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Neuroimaging Clinics of North America: Advances in Brain Tumor Imaging and Therapy

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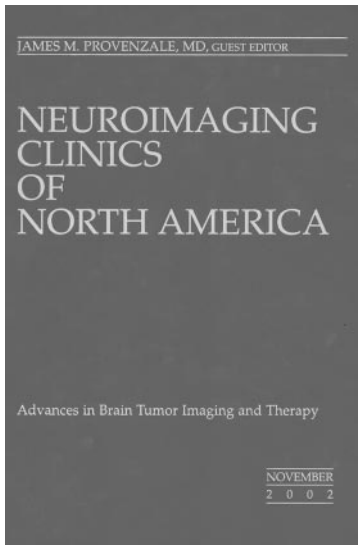
Neuroimaging Clinics of North America: Advances in Brain Tumor Imaging and Therapy
James M. Provenzale, guest editor. Vol 12, No 4, WB Saunders; Philadelphia, PA: 699 pages, 78 illustrations. $45.00.



In the preface to this issue of *Neuroimaging Clinics of North America,* James Provenzale states that advances in brain tumor treatment will necessitate changes in imaging techniques and strategies. The dual goals of this monograph are to provide radiologists and other clinicians with knowledge of these new (or potential) treatment options and the imaging tools needed to evaluate them. To a large extent, the monograph succeeds, although some of the presentations are not for the faint of heart.

The editor has organized many of the chapters in pairs dealing with a treatment approach (and the science that underlies it) and a means of imaging it. This organization is somewhat artificial. It works for some topics (eg, tumor hypoxia and hypoxia imaging), but not for others. The chapter on perfusion imaging is superb, but not particularly relevant to the chapter on anti-antigenic agents. It is best to view the chapters as stand-alone presentations.

Four chapters provide excellent reviews of current state of the art and future directions for imaging techniques already in use in tumor management at major centers. The discussions of dynamic susceptibility contrast-enhanced MR imaging (perfusion imaging), positron-emission tomography (PET), and MR spectroscopy are thorough and informative. The perfusion discussion reviews the specific challenges to performing perfusion imaging in the presence of disruption of the blood-brain barrier and tumor vascularity. The PET presentation provides an excellent review of FDG imaging and the use of fusion of MR and PET data to improve detection of lesions near the corticomedullary junction that typically have uptake similar to that of gray matter. The use of newer ligands is discussed as well. The chapter on MR spectroscopy deals almost exclusively with multivoxel imaging. This technique is rapidly replacing single-voxel MR spectroscopy in the assessment of tumors for the altogether important reason that gliomas are extremely heterogeneous and are unlikely to be well characterized by a single measurement. The emphasis in interpretation has shifted from viewing individual spectra to assessment of the distribution of metabolites within the lesion. MR spectroscopy data are interpreted with other MR parameters (T2, enhancement, and diffusion). Considering that single voxel MR spectroscopy is still being used, it would have been helpful for the authors to have provided a short discussion and a few illustrations of individual spectra for each glioma grade. There are no chapters devoted specifically to diffusion imaging or functional MR. Diffusion tensor imaging (anisotropy measures and tractography) does show some promise in identifying and assessing the extent of tumor infiltration. This topic is covered in the final chapter, on intraoperative MR imaging, in which the role of functional MR imaging is also discussed. These chapters provide an excellent review of the current state of the art and near future developments in physiologic imaging of brain tumors. Each chapter assumes that the reader has some knowledge of these techniques and should therefore prove most useful to fellowship-trained neuroradiologists and nonradiologists (eg, neurologists, neurooncologists, and neurosurgeons) engaged in the management of brain tumors.

The chapters dealing with the various therapeutic alternatives are extremely informative. The presentations on viral delivery of gene therapy and immunotherapy are noteworthy for their clarity and completeness. The presentation on the molecular abnormalities in tumors offers an excellent review of the genetics of glial tumors and the implications of this genetic information for treatment. This material may seem to have little practical value for radiologists, but as the editor states, radiologists must develop at least a passing knowledge of these topics if they are to design and perform the imaging studies in glioma patients. Practicality aside, the topics discussed in these chapters should be fascinating to anyone dealing with brain tumors. Of course, there is always the risk that more detail than is necessary is provided for the "casual reader." At times, I did get a bit overwhelmed, but it is was easy enough to skim some of the specific details on gene variations and well worth the effort to gain an understanding of tumor biology and how it can be manipulated for therapeutic advantage.

In conclusion, this monograph accomplishes the goals set out by the editor. It provides radiologists (and other interested clinicians) with an excellent review of current physiologic imaging and a superb introduction to the biology of brain tumors and treatment options.