For several years radiation beams have been modulated by mechanical and dynamic wedges, compensators, individual shields and unequal beam weights. Nowadays three dimensional conformal treatment and intensity modulated radiation therapy techniques (IMRT) provide very precise conformation of the dose to the target volume while sparing adjacent healthy tissues. On the other hand conformal radiotherapy requires very precise definition of anatomical structures, improved patient repositioning systems. New challenge represents quality control program and treatment verification.

IMRT was introduced in clinical practice in Center of Oncology, Glivvice in year 2000. Such treatment is delivered by Clinac 2300 with dynamic MLC option, on the base of dose distributions calculated by CadPlan-Helios treatment planning system, and sent via Varis to accelerator.

The aim of this paper is to present our experience with IMRT technique with particular regard to IMRT treatment plan (definition of PTV and calculation factors like Termination Tolerance, Priority Factor, Scatter Factor).

8.
EVALUATION OF A NEW SYSTEM FOR IN-VIVO DOSIMETRY BASED ON MOSFET DETECTORS

P.F. Kukołowicz, K. Buliński, K. Lis, J. Miedzińska

Holycross Cancer Centre, Medical Physics Department, Kielce, Poland

Purpose: In Holycross Cancer Centre in Kielce in vivo dosimetry is performed with new miniature detectors called MOSFET. MOSFETs are advertised by Thomson &Nielsen company as almost ideal detector for in-vivo dosimetry: they are isotropic, can be treated as point detector fully transparent to treatment beam, having zero temperature and negligible energy effect, can be used either for electron and photon radiation, in teletherapy and brachytherapy, can be used in several QA procedures, very easy and convenient for handling and very low time consuming. Our experience both from extensive tests and clinical use will be presented.

Results: From our experience MOSFETs detectors can be treated as isotropic, are fully transparent for radiation, can be used both in teletherapy and brachyterapy. For application in brachyterapy special catheters with lead localisation markers must be used. The energy dependence cannot be considered as negligible. For 6 and 15 MV X photons calibration factors differ of about 5%. Reproducibility depends strongly on the dose. It decreases very much for very small doses (for dose 60 cGy - 1 standard deviation is of 2,5%). Very useful advantage of MOSFET detectors is their applicability for surface dose measurements. More details will be presented during the congress.

Conclusion: MOSFET detectors can be effectively used for in-vivo dosimetry in tele and brachytherapy. The reproducibility should be improved.

9.
COMPARISON BETWEEN CONVENTIONAL SIMULATOR PLANNING AND CONFORMAL 3-D PLANNING FOR CERVICAL CANCER TELETHERAPY

K. Bratos, A. Roszak, E. Cikowska-Woźniak, T.Piotrowski

Wielkopolskie Centrum Onkologii, Poznań, Poland

The using of simulator planning based on bony landmarks for pelvic irradiation of cervix cancer is associated with a risk in a geographical miss, which may be generated by inadequate knowledge of the individual anatomy. 3D treatment planning system let us know an individual topography of pelvic organs, enables to mark a PTV and it allows more adequate coverage. PURPOSE The aim of this study was to evaluate a benefit resulting from 3D treatment planning for teletherapy of cervical cancer. MATERIAL AND METHOD In our study on 15 patients with cervical carcinoma in the stage IIIB simulator planning of „box" technique was performed. Next we defined the PTV in 3D-planning system and compared the dose distribution, obtained with both methods, in the target volumes and organs at risk using dose-volume histograms. RESULTS In 4 of 15 patients the encompassment of the PTV by the treated volume was inadequate in case of simulator planning. The treated volumes based on 3D-planning were 8% smaller than volumes based on simulator planning. The treated volume/ planning target volume ratio was 1,64 for simulator planning and 1,50 for 3D planning. 3D-planning system resulted in a reduction of the irradiated bladder volume(-12%) and the bowel volume (-9%). The bladder and bowel

volumes in treated volumes depended on bladder fillings. CONCLUSIONS Implementation of 3D treatment planning system in teletherapy of cervical cancer helps to avoid a geographical miss, to reduce both the treated volume and the doses delivered to organs at risk.

