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Since the beginnings of medicine, physicians have sought minimally invasive ways to peer into body cavities. It is only in the last several decades that the promises of endoscopy have begun to be answered. What follows is a brief outline of the development of endoscopic technology and its application to the nervous system both for diagnostic and therapeutic procedures.

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There is little doubt that most arachnoidal cysts will be managed endoscopically in the future given the advances we have seen over the last decade in our instrumentation. Excitement to employ this new technology should be governed by the reality that we are still learning and that our current success rate is not quite as good as what can be expected when using microneurosurgery.

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Understanding some of the basic principles of endoscopy and awareness of available resources can potentially be of considerable help to experienced neurosurgeons as well as beginners in selection of the most appropriate tools for different procedures and making cost-effective choices when browsing through multiple commercial advertisements and purchasing new equipment. Although numerous advantages in science and industry have made it possible to offer a wide variety of neuroendoscopes and tools, we believe the major achievements in this field are yet to occur. This particularly refers to the development of smaller fiberoptic scopes with better image quality and three-dimensional endoscopes and to the invention of more efficient tools for endoscopic tumor removal with the same degree of safety as in open surgery.

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The embryology of the ventricular development of the brain assists in understanding the final relations between structures forming these cavities. An accurate concept of this anatomy allows the endoscopist to maneuver within the ventricular system.

Selecting Patients for Endoscopic Third Ventriculostomy

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Harold L. Rekate

Endoscopic third ventriculostomy has been used for about 70 years in the treatment of hydrocephalus but was generally abandoned with the development of valve-regulated shunts. With improvements in the understanding of the pathophysiology of hydrocephalus and technical equipment improvements for endoscopy, there has been a resurgence of interest in the procedure. Late-onset aqueductal stenosis is the ideal pathologic condition responding to this treatment, but there are multiple other conditions that are potentially responsive to internal bypass. All patients in whom the ventricles expand at the time of shunt failure should be considered as candidates.

Techniques of Endoscopic Third Ventriculostomy

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Douglas Brockmeyer

Modern techniques of endoscopic third ventriculostomy (ETV) are based on the concept of establishing a natural conduit for cerebral spinal fluid (CSF) flow through the floor of the third ventricle. Through the years, a wide variety of techniques have been used as a means to this end and have included both open and closed approaches. However, the relatively recent application of endoscopic technology to intraventricular surgery has allowed neurosurgeons to perform third ventriculostomies in a minimally invasive fashion. Advances in third ventriculostomy technique have been based on a detailed understanding of third ventricular anatomy, surgical trajectories, and improved instrumentation. The goal of this article is to discuss these issues in detail and to point out the relevant risks and known complications associated with them.

Complications of Third Ventriculostomy

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Marion L. Walker

As experience with ETV grows, the procedure will be performed by an increasing number of neurosurgeons. Although the technique has been greatly refined since its advent almost a century ago, today's neurosurgeon must never forget that this seemingly simple procedure holds the potential for a number of devastating complications. Appropriate training and experience are important to the success of ETV and for avoiding complications. It is imperative that surgeons continue to report their experience with the complications of ETV so that the procedure can continue to be made as safe as possible.

Results of Endoscopic Third Ventriculostomy

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Mark R. Iantosca, Walter J. Hader, and James M. Drake

Endoscopic third ventriculostomy is emerging as the treatment of choice for aqueductal stenosis caused by anatomic, inflammatory, and selected neoplastic etiologies. The technique has also proven useful in the pathologic diagnosis and treatment of these conditions. Long-term results of this procedure and comparison to standard shunting procedures are necessary to define indications for patients with pathologic findings in the intermediate response groups. Development of new studies for preoperative assessment of cerebrospinal fluid absorptive capacity and quantitative postoperative measures of ventriculostomy function would be invaluable additions to our ability to assess candidates for this procedure and their eventual outcome. Further study and technical refinements will, no doubt, lead to many more potential uses for these procedures in the treatment of hydrocephalus and its associated etiologies. The challenge for neurosurgeons will be to define the operative indications and outcomes, while refining techniques for safely performing these useful procedures.

Loculated Ventricles and Isolated Compartments in Hydrocephalus: Their Pathophysiology and the Efficacy of Neuroendoscopic Surgery
Shizuo Oi and Rick Abbott

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Trapped cerebrospinal fluid spaces can, on occasion, complicate the management of hydrocephalus and present the surgeon with a treatment dilemma. This condition can be categorized into one of two types: those arising as a complication of shunting and those that arise as a complication of an inflammatory process within the ventricles. Whatever the cause, the result is a significant escalation in the complexity of the management of the patient. Neuroendoscopy is typically viewed as an attractive treatment alternative in such a setting because of its minimalistic and thus seemingly simplistic nature. We have learned that nothing could be further from the truth. This article reviews the various entities that can arise in the hydrocephalic patient, how they can be managed endoscopically, and what sort of result can be expected.

Neuro-oncologic Applications of Endoscopy
Charles Teo and Peter Nakaji

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Neuro-oncology, in all its aspects, provides an ideal venue for the application of endoscopy. The main obstacle to its use has been neurosurgeons' lack of familiarity with the techniques and their advantages. As the neuro-oncologic surgeon uses the endoscope more, endoscopy will take its rightful place in the surgeon's armamentarium. The advantages of improved visualization of intraventricular pathology, better management of tumor-related hydrocephalus, less morbid biopsies, and minimally invasive removal of intraventricular tumors are invaluable adjuncts to traditional tumor management. Furthermore, endoscopy is the logical next step for surpassing the limitations of traditional microsurgery. Endoscopy is still in its infancy. Rigorous application of the technology is increasingly allowing us to provide our patients the most maximally effective and minimally invasive surgery possible.

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