrence was defined as clinical, radiological or pathological evidence of tumour in any other site. The time to last follow up, local recurrence, or death was measured from the time of radical resection. Disease free and overall survival were estimated using the KM method, and differences between survival curves were determinated by using the long rank test. A P value of <0.05 was considered statistically significant.
Results: 37 pts had a complete response and 78 pts were not responders. Sphincher preservation, anteroposterior resection and endoscopic surgery were performed in 36 pts (97.2%). A patient with complete refused rectal surgery. Mean number of examinated lymphnodes was 14.3±7.95. Median follow up was 60 months. In pCR pts no locoregional recurrence occured and distant metastase occured in 2 pts (5.4%). In the no responder group we found 18 local recurrence (p = 0.0001) and 46 patients developped distant metastases (p = 0.0001). The pCR group 5-years overall and disease free survival were 97% and 94% rispectively. During the follow up one patient died.
Conclusions: The improved ontological outcome in patients with rectal cancer who achieve a pCR appears related to their significantly decreased rate of distant failure when compared with no down staging patients. To further improve the oncological outcomes and sphincter preservation rates in patients with locally advanced rectal cancer, the molecular mechanism governing the rectal cancer response to preoperative CRT need to be explored.

6029 POSTER

Randomized phase III trial comparing preoperative versus postoperative radiotherapy with capecitabine in locally advanced rectal cancer

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Background: Preoperative chemoradiotherapy using bolus fluorouracil demonstrated the superiority of preoperative treatment in local control and sphincter preservation in locally advanced rectal cancer. We conducted a prospective, single-institutional, phase III trial which compared preoperative chemoradiotherapy with postoperative chemoradiotherapy using oral capecitabine. We present the final results of our trial in this report.
Materials and Methods: Patients with locally advanced rectal cancer (cT3 or N+) were randomly assigned to receive either preoperative (arm I) or postoperative (arm II) chemoradiotherapy. Preoperative radiotherapy was delivered to the pelvis at a dose of 46 Gy in 23 fractions, followed by a boost of 4 Gy in 2 fractions. Postoperative radiotherapy consisted of 50 Gy in 25 fractions to the pelvis without boost. Capecitabine (1,650 mg/m^2/day) was administered concurrently during radiotherapy. Surgery was performed according to total mesorectal excision technique with the time interval of 4−6 weeks in both arms. This protocol was closed earlier than initially planned due to difficulty in patient enrollment.
Results: Between March 2004 and April 2006, 117 and 123 patients were randomly assigned to arm I and arm II, respectively. Clinical characteristics were well balanced between the two arms, except more low-lying (⩽5 cm from anal verge) tumors in arm I (60% vs. 46%, p = 0.041). In the patients with lower-lying tumors, arm I showed higher rate of sphincter sparing surgery (68% vs. 42%, p = 0.008). After a median follow-up of 47 months, the 5-year cumulative incidence of local recurrence was non-significantly higher in arm II (3% vs. 6%, p = 0.335). The 5-year overall survival and disease-free survival rates were not different between two groups. Ninety-nine patients (92.5%) in arm I and 84 patients (74.3%) in arm II completed chemoradiotherapy as planned. Grade 3 or higher acute toxicity was observed in 15% of the patients in arm I and 16% in arm II. Postoperative complications were also similar in both arms.
Conclusions: Preoperative or postoperative chemoradiotherapy with oral capecitabine was safe and well tolerated. Although we could not demonstrate significant benefit of preoperative chemoradiation in local control and survival, our data showed that increased rate of sphincter preservation was possible in lower-lying tumors without jeopardizing local control and surgical complication by preoperative chemoradiotherapy.

6030 POSTER

The use of the cell saver in rectal cancer surgery is safe

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Introduction: In T4 and locally recurrent rectal cancer the dissection planes often need to be extra anatomically. Blood loss in fibrotic tissue (after prior primary treatment or after recent radiochemotherapy) may be considerable. The use of the cell saver can help to reduce the need for donor blood. In non-oncological procedures the role of the cell-saver has been recognized. However, in oncological surgery the cell saver is being used much less for fear of disseminating tumour cells.
Patients and Methods: Our hospital is a centre for complex rectal cancer surgery. In more than half of the patients blood loss exceeds 2.5 litres. Since more than ten years, the cell saver is used to return filtered and washed erythrocytes to the patient in order to maintain the circulating red cell volume. Since 1994 until December 2006 290 patients have been treated for advanced rectal cancer and the data were collected prospectively. Four quartiles representing the volume of blood loss were created. (Q1 less than 1385 ml (n = 69), Q2 1385 up to 2500 ml (n = 76), Q3 2500 up to 4650 ml (n = 62), Q4 more than 4650 ml n = 69)).
Results: Univariate analysis showed that particularly in the largest blood loss quartiles outcome parameters were improved. Cancer specific survival at 5 years for patients in whom the cell saver was used (n = 151) per quartile blood loss volume compared to those without cell saving (n = 125) were 74%, 85%, 78%, 76% and 73%, 86%, 60%, 30% respectively (p = 0.042 in Q3 and p = 0.012 in Q4, overall p = 0.002). The percentages for metastasis free survival were 74%, 85%, 78%, 76% and 77%, 71%, 71%, and 37% respectively (p = 0.038 for Q4, overall n.s.). Other significant variables for oncological outcome were: free circumferential margin, lymphnode status, the use of neoadjuvant chemotherapy compared to radiotherapy alone and the use of adjuvant chemotherapy. After multivariate analysis the use of the cell saver did only show a positive trend, unlike the other variables, which remained significant.
Conclusion: Since 1994 the multimodality treatment of advanced rectal cancer has changed. It is difficult to establish the exact role of the cell saver in the oncological outcome of these patients. However modelling of multivariate analysis and stratification for all tumour variables did never show a negative outcome for the use of the cell saver. In all models the trend remained positive. Therefore we conclude, that introduction of the cell saver did not compromise oncological outcome and is safe to use in these kinds of patients.

