Purpose: Major steps in the evolution of neurosurgical techniques include neuroendoscopy and its minimally invasive nature, as well as neuronavigation and advanced imaging. With traditional neuroendoscopic techniques, e.g. free-hand endoscopy or the use of mechanical arms, a definitive and controlled movement of the endoscope within the brain depended on the experience of an individual surgeon.

Method: With the precision robot "Evolution 1" (U.R.S. Universal Robot Systems, Schwerin, Germany) a new neurosurgical tool became available for the precise steering of instruments within the cranium. After preclinical anatomical studies the system was integrated into the neurosurgical operating room and used for different navigated neuroendoscopic procedures in seven patients (5 ventriculostomies, 1 pellucidotomy, 1 ventriculo-cystostomy).

Results: All robot-assisted navigated neuroendoscopic procedures were successfully completed. The time for the registration procedure and setup of the robot decreased from 60 min. for the first procedure down to 30 min.. The time for the surgical part of the endoscopic procedure itself ranged from 17 to 65 min.. During all procedures no complications occurred.

Conclusions: The use of robotic technology for neuroendoscopic procedures is a major step towards the controlled movement of the endoscope within the cranium. The start up procedure and calibration of the robot is still time consuming, but the real operation time is decreased because the steering of the endoscope is facilitated. The safety and precision of the endoscopic movements is noteworthy.