10.
THE COMPARISON BETWEEN THE THREE – FIELD AND FOUR-FIELD TECHNIQUES OF PLANNING OF RADIOTHERAPY IN PROSTATE CANCER

P. Milecki, T. Piotrowski, M. Dymnicka, J. Malicki, G. Stryczyńska

Greatpoland Cancer Centre, Poznań, Poland

Purpose: evaluation 3-field(3F) and 4-field(4F) planning techiniques for patients with localized prostate cancer. Materials/methods: Five patients with prostate cancer (T3N0M0) were evaluated. CT images were obtained at 5mm increments and were transferred to CadPlan_planning_workstation. The planning target volume (PTV) was defined as prostate and seminal vesicles with 15mm margins around clinical target volume (CTV) except prostate–rectum interface where 5mm margin was applied. CTV was defined as prostate and seminal vesicles.Following organs at risk (OAR) were outlined: rectum, bladder, right femoral head. Following 3F and 4F plans were performed: 3F with angles (0deg-120deg-240deg; 0deg-90deg-270deg) and 4F (0deg-90deg-180deg-270deg). We also created two versions of treatment plans including of energy; 6MV and 20MV for Clinac2300CD. Total dose was 74Gy. Mean total doses of thirty plans in irradiated organs at risk (rectum, bladder and righ femoral head) were compared. For PTV mean and minimum dose were criteria for comparision of treatment plans. Results: There were no significant dose differenes between evaluated plans of treatment in PTV(0.05). Because mean dose in femoral head in each treatment plan was below tolerance dose, main dose-limiting organ was rectum and bladder. Lowest mean dose 42.7 Gy in rectum was achived by application of 3F technique of 20MV(0deg-90deg-270deg). Bladder was also spared with the same 3F technique of 20MV, where mean dose was 45.2Gy. Conclusions: This study showed that the „T" three-field technique (an anterior and two opposing lateral fields) provided with 20 MV is optimal and assures the lowest rectal dose.

11.
THE ANALYSIS OF DOSES IN THE TUMOUR AND IN CRITICAL TISSUES IN THE BRACHYTHERAPY OF MALIGNANT MELANOMA LOCALISED IN EYES

J. Kierzkowski[1], J. Malicki[1], A. Roszak[2]

[1]Medical Physics Department and [2]Brachytherapy Ward, Greatpoland Cancer Centre, Garbary 15 Street, 61-866 Poznań, Poland.

Brachytherapy is known and used procedure in the treatment of tumours localised in eyes, especially recommended when avoiding of enucleation accompany the long term cure.

Aim: The aim of this paper was to compare the doses delivered to the tumour and critical tissues during the treatment of the group of patients treated with Ru-106 applicator.

Patients: Between 1994 and 2000, 67 patients (dgn. melanoma malignum in eye) underwent brachytherapy. At 51 patients the tumour was localized in the back of eye, at 15 equatorially and at one in the front section of the eyeball. The median of the patients' age was 56.3 years. The CCB type applicator was applied for 56 patients, the COB for 7 and the ROA for 4 patients.

Method: Irradiation - Prescribed dose of 60 Gy was normalized to the top of the tumour, it decreased by 50%—10% per millimetre with the distance from applicator. The isotope producer determined the dose-rate accuracy for +/-30%. This caused that therapeutic dose had to be calculated taking account for the minimal dose-rate, while the doses in critical organs for maximal dose-rate possible.

Analysis: All patients were divided into three subgroups: 8 patients into 1st , 19 into 2nd and 40 into 3rd. The inclusion criterion was size of tumour: up to 3 mm of height (1st group), 3-5 mm (2nd), and larger than 5 mm (3rd) respectively.

Results: Table presents mean doses in the tumour, sclera and lens (calculated at it's middle) for each group of patients.

Tumour size [mm]	Doses [Gy]		
	Tumour	Sclera	lens
< 3	102.9	162.4	137.6
3 – 5	186.2	463.5	396.2
> 5	268.2	974.9	840.6