Study identifies new way to biopsy brain tumors in real time

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A new miniature, hand-held microscope may allow more precise removal of brain tumors and an easier recognition of tumor locations during surgery.

Neurosurgeons at Barrow Neurological Institute at St. Joseph's Hospital and Medical Center are using the new miniature laser confocal microscope to view brain tumor regions during surgery and obtain digital images of the tumor and brain tissue. This was not previously possible without taking biopsies of the tissue.

The microscope is used to image the tissue after a fluorescent drug is injected into the patient and travels into the tumor. The first application of the technology in the research lab at Barrow showed that it was possible to distinguish cancer cells and the margin of the brain tumor without taking a biopsy. Barrow researchers also discovered that it was possible to obtain a digital video of the brain tumor to show blood flowing through the abnormal vessels of the tumor and the transition from normal to abnormal brain tissue.

Typically, intraoperative diagnosis is performed by obtaining several specimens from within a brain tumor using biopsy forceps and cutting, freezing and staining the specimen for examination under the microscope. The traditional analysis is limited by sampling error and by mechanical tissue damage from the biopsy forceps, slowing operative workflow by 30 to 40 minutes.

The new microscope can overcome these limitations by helping to visualize the cellular and tissue features of a tumor in real-time. As in the study, the probe can be moved over the entire visible extent of a tumor, guiding the neurosurgeon to hypercellular or aggressive areas that are likely to generate high-yield biopsies.

"As neuropathologists become familiar with the new confocal microscopic appearance of various tumor types and grades, the traditional intraoperative diagnosis may be replaced by the real-time analysis of confocal images by the new microscope," says Mark Preul, MD, Newsome Chair of Neurosurgery Research at Barrow. These images could be analyzed remotely, improving the accuracy of intraoperative diagnosis.

This study was presented at the Annual Meeting of the American Association of Neurological Surgeons in San Diego and was recently published in the *Journal of Neurosurgery.*

Source: St. Joseph's Hospital and Medical Center