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In recent years, interest in the management of anterior skull base tumors has been fostered by the introduction and subsequent rapid expansion of indications of transnasal endoscopic techniques. In parallel, extraordinary progress has been made in all the other disciplines which are involved in the complex process of managing anterior skull base tumors, leading to substantial improvements in diagnosis and treatment. The anterior skull base can be involved in a large variety of tumors of a varying nature and histology, which in the majority of cases originate from adjacent anatomic sites. In fact, primary lesions of the anterior skull base mainly include osteoma and other tumors originating from bone and cartilage. Tumors involving the anterior skull base have their origin prevalently in the sinonasal tract, but lesions developing on the intracranial site, such as meningiomas, may also extend caudally to encroach upon this area. All these lesions are rare, which means that the pertinent literature does not include prospective studies or treatment guidelines based on a high level of evidence. In view of the extreme histological variability of lesions involving the anterior skull base, much emphasis has been placed on addressing the different nuances of treatment in relation to histology, especially for malignant tumors. The chapters focusing on surgery provide divergent views on selection criteria for a specific surgical technique, which is the aim of this publication.

Meningiomas of the Skull Base Springer Nature

The overall incidence of meningiomas, particularly in the developed countries, is rising due to a growing size of the aging population, with people living longer and enjoying healthier lives than ever before. Additionally, an increased utilization of imaging studies such as computer tomography (CT) and magnetic resonance (MR) for routine evaluation of closed head injuries, paranasal sinus problems and various non-specific neurological symptoms, ranging from headaches to dizziness, has contributed to enhanced detection of incidental meningiomas. The book contains the most up-to-date information in all matters related to meningiomas, and is written by multiple contributors - internationally recognized experts in their respective fields from Asia, USA and Europe. This is an essential reference guide to neurosurgeons and neurologists (in training and in practice), as well as medical libraries, throughout the world.

Influence of 68Ga-DOTATOC on Sparing of Normal Tissue for Radiation Therapy of Skull Base Meningioma Springer Science & Business Media

Brain tumors comprise a spectrum of histological patterns. Their

presentation and management depend on their location, size, and grade of lesions. This book is a collection of high-quality research work from global experts on brain tumors, including meningiomas, and their treatment.

Intravoxel Incoherent Motion (IVIM) MRI Springer Science & Business Media

This book elucidates the radiation therapy protocols and procedures for the management of adult patients presenting with primary benign and malignant central nervous system tumors. With the development of new treatment strategies and rapid advancement of radiation technology, it is crucial for radiation oncologists to maintain and refine their knowledge and skills. Dedicated exclusively to adult CNS radiation oncology, this textbook explores CNS tumors ranging from the common to the esoteric as well as secondary cancers of metastatic origin. The first half of the book is organized anatomically: tumors of the brain, spinal cord, leptomeninges, optic pathway, ocular choroid, and skull base. The second half covers primary CNS lymphoma, rare CNS tumors, metastatic brain disease, vascular conditions of the CNS, radiation-associated complications, and radiation modalities. Each chapter provides guidance on treatment field design, target delineation, and normal critical structure tolerance constraints in the context of the disease being treated. Learning objectives, case studies, and Maintenance of Certification Self-Assessment Continuing Medical Education-style questions and answers are incorporated throughout the book. This is an ideal guide for radiation oncologists, residents, and fellows, but medical students may also find value in the text.

Primary Optic Nerve Sheath Meningioma CRC Press

Purpose: Proton beam therapy is often utilized for patients with meningioma given its ability to achieve a lower integral brain dose compared to photon therapy. However, it is unclear whether rates of brain injury are different due to uncertainties in end of range effects. The purpose of this study is to characterize and compare rates of brain injury after proton or photon therapy. Materials/Methods: We retrospectively reviewed 38 consecutive patients treated with proton therapy from 2014-2017 and 39 patients treated with photon therapy from 2008-2018 from two separate academic institutions. Patients with previous radiation therapy or less than 3 months follow up were excluded. Radiation induced brain injuries were categorized into white matter lesions (WML) defined as newly detected abnormal T2 signal intensities, or radiation necrosis (RN) defined as newly detected abnormal T2 and T1 post contrast signal intensities. Follow up imaging was reviewed by an experienced neuro-radiologist and radiation oncologist. Abnormal MRI scans were then reviewed after fusion with initial radiation plans. Toxicity was graded as per the common terminology criteria for adverse events (CTCAE v4.03). Results: Median follow-up time was 17.5

