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POSTER

The cribriforme plate on lateral radiographs- a blinded study on the accuracy of radiotherapy planning

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Background: Whole-brain irradiation is an integral part in the therapy of several brain tumors and requires coverage of the entire subarachnoid space. Numerous retrospective studies on medulloblastoma revealed frequent recurrences in the fronto-basal fossa above the cribriforme plate. Can the latter be reliably identified on lateral radiographs with sufficient accuracy?

Materials and Methods: The lamina cribrosa was localized by 5 radiation oncologists and 5 radiologists on lateral radiographs of 30 human skulls randomly selected from an anatomical collection. Reference radiographs were acquired under identical conditions except for lead markers pointing to the cribriforme plate and obvious bony edges derived from the ethmoid cells. The targeting deviations were determined by comparing the 300 estimates to the reference radiographs.

Results: In 39% (n=116) the location of the cribriforme plate was correctly estimated within 2 mm. Mislocations of 2-5, 5-10, and > 10 mm were noted in 34% (n=102), 20% (n=61), and 7% (n=21), respectively. Neither speciality nor experience (years of training) had a significant influence on targeting accuracy. If the roofs of ethmoid cells formed prominent bony edges, they were mistaken for the cribriforme plate in 37%.

Conclusions: Lateral radiographs provide ambiguous information to accurately locate the lamina cribrosa in whole-brain irradiation. Localization is significantly impaired by the ethmoid cells.

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POSTER

Preclinical studies on the combined effect of radiation and S-1: a new oral formulation of 5-fluorouracil on human colon cancer

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Background: S-1 is a new oral formulation of 5-fluorouracil (5-FU) consist of 1M tegafur, 0.4M 5-chloro-2,4-dihydroxypyridine (CDHP) that inhibits a degradation of 5-FU, and 1M potassium oxonate (Oxo) that regulates the phosphorylation of 5-FU in the gastrointestinal tract, and has shown excellent antitumor efficacy against various murine tumors and human tumor xenografts, compared to the oral tegafur-based antitumor drug, UFT (1M tegafur plus 4M uracil), which is used for chemotherapy or chemo-radiotherapy. The therapeutic effect of S-1 on chemo-radiotherapy was evaluated with human colon xenografts.

Material and methods: KM20C, human colorectal cancer cells, grown in the right hind leg of female BALB/cA nu mice was used when tumors had reached 100-150 mm³ in size. S-1 was administered orally at a dose of 8 mg/kg/day (as tegafur) for 2 weeks (Day 0-13). 5Gy was given to tumors by 4MV X-rays locally on the first day of experiment (Day 0). Tumor response to the treatments was assessed by calculating relative tumor volume (RTV; mean tumor volume during therapy / mean tumor volume at the start of the drug administration). The anti-tumor effect of the treatment was measured by using the following equation: relative inhibition of the tumor growth (RI, %) = [1-(mean RTV of treated group / mean RTV of control group)] x 100. Apoptosis in tumors was detected by TUNEL assay. The concentration of 5-FU in tumors was determined by HPLC.

Results: The antitumor effect of irradiation was enhanced by the combination of S-1 administration. RI of its combination treatment (5Gy/S-1 group) increased markedly till Day 14 (one day after the last administration of S-1) and this level was maintained for over 30 days. RI for 5Gy group was 6.7%, 18.6%, 29.5% and 41.0% on Day 7, Day 14, Day 30 and Day 45, respectively. RI for S-1 group was 21.8%, 33.9%, 28.0% and 16.8%, respectively. RI for 5Gy/S-1 group was 33.2%, 61.4%, 63.8% and 63.9%, respectively. The frequency of apoptosis became maximum at 1 week after 5Gy-irradiation and decreased gradually. This radiation-induced apoptosis was also enhanced by the combination of S-1 administration. Tumor 5-FU levels was found to be various by its administration schedule of S-1. When S-

1 was administered after irradiation, tumor 5-FU levels was quite lower than that from oppositely combined schedule: its AUC was decreased to 70%.

Conclusions: These preclinical study suggested that chemo-radiotherapy with S-1 can potentially be used to treatment tumors in place of 5-FU. S-1 administration before irradiation can be expected the higher tumor 5-FU levels and also effective radiosensitization.

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POSTER

Reproducibility and importance of the bladder status for pelvic irradiation

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Purpose: The aim of this investigation is to define the impact of the bladder status on internal organ motion and on geometric displacement of defined volumes: organs at risks, gross tumour volume (GTV) and PTV, furthermore on urinary side effects. Moreover to develop a simple way of decrease the physiologic variability and monitoring its reproducibility for conformal irradiation at the pelvic region.

Method: Planning CT of 21 patients has been performed using thermo plastic mask fixation and belly board with full bladder, thereafter with empty one. The bladder, rectum, small bowel, GTV and PTV including the elective lymph node regions were indicated and controlled. Using a 3D planning system a conformal dose distribution was planned and evaluated in correlation to the position of the denoted organs. During the course of radiotherapy the patients were educated to come with full bladder and the amount of the urine has been measured after each session. Acute side effects were assessed weekly using NCIC CTC 2.0 toxicity scale.

Results: The V full / V empty = 4,1 ± 2,4 (for bladder). The mean volume irradiated under 80% and 60% isodose curves were near 10 percent higher with empty bladder. The difference was lower comparing the bladder volume irradiated within the 40% isodose curve. The dose homogeneity in PTV was not significantly influenced by the bladder status. The average daily urine amount of 28 patients was 145.8 ml. On the basis of multiple CT and urine measurement the correlation of urine amount to bladder geometry has been established. Interpatient variation was in the range of 0-50ml and 300-650 ml. The adverse events on the bladder were in 7% grade 3, 3% grade 2 and 43% grade 1, no toxicity in 47% respectively. The toxicity showed correlation to the urine volume: if the daily average was under 200ml the side effects has increased significantly.

Conclusion: In conclusion full bladder is recommended for curative irradiation in the pelvic region. The individual variability of the bladder maximal fullness should be taken into account. The small bladder volume proved to be associated with higher frequency of bladder toxicity. Daily measurement of the urine volume after defined correlation to the organ status leads to better cooperation of the patients and higher quality assurance by conformal pelvic irradiation.

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POSTER

The informational needs of the multidisciplinary audience attending monthly radiation oncology palliative care rounds at the Toronto Sunnybrook Regional Cancer Centre - needs assessment

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Background: Palliative radiotherapy plays a significant role in symptom control in patients with advanced cancer. At the Toronto Sunnybrook Regional Cancer Centre, a Rapid Response Radiotherapy Program was developed to meet patients' needs and a continuing education (CE) program in the form of monthly rounds was developed to meet the educational needs of its multidisciplinary audience.

Purpose: Our primary objective was to evaluate this CE program. The secondary objective was to learn about the informational needs of the multidisciplinary audience attending this CE program.

Methods: A self-administered questionnaire, designed specifically for this project, was used. The questionnaire consisted of two parts. In Part one of the questionnaire, we addressed familiarity, evaluation forms, attendance, and satisfaction level with the educational content and satisfaction with presenting speakers. In part two of the questionnaire, we looked at the educational needs of the multidisciplinary audience and their likelihood of attendance at the sixteen educational topics suggested.

Results: Thirty-two questionnaires were returned out of 50 distributed (response rate 64%). Fifty percent of the respondents were very familiar