Intraoperative Mri Guided Neurosurgery

Intraoperative MRI-Guided NeurosurgeryIntraoperative Imaging in NeurosurgeryInteractive Image-guided NeurosurgeryImage-Guided NeurosurgeryMR-compatible Modular Tele-robotic System for MRI-guided NeurosurgeryIntraoperative Imaging and Image-Guided TherapyIntraoperative Imaging, An Issue of Neurosurgery Clinics of North AmericaIntraoperative Imaging in NeurosurgeryAdvanced Techniques in Image-Guided Brain and Spine SurgeryStereotactic and Functional NeurosurgeryYoumans Neurological SurgeryImage-guided NeurosurgeryStereotactic NeurosurgeryAdvanced Neurosurgical NavigationFluorescence-Guided NeurosurgeryMethods in Biomedical Magnetic Resonance Imaging and SpectroscopyInterventional MRIBritish Journal of NeurosurgeryOperative Neurosurgical TechniquesOperative Techniques in Epilepsy Surgery Walter A. Hall R.L. Bernays Robert J. Maciunas Alexandra J. Golby Cyrus Raoufi Ferenc A. Jolesz J. Bradley Elder Karanjit Singh Narang Isabelle M. Germano H. Richard Winn Gene H. Barnett M. Peter Heilbrun Eben Alexander Constantinos G. Hadjipanayis Ian Robert Young Robert B. Lufkin Henry H. Schmidek Gordon H. Baltuch

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the definitive reference on intraoperative mr guided neurosurgery comprehensive in scope and packed with practical information intraoperative mr guided neurosurgery contains detailed coverage of this state of the art technology from the pioneers who developed it renowned neurosurgeons and neuroradiologists combine their collective wisdom and experience to demonstrate how mr guided neuronavigation can be used to view real time images of a patient s brain during surgery to help remove tumors with greater precision the authors provide step by step descriptions of how to perform procedures including advice based on their clinical results readers will learn about the advantages and drawbacks of the various mr imaging systems clinical indications for mr guidance anesthesia considerations safety concerns related to working in a magnetic environment and much more features in depth coverage of all mr imaging systems helps readers to make informed choices about which technique will best suit their surgical needs guidelines on the most appropriate imaging sequences for the resection of different types of brain tumors more than 200 high quality intraoperative photographs taken during actual procedures to orient readers who want to use mri in the operating room tips from

the experts on safety issues suitable magnet designs and field strengths cost and benefit analysis room design equipment and logistics discussion of other forms of technology that have been combined with intraoperative mr guidance such as focused ultrasound neurosurgical robotics and other promising innovations this leading edge text has everything that neurosurgeons neuroradiologists and interventionalists need to know to implement an intraoperative mr guided neurosurgery program

in the continuous effort to further improve neurosurgery intraoperative information on structure and function of the brain has become an important tool which potentially will result in an improved outcome of neurosurgical procedures in this book experts from different countries and neurosurgical organizations have collected information on the state of the art of intraoperative imaging mri ct and ultrasound various contributions cover the future of neuroimaging the impact of intraoperative imaging on glioma surgery technical and neurosurgical aspects of the different imaging modalities and systems and economical aspects the present book thus provides a unique and comprehensive source of information on the complex of intraoperative imaging in modern neurosurgery

interactive image guided neurosurgery is a comprehensive book which studies the impact of computerized image processing and three dimensional special localizers on the accurate localization of intracranial pathology topics covered in interactive image guided neurosurgery include stereotactic frame systems and intraoperative localization devices image registration based on discrete anatomic structures image based frameless stereotactic radiosurgery the role of computers and medical imaging in stereotactic neurosurgery the neuronavigator a potentiometer based localization arm system intraoperative computed tomographic localization intraoperative microendoscopy distributed by thieme for the american association of neurological surgeons

image guided neurosurgery provides readers with an update on the revolutionary improvements in imaging and visualization relating to neurosurgery from the development of the pneumoencephalogram to the operating microscope to cross sectional imaging with ct and later mri to stereotaxy and neuronavigation the ability to visualize the pathology and surrounding neural structures has been the driving factor leading surgical innovation and improved outcomes the book provides a comprehensive reference on the application of contemporary imaging technologies used in neurosurgery specific techniques discussed include brain biopsies brain tumor resection deep brain stimulation and more the book is ideal for neurosurgeons interventional radiologists neurologists psychiatrists and radiologists as well as technical experts in imaging image analysis computer science and biomedical engineering a comprehensive reference on image guided neurosurgery includes coverage of neuronavigation in cranial surgery and advanced imaging including functional imaging adoption of intra operative mri and emerging technologies covers all image guided neurosurgery tools including robotic surgical devices ideal reference for topics relating to neurosurgery imaging stereotaxis radiosurgery radiology epilepsy mri the use of medical robotics lasers and more

