correlated with TS location 13.8% vs 24.8% and 1.7% versus 5.8% in case of non-TS and TS (p < 0.05). 21/25 of patients with severe DES were in TS or temporal location. No patient had enucleation for DES. In AWA, diameter (hazard ratio HR:1.103, CI95:1.003-1.026, p=0.015), gel compensator (HR:0.717, CI95:0.535-0.960, p=0.025) and TS location (HR:2.581, CI95:1.695-3.929, p=0.001) were significantly associated with the occurrence of DES.

Conclusion: Although the incidence of DES and severe DES was increased in TS melanomas and this correlated with the dose to the lacrimal gland, their characteristics were less favorable (larger, superior involvement of ciliary body and limbus). Occurrence of severe DES in TS but also temporal locations suggests that involvement of the ciliary arteries may also be responsible for severe DES. The correlation of TS with ciliary involvement suggests that limbus cells may participate in the occurrence of DES. The role of palpebral and corneal irradiation will be further investigated. Since DES is manageable, TS location should not be considered a contraindication for protontherapy.

OC-0246
Visual outcomes of parapapillary uveal melanomas following proton beam therapy
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9Purpose or Objective: In parapapillary melanoma patients, radiation-induced optic complications are frequent and visual acuity is often compromised. We investigated dose effect relationships for the optic nerve with respect to visual acuity after protontherapy.

Material and Methods: of 5205 patients treated between 1991 and 2014, those treated between 1994 and 2013 (using CT-based planning) to 52 Gy in four fractions, minimal 6 month follow-up and documented initial and last visual acuity, were included. Deterioration of ≥ 0.3 logMAR between initial and last visual acuity was reported.

Results: 865 consecutive patients were included. Median follow-up was 69 months, mean age 61.7 years, tumor abutted the papilla in 64.9% and tumor to fovea distance was ≤ 3 mm in 42.2% of patients. Five-year relapse-free survival rate was 92.7%. Initially, 72.6% of patients had ≥80% visual acuity, 47.2% had ≥ 20/200 at latest follow-up. A wedge filter was used in 47.8% of the patients, with a positive impact on vision and no impact on relapse. Glaucoma, radiation-induced optic neuropathy, maculopathy were reported in 17.9%, 47.5%, and 33.6%, respectively. Patients irradiated to ≥ 80% of their papilla had better visual acuity when limiting the 50% (30 Gy) and 20% (12 Gy) isodoses to ≤ 2 mm and 6 mm of optic nerve length, respectively.

Conclusion: A personalized protontherapy plan can be used efficiently with good oncologic and functional results in parapapillary melanoma patients.

OC-0247
Carbon ion radiotherapy for adenoid cystic carcinomas invading the skull base
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Purpose or Objective: To estimate the toxicity and efficacy of carbon ion radiotherapy for adenoid cystic carcinomas (ACC) invading the skull base.

Material and Methods: Between April 1997 and August 2013, a total of 193 patients with ACC of the head and neck were treated with carbon ion radiotherapy. All of these patients had neither regional lymph node nor distant metastasis before carbon ion radiotherapy. The prescribed tumor doses were 57.6 or 64.0 Gy (RBE) in 16 fractions over four weeks. Of the 193 patients, 78 patients with ACC invading the skull base were analyzed. There were 37 males and 41 females. The median age was 52 years (range, 23-75 years). The most common primary site was the paranasal sinus (46%), followed by the nasopharynx (13%), the nasal cavity (10%) and the hard palate (10%). The extent of surgery was biopsy alone in 52 patients (67%), partial resection in 5 patients (6%). Twenty of 78 patients (27%) had recurrence tumors after surgery. Median follow-up time was 52 months (range, 10-177.7 months). Patients were divided into two groups according to intracranial involvement: Group A was made up of 32 patients whose tumors invading the cranial fossa, Group B consisted of 46 patients whose tumors invading the intracranial region or cerebra. Acute and late morbidities were evaluated by the RTOG, the RTOG/EORTC and the CTCAE (version 4.0).

