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Imaging radiation response 319 Am J Nucl Med Mol Imaging 2015;5(4):317-332 requires the injection of an exogenous probe, 13C-MRSI uses hyperpolarized agents to in-crease the detection sensitivity of injected 13C labeled molecules by greater than 10,000 fold [28]. 13C-labeled molecules such as [1-C]- pyruvate [29], [1, 4-13C]-fumarate [30], and L-[5-

Review Article Imaging radiation response in tumor and ...

Review Article Imaging Radiation Response Review Article Imaging radiation response in tumor and normal tissue Marjan Rafat, Rehan Ali, Edward E Graves Department of Radiation Oncology, Stanford University, Stanford, CA 94305, USA Received April 6, 2015; Accepted May 8, 2015; Epub June 15, 2015; Published July 1, 2015 Abstract: Although X-ray ...

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This review article focuses on the currently used imaging modalities for response assessment in radiation oncology and gives an overview of new and promising techniques within this field. Copyright © 2019 Elsevier Inc. All rights reserved. PMID: 31739950. Publication Types: Review

Imaging for Response Assessment in Radiation Oncology ...

This review article focuses on the currently used imaging modalities for response assessment in radiation oncology and gives an overview of new and promising techniques within this field. AB - Imaging in radiation oncology is essential for the evaluation of treatment response in tumors and organs at risk.

Imaging for Response Assessment in Radiation Oncology ...

Abstract. Patients with metastatic disease are routinely serially imaged to assess disease burden and response to systemic and local therapies, which places ever?expanding demands on our healthcare resources. Image interpretation following stereotactic body radiotherapy (SBRT) for spine metastases can be challenging; however, appropriate and accurate assessment is critical to ensure patients are managed correctly and resources are optimised.

Imaging response assessment following stereotactic body ...

Medical Imaging—Radiation Oncology—Review Article. ... Here, we take a critical review of the merits and pitfalls of various imaging modalities, current response assessment guidelines, and explore novel imaging approaches and the potential for radiomics to add value in imaging assessment.

Imaging response assessment following stereotactic body ...

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In this pictorial review, we discuss the strengths and weaknesses of modern MR imaging, including functional imaging sequences such as diffusion-weighted MRI, for response evaluation after chemoradiation treatment and provide the main pearls and pitfalls for image interpretation.

Response evaluation after ... - Insights into Imaging

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in the management of lung cancer. This review article aims to discuss the role of imaging in precision radiotherapy. Imaging for precision decision making in radiotherapy The aim of curative-intent precision RT in lung cancer is to control all sites of gross disease by the delivery of an anatomically targeted radiation dose sufficient to cause the

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This review gives an overview of the molecular and functional imaging modalities of tumour hypoxia and tumour cell metabolism, proliferation and perfusion as predictive biomarkers for radiation treatment response in head and neck tumours and in lung tumours.

Validation of functional imaging as a biomarker for ...

In this review, we describe the association of systemic lymphopenia with poor tumor outcome, present evidence that radiotherapy is an important contributing cause of lymphodepletion, describe the systemic immune context of tumor and brain injury that contributes to immunosuppression, describe other contributing factors to lymphopenia including concomitant medications and treatments, and speculate about the role of the normal physiologic response to brain injury in the immunosuppressive ...

Radiation Oncology Review Series | Neurosurgery | Oxford ...

Articles are typically published online within 2.73 weeks after acceptance Physics and Imaging in Radiation Oncology is an international, open access journal which is focused on medical physics and imaging in radiation oncology. Submissions from areas related to physics and imaging in radiation oncology are also considered.

Physics & Imaging in Radiation Oncology - Journal - Elsevier

The current standard of care to determine radiation response is an anatomical assessment of tumor volume shrinkage. This evaluation is typically performed 6–8 weeks after completion of treatment using X-ray Computed Tomography (CT) or Magnetic Resonance Imaging (MRI).

Optical Imaging Approaches to Investigating Radiation ...

The integration of 18 F-FDG PET/CT fusion imaging into radiation treatment planning by taking into account the metabolic and biological characteristics of tumours has been demonstrated to have significant impact on the selection and delineation of irradiation treatment volumes in HNSCC and NSCLC. 46,58–64 However, integration of PET images into the radiotherapy planning process in routine ...

Validation of functional imaging as a biomarker for ...

Acoustic radiation force based elasticity imaging methods are under investigation by many groups. These methods differ from traditional ultrasonic elasticity imaging methods in that they do not require compression of the transducer, and are thus expected to be less operator dependent. Methods have been developed that utilize impulsive (i.e.

Acoustic Radiation Force Impulse (ARFI) Imaging: A Review ...

Review Article Vitamin E Analogs as Radiation Response Modifiers . ... The potentially life-threatening effects of total body ionizing radiation exposure have been known for more than a century. Despite considerable advances in our understanding of the effects of radiation over the past six decades, efforts to identify effective radiation ...

Review Article Vitamin E Analogs as Radiation Response ...

This systematic review summarizes the current applications of 18 F-FDG PET imaging in the diagnosis, staging, radiation treatment response assessment, and outcome prognostication of head and neck cancers. For head and neck cancers of unknown primary origin, 18 F-FDG PET/CT increases the likelihood of identifying the primary tumor and establishing the diagnosis.

