Hybrid neurosurgeon

A neurosurgeon who can perform two surgical procedures (Clipping- Coil), (Endoscopy-Microsurgery).

Simultaneous microscopic and endoscopic observation using dual monitors in a neurosurgical suite was ergonomically optimal for the surgeon to perform microsurgical procedures and to avoid traumatizing surrounding vessels or neural tissues. Hybrid microscopic-endoscopic neurosurgery may contribute to safe, less-invasive, and maximal resection to achieve better prognosis in children with craniopharyngioma [1)].

Vascular neurosurgeons today require a thorough understanding of the various intraoperative imaging modalities available for obtaining real-time information. Use of one or more of these modalities may improve the surgeon's confidence during the procedure, the patient's safety during surgery, and surgical outcome. The modern techniques discussed include 1) indocyanine green-based video angiography, which provides real-time information based on high-quality images showing the residual filling of vascular pathological entities and the patency of blood vessels of any size in the surgical field; and 2) intraoperative angiography, which remains the gold standard intraoperative diagnostic test in the surgical management of cerebral aneurysms and arteriovenous malformations. Hybrid procedures, providing multimodality image-guided surgeries and combining endovascular with microsurgical strategies within the same surgical session, have become feasible and safe. Microdoppler is a safe, noninvasive, and reliable technique for evaluation of hemodynamics of vessels in the surgical field, with the advantage of ease of use. Intraoperative MRI provides an effective navigation tool for cavernoma surgery, in addition to assessing the extent of resection during the procedure. Intraoperative CT scanning has the advantage of very high sensitivity to acute bleeding, thereby assisting in the confirmation of the extent of hematoma evacuation and the extent of vascular anomaly resection. Intraoperative ultrasound aids navigation and evacuation assessment during intracerebral hematoma evacuation surgeries. It supports the concept of minimally invasive surgery and has undergone extensive development in recent years, with the quality of ultrasound imaging having improved considerably. Image-guided therapy, combined with modern intraoperative imaging modalities, has changed the fundamentals of conventional vascular neurosurgery by presenting real-time visualization of both normal tissue and pathological entities. These imaging techniques are important adjuncts to the surgeon's standard surgical armamentarium. Familiarity with these imaging modalities may help the surgeon complete procedures with improved safety, efficiency, and clinical outcome [2)].

The impact of combined practices on the outcomes of unruptured intracranial aneurysm coiling remains an issue of debate.

Bekelis et al., investigated the association of combined open and endovascular expertise with the outcomes of unruptured cerebral aneurysm coiling.

Bekelis et al., performed a cohort study of 100% of Medicare fee-for-service claims data for elderly patients who underwent endovascular coiling for unruptured cerebral aneurysms between 2007 and 2012. To control for confounding, the authors used propensity score conditioning, with mixed effects to account for clustering at the hospital referral region level.

During the study period, there were 11,716 patients who underwent endovascular coiling for unruptured cerebral aneurysms and met the inclusion criteria. Of these, 1186 (10.1%) underwent treatment performed by hybrid neurosurgeons, and 10,530 (89.9%) by proceduralists who performed

only endovascular coiling. Multivariable regression analysis with propensity score adjustment demonstrated a lack of association of combined practice with 1-year postoperative mortality (OR 0.84; 95% CI 0.58-1.23), discharge to rehabilitation (OR 1.0; 95% CI 0.66-1.51), 30-day readmission rate (OR 1.07; 95% CI 0.83-1.38), and length of stay (adjusted difference, 0.41; 95% CI -0.26 to 1.09). Higher procedural volume was independently associated with improved outcomes.

In a cohort of Medicare patients, the authors did not demonstrate a difference in mortality, discharge to rehabilitation, readmission rate, and LOS between hybrid neurosurgeons and proceduralists performing only endovascular coiling [3] .

1)
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2)
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3)
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