Results: The 5-year local control and overall survival rates of all patients were 65% and 60%, respectively. Median survival time was 74.4 months. In total 45 patients died, the major cause of death was distant metastases (67%). The 5-year local control rates were 71% for Group A and 56% for Group B. The 5-year overall survival rates were 74% for Group A and 49% for Group B. In univariate analysis using log-rank test, there were no significant differences in local control and overall survival rates between the two groups. There was no evidence of any unexpected severe acute (grade ≥4) and late (grade ≥3) reactions to the skin, the mucosa and other critical organs. In regard to brain toxicity, 5 of 32 patients (16%) in Group A and 9 of 42 patients (21%) in Group B developed grade 2 late reactions, which necessitated steroid administration temporarily. Four patients in Group B who had marginal recurrence received re-irradiation. Therefore, it was difficult to evaluate brain toxicity for these patients.

Conclusion: Our results showed acceptable brain toxicities and excellent therapeutic effectiveness for unresectable adenoid cystic carcinomas invading the skull base.

OC-0248
Proton Beam Therapy in childhood - First 2-years of practice results from the WPE
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Purpose or Objective: Proton beam therapy (PT) has experienced increasing interest over time especially in pediatric malignancies as PT offers a chance to reduce post-treatment late effects. The West German Proton Therapy Center Essen (WPE) started treatments for pediatric tumors in June 2013. Since September 2013 all children under the age of 18 years were enrolled in the standardized prospective
registry study for children (“KiProReg”) at WPE. Initial findings are presented.

Material and Methods: Between September 2013 and September 2015, data on 138 children (78 males, 60 females, aged 0.9-17.9 years (median 5.7 years)) were prospectively collected in KiProReg at WPE. Diagnoses were CNS tumours (n=73), sarcomas (n=59), extracranial germ cell tumors (n=3) and others (n=3), respectively. Treatment sites were brain (n=72), head and neck including base of skull (n=38), spine (n=15), or pelvis (n=13). In 73.9% of the patients, macroscopic residual disease was present before PT. The median total dose of PT was 54.0 Gy (range 29.8-74.0 Gy). Only two patients had a mixed beam technique. Due to the very young age, sedation was necessary in 55.1% of children. Concurrent chemotherapy was applied in 54.3% of children. Side-effects were classified according to Common Terminology Criteria for Adverse Events (CTCAE) V4.0 grading system.

Results: Median follow-up (FU) since first diagnosis was 1.2 years (range 0.3-16.3 years). PT was well tolerated. No or only mild to moderate acute side-effects (grade 1 to 2) were documented in the majority of children (n=116). During PT, acute grade 3 side-effects were observed for blood/bone marrow (n=21), gastrointestinal (n=8) or as general disorders (n=3) as well as anorexia (n=1) when compared to baseline. Acute grade 4 side-effects during PT were only seen for blood/bone marrow (n=9). In 77 children, information on toxicity three months after PT is available. Only few patients presented with grade 3 or 4 toxicities, predominantly for blood/bone marrow (n=7, grade 4 n=2). Seven of them had received chemotherapy after PT. So far, 17 patients failed due to recurrence or progression (local n=5; systemic n=12). Six of them (4.3%) have died so far, all due to disease.

Conclusion: Initial prospective data from WPE registry suggest good feasibility with only mild or moderate side-effects in the majority of children even when administering high doses at critical sites. Higher-grade side-effects primarily for blood and bone marrow are obviously influenced by concurrent chemotherapy. Early local control rates achieved with PT are promising so far. However, longer FU is needed to analyze long-term outcome and late effects.

OC-0249
Five-year clinical outcomes after dose-escalated image-guided proton therapy for prostate cancer
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Purpose or Objective: To report clinical outcomes for patients treated with image-guided proton therapy for localized prostate cancer.

