levels before liver surgery. In patients with CRLM we advocate both CEA monitoring and imaging in the follow-up after liver surgery.

6069 POSTER

A Combined Volume and Quality Threshold to Reliably Assess Hospital Performance

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Background: Recent studies have shown that a high procedural volume is associated with a better quality of care, resulting in volume thresholds set for hospitals. However, hospital-specific outcomes that may be better or worse than average, are ignored in these thresholds. We aimed to develop a combined volume and (risk-adjusted) outcome threshold that identifies hospitals that deliver adequate care.
Methods: We illustrate our methods on the Dutch Surgical Colorectal Audit database of 2009. Outcome was measured by postoperative mortality and morbidity. The minimal volume needed to detect a difference between the population average outcome and twice this average, regardless of hospital-specific outcomes, was calculated. Than, for each hospital, an Observed/Expected (O/E) outcome was calculated. Expected outcome was based on hospitals' case-mix. When the 95% confidence interval around the hospitals' O/E outcome was below 2 and not above 1, the hospital met the combined volume and quality threshold.
Results: We included 6416 patients, treated in 81 hospitals. Average mortality was 4%, average morbidity was 24%. A minimum volume of 247 patients was needed for mortality, and 45 for morbidity. No hospitals met this volume threshold for mortality; 68 (81%) hospitals had sufficient volume for morbidity. For mortality, 73 (90%) hospitals had an O/E outcome less than 2, but only 16 (20%) also had a sufficient volume to prove their results to be reliable. For morbidity, all hospitals had an O/E outcome less than 2, while 61 (75%) hospitals also had sufficient volume to meet the combined volume and quality threshold.
Conclusion: Using the combined volume and outcome threshold we can identify those hospitals that deliver adequate care, and increase transparency and trust in quality of care.

6070 POSTER

Non Elective Colon Cancer Resections in the Dutch Surgical Colorectal Audit, a Scoring System to Identify High Risk Patients

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Background: Although outcome after non-elective colon cancer resections is worse than after elective resections, there may be elective patients with a high risk of postoperative mortality, and non-elective patients with a lower risk. The aim of this study was to develop a prediction score for postoperative mortality after elective and non-elective resections, which enables to identify and compare high- and low-risk elective and non-elective patients in clinical practice.
Patients and Methods: In the Dutch Surgical Colorectal Audit (DSCA) detailed clinical data on case-mix, treatment and outcome variables were registered of patients operated for a colon carcinoma in the Netherlands. All factors predicting mortality were identified for elective and non-elective patients separately, by means of multivariate logistic regression. Every 100% rise in odds ratio was translated into one point in the scoring system. Patients were divided into risk-categories based on their score.
Results: A total of 3547 elective, and 968 non-elective patients operated for a colon carcinoma in 2009 were included. Postoperative mortality ranged from 1% in the low-risk elective patients to 27% in the high-risk non-elective patients. Low-risk non-elective patients had a similar mortality rate as medium-risk elective patients (4% and 3% respectively, $p = 0.24$). Of all non-elective patients, 26% were diagnosed 1 week or longer before surgery. When all of these patients could have been treated electively, mortality might be reduced.
Conclusion: Using a simple scoring system, physicians can identify high-risk patients during their preoperative visit. Only a select group of non-elective patients were classified as high-risk patients with a postoperative mortality risk of 27%. Maximum effort should be made to treat these patients in an elective setting.

6071 POSTER

Quality of Life of Older Rectal Cancer Patients is Not Impaired by a Permanent Stoma

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Background: The association between age at treatment and health-related quality of life (HRQL) of older rectal cancer patients is poorly understood. The aim of this study was to investigate whether HRQL of older rectal cancer patients ($\geqslant$70 years) treated for a tumour in the lower two-third of the rectum differs from younger patients (<70 years). Furthermore the influence of a permanent stoma was taken into account.
Materials and Methods: Patients with rectal cancer from 4 hospitals diagnosed in 1998–2007 were identified from the Eindhoven Cancer Registry. All patients were treated with either abdominoperineal or low anterior resections. Survivors completed the Short-Form-36 (SF-36) health survey and the EORTC Quality of Life Questionnaire-Colorectal 38 (QLQ-CR38). HRQL scores were compared after dividing the patients in four groups, stratified by stoma status and age at time of operation (<70 and $\geqslant$70). The SF-36 and the QLQ-CR38 sexuality subscale scores of the survivors were compared with a normal age- and sex-matched Dutch population.
Results: 143 patients were included. Median follow-up was 3.4 years. Older patients had significantly worse physical function ($p = 0.0003$) compared to younger patients on the SF-36 subscales. On the QLQ-CR38 domains, older patients ($p = 0.005$) and patients without a stoma ($p = 0.009$) had worse sexual functioning compared to younger patients and patients with a stoma, respectively. There was a significant age effect ($p = 0.01$) for male sexual dysfunction, where older males had more sexual dysfunction compared to younger males. Older patients with a stoma had worse physical function ($p < 0.01$), but slightly better mental health ($p < 0.05$) compared to the Dutch normative population. Older patients without a stoma had better emotional role function ($p < 0.01$) compared to the normative population. However younger patients had a worse sexual functioning and enjoyment compared to the normative population (both $p < 0.0001$).
Conclusions: This study shows that older patients with a stoma have comparable HRQL to older patients without a stoma or the normative population. Patients who are sexually active after treatment could benefit from receiving psychosocial and clinical support in the management of potential sexual dysfunction following treatment.

