from 15.4 to 27.3 per minute. Rotations, respiratory amplitudes and frequencies showed significant interindividual differences ($p < 0.0001$). We found no correlation between age, body-mass-index and surgical status, and uncertainties from positioning and patient movement.
Conclusions: Positioning accuracy and respiration-dependent motion vary significantly between individual patients. Considering characteristic patient-dependent motion patterns and taking into account also potential time-dependent changes, individually tailored radiotherapy planning and delivery should be the subject of further investigations.

1373 POSTER

Postoperative radiation therapy for pituitary adenomas: analysis of tumour control and hormonal sequelae

T. Eder[1], G. Jakse[1], M. Mokry[2], U. Langsenlehner[3], R. Mayer[1].
[1]*Department of Radiation Oncology, Medical University, Graz, Austria;*
[2]*Department of Neurosurgery, Medical University, Graz, Austria;*
[3]*Department of Clinical Oncology, Medical University, Graz, Austria*

Background: The role of postoperative radiotherapy in the management of pituitary adenomas is still controversial. The aim of our study was to evaluate local tumour control and the incidence of hypopituitarism following pituitary surgery and radiotherapy.
Patients and methods: Between 4/1984 and 11/1991, 89 patients (43 female, 46 male) with pituitary macroadenomas received external beam radiotherapy at the Department of Radiation Oncology, Graz, Austria. Prior to radiotherapy all patients had undergone surgery (transsphenoidal, n = 86, craniotomy, n = 3), six patients had undergone two or more previous tumour resections. Fifty-five patients had functional and 34 patients had non-functional adenomas. Fifteen patients received radiotherapy after complete tumour resection and 74 patients for residual disease. Radiotherapy was delivered in a three field technique and a mean total dose of 50.2 Gy (range 23.4 – 54 Gy).
Results: Pituitary tumour regrowth has occurred in 6 of the 89 patients (6.7%) during a mean follow up of 76 months (range, 1.5 to 166 months). Three of these patients required a second surgical procedure. In 73 patients information on hormonal function was available and in 65 of them (89%), hormonal insufficiency was observed (partial hypopituitarism, n = 61, panhypopituitarism, n = 4). Forty five patients (62%) developed a deterioration that required hormonal replacement therapy.
Conclusions: Radiotherapy after pituitary surgery is highly effective in preventing recurrence of pituitary adenomas. Multiple endocrine axes, however, were commonly involved with an overall frequency of 89% and therefore patients need lifelong endocrine follow up after combined treatment of the pituitary region.

1374 POSTER

Modulation of radiation response by histone deacetylase inhibition

I. Fedotova, F. Vladimir. *Kharkov Medical University, Oncology, Kharkov, Ukraine*

Background: Histone deacetylase (HDAC) inhibitors, which modulate chromatin structure and gene expression, represent a class of anticancer agents that hold particular potential as radiation sensitizers. In this study, we examine the capacity of the HDAC inhibitor suberoylanilide hydroxamic acid (SAHA) to modulate radiation response in human tumor cell lines and explore potential mechanisms underlying these interactions.
Materials and methods: Exponentially growing tumor cells were incubated in medium containing 0–10 μM of SAHA for 92 h. Cells were fixed with crystal violet to estimate cell viability. Caspase activity was analyzed by fluorescence spectroscopy using a fluorescein labeled pan-caspase inhibitor. Cells were harvested after 72 h of exposure to SAHA (1.0 μM), radiation (7 Gy), or the combination. Whole cell lysates were evaluated for poly(ADP-ribose) polymerase (PARP) cleavage by western blot analysis. Cells were exposed to varying doses of radiation ±5 days pretreatment with SAHA (0.75–1.0 μM). After incubation intervals of 14–21 days. Cells were grown and treated in chamber slides. At specified times after treatment with SAHA, cells were fixed in paraformaldehyde, permeabilized in methanol, and probed with primary and secondary antibody solutions. Slides were analyzed using an epifluorescent microscope.
Results: SAHA induced a dose-dependent inhibition of proliferation in human prostate and glioma cancer cell lines. Exposure to SAHA enhanced radiation-induced apoptosis as measured by caspase activity ($p < 0.01$) and PARP cleavage. The impact of SAHA on radiation response was further characterized using clonogenic survival analysis, which demonstrated that treatment with SAHA reduced tumor survival after radiation exposure. We identified several oncoproteins proteins that show differential expression after exposure to SAHA. These proteins may contribute to mechanistic synergy between HDAC inhibition and radiation response.
Conclusion: These preclinical results suggest that treatment with the HDAC inhibitor SAHA can enhance radiation-induced cytotoxicity in human prostate and glioma cells. We are examining the capacity of HDAC inhibitors to modulate radiation response and tumor control in animal xenograft model systems to strengthen the rationale for future clinical trial exploration.