months for proton and 24 months for photon therapy. There was no significant difference between the groups for WHO grade, radiation dose, clinical target volume (CTV), history of diabetes, or history of stroke. The median dose in the proton group was 54 CGE (Cobalt Gray Equivalent) in 30 fractions (range: 50.4-60 CGE) and in the photon arm 54Gy in 27 fractions (range: 50.4-61.4 Gy). Nine patients on the photon group received an additional 7.5-9Gy radio-surgical boost. In the proton group, 23 patients were treated with pencil beam scanning and 15 with uniform scanning. The cumulative incidence of WML at 2 years was 34.2% after proton and 48.7% after photon therapy (p=0.20). The cumulative incidence of RN at 2 years was 18.4% after proton and 2.6% after photon therapy (p=0.02). In the proton group, grade u22652 was recorded in 3 patients and one patient had a grade 4/5 event. In the photon group, grade u22652 was recorded in only one patient. Conclusion: Patients treated with either proton and photon beam therapies have high rates of developing parenchymal T2 signal intensity abnormalities. However, in our series, patients were more likely to develop parenchymal T1 post-contrast abnormalities after proton therapy. Further study into strategies to decrease risk of brain injury may be warranted to optimize treatment for meningioma patients.

Evidence based practice in Neuro-oncology Springer

Introduction: The assessment of visual field (VF) measured via automatic perimetry (AP) is a standard examination. Optical coherence tomography (OCT) is a non-invasive, non-contact and painless imaging technique that provides high-resolution measurements and cross-sectional imaging of the retina and retinal nerve fibre layer (RNFL). The RNFL thickness is of particular interest in clinically manifest as well as subclinical optic neuropathies. Methods: Visual parameters including VF and RNFL thickness were measured before start of radiation. VF was measured by AP, RNFL via OCT. The examination was performed prior to treatment planning for proton therapy. Additionally the involvement of the anterior visual pathway (optic nerve, chiasma) was defined on the planning MRI. Results: 24 patients with no ophthalmologic comorbidities were included. The mean age at time of radiation was 55.4 a (+/- 12.8 a). At baseline a restriction of the VF was detected via AP in 12 patients on the left and in 7 patients on the right. Via OCT in 13 patients a deficiency was detected on the right side and in 9 patients on the left. On MRI the right optic nerve was in direct contact to the meningioma in 13 patients, the left optic nerve in 16 and the chiasma in 11 patients, respectively. Discussion: In this cohort the detection of the anterior visual pathway disorders was higher with OCT compared to AP. OCT provides additional base line information which is beneficial for treatment planning, follow-up and as endpoint in future clinical trials.

Neurologic Oncology Springer Science & Business Media

Intravoxel incoherent motion (IVIM) refers to translational movements which within a given voxel and during the measurement time present a distribution of speeds in orientation and/or amplitude. The concept was introduced in 1986 together with the foundation of diffusion MRI because it had been realized that flow of blood in capillaries (perfusion) would mimic a diffusion process and impact diffusion MRI measurements. IVIM-based perfusion MRI, which does not require injection of any tracer or contrast agent, has been first investigated in the brain, but is now experiencing a remarkable revival for applications throughout the body, especially for oncologic applications, from diagnosis to treatment monitoring. This book addresses a number of highly topical aspects of the field from leading authorities, introducing the concepts behind IVIM MRI, outlining related methodological issues, and summarizing its current usage and potential for clinical applications. It also presents future research directions, both in terms of methodological development and clinical application fields, extending to new, non-perfusion applications of IVIM MRI, such as virtual MR elastography.

Radiation Induced Brain Injury In Meningioma Patients Treated With Proton Or Photon Therapy Springer Science & Business Media

This book is a unique resource on the influence cancer and cancer treatments have on cognition. The majority of cancer patients on active treatment experience cognitive impairments often referred to as 'chemobrain' or 'chemofog'. In addition, patients with primary or metastatic tumors of the brain often experience direct neurologic symptoms. This book helps health care professionals working with cancer patients who experience cognitive changes and provides practical information to help improve care by reviewing and describing brain-behavior relationships; research-based evidence on cognitive changes that occur with various cancers and cancer treatments; assessment techniques, including neurocognitive assessment and neuroimaging techniques; and intervention strategies for affected patients. In short, it will explain how to identify, assess and treat these conditions.

