(range 0–20 degrees) and with the same photon energy (6 or 15 MV), for a conventional treatment of 50 Gy, 2 Gy per fraction. Measurements were performed in the planning target volume (PTV, 1 cm margin around clinical target volume), controlateral breast, ipsilateral lung, heart (for left sided tumors).
Results: Through visual inspection of the dose distribution for all CT slices, dose distribution in the PTV was almost identical for both plans; the 90% of prescribed dose was delivered to a mean of 91.2% (±5.6) of PTV with the CT and to a mean of 92% (±5.9) with the NCT. In the controlateral breast the dose delivered to 5% of volume was 1.8 Gy (±0.3) with CT and 1.3 Gy (±0.3) with NCT. Ipsilateral lung received a mean dose of 7.8 Gy (±1.6) and a V20 at 14% (±2.8) with CT; with NCT mean lung dose was 6.8 Gy (±1.8) and V20 was 12% (±3.3). In the 2 left sided treated breast, heart received a V33 at similar volume for both treatments.
Conclusions: A treatment technique utilizing two non-coplanar wedged beams offers a better solution compared to standard coplanar treatment for patients with difficult breast anatomy (i.e. large breast), in terms of lung and controlateral breast sparing, while maintaining the same PTV coverage.

2051 POSTER

RapidArc: dose distribution and irradiation time in relation to sliding window and dynamic arc

K. Buth[1], W. Oehler[1], K. Wagner[1], D. Strauss[1]. [1]*Südharz-Krankenhaus, Klinik für Radioonkologie und Strahlentherapie, Nordhausen, Germany*

Purpose: RapidArc is a combination of sliding window and dynamic arc with additional dose rate modulations or gantry speed control. The introduction of RapidArc into the clinical practice is only rational because of the benefit for the patient. The benefit for the patient can be a shorter irradiation time with related dose distribution or a better dose distribution with the same irradiation time.
Material: For this examination we used patients with head and neck, breast, prostate, lung and brain tumors. Each patient has been planned for all three techniques and the dose distributions were compared referring to the dose homogeneity of PTV's and the protection of organs at risk. The comparison of irradiation time was executed with detecting the number of monitor units and the setup time for the patient.
Results: The comparison of the dose distributions shows many plans with similar results for head and neck and prostate tumors for RapidArc and sliding window, but the irradiation time for RapidArc plans is less than 50%-70% compared to sliding window plans. Comparison of the same tumors between RapidArc and dynamic arc shows mostly better dose distributions for RapidArc and for some cases similar dose distributions, but the irradiation time is approximately identical.
Dose distribution comparison for head and neck, breast and lung between the three methods shows sometimes advantages for RapidArc and sometimes advantages for sliding window, according to the PTV-contours. Dynamic arc is equivalent referring to dose distributions for some cases.
All Plans show a benefit for Rapid Arc and dynamic arc referring to irradiation times.
Conclusion: All three irradiation methods are possible for the patient treatment, but which one is to use must be decided for each patient individually, any criteria for these decision are the dose distributions (dose homogeneity of PTV's and the protection of organs at risk), the irradiation time and the planning time.

2052 POSTER

Clinical and therapeutic aspects in elderly patients with Merkel Cell Carcinoma: special focus on radiotherapy

A. Levy[1], A. Assouline[2], C. Krzisch[2], C. Chargari[3]. [1]*Pitie Salpetriere University Hospital, Radiation Oncology, Paris, France;* [2]*Amiens University Hospital, Radiation Oncology, Amiens, France;* [3]*Val de Grace Hospital, Radiation Oncology, Paris, France*

