Intrinsic brain tumor

Insular gliomas represent a unique category within intrinsic brain tumors in terms of their presentation and behavior [1].

During surgery for intrinsic brain lesions, it is important to distinguish the pathological gyrus from the surrounding normal sulci and gyri. This task is usually tedious because of the pia-arachnoid membranes with their arterial and venous complexes that obscure the underlying anatomy. Moreover, most tumors grow in the white matter without initially distorting the cortical anatomy, making their direct visualization more difficult.

Harput et al., used free computer software OsiriX (OsiriX Medical Imaging Software) that allowed us to create three-dimensional reconstructions of the cerebral surface with and without cortical vessels. These reconstructions made use of magnetic resonance images from 51 patients with neocortical supratentorial lesions operated on over a period of 21 months (from June 2011 to February 2013). The 3-D anatomical images were compared with the true surgical view to evaluate their accuracy. In all patients, the landmarks determined by 3-D reconstruction were cross-checked during surgery with high-resolution ultrasonography; in select cases, they were also checked with indocyanine green videoangiography.

The reconstructed neurovascular structures were confirmed intraoperatively in all patients. We found this technique to be extremely useful in achieving pure lesionectomy, as it defines tumor's borders precisely.

A 3-D reconstruction of the cortical surface can be easily created with free OsiriX software. This technique helps the surgeon perfect the mentally created 3-D picture of the tumor location to carry out cleaner, safer surgeries [2].

Differential diagnosis

Intrinsic brain tumors such as astrocytomas must be distinguished from other tumors of brain tissue. These include ependymomas, medulloblastomas, and oligodendrogliomas. These can usually be distinguished from each other using MRI imaging.

Surgery

Intrinsic brain tumor surgery.

1)
Yaşargil MG: Microneurosurgery. Stuggart: Georg Thieme Verlag, 1994
2)
Harput MV, Gonzalez-Lopez P, Türe U. Three-dimensional Reconstruction of the Topographical Cerebral Surface Anatomy for Pre-surgical Planning With Free OsiriX Software. Neurosurgery. 2014 Mar 21. [Epub ahead of print] PubMed PMID: 24662508.