MONITORING AND MANAGEMENT OF ANATOMICAL VARIATIONS DURING PROTON THERAPY TREATMENTS IN PEDIATRIC PATIENTS Springer

Stereotactic body radiation therapy (SBRT) has emerged as an important innovative treatment for various primary and metastatic cancers. This book provides a comprehensive and up-to-date account of the physical/technological, biological, and clinical aspects of SBRT. It will serve as a detailed resource for this rapidly developing treatment modality. The organ sites covered include lung, liver, spine, pancreas, prostate, adrenal, head and neck, and female reproductive tract. Retrospective studies and prospective clinical trials on SBRT for various organ sites from around the world are examined, and toxicities and normal tissue constraints are discussed. This book features unique insights from world-renowned experts in SBRT from North America, Asia, and Europe. It will be necessary reading for radiation oncologists, radiation oncology residents and fellows, medical physicists, medical physics residents, medical oncologists, surgical oncologists, and cancer scientists.

We report on a case of a patient treated with pencil-beam-scanning proton therapy (PBS-PT) who developed severe optic pathway toxicity despite all optical structures dose constraints being within well-established limits. The otherwise healthy 50-year-old woman was treated with definitive PBS-PT for a skull-base meningioma with no ophthalmologic impairment at treatment initiation. The treatment was delivered in a single plan using three (two quasi-lateral and a vertex) fields up to 50.4 Gy(RBE) at 1.8Gy(RBE)/fraction. Nominal doses to optical structures were below 51Gy(RBE) (D2%). Five months after treatment, the patient presented with visual field defect on the right eye, quickly deteriorating to amaurosis, followed shortly afterwards by visual field defect on the left eye. A diagnosis of radiation-induced optic neuropathy was confirmed on MRI, which showed inflammatory changes in both chiasmatic and proximal optic nerve regions (Fig.1). Consequently, a comprehensive treatment review was performed, including nominal and log-file reconstructed dose distributions, delivery accuracy, plan robustness and LET distribution. As with the nominal dose distributions, log-file reconstructed doses resulted in low-risk dose levels in the optic structures (Table 1), and MR changes were in low LET (

05 - Proton Beam Therapy for Meningioma - Treatment Outcome and Toxicity Lippincott Williams & Wilkins

Pocket Guide to Radiation Oncology is an efficient, no-frills guide to the basics of clinical radiation oncology. The chapters are packed with clinical pearls and tables covering treatment options, doses, side effects, target delineations, treatment planning, and other essentials. Chapters are organized by site-specific disease. Each chapter presents the must-know key points, including treatment options by stage, relevant technical considerations, and important items for follow-ups. This crucial material makes the book an ideal companion for the practicing physician during rounds and other clinical settings. The book's organized format also lends itself to quick review for the board or MOC exams, and it can serve as a handy reference during a case review at a tumor

board. Key Features: The outline format and wealth of succinct tables make this a great quick reference Each chapter concludes with a list of selected, summarized studies relevant to the disease 51 disease-based chapters make it easy to find particular sites without having to sift through dense, broad text Supplemental sections at the end of the book provide quick access to normal tissue tolerance constraints as well as recommendations for managing symptoms after radiation therapy **Primary Central Nervous System Tumors** Springer Science & Business Media

This book provides evidence-based management in neuro-oncology covering all aspects such as pathology, radiology, surgery, radiation, and chemotherapy. The field of neuro-oncology is rapidly evolving and new evidence is coming out every day towards the optimal management of brain tumors. This necessitates a requirement of a complete guide that shall provide an evidence-based and personalized approach towards dealing with patients. This book also covers recent advances in personalized treatment formed through the relevant basis of anatomy, imaging, radiology, surgical, radiation and systemic treatment of brain and spinal tumors. In addition it also covers the , practical aspects of the planning of the Gamma knife and other radio surgical aspects. The book shall provide valuable assistance to practicing neuro-oncologists to practice better evidence-based personalized medicine.

Pocket Radiation Oncology BoD - Books on Demand

Optic nerve sheath meningioma (ONSM) is a rare tumour. Cases are usually separated into primary ONSM, which arises either intraorbitally or, less commonly, intracranially, and secondary ONSM, which arises intracranially and subsequently invades the optic canal and orbit. This is the first book to cover all important aspects of the diagnosis and treatment of primary ONSM. After a general introduction, individual chapters discuss the clinical presentation, clinical examination and diagnosis, imaging, and histology. Treatment options are then addressed in detail, with special emphasis on external beam radiation therapy, and in particular stereotactic fractionated radiation therapy. The latter has recently produced consistently good results and is now considered the emerging treatment of choice for the vast majority of patients with primary ONSM. This well-illustrated book will prove invaluable to all practitioners who encounter primary ONSM in their clinical work.

