

Methods: All 8051 patients with invasive colon cancer stage III aged ≥ 75 years diagnosed in 1997–2009 in the Netherlands were included. Data were extracted from the Netherlands Cancer Registry. Trends in adjuvant chemotherapy administration over time were analysed and multivariable overall survival analyses were performed.

Results: The proportion of stage III colon cancer patients aged ≥ 75 years who received adjuvant chemotherapy increased from 12% in 1997–2000 to 23% in 2007–2009 ($p_{\text{trend}} < 0.0001$), with large differences between age groups: in patients 75–79 years adjuvant chemotherapy administration doubled from 22% to 44%, in those aged 80–84 years it increased from 4% to 10%, while patients aged ≥ 85 years hardly received any adjuvant chemotherapy. Furthermore, there was large variation between geographic regions. Three-year overall survival increased over time from 40% in 1997–2000 to 52% in 2007–2009 ($p < 0.0001$). Receiving adjuvant chemotherapy was the strongest positive predictor of survival in this retrospective study (hazard ratio = 0.46 (95% confidence interval: 0.42–0.51)), while older age negatively influenced survival as well as male gender and tumour characteristics. Geographic region was not correlated with survival.

Conclusion: There is an increase in adjuvant chemotherapy administration in elderly patients with stage III colon cancer in the Netherlands since 1997, with a strong age gradient and large geographic variation. Subsequently, survival in elderly patients with stage III colon cancer increased over time, most likely due to stage migration caused by better diagnosis over time. Furthermore, there is a large effect of adjuvant chemotherapy on survival, which might be caused by selection of the fitter patients, which is further investigated.

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POSTER

Does Age Count in Pancreatic Resection?

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Background: Surgery offers the only potential for cure in localized pancreatic cancer. The majority of patients (pts) are >65 years at presentation. Due to compromised physiological reserve, increasing comorbidities and the natural history of pancreatic cancer, elderly pts are often denied the option of surgical resection. We assessed our institution's experience of pancreatic resection for pts aged ≥ 70 years.

Methods: A prospectively maintained institutional database was retrospectively reviewed for all pts undergoing pancreatic resection from 2006 to 2011. Demographics, laboratory, treatment and outcomes data were obtained.

Results: Of 69 pts who had surgery for pancreatic neoplasm, 19 (28%) pts were ≥ 70 years. Sites of disease in these pts included pancreas head ($n = 11$, 58%), peri-ampullary ($n = 5$, 26%), and distal cholangiocarcinoma ($n = 3$, 16%). Surgical procedures included pancreaticoduodenectomy ($n = 16$, 84%) and double biliary bypass ($n = 3$, 16%) [due to occult metastases at surgery]. Pathologies included adenocarcinoma (AC) ($n = 16$, 84%) and NET (neuroendocrine tumour)/IPMN (intraductal papillary mucinous neoplasms) ($n = 3$, 16%). Number of R0 resections was 15 (15/16, 94%), with positive lymph nodes in the majority of cases. Pre-operative comorbidities included: COPD ($n = 3$, 16%), and vascular disease ($n = 10$, 53%). Median baseline ECOG was 1 (range, 0–2). There was no perioperative mortality. Median length of hospital stay was 13 days (range, 9–50). The majority of pts were referred to medical oncology with complete recovery of baseline ECOG. Thirteen pts who underwent pancreatico-duodenectomy for AC (81%) received adjuvant chemotherapy (with expected toxicities) and the remaining 3 pts required no treatment. Ten pts, after pancreatico-duodenectomy and adjuvant therapy had at least 2 yrs follow-up with median overall survival of 21.5 months (range, 12–44). Indeed, in those pts aged 70–75 yrs median overall survival was 18.6 months while in the pt subset aged 75–80 yrs median overall survival was 25.75 mths. A further three pts aged ≥ 80 yrs underwent pancreaticoduodenectomy followed by adjuvant chemotherapy in the past 12 mths, with no peri-operative complications or significant acute chemotherapy-related toxicities. They remain on active follow-up, with maintenance of baseline performance status to date. Data is currently awaited from another institution in Ireland specialising in pancreatic resections to further validate these findings.