Material and Methods: Under institutional review board approval, the medical records of 1,215 men enrolled either on a prospective protocol or an outcomes tracking study were analyzed for data and report outcomes for localized cancer with proton therapy at our institution between 2006 and 2010 were reviewed. Ninety-eight percent of patients received 78 Gy (RBE) or higher; 15% received androgen deprivation therapy (ADT). Five-year freedom from biochemical progression (FFBP), distant metastasis-free survival, and cause-specific survival rates are reported for each risk group. Prospectively collected patient-reported quality-of-life data and high-grade toxicities are reported. A multivariate analysis was performed to identify clinical predictors of biochemical failure.

Results: The median follow-up was 5.5 years. The 5-year FFBP rates were 99%, 94%, and 74% in low-, intermediate-, and high-risk patients, respectively. Actuarial 5-year rates of late grade 3 gastrointestinal and genitourinary toxicity were 0.6% and 2.4%, respectively. Median International Prostate Symptom Scores (IPSS) before treatment and at ≥4 years after treatment were 7 and 7. Median changes in EPIC scores between baseline and 4+ years of follow-up were minimal in the bowel, urinary irritative/obstructive, and urinary incontinence summary domains.

Conclusion: Image-guided proton therapy provided excellent biochemical control rates for patients with localized prostate cancer. Patient-reported quality of life outcomes are favorable and actuarial rates of high-grade toxicity were low following proton therapy.

OC-0250
Hadrontherapy as re-irradiation using active beam delivery at CNAO
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Purpose or Objective: Reirradiation of non resectable local recurrence, after previous full course of radiotherapy, is extremely challenging. Particle therapy may theoretically be the ideal tool for re-irradiation thanks to its complete sparing of large volumes and target tissues. We report favorable and actuarial rates of high-grade toxicity were low following proton therapy.

Material and Methods: Since February 2013 to February 2015, 70 patients (M/F = 41/29) underwent hadrontherapy in CNAO as re-irradiation. Site of disease was head and neck in 52 patients cancer, sacrum in 12 patients, skull-bone in 4 patients and brain in 2 cases. The histologies were: squamous cell carcinoma (21 pts), adenoid cystic carcinoma (18 pts), chordoma (7 pts), other sarcoma (6 pts), adenocarcinoma (7 pts), meningioma (4 pts), others (7 pts). Sixty-two patients had been treated with Carbon ions, the rest (8 pts) with protons. Average age was 59 (range 31 - 78). Previous radiotherapy doses ranged between 54 to 76 Gy (with conventional fractionation) and 20 to 28 Gy (with hypofractionation). Mean prescription dose was 61.7 Gy [RBE] (32.5 - 64), mean dose per fraction was 2.4 Gy [RBE] (2 - 4.5). Early toxicity was evaluated during, at the end and within 90 days after radiotherapy (RT). Patients were also followed up for late toxicity and radiologic response every three months after RT with magnetic resonance (MRI) and clinical evaluation.

Results: Acute toxicity was mild with no G4 event. At the end of treatment 26 pts (37%) had G0 toxicity; 27 pts (38%) had G1 toxicity; 16 pts (23%) had G2 toxicity and only 1 pts (1%) had G3 mucositis. At three months this favorable profile was maintained; FU average 9 months (range 3 - 24 ). Only one patient had G4 toxicity detected at 3 months (united to blindness due to intentional irradiation of one optic nerve beyond tolerance dose). Only 3 patients had G3 toxicity: skin fistula and osteoradionecrosis, 6 months after RT and cerebral edema (requiring medical treatment) 9 months after RT. The patient with longest FU (24 months), has late toxicity G1 (hearing impairment). At the time of analysis 11 patients had died of progressing disease (PD), 6 and 9 months progression free survival were 83% and 72% respectively.

Conclusion: Hadrontherapy as reirradiation allows good dose distribution with optimal sparing of already irradiated organs at risk. Due to mild acute toxicity hadrontherapy may be considered safe and well tolerated. Longer follow up is needed to confirm the efficacy and the late side effects.