Robotic Radiosurgery Frontiers Media SA

Written by internationally renowned experts, Clinical Ophthalmic Oncology provides practical guidance and advice on the diagnosis and management of the complete range of ocular cancers. The book supplies all of the state-of-the-art knowledge required in order to identify these cancers early and to treat them as effectively as possible. Using the information provided, readers will be able to provide effective patient care using the latest knowledge on all aspects of ophthalmic oncology, to verify diagnostic conclusions based on comparison with numerous full-color clinical photographs, and to locate required information quickly owing to the clinically focused and user-friendly format. This volume, devoted solely to uveal tumors, explains the various diagnostic and biopsy techniques that may be used and describes the therapeutic options of potential value for different types of tumor.

Use of Optical Coherence Tomography (OCT) as Routine Base Line Examination in Meningioma Patients Before Proton Beam Radiation Lippincott Williams & Wilkins

Purpose: Proton beam therapy (PT) is of increasing interest especially in tumors in close proximity of critical structures like skull base meningioma. Treatment outcome and toxicity data collected in a prospective registry of a single institution are presented. Methods: Between July 2013 and May 2018, 55 adult patients with meningioma with a median age of 55.7 y (20.1-79.6 y) were treated and were prospectively enrolled in the in-house registry ProReg. The cohort consisted of 15 male and 40 female patients. Histopathology included WHO u00b001 (36, 65.5%) and WHO u00b002 (8, 14.5%). Eleven patients (20%) received no biopsy. Twenty-two (40%) patients received definitive PT. Adjuvant PT was administered after gross total resection and subtotal resection in 8 (14.5%) and 25 (45.5%), respectively. The median total dose of PT was 54Gy (54-60Gy) applied in 27 (27-33) fractions. Results: The median follow-up time from the primary diagnose was 3 years (0.4 u2013 26.1 y) and after the end of PT 1 year (0-4.5 y). Local disease control was achieved in 52 patients (94.5%). Local recurrence occurred in 1 patient and 2 patients had local progress after treatment. All patients were alive at last follow-up. PT was well-tolerated. No new higher-grade (CTCAE u2265u00b03) acute toxicity occurred. Long-term follow-up after PT showed 1 new CTCAE u00b03 toxicity as increasing vision deficit due to tumor progression. Conclusion: Current data support good early tumor control and feasibility of PT in meningioma.

Ion Beam Therapy Cambridge University Press

Meningioma patients depict one of the largest patient cohorts treated at MedAustron. Since the start of clinical treatments in 2016, 240 patients suffering from Meningioma have been treated with proton therapy. Therefore, the analysis of possible therapy-related late side effects is of great interest and hence formed the

aim of this Master Thesis. It represents additional correlations of a former written thesis and describes the dose-response relationship for Organs at Risk (OAR) and existing late side effects of 112 Meningioma patients treated at MedAustron. To enable this, recent follow-up outcomes of this patient cohort were correlated with dosimetric parameters for OARs derived from the treatment planning system. The thesis focused on fatigue, headache, ear- and labyrinth disorders as well as on eye disorders. The median follow-up time of the patient cohort was 3.08 years. Late side effects which occurred three months after a completed proton therapy were considered. Only 4 patients suffered from symptoms denoted with CTCAE grade II and no grade III or IV symptoms could be observed. Selected dosimetric parameters for statistical tests performed using the Mann-Whitney-U method, were median dose, D1%, D2%, D98%, D99%, V10Gy(RBE), V40Gy(RBE) and V60Gy(RBE). OAR correlated with the generation of late headache showed significant results for D1%, D2%, V10Gy(RBE) and V40Gy(RBE). Moreover, for fatigue as a late side effect, median dose, D1%, D2%, D98%, D99%, V10Gy and V40Gy were associated dosimetric parameters of OAR. Statistical tests also revealed significant associations between D1% and D2% of any correlated OAR and experienced late eye disorders. At last, reported ear and labyrinth disorders as late toxicities after PBT were considered to show statistically significant dependence on median dose, D1%, D2% and V10Gy(RBE) of tested OAR. As the number of PBT facilities increases and more patients receive an opportunity for a treatment with protons, future studies focus