Conclusions: Therapeutic nihilism exists in the treatment of pancreas cancer in elderly pts. This group can undergo pancreatic resection with acceptable post-operative morbidity, mortality and overall outcome as is evidenced in our institution's experience.

Age alone should not be a discriminatory factor. Standard pre-operative assessment and geriatric scoring systems combined with more intensive post-operative rehabilitation is affording the older patient the opportunity to avail of optimal oncologic treatment.

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POSTER

Concurrent Chemoradiation in Locally Advanced, Unresectable Non Small-cell Lung Cancer (LA-NSCLC): Comparison of Efficacy and Treatment Tolerance in the Elderly

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Background: Concurrent chemoradiation (CCRT) is considered the standard of care for LA-NSCLC but is associated with significant local and systemic toxic effects. To test the hypothesis that elderly patients are more subject to toxicity, we compared treatment-related toxicity, impact of treatment on quality of life and differences in outcome between younger (<70 years) and older (≥ 70 years) patients.

Materials and Methods: Fifty-nine consecutive patients (<70 years = 42, ≥ 70 years = 17) were prospectively enrolled in a phase I/II radiation dose escalation trial with fixed dose weekly chemotherapy consisting of cisplatin and docetaxel at 20 mg/m² each. The trial was approved by the competent authorities and institutional ethics committee and was registered (NCT00379717, EUDRACT2006–003708–21). A median total dose of 67.2 Gy (range, 60–74.4 Gy) was administered in all patients besides one patient due to early progressive disease. Dose intensity of concurrent cisplatin and docetaxel was 96% each. Dose reductions and/or omission of weekly chemotherapy occurred in 8 patients (<70 years = 3, ≥ 70 years = 5, $p = 0.152$). Acute and late toxicities were scored using RTOG/EORTC toxicity scoring systems. Quality of life was assessed using the QLQ C-30 questionnaire. Incidences of toxicities and mean scores for global health status were compared using Student t-test and paired-samples t-test. Overall survival was calculated using Kaplan–Meier method with log-rank testing for intergroup comparison.

Results: The rate of acute \geq grade 3 esophagitis and pneumonitis was 15% and 3% respectively. The rate of late \geq grade 3 esophagitis was 26% and pneumonitis was 2%. No significant differences in esophageal or lung toxicity were observed between both age groups. The rate of \geq grade 3 neutropenia was 23.5% in the older population, significantly higher than the 2% incidence in the younger population ($p = 0.0099$). Mean values for global health status decreased at last day of treatment compared with baseline for both groups. However, decrease in global health status was significant in younger population only (62.5 ± 23.5 at baseline vs 52.6 ± 18.6 at last day of CCRT, $p = 0.0403$). Median survival time for elderly patients was not significantly different (416 days vs 450 days, $p = 0.425$).

Conclusions: Besides increased rate of neutropenia, elderly patients did not experience increased toxicity or decreased quality of life after CCRT, compared to younger patients. A comparable survival can be achieved in the elderly patient.

4012

POSTER

Stereotactic Radiosurgery of Brain Metastases in Elderly Patients: the Cleveland Clinic Experience

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Background: Elderly patients often suffer from cerebrovascular impairment. Whole brain radiotherapy (WBRT) can cause vascular damage and enhances the risk of dementia. For patients with a limited number of brain metastases (BM) stereotactic radiosurgery (SRS) is promising alternative. This study was designed to evaluate the therapeutic effect of SRS in patients aged ≥ 70 years who presented with BM.

Methods: The IRB-approved Cleveland Clinic Brain Tumour and Neuro-Oncology Center's database was used to identify patients with BM who were ≥ 70 years at the time of diagnosis of BM and were treated with SRS between 8/2000 and 12/2009. Multivariable analysis was conducted to identify independent predictors of survival using a Cox proportional hazards model and a stepwise selection algorithm with $p = 0.10$ and $p = 0.05$ as criteria for entry and retention.

