The response to treatment was about 20% higher in the clinical trial group. The 20% difference between the outcomes in the prospective and retrospective studies recorded in the response to treatment was similar in the 1, 2, and 3 years local control observations.

62.
THE RADIOTHERAPY OF IMRT

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Intensity Modulated Radiotherapy (IMRT) is going to revolutionise treatment planning and delivery of radiotherapy in the next few years. Although there are still technological constraints, IMRT allows delivery of a specified dose-distribution that is superior to what is realistically achievable with 3D conformal radiotherapy using standard techniques. This forces a re-think of the whole process of delivering radiotherapy. With our current technology, the physics has overtaken the biology and it appears that to realise the full potential of IMRT, a major research effort on the biological aspects of radiotherapy is needed. This goes far beyond traditional cellular radiobiology. New powerful assays in molecular biology and bioimaging will be key elements in the biological optimisation of radiotherapy. In this lecture, I will try to identify some of the research areas that will need to be further developed in order to get the full therapeutic benefit from IMRT.

63.
STEREOTACTIC RADIOTHERAPY FOR PRIMARY AND RECURRENT BRAIN TUMORS. A NEW METHOD FOR IMPROVEMENT OF THE TREATMENT RESULTS?

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To evaluate the effectiveness of the stereotactic radiosurgery (SRS) and stereotactic fractionated radiotherapy in the primary, recurrent and metastatic brain tumors.

To present potential usefulness of stereotactic boost in anaplastic astrocytomas (AA) and glioblastoma multiforme (GBM).

Between March 2000 and December 2000, SRS was applied in 23 patients (pts) with brain tumors (metastatic tumors – 9 pts, recurrent tumors – 7 pts, primary meningiomas – 4 pts, vascular malformations – 3 pts).

Fractionated stereotactic radiotherapy was applied in 6 pts (recurrent anaplastic gliomas – 2 pts, recurrent medulloblastoma – 1 pt, acustic neurinoma – 1 pt, meningioma – 1, pituitary adenoma - 1).

Detailed technique of treatment planning is presented and discussed. The planning target volume (PTV) and organs at risk (OAR) were assessed comparing dose statistics, dose volume histograms and RTOG stereotactic radiosurgery criteria.

Recommendations regarding the total dose level and fractional dose are proposed.
The treatment tolerance and preliminary results are presented.

The own protocol of stereotactic boost to residual tumor using SRS after initial conformal radiotherapy in patients with AA and GBM is presented and discussed.

64.
STATE OF MONTE CARLO CALCULATIONS IN RADIATION TREATMENT PLANNING

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Monte Carlo (MC) particle transport simulations are increasingly applied in treatment planning methods. This has become feasible through a number of adaptations of general MC codes, such as EGS4 or ETRAN, to the specific needs of treatment planning. The currently most advanced "conventional" planning methods, such as convolution or delta-volume algorithms still have serious limitations in terms of accuracy when tissue inhomogeneities, small and complex body shapes or high-density implants are involved. The Monte Carlo simulation mimics individual particle transport, in any applicable geometry, by applying first principles of radiation interaction with matter and random choice of collision parameters such as step length, type of interaction, energies and scattering angles. In principle, the accuracy of MC calculations is only limited the radiation beam quality definition and the interaction parameters and can be taken to below l2%. In