6031 POSTER

Robotic radiosurgery in the local control of unresectable liver metastases in patients with colorectal cancer – preliminary results

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Background: The median survival of untreated patients with liver metastases ranges between 6 and 18 months, but unfortunately surgery may be performed in only 20% of cases. The aim of this preliminary study was to evaluate the usefulness of CyberKnife ® (Accuray Inc, Sunnyvale, CA) image-guided robotic stereotactic radiosurgery for local control of unresectable liver metastases.
Patients and Methods: Eight-teen consecutive patients with liver metastases from colorectal cancer, considered unsuitable for surgery, confirmed by ultrasound- or CT-guided biopsy or ultrasound-guided FNAB, were enrolled in the study. There were 11 men and 7 women, with an overall median age of 59 years (range 49−73 years). The inclusion criteria were: age between 50−75, no chemotherapy during the last 30 days, acceptable liver function (ALT and ALT<150 U/L, PT > 2.5%), Karnofsky performance score <3, no extra-hepatic disease on 18-FDG CT-PET, tumor size and estimated residual liver volume on CT-scan <6 cm and >700 mL, respectively.
Results: The overall tumor volume ranged from 25 to 185 mL (median 70 mL), and the irradiated volume was 18±10 mL (range 11−40 mL). The

mean post-treatment follow-up was 11 months. Inhibition of growth or a reduction in size was obtained in 12 of 18 patients: 5 with complete response, and 7 with partial response. There was a local complete response with other single lesions appearing in two patients, and a progressive disease in 4. Among responders, the median post-treatment volume of the tumor was 22 mL (range 5−55 mL), with an overall reduction rate of more than 70%. Toxic events were observed in 11 patients: transient hepatic dysfunction was evident in 7, and pleural effusion, pulmonary embolism, partial portal vein thrombosis, and upper gastrointestinal tract bleeding in one patient each. Three patients with progressive disease died during follow-up, both developing severe liver failure.
Conclusions: Using stereotactic radiosurgery a good local control of the disease may be achieved, with limited toxicity. This promising treatment strategy should be further studied in larger series, representing an acceptable alternative in patients with liver metastases unsuitable for surgery.

6032 POSTER

Helical tomotherapy (HT) for the treatment of anal canal cancer: preliminary clinical results, and dosimetric comparison between HT and intensity-modulated or 3D conformal radiotherapy

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Background: To report a single-center experience in 19 patients (pts) with anal canal cancer treated with helical tomotherapy (HT) and concurrent chemotherapy, and compare the dosimetric results with fixed-field intensity-modulated radiotherapy (IMRT) and 3D conformal radiotherapy (3D RT).
Materials and Methods: Between 2007 and 2008, 19 consecutive pts were treated with HT and concurrent CT for anal canal cancer. Median age was 59 years (range, 38−83), and female/male ratio was 14/5. The majority of the pts had T2 or T3 tumours (68.4%), and 52.6% had positive lymph nodes. In all 19 pts, pelvic and inguinal nodes, and tumour irradiation was given using HT upto a median dose of 36 Gy (1.8 Gy/fr) followed by a 1-week gap. A boost dose of 23.4 Gy (1.8 Gy/fr) was delivered to the tumour and involved nodes using 3DRT (n = 12), HT (n = 6), or IMRT (n = 1). Simultaneous integrated boost was used in none of the pts. All but one patient with a T1N0 tumour received concomitant mitomycin/5-fluorouracil (n = 12) or mitomycin/capecitabin (n = 7) CT. Toxicity was scored according to the Common Terminology Criteria for Adverse Events (NCI-CTCAE v3.0). HT plans and treatments were generated using Tomotherapy, Inc., software and hardware; and 3D or IMRT boost plans with the CMS treatment planning system (TPS), using 6−18 MV photons from a Siemens Primus accelerator. For dosimetric comparison, computed tomography data sets of 10 pts were imported into the TPS, and 3D and 5-field step-and-shoot IMRT plans were generated for each case. Plans were optimized with the aim of assessing organs at risk (OAR) and healthy-tissue sparing while enforcing highly conformal target coverage, and evaluated by dose-volume histograms (DVH) of planning target volumes (PTV) and OAR.
Results: With a median follow-up of 13 months (range, 3−18), all pts are alive and well; except one patient developing local recurrence at 12 months. No patient developed grade 3 or more acute toxicity. No unplanned treatment interruption was necessary because of toxicity. With 360-degree-of-freedom beam projection, HT showed an advantage over 3D or IMRT plans in terms of dose conformity around the PTV, and dose gradients were steeper outside the PTV, resulting in reduced doses to OARs. Using HT, acute toxicity was acceptable, and seemed to be better than historical standards.
Conclusion: We conclude that HT combined with concurrent chemotherapy for anal canal cancer is effective and tolerable. Compared to 3DRT or 5-field IMRT, there is better conformity around the PTV, and OAR sparing.