1375 POSTER

Differential effects of polyunsaturated fatty acids on the radiosensitivity of normal colorectal and colorectal adenocarcinoma cell lines

A. Hong[1,3], M. Zhang[1], P. Quaggiotto[2], D. Volker[2]. [1]*Royal Prince Alfred Hospital, Radiation Oncology, Sydney, Australia;* [2]*University of Sydney, Human Nutrition, Sydney, Australia;* [3]*University of Sydney, Medicine, Sydney, Australia*

Background: Animal and in vitro studies have demonstrated that n-3 polyunsaturated fatty acids (PUFAs) are cytotoxic against a variety of malignant cells including colonic adenocarcinoma. However the effect of PUFAs on normal colorectal epithelial cells has not been established. The aim of our study was to investigate the effect of n-3 and n-6 PUFAs on a normal colon and 2 colonic adenocarcinoma cell lines. We also evaluated the effect of PUFAs on the radiosensitivity of these cell lines.
Method: The 2 colon adnenocarcinoma cell lines (SW480, SW620) and normal colon (CRL7418) cell line were incubated with n-6 PUFAs: arachidonic acid (AA), linoleic Acid (LA) and n-3 PUFAs: Alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) with or without radiation (0–5 Gy). Radiation cell survival was assessed with trypan blue exclusion assay and MTT assay. Annexin-V staining for apoptosis and flow cytometry were used to evaluate the mechanism of PUFAs and radiation interaction.
Results: The 3 cell lines were incubated with various concentration (0, 50, 100 and 200 μM) of PUFAs for 4 days for cytotoxicity assay. LA, ALA, EPA and DHA inhibited SW480 and SW620 cell growth in a dose-dependent manner. In contrast, low doses (<100 μM) of PUFAs enhanced the proliferation of CRL7418 cells. Preincubation of the 2 cancer cell lines with DHA (50 μM) for 24 hrs prior to radiation resulted in an enhanced radiation cell kill. Interestingly, 50 μM DHA protected the CRL7418 cells from radiation damage. ANNEXIN-V staining showed that DHA induced apoptosis in both cancer and normal cells. All of the PUFAs did not have any effect on the cell cycle progress.
Conclusions: In conclusion, we have demonstrated that PUFAs are cytotoxic to colorectal cancer cells and DHA can act as a radiosensitizer. In contrast, PUFAs have no cytotoxic effect on normal colorectal cells and in fact can act as a radioprotector. The results provide in vitro rationale for the use of n-3 PUFAs in combination with radiation therapy for the treatment of colorectal cancer.

1376 POSTER

Clinical results of intracoronary radiotherapy for In Stent Restenosis (ISR)

P. Stadler[1], S. Chaber[1], C. Schäfer[1], M. Treutwein[1], M. Herbst[1], F. Muders[2], O. Kölbl[1]. [1]*Klinikum der Universtität Regensburg, Dep. of Radiation Therapy and Oncology, Regensburg, Germany;* [2]*Klinikum der Universtität Regensburg, Dep. of Cardiology, Regensburg, Germany*

Background: Treatment of in-stent restenosis with PTCA alone is considered to be relatively ineffective. Mechanisms of repair result in intimal hyperplasia followed by early re-restenosis. There is evidence that ICBT can reduce the probability of a in-stent restenosis after PTCA due to inhibition of neointimal formation within the stent.
Patients and methods: 40 Pat. (27 m., 13 f, age: 66.9 years) were retrospectively analysed. All patients were treated by using the Novoste-Beta-CathTM-3,5F System after PTCA. The target vessel received 18.4 to 25.3 Gy of radiation at a depth of 2 mm from the center of the source as recommended by the Novoste company. Times of ISR before and after ICBT were registered and restenosis free survival and overall survival were calculated by Kaplan-Meier-Analysis (log-rank). The time interval between last PTCA without ICBT and the consecutive recurrence was compared with the follow up time after PTCA with ICBT.
Results: The three year overall survival rate after ICBT was 93%. The 1/2, 1, 2 and 3 year ISR-free survival rate after PTCA + ICBT were 81, 72, 52 and 38%, respectively. After PTCA alone the 1/2, 1 and 2 year ISR-free survival rate was 30, 13 and 0%. This difference was highly significant ($p < 0.0001$). Patients with more than two IRS before ICBT had a better outcome (3 year IRS-free survival: 80%) than patients with only one or two IRS before ICBT (25%, $p < 0.05$).