New microscope is expected to improve accuracy of intraoperative diagnostics

A new miniature, hand-held microscope may allow more precise removal of brain tumours and a easier recognition of tumour locations during surgery.

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

The microscope is used to image the tissue after a fluorescent drug is injected into the patient and travels into the tumour. 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 tumour without taking a biopsy. Barrow researchers also discovered that it was possible to obtain a digital video of the brain tumour to show blooc flowing through the abnormal vessels of the tumour and the transition from normal to abnormal brain tissue

Overcoming limitations

Typically, intraoperative diagnosis is performed by obtaining several specimens from within a brain tumour using biopsy forceps and cutting, freezing and staining the specimen for examination under the microscop 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 feature of a tumour in real-time. As in the study, the probe can be moved over the entire visible extent of a tumour guiding the neurosurgeon to hypercellular or aggressive areas that are likely to generate high-yield biopsie

"As neuropathologists become familiar with the new confocal microscopic appearance of various tumour 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 Resear 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 Centre