applying techniques that allow sparing critical tissues and appropriate dose distribution in planning target volume. The most attractive seems to be Intensity Modulated Radiosurgery (IMRS). IMRT is a treatment modality that uses varying energy fluence across the field to assure better conformity and steeper dose gradients than techniques based solely on geometric field shaping. The indications for its use are still discussed, especially in conjunction with stereotactic radiosurgery. Objective. The aim of our study was to analyze treatment plans in order to find the most frequent situations when intensity modulation was used and, thus, to determine the possible indications for IMRS.

Material and Methods. Thirty-three treatment plans of IMRS of 220 made for radiosurgery between October 2001 and February 2003 were analyzed.

Results. IMRS was most commonly used when target volume was localized in the vicinity of organs at risk (17 cases - 51%). In 7 of these cases the need for intensity modulation was caused both by the necessity of sparing organs at risk and geometric complexity of irradiated volume. In 15 cases (45%), including the mentioned above, complex shape of target volume was the reason of intensity modulation application. In 4 cases (12%) – multiple target volumes (2-4) – in brain metastases and bifocal recurrence of malignant glioma. In 3 cases (9%) - dose escalation within the irradiated volume (boost on gross tumor volume inside the PTV). In two cases the use of intensity modulation was the only way to obtain optimal dose distribution in the target volume of simple shape, located away of organs at risk.

Conclusions. Intensity modulation in radiosurgery is a very attractive option when there is a need for irradiation volumes close to organs at risk. It is also useful when "conventional" conformal techniques cannot assure optimal dose distribution in target volumes of complex shapes. Finally, it is a convenient way to boost gross tumor volume inside the PTV when prescribed dose is delivered in single fraction.

163. RADICAL RADIOTHERAPY FOR MUSCLE-INVASIVE BLADDER CANCER: THE INFLUENCE OF TOTAL RADIATION DOSE AND OVERALL TREATMENT TIME ON DISEASE OUTCOME.

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Purpose: To assess the influence of total radiation dose, overall treatment time and other clinical factors on treatment outcome for muscle-invasive (T2,T3) bladder cancer patients, treated with radical radiotherapy.

Material and methods: Between 1975 and 1995, 480 consecutive patients with T2, T3 bladder cancer were treated with radical radiotherapy. During that period various fractionation schedules were used: 1. conventional fractionation (once a-day, 1.8-2.5 Gy/fraction; OTT-53 days), 2. protracted fractionation (once a-day, pelvis- 1.6-1.7 Gy/fraction, boost- 2.0 Gy/fraction; OTT-62 days), 3. accelerated hyperfractionated boost (pelvis- once a-day, 2.0 Gy/fraction; boost- twice a-day, 1.3-1.4 Gy/fraction; OTT-45 days), 4. accelerated hyperfractionation (pelvis and boost- twice a-day, 1.2-1.5 Gy/fraction; OTT-41 days). For the whole group of patients mean total dose and mean overall treatment time were: 65.5 Gy and 51 days, respectively. Maximum-likelihood logistic model and Cox proportional hazard model were used to evaluate the role of total dose, overall treatment time, T-stage, hemoglobin level and bladder capacity before radiotherapy. The median follow-up was 76 months.

Results: Five-years actuarial local control rate was 47% and overall survival rate was 40%. Logistic model including total dose, overall treatment time and T-stage revealed that all those factors significantly influenced local control probability (p=0.021 for TD, p=0.038 for OTT and p=0.00068 for T-stage). When other clinical factors and treatment-related parameters were analysed in Cox
proportional hazard model the results were as follows: Hb-level and bladder capacity before radiotherapy significantly influenced local control and overall survival, total radiation dose was of borderline significance for overall survival (p=0.065) but overall treatment time was not significant parameter.

Conclusions: Our study suggest that, higher total radiation dose may be related to better treatment outcome. The effect of overall treatment time is difficult to define, because its role depends on influence of other prognostic factors. The most important factors for treatment outcome are: hemoglobin level, bladder capacity before radiotherapy and T-stage.

164.
1H-MR SPECTROSCOPY OF NORMAL BRAIN TISSUE BEFORE AND AFTER POSTOPERATIVE RADIOTHERAPY FOR PRIMARY BRAIN TUMORS
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Purpose: The aim of the study was to reveal the impact of postoperative radiotherapy (pRT) on normal brain tissue metabolism and find out, if proton magnetic resonance spectroscopy (1H-MRS) can help in delineating tumor recurrence area.

Methods and Material: Spectra of 43 patients treated with pRT for glial tumors assessed by 1H-MRS were analyzed. Patients were treated with conformal 3D techniques using 6-20 MV photons to the total dose of 60 Gy given in 30 fractions. Control group consisted of spectra registered for 30 healthy volunteers. Spectra were taken from tumor bed and from control region before pRT and from 3 uninvolved regions 9-12 months after the end of pRT. Voxels were located in the region of low, medium and high total dose. Relative intensities of the signals due to N-acetyl aspartate (NAA), choline based compounds (Cho), mio-Inositol (mI), lactate (Lac) and lipids (Lip) were obtained. The statistical difference be-
tween means was calculated using Mann-Whitney U-test for independent samples or paired Wilcoxon test for the different dose levels for one patient.

Results: Spectra taken after pRT were significantly different from those obtained from healthy volunteers and those acquired before radiotherapy. The lactate and lipids signals were strong and not correlated with absorbed dose. NAA/Cr ratios were significantly lower than before pRT even for the low dose regions. These differences were increasing with radiation dose. Cho/Cr and Cho/NAA ratios increased significantly in medium and high dose area.

Conclusion: 1H-MRS can not help in delineating tumor recurrence area after pRT. Surgery and pRT cause alteration of brain metabolism even in regions far from the postoperative tumor bed that received relatively low total radiation dose.

165.
ROLA CZYNNIKÓW WZROSTU DZIAŁAJĄCYCH POPRZEZ RECEPTORY O Wewnìtrznej AKTYWNOSCI KINAZY TYROZYNOWEJ W WYBRANYCH CHOROBACH ROZROSTOWYCH UKLAĐU KRWIOTWÓRZEGO
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Założenia i cel pracy: Cytokiny działające poprzez receptory komórkowe o wewnìtrznej aktywności kinazy tyrozynowej (TKRs) regulują wczesne etapy hematopoezy. Wśród nich wyróżniamy: insulinę (INS), somatomedynę (IGF), ligand receptora C-KIT (KL,SCF), czynniki wzrostu fibroblastów (FGF), czynnik wzrostu hepatocytów (HGF), neutrofinę (NGF), płytkowy czynnik wzrostu (PDGF), makrofagopoetynę (CSF-1). Prawid³owe komórki hematopoetyczne syntetyzują samodzielnie czynniki wzrostu podlegaj¹c działaniu p³etli autokrynnych. Nie ma danych, czy wzrost komórek białacz-