Brain Tumors Springer Science & Business Media

As proton therapy treatment centers become smaller and more cost-effective, education and training for today's multi-disciplinary oncology teams are more important than ever before. This state-of-the-art reference brings you fully up to date with all aspects of proton therapy, with guidance you can trust from MD Anderson Cancer Center, the largest and most experienced proton therapy center in the world. Led by Drs. Steven J. Frank and W. Ronald Zhu, Proton Therapy provides a unique opportunity to benefit from the unsurpassed knowledge and expertise of an esteemed team of leaders in the field. Covers all cancers for which proton therapy is used most often, including prostate, head and neck, pediatrics, central nervous system, gastrointestinal, sarcomas, lungs, breast, lymphomas, and gynecologic cancers. Provides up-to-date information on radiobiology, treatment planning and quality assurance, indications for proton therapy, management approaches, and outcomes after proton therapy by disease site. Discusses technologic advances such as spot scanning and treatment planning systems for the management of solid tumors; radiobiology of proton therapy, including DNA damage and repair mechanisms and acute and late effects on normal tissues; and multifield optimized intensity-modulated proton therapy (MFO-IMPT) for optimizing the distribution of linear energy transfer (LET) of proton beams within target volumes and away from critical normal structures. Includes a special section on head and neck cases in the e-book that photographically illustrates the full cycle of proton therapy care.

Adaptive Proton Radiation Therapy Via Fast Monte Carlo Dose Calculation to Correct for Inter- and Intra-fraction Motion and Geometry Changes Springer

Intracranial germ cell tumors are a group of uncommon neoplasms of the central nervous system. The clinical features and natural history of these lesions are quite unique and variable. While intracranial germ cell tumors have been a fascination to neurooncologists for decades, the relatively small number of patients seen in any single institution has hampered the important clinical investigation that is so needed. This text is complete with detailed information concerning the epidemiology, pathology, oncological biology, clinical findings, radiology, and treatment options including surgical strategy, radiotherapy, and chemotherapy for this heterogeneous group of neoplasms. The ongoing clinical trials concerning the optimization of therapy are efficiently summarized. An important final segment addresses the late sequelae of therapy which is of great significance since the majority suffering from these tumors are young patients. This first and only book on intracranial germ cell tumors includes excellent and comprehensive data sheets, illustrations, and radiograms. It provides a detailed and outstanding reference source for physicians taking care of patients with intracranial germ cell tumors, and will be a very welcome edition to their reference libraries.

Principles and Practice of Proton Beam Therapy, AAPM Monograph Springer Publishing Company

This book describes the basics, the challenges and the limitations of state of the art brain tumor imaging and examines in detail its impact on diagnosis and treatment monitoring. It opens with an introduction to the clinically relevant physical principles of brain imaging. Since MR methodology plays a crucial role in brain imaging, the fundamental aspects of MR spectroscopy, MR perfusion and diffusion-weighted MR methods are described, focusing on the specific demands of brain tumor imaging. The potential and the limits of new imaging methodology are carefully addressed and compared to conventional MR imaging. In the main part of the book, the most important imaging criteria for the

differential diagnosis of solid and necrotic brain tumors are delineated and illustrated in examples. A closing section is devoted to the use of MR methods for the monitoring of brain tumor therapy. The book is intended for radiologists, neurologists, neurosurgeons, oncologists and other scientists in the biomedical field with an interest in neuro-oncology.

Pocket Guide to Radiation Oncology Springer Science & Business Media

Introduction Proton therapy (PT) is increasingly being used for pediatric tumors. This is mainly due to the advantages with respect to conventional therapy in terms of organs at risks (OAR) sparing. It is known that PT is more sensitive to

anatomical/density modifications. Aim of this study is to present our experience in monitoring and managing anatomical variations in cranial and spinal pediatric lesions. Materials and Methods Five cases, with different histology and location, were studied: 1 Skull base chordoma, 1 supratentorial glial neoplasm with hygroma, 1 craniopharyngioma with cystic component, 1 glial tumor of the posterior cranial fossa with vermian residue and 1 atypical meningioma with residual disease in close proximity with the cervical cord. Each patient underwent several CT and MR scans over the treatment course. The following MR sequences were acquired: T2 (study of the cystic and hygomatous component),

3D Flair (study of the edemigenous component), 3D T1 (OAR anatomical definition), DWI (study of cellularity). MR imaging was used to outline target and OAR on the control CTs, then the nominal plan was re-calculated on the CT. In case of target under dosage or OAR constraints violation a re-planning occurred in order to recover the initial dose prescription/constraints. Results A total of 9 CT and 15 MR were acquired in this study. Only in 1 case the re-planning was needed due to the increase of the cystic component in a craniopharyngioma. Conclusions Monitoring and management of anatomical variations via repeat imaging is feasible in pediatric patients and in some cases it was used to trigger replanning.

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