the basic premise of magnetic resonance imaging mri guided neurosurgery is that the location of a surgical instrument can be shown on an image display monitor relative to a detailed depiction of the internal cranium precision and potential for tele surgery are the prime motivations for applying robots in the mri environments typically neurosurgeries are performed in open bore mri scanners this results in the use of preoperative mri images during the procedures use of closed bore scanners would eliminate this concern however there is no space for the neurosurgeon to perform operations therefore remote control surgery would be

the appropriate method to be used in closed bore mri based surgery in this dissertation the design and control paradigms of a novel modular tele robotic system for closed bore mri guided neurosurgery are presented candidate neurosurgical procedures enabled by this system would include thermal ablation radiofrequency ablation deep brain stimulators and targeted drug delivery a new infrastructure for mri guided intervention is also developed to address clinical requirements in a typical closed bore mri environment the design paradigm is fundamentally based on a modular design configuration for the slave manipulator performing the required task inside mr scanner navigation and operating modules were designed to undertake the alignment and advancement of the surgical needle respectively the control paradigm was developed based on two novel control methods including fiducials tracking and semi autonomous motion in the former the surgeon could manipulate the needle inside the mri scanner while relative position of the needle and the target are visualized on a display in the latter the needle is manipulated autonomously based on feedback from mr images to the controller two mr compatible actuation systems that include ultrasonic motors and hydraulic pneumatic cylinders were developed a series of the experimental tests were conducted to evaluate mr compatibility of an ultrasonic motor the results show that the actuation of the motor only slightly deteriorated the mr image and no image shift and significant degradation of signal to noise ratio was observed this research provides a first complete surgical system for closed bore mri based neurosurgery the main contributions are the system mr compatibility and the modular design and control paradigms

image guided therapy igt uses imaging to improve the localization and targeting of diseased tissue and to monitor and control treatments during the past decade image guided surgeries and image guided minimally invasive interventions have emerged as advances that can be used in place of traditional invasive approaches advanced imaging technologies such as magnetic resonance imaging mri computed tomography ct and positron emission tomography pet entered into operating rooms and interventional suites to complement already available routine imaging devices like x ray and ultrasound at the same time navigational tools computer assisted surgery devices and image guided robots also became part of the revolution in interventional radiology suites and the operating room intraoperative imaging and image guided therapy explores the fundamental technical and clinical aspects of state of the art image guided therapies it presents the basic concepts of image guidance the technologies involved in therapy delivery and the special requirements for the design and construction of image guided operating rooms and interventional suites it also covers future developments such as molecular imaging guided surgeries and novel innovative therapies like mri guided focused ultrasound surgery igt is a multidisciplinary and multimodality field in which teams of physicians physicists engineers and computer scientists collaborate in performing these interventions an approach that is reflected in the organization of the book contributing authors include members of the national center of image guided therapy program at brigham and women s hospital and international leaders in the field of igt the book includes coverage of these topics imaging methods guidance technologies and the therapy delivery systems currently used or in development clinical applications for igt in various specialties such as neurosurgery ear nose and throat surgery cardiovascular surgery endoscopies and orthopedic procedures review and comparison of the clinical uses for igt with conventional methods in terms of invasiveness effectiveness and outcome requirements for the design and construction of image guided operating rooms and interventional suites

this issue of neurosurgery clinics focus on intraoperative imaging article topics will include historical current and future intraoperative imaging modality imri suites history design utility

and cost effectiveness stereotactic platforms for imri imri for tumor maximizing extent of resection of glioma imri for tumor combining imri with functional mri imri for tumor pituitary adenoma imri for tumor mr thermometry imri for tumor litt for spinal tumors imri for functional epilepsy neurosurgery dbs placement imri for functional epilepsy neurosurgery mr thermometry for mesial temporal epilepsy imri for functional epilepsy neurosurgery mr thermometry hifu fluorescence imaging agents in tumor resection intraoperative 3d ultrasound intraoperative 3d ct spine surgery intraoperative 3d ct cranial functional trigem intraoperative imaging for vascular lesions imaging of intraoperative drug delivery intraoperative ultrasound for peripheral nerve and intraoperative raman spectroscopy

