

# Preface

In the pursuit of the goal of continuous improvement in surgical results, intraoperative imaging technologies have taken an ever-increasing role in the daily practice of neurosurgeons. To adapt available imaging technologies to the operating room a considerable amount of effort has been focused on the subject. Most centers have taken individual and independent approaches on the subject and an ever-diversifying field of “intraoperative imaging” has been created. In an initiative of coordinating and symbiotically integrating these novel technologies, the international “Intraoperative Imaging Society” has been formed. After the second international meeting of the society, this book is aimed to bring together both the essence and details of the current status.

The initial drive for intraoperative imaging in neurosurgery came from the demands of neurooncology. Accumulating evidence over the years has indicated that a more complete resection of brain tumors was associated with a lower incidence of recurrences and longer survival. This led to a search for techniques and technologies to improve the extent of surgical resections. Stereotactic techniques have led to the development of Neuronavigation as a means to define brain anatomy during surgery and to guide surgical interventions. The technology was welcomed with much enthusiasm as it provided precise stereotactic definition of both the brain anatomy and the boundaries of intracranial lesions. However, neuronavigation was based on preoperatively acquired images and the brain shift caused by the surgical intervention severely affected the accuracy and therefore the dependability of this technology. Meanwhile several different technologies of intraoperative imaging were under development. Ultrasonography (U/S), computed tomography (CT) and MRI are currently the most prominent of these techniques. Initial designs were tested in the clinic and most were replaced by newer designs to accommodate clinical needs and to compensate for the shortcomings. The financial burden of these sophisticated intraoperative imaging technologies was also a serious consideration and had an important influence on equipment and facility designs. Intraoperative imaging technology certainly did not stay confined to the field of neurooncology. Neurovascular, pediatric, functional and spine surgery had different needs and these were fulfilled by development of even more diversified technologies.

The increasing attention and interest on intraoperative imaging also necessitated international interaction and collaboration and the Intraoperative Imaging Society was formed in 2007. The first Annual Meeting of the Intra-operative Imaging Society was held at the Hyatt Regency Resort, Spa and Casino in Lake Tahoe-Nevada in 2008. After this very successful meeting, the second meeting was held in Istanbul-Turkey from June 14 to 17, 2009. This book brings together highlights from this second meeting of the Intraoperative Imaging Society. The first section of the book gives an overview of the emergence and development of the intraoperative imaging technology and it gives a glimpse on where the technology is heading. Among all technologies, intraoperative MRI has received most of the attention due to immense technical potential of this modality. Various new technologies have been developed

in the last decade and this led to very diverse designs. Therefore, we have divided this section into parts discussing low, high and ultra-high field designs. The second, third and fourth sections provide separate reports on each system. After reading these chapters the reader should have a general idea on intraoperative MRI technology and know the pros and cons of each design. The sections on CT and Ultrasonography are followed by a section with reports from the most prominent centers which have attempted integrating different imaging technologies. The last one is a diverse section bringing together ancillary techniques as well as reports on intraoperative robotic technology.

We believe that this book will provide an up-to date and comprehensive general overview of the current intraoperative imaging technology as well as detailed discussions on individual techniques and clinical results.

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