Results: 173 BM patients with a median age of 75 years (range 70–87, 64% male) were included. Most patients had either lung cancer (55%, 95/173) or kidney cancer (16%, 28/173) primaries and the median time between diagnosis of the primary cancer and diagnosis of BM was 10.3 months (0–309.6 months). Forty-six percent (79/173) of patients had multiple BM and 57% (99/173) had extra-cranial metastases at the time BM was diagnosed. Median overall survival (OS) was 5.5 months from the time of SRS (95% CI, 4.4–7.2 months). Cause of death was extracranial tumour progression in 35% of the patients, cerebral tumour progression in

only 3%, both cranial and extracranial tumour progression in 9%, and the cause of death was unknown in 53%.

Conclusion: In multivariable analysis (Table 1), performance status (KPS), the interval from diagnosis of the primary cancer to BM, WBRT prior to SRS and lack of extracranial metastasis were all identified as independent predictors of OS. SRS is a well tolerated and effective treatment for elderly patients.

Table 1. Multivariable Analyses of Survival (Wald test)

Factor ¹	Hazard Ratio (95% C.I.)	P
KPS (50–60 vs. 70–80 vs. 90–100)	1.47 (1.16–1.88)	0.002
Interval from diagnosis of primary tumour to diagnosis of BM (≤12 months vs. >12 months)	1.69 (1.21–2.36)	0.002
Extracranial metastasis (No vs. Yes)	1.66 (1.18–2.32)	0.003
WBRT prior to SRS (Yes vs. No)	1.67 (1.18–2.32)	0.004

¹Feature with the poorest prognosis is listed first.

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POSTER

Obesity in the Elderly: on the Role of Adipokines in Prostate Cancer Progression

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Background: Although an increasing number of studies confirms the relationship between obesity and several cancers, available data are largely insufficient in understanding the underlying molecular basis in most fields. Adipose tissue, which is the largest endocrine organ in the body, plays, through the release of adipokines, an important role in regulating not only energy metabolism but also cell growth and differentiation in several tissues. For this reason adipokines have been suggested to influence the progression of cancer cells. Increasing prevalence of visceral obesity in the elderly population may explain the increment in incidence of advanced prostate cancer in western Countries despite the improvement in diagnostic procedures.

Materials and Methods: Ninety consecutive patients diagnosed with prostate cancer (PCa), benign prostatic hyperplasia (BPH) or for other non prostatic and non tumoral urological diseases were enrolled at the urology clinic of our University. For each patient a detailed clinical history and serum values of metabolic variables were recorded. Blood samples and surgical prostatic tissue specimens, when applicable, were collected for the measurement of serum adipokines and tissue adipokine receptors. **Results:** The waist to hip ratio (WHR) appeared to be a significant risk variable for both PCa and BPH. Among the adipokines tested, including leptin, adiponectin, TNF and IL-6, only serum values of leptin were significantly associated to risk of PCa but not of BPH. Moreover leptin values were positively associated to WHR. Leptin receptors were localized in epithelial prostate cells mainly in tumour cells with invading phenotype. Adiponectin serum values, although were not associated to risk of PCa, demonstrated an inverse correlation with neuroendocrine variables. These data were confirmed in vitro by using PCa cell models. In fact high leptin production was positively correlated with increased proteolytic and invasive capacity in PCa cells.

Conclusions: Our data appear to confirm the association between leptin levels and progression of prostate cancer and suggest a molecular mechanism based on the modulation of cancer cell invasion.

