A. Perneczky, A. Perneczky, W. Müller-Forell, E. van Lindert

Keyhole Concept in Neurosurgery: With Endoscope-Assisted Microsurgery and Case Studies
Thieme, Stuttgart 1999
262 pp.; USD 229.00
ISBN 0–865–77709–8

As image-guided surgery becomes more refined, it enables less and less invasive procedures. In order to take maximum advantage of minimal exposure, Perneczky et al. have expanded the concept of ‘keyhole’ exposure and have elaborated principles that might interrelate with image guidance to provide the optimal use of both techniques.

The book begins with an extensive presentation of the concept that a small opening in the bone might be used to provide entry to a larger surgical field if the opening is away from the target and not immediately overlying it, if the path is well selected to minimize interference from intervening structures, if ‘light and sight’ are well provided and if the surgeon is well versed in microneurosurgical exposure and techniques. A large portion of the book is then used to present 25 well-illustrated and well-selected cases. Each case report includes information about the proper position of the patient, the best location and type of the incision, the field that would be exposed, the relevant anatomy and the technique of microsurgery or endoscopic neurosurgery.

This is an excellent volume for any neurosurgeon who uses or intends to use minimally invasive techniques, and that should include every neurosurgeon. It contains a wealth of information from a surgeon who has thought through his concepts and has vast experience with the information he conveys. The surgical approaches are not always intuitive, but are well conceived and illustrated, and most often superior to the more conventional exposures.

The book does not, however, link image guidance to those keyhole techniques, partly because the author is familiar enough with the anatomy and exposure that he feels confident about identifying the anatomy. The rest of us, however, feel that any additional information we can get to verify the anatomy or location of the surgical instruments is not only welcome but important. It would be most helpful to use image guidance to provide the surgeon with definitive information about his or her location and the identity of the observable anatomy, and to combine it with the illustrated keyhole techniques.

This book is recommended for any neurosurgeon using image guidance who wishes to engage in truly minimally invasive neurosurgery.

Philip L. Gildenberg, Houston, Tex.
In this time when publications are appearing in a variety of media formats, it seems appropriate to review a CD-ROM specifically designed for use in functional neurosurgery.

An electronic atlas was constructed from a three-dimensional extended deformable database derived from five different electronic brain atlases, each of which was digitized, segmented, anatomical structures color coded and labeled, and formatted for interactive reference. The images in the resulting CD-ROM atlas can be warped to selected size or to the image-derived anatomy of the individual patient. This elaborate procedure has guarded against the problem inherent in most atlases, that is that most atlases present a representative brain which may not be consistent with the anatomy of the patient under study or may be warped in only a limited manner. This electronic version allows the surgeon to fit the atlas well to a CT or MRI and to use the derived information for accurate guidance.

The atlas has a variety of modalities, and images can be demonstrated in several displays, depending on how the images are to be used. One can demonstrate slice-related or three-dimensional anatomical structures, orthogonal planes corresponding to the planes under study, or two- or three-dimensional representations of trajectories tracking movement of electrodes. The three-dimensional internal anatomy of the brain can be used with much benefit for teaching. The details of this and its many associated programs have been published in a variety of journals (for instance Nowinski [1]).

This electronic atlas has an abundance of displays and modules, and consequently is complicated to use, and the help information is somewhat unfriendly. When I had difficulty engaging the various modalities, I asked a computer engineer colleague familiar with stereotactic programs his opinion, and he also had some difficulty. When the program was demonstrated by the authors, its versatility and elegance became much more apparent.

Since most functional neurosurgical procedures are relegated to set protocols, its utility during surgical planning or during surgery may be less than its capabilities would provide, except for physiological mapping of the anatomy of subcortical structures or for research purposes. It can be used to design optimal trajectories when first setting up treatment protocols and to verify those trajectories in each individual patient. In summary, this electronic atlas has great potential utility. It would benefit from documentation to make it more user friendly.

Philip L. Gildenberg, Houston, Tex.

Reference