6072 POSTER

Postoperative Morbidity After Hypertherm Intraperitoneal Chemotherapy Related to Perfusion Temperature

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Background: Hypertherm intraperitoneal chemoperfusion (HIPEC) is a treatment given to patients with peritoneal carcinomatosis of different primary origin. Hyperthermia is supposed to enhance the tumoricide effects of chemotherapy. In this study, the clinical effects of temperature during a HIPEC were investigated.
Material and Methods: All patients treated in one tertiary with oxaliplatin based HIPEC (460 mg/m^2) were included. In addition to intraperitoneal oxaliplatin, 5-fluorouracil was administered intravenously. The temperature of the perfusion was adjusted to the clinical condition of the patient. During the 30 minute perfusion, temperature was continuously recorded at 3 sites. The maximal temperature and the area under the temperature curve (AUC) were recorded. Data on age, sex, anaesthesia time, BMI, blood counts and biochemistry, number of anastomosis, postoperative complications, time in the intensive care (IC) department, total hospitalisation time and time to removal of the stomach tube were extracted from patient files. The latter was considered a measure of postoperative ileus. A stepwise multiple linear regression analysis was performed to predict time in the IC department and time to removal of stomach tube.
Results: Between July 2005 and February 2011, 138 patients with peritoneal carcinomatosis of different origin were eligible for inclusion. Data on time to removal of stomach tube of 131 patients were available. The mean age was 57 years (range 17−82) and the sex ratio was 60 males to 78 females. Mean operation time was 579 minutes. Adequate temperature data of 102 patients were available. Maximal temperature was not related to the time to removal of stomach tube, occurrence of anastomotic leaks

or 30 days mortality. However there was a relation to prolonged stay in the IC department. A survival analysis was not performed because of the prognostic heterogeneity of the included patients.
Conclusion: This study analysed the effect of maximal temperature and AUC on the time in the intensive care department and postoperative ileus. The retrospective nature of this study requires careful interpretation of the results. Although a relation between temperature of the perfusion and complications was not demonstrated, there was a relation to prolonged stay in the IC department. Prospective studies are required to confirm these results.

6073 POSTER

Results of Surgical Treatment and Unfavourable Splenomegaly After Conversion Chemotherapy for Initially Unresectable Colorectal Liver Metastases

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Background: Recent progress in chemotherapy and molecular target agents has made initially unresectable colorectal liver metastase converted to resectable. The objective of this study is to clarify the beneficial and adverse effects of conversion chemotherapy on surgical treatment for colorectal liver metastases.
Methods: We identified 36 patients treated by conversion chemotherapy who had initially unresectable colorectal liver metastases. The unresectability of hepatic resection is based on the lack of the future remnant liver volume due to multiple bilobular metastases or the anatomical reason because of the tumour location close to all three hepatic veins, and simultaneous unresectable lung metastases. The medical records of these patients were retrospectively reviewed. The liver and splenic volume was measured by the volumetric analysis before and after chemotherapy. Indocyanine green retention rate at 15 min (ICGR15), platelet counts, and serum AST/ALT levels were measured before and after chemotherapy. Overall survival rates were evaluated by the Kaplan–Meier method. Differences were considered significant when $p < 0.05$.
Results: The median age of these patients was 62 years. Twenty-three patiensts were converted to resectable. Surgery was possible after one (55%) or more (13%) lines of chemotherapy. Eleven patients underwent hemihepatectomy or more, and 2 patients underwent two-stage hepatectomy. Combined vascular resection and reconstruction with hepatectomy were performed in 5 patients. Postoperative complication was seen in 23% of resected patients. Of the 19 patients who had PR/SD responding to the first line chemotherapy, 3-year overall survival was 70% compared with that of other patients. Survival of patients with tumour shrinkage more than 20% at 8 weeks after chemotherapy was better than that of other patients. The spleen volume statistically increased after chemotherapy. This increase was significantly seen in patients who underwent oxaliplatin-based chemotherapy over 10 courses relative to irinotecan-based chemotherapy. The spleen volume was correlated with AST/PLT ratio (r = 0.607, p = 0.003), but not ICGR15. The remnant liver volume 1 week after hepatectomy in patients with long-term chemotherapy tended to decrease liver regeneration.
Conclusion: Surgical treatment was beneficial for patients with initially unresectable colorectal liver metastases downstaged by conversion chemotherapy. Long-term chemotherapy prior to surgery was associated with splenomegaly, which may affect liver dysfunction.