4014

POSTER

Evaluation of Therapeutic Response to a New Radiosensitization Treatment (KORTUC II) for Aged And/or Surgery-refusing Patients With Stage I/II Breast Cancer by Dynamic MRI

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Background: We have developed a new radiosensitizer containing hydrogen peroxide and sodium hyaluronate for topical tumour injection, to convert various radioresistant tumours into radiosensitive tumours. The method has been named Kochi Oxydol-Radiation Therapy for Unresectable Carcinomas, Type II (KORTUC II). Using KORTUC II, we started to perform breast-conservation treatment (BCT) without any surgical procedure for aged and/or surgery-refusing patients with breast cancer in stages I or II. Given the desire of patients to avoid surgical procedures, we could not obtain histological confirmation of the primary tumour region following KORTUC II treatment. Instead of getting histological confirmation, we employed dynamic magnetic resonance imaging (MRI), which is

considered highly useful for precise evaluation of therapeutic responses to neo-adjuvant chemotherapy (NAC) and or induction chemotherapy for patients with breast cancer. The purpose of this study was thus to evaluate therapeutic response to KORTUC II treatment in patients with stage I/II breast cancer using annual dynamic magnetic resonance imaging. Moreover, in comparison with other diagnostic modalities such as positron emission tomography-computed tomography (PET-CT), power-Doppler ultrasonography, and mammography, the diagnostic accuracy of dynamic MRI was also evaluated.

Materials and Methods: The study was performed at Kochi Medical School Hospital from 2006 to 2011. Eleven aged and/or surgery-refusing patients with stage I/II breast cancer were enrolled in the study after obtaining fully informed consent. Prior to and following KORTUC II treatment, no patients received any chemotherapeutic agents due to high age and/or refusal. All patients underwent dynamic MRI prior to and annually following KORTUC II treatment. We compared these MRI findings, and also compared MRI findings with other diagnostic modalities performed at the same period. Following KORTUC II treatment, patients with estrogen receptor-positive tumour were started on endocrine therapy using an aromatase inhibitor.

Results: In all cases, disappearance of tumour lesions was shown on dynamic MRI performed at approximately 1 year following KORTUC II treatment and marked therapeutic effects of treatment were also confirmed through other diagnostic modalities performed during the same period. The mean follow-up period for patients at the end of February 2011 was 35.1 months.

Conclusions: Dynamic MRI of the breast clearly showed marked therapeutic effects of KORTUC II treatment for stage I/II breast cancer. These results confirm that BCT without any surgical procedure can be safely performed using our new radiosensitization treatment of KORTUC II for topical injection into the tumour tissue.

4015

POSTER

Liver Resection in the Elderly: Combined Anaesthetic Assessment and Enhanced Recovery Improves Outcome

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Background: Colorectal carcinoma is the second most common malignancy and the second most leading cause of cancer deaths in western countries. 76% of patients with a newly diagnosed colorectal carcinoma are between 65 and 85 years old. Around 25% of patients will develop hepatic metastasis, for which resection is the only potential curative treatment.

Previously published data from our unit has shown that liver resection for colorectal liver metastasis in the over 70's is feasible, though there is higher morbidity and mortality in this group. Between 1/1/2008 and 1/11/2009, our unit performed a staged introduction of enhanced recovery program, and formalised anaesthetic assessment including cardiopulmonary exercise testing (CPET), a non-invasive method of quantifying a patients fitness. This study aimed to assess the combined effect of these interventions on outcome in elderly patients undergoing resection of colorectal liver metastasis.

Methods: All patients over the age of 70 undergoing resection of colorectal liver metastasis from 1/1/2008 to 11/3/2011 were identified from a prospectively maintained research database (Group A). Data was extracted to compare with previously published data from our unit collected between 8/1990 and 4/2007 (Group B).

Results: Group A consisted of 79 patients, compared to 178 in group B. In group A, 31 patients (39.2%) received neoadjuvant chemotherapy compared to 34 patients (18.8%) in group B ($p < 0.001$). Median hospital stay was 7 days for group A and 13 days in group B ($P < 0.001$). 36 (45.6%) patients in group A had complications in comparison to 70 (38.5%) patients in group B ($p = 0.348$). Two in hospital deaths occurred in group A (2.5%) compared to 9 (4.9%) in group B ($p = 0.356$).

Conclusions: The introduction of cardiopulmonary exercise testing and anaesthetic assessment, within an enhanced recovery program, can lead to significant reductions in length of stay in elderly populations. There is a developing trend towards lower mortality. There is a trend towards increasing complications, which may be attributable to increased use of neoadjuvant chemotherapy.