

choice. A novel approach is the using of Extracorporeal Shock Wave Therapy (ESWT) if the established treatment schedules have failed. So far there has been no controlled study comparing the effectiveness of ESWT with an established conservative therapy such as X-ray stimulation irradiation.

**Method:** Thirty patients with chronic supraspinatus tendinitis were admitted into this prospective randomised study. After randomisation the patients were treated either with low dose radiotherapy or with ESWT. Irradiation was performed using a cobalt 60 unit. The applied was 6 times 0.5 Gy and was delivered to the ICRU reference point (1 fraction/day) with cobalt 60 gamma rays. ESWT treatment occurred three times with 2000 pulses per session (energy flux density ED+ 0.1mJ/mm<sup>2</sup>) in one week intervals using a Storz Minilith SL1. Primary endpoint was the age-corrected constant score.

**Results:** In the radiotherapy group average the age-corrected constant score improved from 38.6 before radiotherapy through 63.9 points after 12 weeks to 70.4 points after 52 weeks. In the ESWT group it rose from 41.5 points to 76.4 points and 81.9 points, respectively.

**Conclusion:** No statistically significant differences were proven between radiotherapy and ESWT. ESWT appears to be equivalent but not superior to radiotherapy in treating chronic supraspinatus tendinitis syndrome. A comprehensive randomised study is however necessary to ensure the equivalence of ESWT.

727

POSTER

### Radiotherapy for age-related macula disease: a longitudinal single-arm study

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**Purpose:** To study the benefit from low dose fractionated radiotherapy in age-related macula disease (ARMD).

**Methods:** From 1997 to 1998, 72 patients with ARMD were enrolled. Patients with advanced cataract or concurrent retinal disease were excluded. 8 x 2Gy were administered to one eye in each patient. Fluorescein angiography and measurements of visual acuity were performed prior to, 3 mo., 6 mo., and 12 months after therapy. From 69 patients (30 classic ARMD, 39 occult ARMD) complete follow up data of at least 1 year were accessible to evaluation. The Wilcoxon rank test adjusted to serial tests (Bonferroni-Holm-method) was used to establish statistical significance. Acute and chronic potential side effects were also registered.

**Results:** The visual acuity decreased during follow up in 43/69, was stable in 18, and improved in 8 cases. The mean visual acuity deteriorated significantly ( $p=0.02$ ). This holds true of both subtypes of ARMD. The most pronounced decrease of visual acuity occurred within the first 3 weeks. Occult ARMD did significantly better than classic ARMD ( $p=0.03$ ). Neither age ( $p=0.17$ ) nor sex ( $p=0.2$ ) significantly influenced prognosis. 4 patients reported transitional complaints. Opacification of the ocular lens was not observed.

**Conclusion:** Low dose fractionated radiotherapy with 16 Gy is well tolerated. However, visual acuity is not preserved in the majority of ARMD patients. Despite promising initial reports our disappointing findings are in accordance with an increasing number of negative randomized and non-randomized published trials.

728

POSTER

### Hyperbaric oxygen does not enhance tumour growth and metastatic potential of the rhabdomyosarcoma R1H

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**Purpose/Objective:** There is concern that hyperbaric oxygen therapy might have cancer-enhancing properties. This analysis was performed to investigate whether hyperbaric oxygen affects tumour growth and influences metastatic potential in an experimental tumour system.

**Material and Methods:** WAG/Rij rats bearing the R1H rhabdomyosarcoma on the right flank were locally irradiated with 250 kV X-rays. The radiation dose ranged between 50-90Gy given in 22-30 fractions in an overall treatment time of six weeks. For radiation enhancement, animals inhaled room air under ambient conditions ( $n=38$ ), or normobaric carbogen

(95% O<sub>2</sub>; 5% CO<sub>2</sub>) ( $n=41$ ), or hyperbaric oxygen at a pressure of 240kPa ( $n=41$ ). The number of carbogen or oxygen exposures ranged between 2-30 (median: 6), and the oxygen exposure times were at least 10 minutes at treatment pressure. Animals were followed up to 150 days after the start of treatment. The incidence of local recurrence or metastatic lung disease was scored. Pulmonary metastases were verified by post mortem lung dissection. The time interval between tumour transplantation and first signs of lung metastases was analysed using Kaplan-Meier statistics.

**Results:** Fourteen animals in air, 13 in carbogen and 10 in hyperbaric oxygen developed lung metastases. The median time interval for the occurrence of pulmonary metastases was 127 days (95%-CI: 101-153 days), 132 days (95%-CI: 116-148 days) and 137 days (95%-CI: 120-154 days) for air, carbogen and hyperbaric oxygen, respectively. In the Kaplan-Meier-analysis there were no differences between the three groups (log-rank-test  $>0.5$ ).

**Conclusion:** Our data give no evidence that tumour growth and metastatic potential of the R1H rhabdomyosarcoma is enhanced by hyperbaric oxygen breathing.

729

POSTER

### The role of postoperative radiotherapy in the management of merkel cell carcinoma

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**Purpose:** Merkel cell carcinoma (MCC) is a rare, aggressive neuroendocrine tumor of the skin with a high potential of locoregional relapse after surgery alone. The value of radiotherapy (RT) for curative treatment strategies was evaluated.

**Methods:** From 1/1990 to 5/2000, 31 patients with MCC (13 men, 18 women, age 34 - 92 years) were treated at the University of Cologne, Germany. Primary tumor sites were: head and neck region 13 pts., limbs 13 pts., trunk 5 pts.. The tumors were stage I (primary tumor alone) in 26/31 pts., stage II (locoregional metastases) in 4/31 and stage III (distant metastases) in 1/31. Treatment consisted of surgery alone in 14/31 pts., adjuvant postoperative RT in 16/31 pts. (one with incomplete surgery), and definitive RT in 1 patient with a stage III tumor. Postoperatively, the median target dose was 55.5 Gy to the tumor region. Additional RT to the regional lymph nodes was applied in 7 pts. with a median target dose of 54 Gy.

**Results:** With a follow-up of 4 to 112 months (median 22 months) the median overall survival (OS) after first diagnosis was 32 months (95%-CI: 0-75 months) with a 3-year OS rate of 47% (95%-CI: 25-69%). 6/31 pts. relapsed locally after a median of 4 months, 10/31 pts. developed regional lymph node metastases, and 7/31 pts. distant metastases. 9 pts. died as a direct result of MCC. Locoregional control and disease-free survival were significantly improved for pts. with postoperative RT ( $p=0.023$ ). Uni- and multivariate analysis revealed that tumor locations in the head and neck and the lack of postoperative RT are unfavorable prognostic factors.

**Conclusion:** Postoperative RT to the primary tumor region and regional lymphatics reduces significantly the risk for locoregional recurrence, especially for head and neck MCC. Prospective clinical trials should be performed to confirm these observations.

730

POSTER

### Osteoradionecrosis of pelvic bones - a single institution experience

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**Purpose:** to assess the incidence and risk factors of pelvic fractures as a result of radiation therapy in women with gynecological cancer.

**Methods and materials:** We retrospectively reviewed 4016 female patients treated at our institute between 1980 and 1998 with megavoltage radiation with or without brachytherapy for cancer in the pelvic area. Eligible were patients with vulvar, vaginal, cervical, endometrial and Fallopian tube cancer. Median follow-up was 88 months (range 0-240). Emphasis was put on treatment-related and patient-related risk factors.

**Results:** 15 patients developed symptomatic bone fracture caused by osteoradionecrosis, which makes an overall incidence of 0.37 per cent. The diagnosis was based on anamnesis, clinical course and X-ray or CT