6074 POSTER

Cytoreductive Surgery and HIPEC in Patients With Peritoneal Carcinomatosis of Colorectal and Appendicular Origin − Results

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Purpose: To report the results of our experience with cytoreductive surgery (CS) and HIPEC in peritoneal carcinosis of colorectal and appendicular origins.
Patients and Methods: 47 patients with peritoneal carcinomatosis (PC) of either colorectal or peritoneal origin underwent complete cytoreductive surgery followed by HIPEC. Inclusion criteria for CS an HIPEC were absence of extra-abdominal disease, complete macroscopic tumoral resection (R1) and/or residual nodules <2.5 mm (R2a), PCI score <25 (excluding for pseudomyxoma peritoneal). HIPEC was performed using the coliseum technique (open abdomen) with oxaliplatine 460 mg/m^2 for 30 minutes at 42−43ºC with 2 L/m^2 of a 5% dextrose instillation in a closed continuous circuit.
Results: 40 CS + HIPEC procedures were performed in 38 patients (M: 16, W: 22, mean age: 54.3 y (range: 37−75)). 2 patients underwent a second HIPEC procedure for isolated recurrent peritoneal disease. 9 patients were excluded for CS and HIPEC (20%), respectively 1 for anaesthetic reason, 1 for a synchronous recurrent breast tumour and 7 for residual tumour >2.5 mm (including 1 with retroperitoneal involved lymph nodes). Tumours treated with CS-HIPEC were respectively appendiceal in 9 (22%), colorectal in 30 (75%) and mesothelioma in 1 (3%). In-hospital and 30-day mortality rates were 5%. 1 patient presented a postoperative renal insufficiency and pneumonia and developed a septic shock with ARDS. The second one developed a neutropenic septic shock. Mean and median follow-up were respectively 21 months and 19 months (range 3−58 months). One year overall survival is 93% (short follow-up). There are 3 long term survivors respectively at 58, 52 and 45 months.
Conclusion: CS and HIPEC procedures in the treatment of peritoneal carcinomatosis are related to a mortality of 5% as related in literature. Although longer follow-up is need, long term survivors are reported.

6075 POSTER

Phase III Trial of Treatment Duration of Oral Uracil and Tegafur/ Leucovorin Adjuvant Chemotherapy for Patients (pts) With Stage IIb/III Colon Cancer − an Interim Safety and Feasibility Report, JFMC33–0502

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Background: Although adjuvant chemotherapy for high risk colon cancer is standard, treatment duration of adjuvant chemotherapy is controversial. Oral uracil and tegafur (UFT)/leucovorin (LV) are widely used as standard adjuvant chemotherapy for colorectal cancer (CRC) in Japan. We conducted a phase III trial to investigate the optimal duration of adjuvant chemotherapy with UFT/LV for Stage IIB/III colon cancer. Here we report the results of a pre-planned safety and feasibility analysis.
Material and Methods: Pts with curatively resected stage IIB/III colon cancer (PS, 0 to 1; age, 20 to 75 years; no other therapy) were eligible for this trial. Pts were registered within 6 weeks after surgery and were randomly assigned to receive UFT (300 mg/m^2/day)/LV (75 mg/day), given for 28 days per 35 days for 6 months (arm C) or given for 5 consecutive days per week for 18 months (arm S). The sample size of pts was 840 (hazard ratio = 0.667, two-sided $\alpha = 0.05$, $\beta = 0.2$). The primary endpoint was disease-free survival (DFS), and the secondary end points were overall survival (OS) and safety.
Results: A total of 1071 pts were registered from 233 centers. There were no differences in patient demographics. 135, 114, 559, 217 pts were stage IIB, IIIA, IIIB, IIIC respectively. S arm was more feasible than C arm. The most common grade 3 or 4 non-hematological toxicities were diarrhea (C vs. S, 6.7% vs. 2.1%), anorexia (3.4% vs. 1.4%), and stomatitis (1.2% vs. 0%). The proportion of pts who could complete UFT/LV therapy for C and S were 73% and 56% respectively. Proportion of refusal not related to toxicity for treatment discontinuation was 25% for patients receiving S arm. 3-year DFS and OS combined from both arms were 74.0% and 95.7%.
Conclusion: This interim analysis demonstrated that adjuvant chemotherapy with UFT/LV for Stage IIB/III colon cancer is feasible and showed no unexpected toxicity. Usefulness of prolongation of duration will be clarified at the final analysis.

6076 POSTER

Assessment of Peritoneal Cytology in Patients With Colon Cancer

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Background: The clinical and prognostic significance of peritoneal fluid cytology in patients undergoing surgery for colonic cancer is not well defined. Concerns about tumour cell spillage during surgical resection of the tumour both during open as well as in laparoscopic surgery have been raised recently. The aim of the present study was to correlate peritoneal cytology with stage and histology of colon cancer and to find out frequency of tumour cell spillage during surgical resection.
Material and Methods: 22 cases of histologically proven colon cancer were included in the study. Cases with clinical or radiological evidence