Introduction: Merkel Cell Carcinoma (MCC) is a rare and aggressive primitive malignant epidermal cancer mostly affecting elderly people. While the place of adjuvant radiation therapy (RT) is widely recognized, it remains debated whether elderly patients would fully benefit from adjuvant RT.
Material and Methods: Between March 1996 and March 2007, 29 patients with histologically confirmed MCC were treated in Amiens hospital, France. Mean age was 75.6 years (54.7–95.2), including 12 patients (41.4%) being more than 80 years-old. At diagnosis, 25 patients (86.2%) were stage I (localized disease) and 4 patients (13.8%) had stage II (regional lymph node invaded, no metastases spread) or III disease (visceral metastases). All patients but one underwent a surgical excision of the primary tumor and classical adjuvant RT was performed in 14 patients (50%) on tumor bed with margins of 3 to 5 cm, mean dose of 46 Gy (range 30–60 Gy), using 2 Gy per daily fraction. Ten out of them received also RT of lymph node drainage area with mean dose of 44.3 Gy (26–50).
Results: For the whole cohort, the median overall survival (OS) was 18.9 months (3–122 months) and the median time to progression (TTP) was 5.5 months (1–26 months). For stage I patients, 5-year OS was 41.1% (IC95: 17–65%), *versus* 0% in patients with stage II or III disease ($p < 0.0001$). Most frequent sites for recurrence were nodal (34.5%), then local (24.1%) and metastatic (17.2%). After RT, 5-years OS was 47% (IC95: 12–82%), *versus* 27% (IC95: 5–49%) if no RT ($p = 0.032$). When focusing on patients more than 70 years-old, 8 (36.5%) remained disease-free at last follow-up, 8 (36.5%) died from disease-related cause, and 6 died from unrelated cause (27%). No patient died from treatment-related cause. In this subgroup, the TTP was 6 months (2–19 months) and median OS was 19 months (4–87 months). In patients more than 80 years-old, median OS was 20.8 months (4–73 months). The age was not a significant factor for disease-related death. All acute toxicities were less than grade 2. No significant difference was reached according to the age.
Conclusion: The impact of local control on survival remains uncertain but it is believable that the benefice of RT in elderly patients would not be drastically different from that in younger patients. It is associated with low toxicity and improved outcome. Multicentric prospective trials are needed to better refine and validate the optimal strategy.

2053 POSTER

Does electronic portal image device really impact set-up practice? A first step introducing a displacement correction protocol and PTV margin re-design

X. Maldonado[1], J.J. Rovira[2], J. Saez[2], M. Molla[1], V. Reyes[1], E. Puertas[1], I. Giraldo[1], J. Giralt[1]. [1]*H. Vall d'Hebron, Radiation Oncology, Barcelona, Spain;* [2]*H. Vall d'Hebron, Physics, Barcelona, Spain*

Materials/Methods: 237 Electronic portal images (EPID) from 39 consecutive radical prostate cancer treatments were reviewed. Patients were treated in the supine position with a knee support, full bladder and empty rectum. Initial patient setup displacements were determined by dosimetry requirements and performed daily using reference skin marks and laser alignment. For each beam, a digitally reconstructed radiography (DRR) was created and matched with its correspondent EPID image to obtain setup displacements. The symphysis, obturator holes and acetabuli were drawn in DRRs as bone references.
Mean displacement and its inter-fractional standard deviation were determined for each patient in orthogonal directions. In a given direction, inter-fraction standard deviation and mean displacement standard deviation were calculated taking into account all patients and were interpreted as systematic (Σ_{setup}) and random (σ_{setup}) setup displacement uncertainties, respectively. Both the systematic and random deviations were assumed to follow a Gaussian distribution in the three directions.
Results: The following are our systematic and random setup displacement uncertainties in the three directions according to our measurements and calculations after offline matching performance.

	LR (mm)	SI (mm)	AP (mm)
Σ_{set-up}	2.7	2.9	3.9
σ_{set-up}	2.6	2.0	2.8

LR, left-right; SI, superior-inferior; AP, anterior-posterior.

Conclusion: Our calculated systematic and random displacement uncertainties are in agreement with the literature. Next, we plan to introduce our results in the Van Herk [1] formula for PTV margin design and to use data to decide when displacement is statistically significant.

References

[1] van Herk M, et al. *The probability of correct target dosage: dose-population histograms for deriving treatment margins in radiotherapy.* Int. J. Radiat. Oncol. Biol. Phys 2000;**47**:1121−35.

2054 POSTER

Sequential evaluation of prostate edema after permanent seed prostate brachytherapy

T. Chang[1], K. Karasawa[1], M. Shinohara[2], Y. Yamada[2], H. Ichikawa[2], S. Natsui[2], S. Maekawa[2], N. Kamata[3]. [1]*Tokyo Metropolitan Komagome Hospital, Division of Radiation Oncology, Tokyo, Japan;* [2]*Tokyo Metropolitan Komagome Hospital, Department of Urology, Tokyo, Japan;* [3]*Tokyo Metropolitan Komagome Hospital, Division of Radiology and Nuclear Medicine, Tokyo, Japan*

Background: The postoperative dosimetric analysis of permanent prostate brachytherapy requires a subjective delineation of implant volume in