this book is a complete guide to intraoperative imaging in neurosurgery divided into eighteen sections the text begins with an introduction to the history of neuroimaging and an overview of intraoperative imaging in neurosurgery the following chapters discuss different types of intraoperative imaging techniques magnetic resource imaging computed tomography ultrasound and the use of each of these techniques during different surgical procedures including epilepsy surgery pituitary surgeries skull base surgeries cerebrovascular surgeries and more a complete chapter is dedicated to multimodality imaging and the final chapter considers the future of navigation and intraoperative imaging intraoperative photographs and figures further enhance the comprehensive text key points comprehensive guide to intraoperative imaging in neurosurgery covers different types of imaging techniques mri ct ultrasound complete chapter dedicated to multimodality imaging includes intraoperative photographs and figures

an advanced technique quickly becoming the standard for all neurosurgeons a comprehensive review of the state of the art technology currently available for neuronavigation it will provide the reader with the clinical applications of this technology to various aspects of cranial and spinal surgery

the first of the four volumes introduces approaches to the patient radiology fundamentals perioperative evaluation and treatment and surgical exposures and positioning and it covers oncology the second volume covers vascular disease and malformations and epilepsy the third functional neurosurgery pain and pediatric issues and the fourth the peripheral nerve radiation therapy and radiosurgery the spine and trauma basic science in most cases is represented in its own chapter in each section so as to make the rest of the section chapters more clinical in focus

offers full information on transferring medical data into mapping strategies viewing the clinical applications of sterotaxis and observing image guided neurosurgical procedures in actual clinical practice contributors to the text include neurosurgeons and computer scientists

the definitive textbook on state of the art fluorescence guided neurosurgery advances in fluorescence guided surgery fgs have resulted in a paradigm shift in neurosurgical approaches to neuro oncological and cerebrovascular pathologies edited by two of the foremost authorities on the topic fluorescence guided neurosurgery neuro oncology and cerebrovascular applications encompasses the depth and breadth of this groundbreaking still nascent technology the book reflects significant contributions made by world renowned neurosurgeons constantinos hadjipanayis walter stummer and esteemed contributors on the growing uses of 5 aminolevulinic acid 5 ala and other fgs agents the european medicine agency approved 5 ala in 2007 heralding the birth of fgs globally in 2017 the u s food and drug administration approved 5 ala gleolan as an imaging agent to facilitate realtime detection and visualization of

malignant tissue during glioma surgery in the two decades since dr stummer s initial description of 5 ala fgs in a human patient major strides have been made in its practical applications leading to improved resection outcomes as fgs is increasingly incorporated into neurosurgical practice it holds promise for future innovations generously illustrated and enhanced with online videos this textbook is the definitive resource on the subject key features the improved efficacy of 5 ala for resecting high and low grade gliomas recurrences meningiomas brain metastases spinal cord tumors pediatric brain tumors and other adult tumors the future of fluorescence including potentially powerful new fluorophores molecularly targeted specifically to tumors the use of the fluorescent agent indocyanine green icg for brain tumors cerebral aneurysms avms and cerebral vascularization special topics such as fluorescein illuminating tumor paint confocal microscopy raman spectroscopy and integrating fgs with intraoperative imaging and brain mapping this single accessible reference presents the current state of the art on this emerging exciting surgical technology as such it is a must have for neurosurgical residents fellows and practicing neurosurgeons

in this first ever volume interventional mri presents a comprehensive up to date assessment of the new rapidly growing field of mr guided therapy lavishly illustrated with nearly 550 images it provides in depth state of the art coverage of instrumentation techniques and clinical applications parts i and ii cover instrumentation and general interventional mr guidance techniques part iii covers image guided treatment techniques and part iv covers clinical applications provides the first ever comprehensive up to date overview and state of the art assessment of interventional mri for a wealth of general information on this emerging field includes the most current information on instrumentation techniques and clinical applications as well as economics start up and database management issues features 548 state of the art images including 44 in color to visually support and enhance the text includes contributions from an international cast of more than 90 leaders in the field for the most up to date and reliable information spanish version also available isbn 84 8174 467 0

practical coverage of the innovative surgical techniques for epilepsy operative techniques in epilepsy surgery is an essential guide to the latest techniques and therapeutic strategies for the surgical management of patients with epilepsy distinguished pioneers in the field provide comprehensive coverage of the range of operative approaches helping clinicians to thoroughly prepare for surgery the book first discusses surgical planning and then presents techniques for cortical resection and various types of intraoperative mapping the final sections of the book describe innovative approaches such as neuromodulation and radiosurgery features guidelines from leading experts in the field of epilepsy surgery detailed step by step descriptions of procedures including practical information on image guidance and invasive monitoring discussion of innovative techniques including deep brain stimulation responsive stimulation and radiosurgery high quality illustrations that facilitate comprehension of surgical steps ideal for neurosurgeons and trainees this book is an indispensable single volume source of information on all technical aspects of epilepsy surgery it also serves as a valuable reference for clinicians and residents in neurology and neuroradiology

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