6033 POSTER

Trends of metastasectomy rate in U.S. patients with metastatic colorectal cancer

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Background: Metastasectomy in patients with metastatic colorectal cancer (mCRC) is the best option to achieve long-term survival and offers the only chance for cure. Increasing the number of resectable patients is therefore a medical treatment goal. This study examines the trend over time in metastasectomy and pre-surgery chemo- and biologic therapy in newly diagnosed mCRC patients.
Material and Methods: Using a large, U.S. medical claims database from a national commercially-insured population, we identified patients with newly diagnosed mCRC and CRC patients who developed metastases between 2001 and 2005. Metastasectomy rates by anatomic location were assessed for all mCRC patients during one year after mCRC diagnosis. Chemotherapy and/or biological therapy within 90 days prior to the date of metastasectomy was evaluated.
Results: A total of 1,785 newly diagnosed mCRC patients were identified; of which 327 patients (18.3%) received metastasectomy within one year after mCRC diagnosis. This included 70 patients (3.9%) who were not initially resected but had metastasectomy following chemo- and/or biologic therapy. From 2001 to 2005, the most common surgery site was the liver (ranged 13.9%-16.7%), followed by the lung (2.3% to 4.9%) and pelvic resection (0.0%-0.5%). The percentage of patients who were not initially resected and had metastasectomy after receiving chemo- and/or biologic therapy increased from 2.9% in 2001 to 5.6% in 2005. Among patients who received pre-surgery chemo- and/or biologic therapy, the percentage of receiving biologic therapy increased rapidly in 2004–2005 from 35.0% to 77.3%.
Conclusions: The proportion of patients with mCRC undergoing metastasectomy increased over time and the percentage of patients who were not initially resected and had metastasectomy after receiving chemo- and/or biologic therapy almost doubled during the study period.

6034 POSTER

The short-term effect of neoadjuvant chemoradiation on anorectal function in rectal cancer: analysis using preoperative manometric data

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Background: Though there are a few reports of the effect of neoadjuvant chemoradiation (nCRT) on anorectal function, they mostly assessed the long-term postoperative results on anorectal function. The purpose of this study is to evaluate the short-term preoperative effects of nCRT on anorectal function, excluding the bias of postoperative impairment.
Materials and Methods: From January 2005 to December 2008, 126 patients with locally advanced rectal cancer underwent nCRT in Seoul National University Bundang Hospital. Among these, we analyzed 80 patients whose preoperative anorectal manometry data were available for both pre- and post-nCRT. Patients were divided into two group according to the tumor location; lower rectum (n = 52) and mid-rectum (n = 28). All patients received radiotherapy of 50.4 Gy with concurrent oral capecitabine or intravenous fluorouracil based chemotherapy. The paired *t* test was used to compare pre- and post-nCRT parameters such as mean resting pressure (mRP), maximum squeeze pressure (mSP), percentage asymmetry of the resting and squeeze sphincter (R and S asymmetry), length of high pressure zone (HPZ), rectal sensory threshold, and rectal compliance.
Results: The mRP increased significantly after nCRT, whereas mSP did not change significantly (data shown in table). There were significant decreases in R and S asymmetry and increase in HPZ length. Rectal compliance decreased significantly. In patients with lower rectal cancer, there were significant differences in S asymmetry, HPZ length, and rectal compliance. In patients with mid-rectal cancer, only mRP increased significantly.

	Pre-nCRT	Post-nCRT	*p* value
mRP (mmHg)	42.98±17.77	47.35±17.09	<0.01
R asymmetry (%)	31.33±6.62	29.57±6.48	0.04
mSP (mmHg)	139.75±76.66	130.94±65.19	0.09
S asymmetry (%)	27.18±6.48	25.33±5.97	<0.01
HPZ length (cm)	2.06±0.67	2.24±0.69	0.03
Rectal sensory threshold for maximal tolerance (ml)	152.41±40.29	143.29±40.69	0.08
Rectal compliance	1.13±0.40	1.01±0.39	0.01

Conclusions: Although there was a decrease in rectal compliance, nCRT did not impair short-term sphincter function significantly regardless of the location of primary tumor and rather seemed to have overall beneficial effect.