This book provides, for the first time, a unified approach to the application of MRI in radiotherapy that incorporates both a physics and a clinical perspective. Readers will find detailed information and guidance on the role of MRI in all aspects of treatment, from dose planning, with or without CT, through to response assessment. Extensive coverage is devoted to the latest technological developments and emerging options. These include hybrid MRI treatment systems, such as MRI-Linac and proton-guided systems, which are ushering in an era of real-time MRI guidance. The past decade has witnessed an unprecedented rise in the use of MRI in the radiation treatment of cancer. The development of highly conformal dose delivery techniques has led to a growing need to harness advanced imaging for patient treatment. With its flexible soft tissue contrast and ability to acquire functional information, MRI offers advantages at all stages of treatment. In documenting the state of the art in the field, this book will be of value to a wide range of professionals. The authors are international experts drawn from the scientific committee of the 2017 MR in RT symposium and the faculty of the ESTRO teaching course on imaging for physicists.

This issue discusses the clinical application of PET Imaging in assessing brain tumors, Including what a neuro-oncologist's expectations should be. One article discusses how PET can help in developing reliable response evaluation criteria in brain tumors; another reviews modern tracers for brain tumors. The evolving role of PET-MRI in brain tumors is examined. Parametric mapping of multiple PET tracers with MRI response evaluation is reviewed. Another article discusses the role of early and delayed PET imaging and novel quantitative techniques in hybrid imaging for brain tumors. The perspective of pediatric imaging is also given.

Completely updated to reflect the latest developments in science and technology, the second edition of this reference presents the diagnostic imaging tools essential to the detection, diagnosis, staging, treatment planning, and post-treatment management of cancer in both adults and children. Organized by major organs and body systems, the text offers comprehensive, abundantly illustrated guidance to enable both the radiologist and clinical oncologist to better appreciate and overcome the challenges of tumor imaging.

Magnetic Resonance Imaging (MRI) is among the most important medical imaging techniques available today. There is an installed base of approximately 15,000 MRI scanners worldwide. Each of these scanners is capable of running many different "pulse sequences", which are governed by physics and engineering principles, and implemented by software programs that control the MRI hardware. To utilize an MRI scanner to the fullest extent, a conceptual understanding of its pulse sequences is crucial. Handbook of MRI Pulse Sequences offers a complete guide that can help the scientists, engineers, clinicians, and technologists in the field of MRI understand and better employ their scanner. Explains pulse sequences, their components, and the associated image reconstruction methods commonly used in MRI Provides self-contained sections for individual techniques Can be used as a quick reference guide or as a resource for deeper study Includes both non-mathematical and mathematical descriptions Contains numerous figures, tables, references, and worked example problems

Surface Guided Radiation Therapy provides a comprehensive overview of optical surface image guidance systems for radiation therapy. It serves as an introductory teaching resource for students and trainees, and a valuable reference for medical physicists, physicians, radiation therapists, and administrators who wish to incorporate surface guided radiation therapy (SGRT) into their clinical practice. This is the first book dedicated to the principles and practice of SGRT, featuring: Chapters authored by an internationally represented list of physicists, radiation oncologists and therapists, edited by pioneers and experts in SGRT Covering the evolution of localization systems and their role in quality and safety, current SGRT systems, practical guides to commissioning and quality assurance, clinical applications by anatomic site, and emerging topics including skin mark-less setups. Several dedicated chapters on SGRT for intracranial radiosurgery and breast, covering technical aspects, risk assessment and outcomes. Jeremy Hoisak, PhD, DABR is an Assistant Professor in the Department of Radiation Medicine and Applied Sciences at the University of California, San Diego. Dr. Hoisak's clinical expertise includes radiosurgery and respiratory motion management. Adam Paxton, PhD, DABR is an Assistant Professor in the Department of Radiation Oncology at the University of Utah. Dr. Paxton's clinical expertise includes patient safety, motion management, radiosurgery, and proton therapy. Benjamin Waghorn, PhD, DABR is the Director of Clinical Physics at Vision RT. Dr. Waghorn's research interests include intensity modulated radiation therapy, motion management, and surface image guidance systems. Todd Pawlicki, PhD, DABR, FAAPM, FASTRO, is Professor and Vice-Chair for Medical Physics in the Department of Radiation Medicine and Applied Sciences at the University of California, San Diego. Dr. Pawlicki has published extensively on quality and safety in radiation therapy. He has served on the Board of Directors for the American Society for Radiology Oncology (ASTRO) and the American Association of Physicists in Medicine (AAPM).

The mode of action by radiation is postulated to be the production of double strand breaks of DNA. The repair of double strand breaks occurs through non homologous end joining through acetylation of histone proteins by histone acetyltransferases (HATs). The fixation of double strand breaks through HAT inhibitors is a promising application for radiation sensitization in the clinic. P53 is a tumour suppressor gene and its mutation has been implicated in 60% of human cancers. As one of the pivotal anticancer genes, P53 controls the transcription and translation of a series of genes. The kinetics of DNA double strand break generation and their co relation to P53 status, ATM and ARF activation are computed and modelled for understanding the potential of such research.

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